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VL/MoEF/006/2023-007
May 31, 2023

The Director
I.A. Division
Ministry of Environment, Forest & Climate Change
Indira Paryavaran Bhawan
Jor Bagh Road
New Delhi-110003

Sub.: **Submission of Half Yearly Compliance Report and Environment Quality data of Smelter & CPP of Vedanta Limited, Jharsuguda for the period from October 2022 to March 2023**

Ref.: **1. Environment Clearance letter No. J-11011/144/2006-IA.II (I) dated 07.03.2007**
2. Environment Clearance letter No. J-13011/10/2006-IA.II (T) dated 14.03.2007
3. Environment Clearance letter No. J-11011/29/2007-IA.II (I) dated 11.06.2008
4. Environment Clearance letter No. J-11011/29/2007-IA.II (I) dated 05.05.2022

Dear Sir,

This has reference to the above subject and cited references. As per the provision of Environment Clearance and EIA notification 2006, we are herewith submitting the half yearly compliance status for conditions in the Environment Clearance for 2.5 LTPA Aluminium Smelter in **Annexure–1,** Captive Power Plant 675 MW in **Annexure–2**, expansion of Aluminium Smelter (2.5 to 16 LTPA) and Captive Power Plant (675 MW to 1350 MW) in **Annexure-3,** Aluminium Smelter 18 LTPA (16 to 18 LTPA) and Captive Power Plant in **Annexure-4** .The environment quality data including stack emission, ambient air quality, noise, water quality (surface, ground and industrial effluent), and soil analysis and forage fluoride in and around the plant premises is also submitted in **Annexure-5** for your records.

Thanking you,
Yours faithfully,
For Vedanta Limited

Dr. Amit Kumar Tyagi
Head- Environment

Encl.: Annexure 1,2,3,4 & 5

Copies to:
1. The Additional Director, Ministry of Environment, Forests & Climate Change, Regional Office, Odisha, Bhubaneswar
2. The Member Secretary, Central Pollution Control Board, New Delhi
3. The Member Secretary, State Pollution Control Board, Odisha, Bhubaneswar

GOVT. OF INDIA
MoEF & CC Integrated R.O.
Bhubaneswar-751023
01 JUN 2023
RECEIVED

VEDANTA LIMITED, JHARSUGUDA
Vill : Bhurkamunda, P. O. : Kalimandir, Dist. : Jharsuguda (Odisha) : 768202
T +91-664 566 6000 F +91-664 566 6267 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

O/C

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1. The Additional Director, Ministry of Environment, Forests & Climate Change, Regional Office, Odisha, Bhubaneswar
2. The Member Secretary, Central Pollution Control Board, New Delhi
3. The Member Secretary, State Pollution Control Board, Odisha, Bhubaneswar

Received
31/5/23

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CIN: L13209MH1965PLC291394

VEDANTA LIMITED, JHARSUGUDA

Compliance Status on

Environmental Clearance – 2.5 LTPA Smelter vide letter No. J-11011/144/2006-IA-II (I) dated 7th March 2007

Sl. No.	CONDITIONS	COMPLIANCE STATUS
SPECIFIC CONDITIONS		
1.	The gaseous emissions from various process units shall confirm 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. At no time the emissions level shall go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit shall not be restarted until the control measures are rectified to achieve the desired efficiency. The particulate emissions from the bake oven plant shall not exceed 50 mg/ NM^3.	Complied. The gaseous emissions from various process units are confirming to the prescribed standards. The particulate matter emission from Bake Oven ranges between 4.1 to 5.9 mg/Nm^3.
2.	Particulate fluoride emissions shall not be more than 0.65 mg/ NM^3 and fugitive particulate fluoride emissions from pot room shall not be more than 1.85 mg/ NM^3.	Complied. The particulate fluoride emission and fugitive particulate fluoride emission monitored were within 0.65 mg/ NM^3 and 1.85 mg/NM^3 respectively.
3.	In-plant, control measures for checking fugitive emissions from spillage /raw materials handling shall be provided. Fugitive fluoride emissions from the pot room and in the forage around the smelter complex shall be monitored and data submitted regularly to the Ministry's Regional Office at Bhubaneswar and OSPCB. Further dry scrubbing system to control the emissions from the pot lines shall be provided. Total fluoride emissions shall not exceed 0.8 kg/ton of Aluminium produced. Further, the pot emissions through fume treatment plant shall not exceed 0.30 kg/ ton of Aluminium produced.	Complied. Fume Treatment plants with dry scrubbing have been provided in the pot room and bake oven to control the fluoride emissions below 0.8 kg/T of Al. Pot emissions through FTP is within 0 30 kg/T of Al.
4.	The company shall install bag-filters, dry scrubbing system, dust suppression system to control the emissions from all melting and casting units. The emissions shall conform to the standards prescribed by the ministry /CPCB /SPCB whichever is more stringent.	Complied. The furnaces in the melting and casting unit are electrically operated and no fuel burning takes place. Provision of bag filters, dry scrubbing systems, dust suppression system has not been done.

5.	The poly-aromatic hydrocarbons (PAH) from the carbon plant (anode bake oven) shall not exceed 2 mg/Nm^3. The data on PAH shall be monitored quarterly and report submitted regularly to the Ministry, it's Regional Office at Bhubaneswar and OSPCB.	Complied. PAH is being monitored in the stack of Bake Oven and is found in the range of 0.16 to 0.23 mg/Nm^3. The same is monitored regularly and the report is submitted to the Regional office of the Ministry.
6.	Fluoride consumption shall be less than 10 kg/ton of Aluminium produced as specified in the CREP guidelines.	Being Complied. Efforts like Revamping of FTP is in full swing and procurement of low soda alumina and Digital AI based Modelling of Sp. fluoride has been initiated to reduce fluoride consumption. Till Mar'23 10.59 kg/T Al achieved.
7.	The spent pot lining generated from the smelter shall be properly treated by setting up of spent pot lining treatment plant to remove fluoride and cyanide and disposal off in secured landfill. The location and design of the landfill site shall be approved by the OSPCB as per Hazardous Wastes (Management and Handling) Rules, 2003. Leachate collection facilities shall be provided to the secured landfill facility (SLF). The dross shall be recycled in the cast house. Fly ash and bottom ash shall be disposed off in concentrate form to the ash pond shall be provided to the cement/ brick manufacturing unit. STP sludge shall be utilized as manure for green belt development. All the used oil and batteries should be sold to the authorized recyclers/ reprocessors.	Complied. SPL (Carbon) is being sent to authorized re-processor for detoxification and further utilization in steel and other industries. Further, SPL mixed fines is being sent to Cement industries for co-processing. Dross is being disposed to authorized re-processors.
8.	Regular groundwater monitoring shall be carried out by installing Peizometers all around the secured land fill site in consultation with the OSPCB / SGWB /CGWB and data submitted to the Ministry's Regional Office and OSPCB.	Complied. Piezometers have been installed and the ground water monitoring around the SLF area is being done as per the CPCB guidelines and the same is being reported to SPCB and Regional Office of the Ministry.
9.	The total water requirement from Hirakud Reservoir shall not exceed 6,240m^3/day as per the permission accorded by the State Govt. Reverse Osmosis plant shall be installed to treat effluent from cooling tower blow down and recycle to raw water reservoir for further utilization for fire protection, dust suppression, gardening etc. ETP and RO permeate will be recycled back. The rejects from the RO plant shall be disposed off in the HDPE lined secured landfill (SLF) within	Complied. Water drawal from Hirakud reservoir is within 6240 m^3/ day. However during monsoon period treated effluent post meeting the standards prescribed by OSPCB//CPCB is being discharged in case of exigency.

	smelter premises. Domestic effluent shall be treated in Sewage treatment Plant (STP). No effluent shall be discharged during the non-monsoon period and shall be discharged during monsoon period, only after proper treatment and meeting the norms of the OSPCB/CPCB.	
10.	Green belt of adequate width and density around the project site shall be developed in 117.5 ha (33%) out of total 355.47 ha. in consultation with the DFO as per the CPCB guidelines having density of 2000 trees/ ha.	Complied. Green belt/cover has been developed in 33% of the area (275 Ha) and density has been increased to 2500 trees/ha by doing gap filling.
11.	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	Complied. The periodic health check-up of the workers is being undertaken regularly. The same is also undertaken as a part of pre-employment medical examination and records being maintained as per Factories Act.
12.	The company shall develop rainwater structures to harvest the runoff water for recharge of groundwater in consultation with the Central Ground Water Authority /Board.	Complied. Roof top Rainwater Harvesting systems has been installed with capacity more than 10000 m3 and the same is being recycled back into the system.
13.	Rehabilitation and Resettlement Plan prepared and submitted to the state Govt. shall be implemented as per the R & R Policy of the State Government. All the recommendations mentioned in the R & R Plan shall be strictly followed including suitable employment and other facilities to all the oustees.	Complied. The R & R Package as finalized by the RPDAC based on Govt. R & R Policy 2006 is being implemented fully under the supervision of District Administration.
14.	The environmental clearance for the 675 MW captive power plant (5 X 135) from the Ministry shall be obtained before initiating construction work and operation of the proposed smelter plant.	Complied. We have received the Environmental Clearance for the 675 MW CPP vide letter no J-13011/10/2006-IA.II (T) dated 14th March, 2007.
15.	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium sector shall be strictly implemented.	Being complied. All recommendations as per CREP for Aluminium sector are being implemented **(Annexure-A).**
16.	Ministry of Environment and Forests shall regularly be informed about the source and quantity of bauxite ore produced from captive /indigenous /imported sources.	The main raw material for Smelting is alumina and not Bauxite. The source of Alumina is from our alumina refinery located at Lanjigarh and other imported sources.
17.	Bauxite ore shall be obtained only from those mines, which have been	Complied.

	accorded environmental clearance by the Ministry of Environment and Forests.	We are not procuring any bauxite ore as alumina is the main raw material for aluminum smelting. Alumina sourced within India is from refineries that have been granted Environment Clearance by MoEF&CC.
18.	Seven reserve forests are located around the project site. While transporting bauxite ore from captive /indigenous /import sources, prior permission from the State Forest Department shall be obtained due to likely impact of transport of ore to the smelter site on the reserve forests and wildlife.	Complied. This plant is not using bauxite ore. Alumina is being transported through existing rail and road networks through wagons and bulkers (which are closed containers).
19.	Recommendations regarding mitigative measures suggested by the State Forest Department and Chief Wildlife Warden, Govt. of Orissa shall be strictly followed.	Complied. The recommended mitigative measures as per the approved site - specific Wildlife conservation plan vide letter no. 4488/7WL-FD & WLC-32/2021 dated 30th April 2021 is under implementation.
20.	The forest and Environment Department, Govt. of Odisha shall undertake the carrying capacity of the region at the expense of the Project Proponents by associating the Wildlife Institute of India, Dehradun having regard to all relevant aspects including the impact of existing plants on elephants and their movement.	Complied. A study hac been carried out by IISc on establishing Elephant Corridor in Jharsuguda Sambalpur region of Odisha and no such establishment of corridor has been envisaged in Jharsuguda.
21.	In case the Govt. of Orissa comes up with the proposed elephant reserve, the same may be informed to the Ministry for imposing additional safeguards, if any.	Complied. In case of any upcoming/proposed elephant reserve by Govt. of Odisha, the same will be intimated to the Ministry.
GENERAL CONDITIONS		
1.	The project authorities must strictly adhere to the stipulations made by the Orissa State Pollution Control Board and the State Government.	Complied. We are strictly adhering to the stipulations made by OSPCB.
2.	No expansion or modification in the plant should be carried out without prior approval of the Ministry of Environment and Forests.	Complied. Noted.
3.	Adequate number of ambient air quality monitoring stations should be established in the downward direction as well as where maximum ground level concentration of SPM, SO_2 and NO_x are anticipated in consultation with the OSPCB. Data on ambient air quality and stack	Complied. Adequate no of AAQ monitoring stations have been established around the Smelter and CPP complex in consultation with OSPCB in line with the CPCB guidelines. Monitoring data is being submitted timely.

	emission should be regularly submitted to this Ministry including its Regional office at Bhubaneswar and Orissa State Pollution Control Board once in six months.	
4.	Industrial wastewater should 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 should be recycled in the plant as well as utilization for plantation purposes.	Complied. The wastewater generated from the plant is collected and treated in the effluent treatment plant to conform to the prescribed standards. The treated water is being recycled and reused in the plant.
5.	The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from OSPCB must be obtained for collection, storage, treatment and disposal of hazardous wastes.	Complied. We are strictly complying with the rules and regulations with regard to handling, collection, transport, treatment, storage and disposal of Hazardous waste in accordance with the HOWM Rules 2016.
6.	The overall noise levels in and around the plant area should 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).	The overall noise levels are being maintained below the stipulated standards as per EPA Rules, 1989. The ambient noise levels monitored are observed within 60.5 dB(A) to 73.6 dB(A) during day time and 53.60 dB(A) to 67.10 dB(A) in night time.
7.	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA / EMP / risk analysis and DMP report.	Complied. All environmental protection measures and safeguards as recommended in the EIA/EMP/risk analysis and DMP are being implemented.
8.	Rs. 193.46 Crores and Rs. 2.60 Crores have been earmarked toward the capital cost and Rs. 1.20 Crores towards the recurring the expenditure /annum for environmental protection measures. The fund so provided shall be used judiciously to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government. The funds so provided shall not be diverted for any other purposes.	Complied. The earmarked budget has been spent towards environmental protection measures and has not been diverted for any other purposes.
9.	The Regional office of this Ministry at Bhubaneswar / Central Pollution Control Board /OSPCB will monitor the stipulated	Complied. A six-monthly compliance report on the EC conditions along with the

	conditions. A six-monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.	environment monitoring report is being periodically submitted to the Ministry Regional Office, CPCB and SPCB.
10.	The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with State pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at http://enfor.nic.in This should be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one shall be in the vernacular language of the locality concerned and a copy of the same should be forwarded to the Regional Office.	Complied. The grant of EC has been published in two widely circulated local newspaper in English and Odia language within 7 days of issue of this letter. The same was made available in the website of MOEF & CC.
11.	The Project Authorities should inform the Regional Office as well as ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	Complied. The Regional Office has been informed about the final approval of the project.

VEDANTA LIMITED, JHARSUGUDA

Compliance Status on

Environmental Clearance – CPP 675 MW vide letter no. J-13011/10/2006-IA-II(T) dated 14th March 2007

Sl. No.	CONDITIONS	COMPLIANCE STATUS
1.	All the conditions stipulated by Orissa State Pollution Control Board vide their letter no. 8064/ ind-II-NOC-3633 dated 31.03.2006 shall be strictly implemented.	Complied. All the conditions stipulated by Odisha State Pollution Control Board vide their letter no. 8064/ ind-II-NOC-3633 dated 31.03.2006 has been implemented.
2.	The total land requirement shall not be exceed 233.92 ha for all the activities/ facilities of the power project put together.	Complied. The total land on which the Plant facilities of CPP has been set up within 233.92 ha.
3.	Ash and sulphur contents in the coal to be used in the project shall not exceed 41.6% and 0.5% respectively.	Complied. Ash and Sulphur content is within the limit as per notification.
4.	One multi-flue stack of 275 m height shall be provided with continuous online monitoring equipments. Exit velocity of at least 23.6 m/sec shall be maintained	Complied. One multi-flue stack of 275 m height with online monitoring system has been provided. Exit velocity of minimum 23.6 m/sec is being maintained.
5.	High efficiency Electrostatic Precipitators (ESPs) with efficiency not less than 99.9% shall be installed to insure that particulate emission does not exceed 100 mg/NM^3. It shall also be ensured that the AAQ levels in the notified ecologically sensitive areas including Reserve forests and Sanctuaries falling in the impact zone of the project do not exceed the prescribed standards for these areas.	Complied. ESPs with 99.9% efficiency have been provided. ESP's have been upgraded to hybrid ESP (ESP followed by bag filters) to control emissions below the stipulated limit of 50 mg/Nm^3.
6.	Space provision shall be made for Flue Gas De-sulphurisation (FGD) unit, if required at a later stage.	Complied. Necessary space has been earmarked for setting up of Flue Gas De-sulphurisation Plant (FGD).
7.	Closed Circuit Cooling system with Cooling Towers shall be provided. COC shall be optimized for ensuring water conservation.	Complied. Closed circuit cooling system with cooling towers (IDCT) has been provided and an optimum level of COC is being maintained as part of water conservation measures.
8.	Environmental clearance is subjected to obtaining clearance under the Wildlife (Protection) Act, 1972 from the Competent Authority.	The project does not fall either in a National Park or a Wildlife sanctuary. Wildlife (Protection) Act, 1972 is not applicable in our case.
9.	Environmental clearance is subject to final order of the Hon'ble	Complied. Not applicable at present

	Supreme Court of India in the matter of Goa Foundation Vs Union of India in Writ Petition (Civil) No. 460 of 2004 as may be applicable to this project.	
10.	A conservation plan for Schedule-I animals reported in the study area of the project, shall be prepared in consultation with an expert organization like Wildlife Institute of India at Dehradun and duly approved by State Wildlife Department of Orissa. A copy of the same shall be submitted to the Ministry and the regional Office at Bhubaneswar within six months of the date of issue of this letter. The plan so prepared shall be implemented effectively. Necessary allocation of funds for the same shall be made and will be included as project cost.	The site specific wildlife conservation plan has been approved by Chief Wildlife Warden, Odisha/PCCF (Wildlife) with an outlay of 610.894 lakhs earmarked for implementation over a period of 10 years.
11.	Adequate dust extraction such as bag filters and water spray system in dusty areas such as coal and ash handling areas, transfer areas and other vulnerable areas shall be provided.	Complied. Necessary dust extraction and dust suppression system such as rain guns, water sprinklers, mist cannons etc. have been provided to suppress/collect the dust generated in coal and ash handling areas.
12.	Fly ash shall be collected in dry form and ash generated shall be used in a phased manner as per provisions of the notification on Fly ash utilization issued by the ministry in September 1999 and its amendment. By the end of 9th year full fly ash utilization should be ensured. Unutilized ash shall be disposed off in the ash pond in the form of High Concentration Slurry.	Complied. Fly ash is being collected in dry form in silos for further utilization in Cement and brick manufacturing as per Fly Ash Notification. Balance ash is disposed in the ash pond through HCSD.
13.	Ash pond shall be lined with impervious lining to avoid leaching into ground water. Adequate safety measures shall also be taken so that pond ash does not become air borne to air pollution in the surrounding areas.	Complied. The ash pond has been lined with impervious HDPE lining to avoid any leaching in to ground water. High concentration slurry disposal system has been implemented.
14.	Rainwater harvesting shall be practiced. A detailed scheme for rainwater harvesting to recharge the groundwater aquifer shall be prepared in consultation with Central Ground Water Authority / State Ground Water Board and a copy of the same will be submitted within three months to the Ministry.	Complied. Roof Top Rain water harvesting facility has been installed at our site to utilize the collected rain water in our water system.
15.	The treated effluents conforming to the prescribed standards shall be re-circulated and reused within the plant. There shall be no discharge	Complied. The treated effluent is recycled and re-used within the plant for ash

	outside the plant boundary. In case of emergency, only 30 m^3/hr discharges from the plant may be done in the drain.	slurry preparation sprinkling in yard etc. In case of exigency treated waste water is discharged after meeting prescribed norms.
16.	Regular monitoring of groundwater in and around the ash pond area shall be carried out, records maintained, and quarterly reports shall be furnished to the Regional Office of this Ministry.	Complied. Regular monitroing of the ground water is being carried out regularly, records maintained and reports are submitted to Regional Office of this Ministry.
17.	A 50 m wide greenbelt shall be developed all along the plant and ash pond boundary covering 1/3rd of the total area.	Complied. Green belt/cover has been developed in 33% of the area (275 Ha) and density have been increased to 2500 trees/ha by doing gap filling.
18.	First aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.	Complied. First aid and sanitation facilities have been provided to all the drivers and contract workers in the construction phase.
19.	Leq of Noise level should be limited to 75 dBA and regular maintenance of equipment be undertaken. For people working in the high noise areas, personal protection devices should be provided.	Complied. The equipment procured are low noise generating and wherever the noise levels are on the higher side (turbines) enclosures have been provided to reduce the impact. Apart from these measures Personal Protective Equipment have been provided to all the personnel working in high noise areas. Periodic maintenance of the equipment is also being undertaken.
20.	Regular monitoring of the ambient air quality shall be carried out in and around the power plant and records maintained. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Quarterly reports shall be submitted to the Regional Office of this Ministry.	Complied. Regular monitoring of Ambient Air quality is being carried out in and around the power plant, records maintained and reports submitted timely to the Regional Office of this Ministry.
21.	The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned, informing that the project has been accorded environmental clearance and copies of clearance letters are available with the State Pollution Control Board/ Committee and may also be seen at the Website of the Ministry of Environment and Forests at http://envfor.nic.in.	Complied. The grant of EC has been published in two widely circulated local newspapers in English and Odia language. The clearance letter has been made available with OSPCB and displayed at MOEF CC website.
22.	A separate environment monitoring cell with suitable qualified staff	Complied.

	should be set up for implementation of the stipulated environmental safeguards.	A separate Environment Management Cell with qualified personnel is in place for implementation of environmental safeguards.
23.	Half yearly report on the status of implementation of the stipulated conditions and environmental safeguards should be submitted to this Ministry, Regional Office, CPCB and SPCB.	Complied. Half yearly report on the status of implementation of the conditions is being submitted to the Ministry, Regional office, CPCB and OSPCB regularly.
24.	Regional Office of the Ministry of Environment and Forests located at Bhubaneswar will monitor the implementation of the stipulated conditions. Complete set of Environmental Impact Assessment Report and Environmental Management Plan along with the additional information submitted from time to time shall be forwarded to the Regional Office for their use during monitoring.	Complied. Complete set of EIA & EMP along with all relevant information has been submitted to the Regional Office of the Ministry. Any additional information required will be provided from time to time.
25.	Separate funds should be allocated for implementation of environmental protection measures along with item-wise break-up. This cost should be included as part of the project cost. The funds earmarked for the environment protection measures should not be diverted for other purposes and year-wise expenditure should be reported to the ministry.	Complied. Separate fund has been allocated for implementation of the Environmental Protection measures and will not be diverted for other purposes.
26.	Full co-operation should be extended to the Scientists /officers from the Ministry/ Regional Office of the Ministry at Bhubaneswar / the CPCB /the SPCB who would be monitoring the compliance of environmental status.	Complied. We shall extend full co-operation to the scientists/ officers from the Ministry/ Regional Office/ CPCB and OSPCB who would be monitoring the compliance of Environmental status.

EC Conditions Six Monthly Compliance Report

(by Project Proponent)

Proposal No : J-11011/29/2007-IA-II (I)

1. Name of the Entity / Corporate Office :

File No. :	J-11011/29/2007-IA-II (I)	Proposal Name :	Expansion of Aluminium Smelter (2.5 to 16 LTPA) and Captive Power Plant (675 MW to 1.350 MW) at Bhurkamunda/Brundamal , Jharsuguda, Orissa by M/s Vedanta Aluminium Ltd. - Environment Clearance reg.
Date Of EC. :	11 Jun 2008	EC Letter :	PDF
Name of the Entity / Corporate Office :	VEDANTA LIMITED	Email Address :	meghna.ghosh@vedanta.co.in
Address :	Meghalahalli office Complex, Bheemasamudra post, Chitradurga	Mobile No :	9303134310

2. Proponent Details :

Proponent Name :	Sunil	Designation :	CEO
Telephone No :	6645-666634	Mobile No :	+91 9937535890
Fax No :	6645-6645666427	Email Address :	envvljsgsc@vedanta.co.in
Website :		Pin Code :	768202
State :	Orissa	District :	Jharsuguda
Village/Town :			

3. Compliance Letter/Report (Proponent):

Compliance Period :	2023 / 01 Jun (01 Oct - 31 March)	Compliance Submission Date :	31 May 2023 09:46:37:110
Remarks :			
Site Visit Report :	N/A	Site Visit Date :	N/A
ATR Report :	N/A	ATR Date :	N/A
Additional Attachment (If Any) :	N/A	Additional Remarks (If Any) :	

4. Summary Status of Compliance :

Total Condition :	62		
Complied :	57	Being Complied :	4
Not Complied :	0	Partially Complied :	1
Agreed to Comply :	0		

5. Details of Production and Project Area :

Date of Commencement of Project/Activity :	03 Jul 2008	Project Area as Per EC Granted (In Case of Mine Lease):	0
Actual Project Area(In Case of Mine Lease):	0		

PRODUCTION CAPACITY :

S.No	Name of the Product	Units	As per EC granted	Production during last financial year
1	Aluminium Metal	Tons per Annum (TPA)	1800000	1686697.138
2	Power CPP - 1215 (9x135)	MW	1215	9398846 MWH
3	Aluminium Metal	Tons per Annum (TPA)	1800000	1720728 T
4	Power CPP - 1215 (9x135)	MW	1215	8786887 MWH

6. Specific Conditions (Proponent) :

S.No	Condition	Self Declaration	Remarks / Reason	Supporting Documents	Observation of IRO
1	Particulate fluoride emissions shall not be more than 0.65 mg/Nm3 and fugitive particulate fluoride emissions from pot room shall not be more than 1.85 mg/Nm3.	Complied	The particulate fluoride emission and fugitive particulate fluoride emission monitored is within 0.65 mg/ NM3 and 1.85 mg/NM3 respectively	N/A	
2	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	Complied	Occupational health surveillance of the workers is being undertaken periodically and records maintained as per Factories Act.	N/A	
3	The poly-aromatic hydrocarbons (PAH) from the carbon plant (anode bake oven) shall not exceed 2 mg/Nm3. The data on PAH shall be monitored quarterly and report submitted regularly to the Ministry/Regional Office at Bhubaneswar and OSPCB.	Complied	PAH has been monitored in stacks of Bake Oven and is found in the range of 0.13 to 0.22 mg/Nm3. The same is being monitored periodically and report is submitted to the Regional office of the Ministry.	N/A	
4	In-plant control measures like fume extraction and dust extraction system for controlling fugitive emissions from all the material handling/transfer points shall be provided to control dust emissions. Fugitive Fluoride emissions from the pot room and in the forage around the smelter complex shall be monitored and data	Complied	We have provision of dry scrubbing system to maintain the total fluoride emissions below the standards. Monitoring is being undertaken and reports submitted to the Ministry's	N/A	

	submitted regularly to the Ministry's Regional Office at Bhubaneswar and OSPCB. Further dry scrubbing system to control the emissions from the pot lines shall be provided.		Regional Office and OSPCB		
5	No effluent shall be discharged outside the premises during the non-monsoon period and shall be discharged during the monsoon period only after proper treatment and meeting the norms of the OSPCB/CPCB.	Complied	There is no discharge of wastewater from the plant in non-monsoon season. However, in case of exigency, treated wastewater post meeting the standards is being discharged during monsoon period.	N/A	
6	Green belt of adequate width and density around the project site shall be developed in 33 % area in consultation with the DFO as per the CPCB guidelines having density of 2,000 trees/ha.	Complied	Green belt/cover has been developed in 33% of the area (275 Ha) and density have been increased to 2500 trees/ha by doing gap filling.	N/A	
7	As proposed, spent pot lining waste shall also be provided to cement and steel industries for further utilization.	Partially Complied	SPL Carbon portion is being sent to authorized re-processors for detoxification and further utilization in steel and cement industries.	N/A	
8	The company shall develop rainwater structures to harvest the runoff water for recharge of ground water in consultation with the Central Ground Water Authority/Board.	Complied	Roof Top Rain water harvesting systems have been installed in plant buildings for harvesting of runoff water and reuse back in the plant as recharge not permitted in red category industry as per CGWA	N/A	
9	Integrated Ash Management Plan shall be prepared for the utilization of fly ash as per Fly Ash Notification, 1999 as amended in 2003 and implemented. A copy of the plan shall be submitted to the Ministry's Regional Office. Fly ash shall be collected pneumatically in silos and used by cement and brick manufacturers for further utilization. Bottom Ash shall be disposed off in ash pond using high concentrated slurry disposal method.	Complied	Fly Ash is being collected pneumatically in silos for further utilization in cement & brick manufacturing as per Fly Ash Notification Dec 2021.Balance ash is being sent to ash ponds by HCSD system.	N/A	
10	Total water requirement for the expansion from Hirakud	Complied	Water drawl from Hirakud reservoir	N/A	

	Reservoir shall not exceed 2,580 m3/hr and prior permission for the existing and proposed expansion shall be obtained from the concerned department before commissioning of the plant. All the effluent including from cooling tower and de-mineralization plant shall be treated in the effluent treatment plant and treated effluent shall be recycled / reutilized in the process in the smelter and CPP and also for fire protection, dust suppression,		is within 2580 m3/hr. Treated Effluent post conforming to standard is used for further recycling and reuse in the plant for dust suppression, green belt development.		
11	Ministry of Environment and Forests shall regularly be informed about the source and quantity of Alumina procured from captive/indigenous/imported sources.	Complied	The source and quantity of alumina procured during April 2022 to September 22 is as below: Captive - 881 Kmt Indigenous - 53.7 Kmt Imported - 807 Kmt	N/A	
12	Rehabilitation and Resettlement (R & R) Plan prepared and submitted to the State Govt. shall be implemented as per the R & R Policy of the State Government. All the recommendations mentioned in the R & R Plan shall be strictly followed including suitable employment and other facilities to all the oustees.	Complied	The R & R package as finalized by RPDAC based on Govt. R & R policy 2006 is being implemented fully under the supervision of District Administration.	N/A	
13	The gaseous emissions (PM, SO2, NOX, PAH, HC, VOCs and Fluoride) 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. At no time, the emission levels shall go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit sh	Complied	The gaseous emissions from various process units are confirming to the prescribed standards. The particulate matter emission from Bake Oven ranges between 3.7 to 5.7 mg/Nm3.		
14	Prior permission from the State Forest Department shall be obtained due to likely impact of transport of raw material and end product and gaseous emissions from the smelter on the surrounding reserve forests and wildlife. Recommendations regarding mitigative measures suggested by the State Forest Department and Chief	Complied	Raw material and end products are transported through existing rail and road networks through wagons, bulkers and covered trucks. Recommendations as per approved wildlife plan is	N/A	

	Wildlife Warden, Govt. of Orissa shall be strictly followed.		under implementation.		
15	All the environmental conditions stipulated by the Ministry vide letter no. J-11011/144/2006- IA II (I) dated 7th March, 2007 for the Aluminium Smelter Plant (2,50,000 TPA) at Village Bhurkamunda / Brundamal, District Jharsuguda, Orissa by M/s Vedanta Aluminium Ltd. shall be satisfactorily be complied and regular compliance report submitted to the Ministry's Regional Office at Bhubaneswar.	Complied	All the environmental conditions stipulated for the Aluminium Smelter Plant (2.5 LTPA) are being complied and half yearly compliance report is being submitted to the Ministry's Regional Office.	N/A	
16	Alumina shall be obtained only from those refineries, which have been accorded environmental clearance by the Ministry of Environment and Forests.	Complied	We ensure that alumina is being sourced from own refinery or from refineries in India which have been accorded Environmental Clearance by MoEF&CC. We also import alumina from other countries.	N/A	
17	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium sector shall be strictly implemented.	Being Complied	All recommendations as per CREP for Aluminium sector are being implemented (Annexure-A).		
18	Electrostatic precipitator (ESP) will be provided to Captive Power Plant (CPP) to control emissions below 100 mg/Nm3. The company shall provide bag-filters, dry scrubbing system and dust suppression system to control the all the emissions including fluoride emissions from all melting and casting units. Tar, dust and fluoride in the fumes shall be controlled in baking furnace by providing dry scrubber. The emissions shall conform to the standards prescribed by the Ministry/CPCB/SPCB whichever is	Complied	Hybrid ESP's comprising of bag filters have been installed to maintain emission level below 50 mg/Nm3 in CPP. Bag-filters, dry scrubbing system and dust suppression system has been provided.	N/A	
19	Anode butts generated from the pots shall be cleaned and recycled to the Anode Plant. The spent pot lining generated from the smelter shall be properly treated in spent pot lining treatment plant to remove fluoride and cyanide and disposed off in secured landfill. The location and design of the landfill site shall be approved by the OSPCB as per Hazardous Wastes (Management and Handling)	Complied	Anode butts generated from the pots is being recycled in the Green Anode Plant. Dross is being recycled in the Cast house. STP sludge is utilized as manure.SPLCarbor is being sent to authorized re-pro	N/A	

	Rules, 2003. Leachate collection facilities shall be provided to the secured landfill facility (SLF). The dro				
20	Regular ground water monitoring shall be carried out by installing Peizometers all around the secured landfill site in consultation with the Orissa Pollution Control Board, Central Ground Water Authority and State Ground Water Board and data submitted to the Ministry's Regional Office and OSPCB.	Complied	Regular ground water monitoring is being carried out all around the secured landfill site and the data is being submitted to OSPCB and Regional Office of the Ministry.		
21	Fluoride consumption shall be less than 10 kg/ton of Aluminium produced as specified in the CREP guidelines.	Being Complied	Efforts are being taken to reduce Fluoride consumption. Revamping of FTP is in full swing and procurement of low soda alumina has also been initiated. Till Sep'22 10.54 kg/t of Al. achieved.	N/A	
22	Anode butts generated from the pots shall be cleaned and recycled to the Anode Plant. The spent pot lining generated from the smelter shall be properly treated in spent pot lining treatment plant to remove fluoride and cyanide and disposed off in secured landfill. The location and design of the landfill site shall be approved by the OSPCB as per Hazardous Wastes (Management and Handling) Rules, 2003. Leachate collection facilities shall be provided to the secured landfill facility (SLF). The dro	Complied	Anode butts generated from the pots is being recycled in the Green Anode Plant. Dross is being recycled in the Cast house. STP sludge is utilized as manure.SPLCarbor is being sent to authorized re-pro	N/A	
23	Fluoride consumption shall be less than 10 kg/ton of Aluminium produced as specified in the CREP guidelines.	Being Complied	Efforts like FTP revamping is in full swing & procurement of low soda alumina is in progress.Digital AI based modelling of Sp. fluoride consumption has been initiated.Till Mar'23 10.59 Kg/TAl achieved	N/A	
24	Electrostatic precipitator (ESP) will be provided to Captive Power Plant (CPP) to control emissions below 100 mg/Nm3. The company shall provide bag-filters, dry scrubbing system and dust suppression system to	Complied	Hybrid ESP's comprising of bag filters have been installed to maintain emission level below 50 mg/Nm3 in CPP.	N/A	

	control the all the emissions including fluoride emissions from all melting and casting units. Tar, dust and fluoride in the fumes shall be controlled in baking furnace by providing dry scrubber. The emissions shall conform to the standards prescribed by the Ministry/CPCB/SPCB whichever is		Bag-filters, dry scrubbing system and dust suppression system has been provided.		
25	Particulate fluoride emissions shall not be more than 0.65 mg/Nm3 and fugitive particulate fluoride emissions from pot room shall not be more than 1.85 mg/Nm3.	Complied	The particulate fluoride emission and fugitive particulate fluoride emission monitored is within 0.65 mg/ NM3 and 1.85 mg/NM3 respectively.	N/A	
26	The gaseous emissions (PM, SO2, NOX, PAH, HC, VOCs and Fluoride) 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. At no time, the emission levels shall go beyond the prescribed standards. In the event of failure of any pollution control system adopted by the unit, the respective unit sh	Complied	The gaseous emissions from various process units are confirming to the prescribed standards. The particulate matter emission from Bake Oven ranges between 4.1 to 5.9 mg/Nm3.		
27	Green belt of adequate width and density around the project site shall be developed in 33 % area in consultation with the DFO as per the CPCB guidelines having density of 2,000 trees/ha.	Complied	Green belt/cover has been developed in 33% of the area (275 Ha) and density have been increased to 2500 trees/ha by doing gap filling.	N/A	
28	The poly-aromatic hydrocarbons (PAH) from the carbon plant (anode bake oven) shall not exceed 2 mg/Nm3. The data on PAH shall be monitored quarterly and report submitted regularly to the Ministry/Regional Office at Bhubaneswar and OSPCB.	Complied	PAH is being monitored in the stacks of Bake Oven and is found in the range of 0.16 to 0.23 mg/Nm3. The same is monitored regularly and the report is submitted to the Regional office of the Ministry.	N/A	
29	Total water requirement for the expansion from Hirakud Reservoir shall not exceed 2,580 m3/hr and prior permission for the existing and proposed expansion shall be obtained from the concerned department before commissioning of the	Complied	Water drawl from Hirakud reservoir is within 2580 m3/hr. Treated effluent post confirming to the standards is used for recycling and reuse in the	N/A	

	plant. All the effluent including from cooling tower and de-mineralization plant shall be treated in the effluent treatment plant and treated effluent shall be recycled / reutilized in the process in the smelter and CPP and also for fire protection, dust suppression,		plant for dust suppression, green belt development.		
30	Occupational Health Surveillance of the workers should be done on a regular basis and records maintained as per the Factories Act.	Complied	Occupational health surveillance of the workers is being undertaken periodically and records maintained as per Factories Act.	N/A	
31	In-plant control measures like fume extraction and dust extraction system for controlling fugitive emissions from all the material handling/transfer points shall be provided to control dust emissions. Fugitive Fluoride emissions from the pot room and in the forage around the smelter complex shall be monitored and data submitted regularly to the Ministry's Regional Office at Bhubaneswar and OSPCB. Further dry scrubbing system to control the emissions from the pot lines shall be provided.	Complied	We have provision of dry scrubbing system to maintain the total fluoride emissions below the standards. Monitoring is being undertaken and reports submitted to the Ministry's Regional Office and OSPCB	N/A	
32	No effluent shall be discharged outside the premises during the non-monsoon period and shall be discharged during the monsoon period only after proper treatment and meeting the norms of the OSPCB/CPCB.	Complied	There is no discharge of wastewater from the plant in non-monsoon season. However, in case of exigency, treated wastewater post meeting the standards is being discharged during monsoon period.	N/A	
33	Regular ground water monitoring shall be carried out by installing Peizometers all around the secured landfill site in consultation with the Orissa Pollution Control Board, Central Ground Water Authority and State Ground Water Board and data submitted to the Ministry's Regional Office and OSPCB.	Complied	Regular ground water monitoring is being carried out all around the secured landfill site and the data is being submitted to OSPCB and Regional Office of the Ministry.		
34	Rehabilitation and Resettlement (R & R) Plan prepared and submitted to the State Govt. shall be implemented as per the R & R Policy of the State Government. All the recommendations mentioned	Complied	The R & R Package as finalized by RPDAC based on Govt. R&R policy 2006 is being implemented fully under the	N/A	

	in the R & R Plan shall be strictly followed including suitable employment and other facilities to all the oustees.		supervision of District Administration.		
35	The company shall develop rainwater structures to harvest the runoff water for recharge of ground water in consultation with the Central Ground Water Authority/Board.	Complied	Roof Top rain water harvesting systems have been installed in plant buildings for harvesting of runoff water and reuse back in the plant as recharge not permitted in red category industry as per CGWA.	N/A	
36	Integrated Ash Management Plan shall be prepared for the utilization of fly ash as per Fly Ash Notification, 1999 as amended in 2003 and implemented. A copy of the plan shall be submitted to the Ministry's Regional Office. Fly ash shall be collected pneumatically in silos and used by cement and brick manufacturers for further utilization. Bottom Ash shall be disposed off in ash pond using high concentrated slurry disposal method.	Complied	Fly Ash is being collected pneumatically in silos for further utilization in cement and brick manufacturing as per Fly Ash Notification. Balance ash is being sent to ash ponds by HCSD system.	N/A	
37	As proposed, spent pot lining waste shall also be provided to cement and steel industries for further utilization.	Complied	SPL Carbon portion is being sent to authorized re-processor for detoxification and further utilization in steel and cement industries.	N/A	
38	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium sector shall be strictly implemented.	Being Complied	All recommendations as per CREP for Aluminium sector are being implemented (Annexure-A).		
39	Alumina shall be obtained only from those refineries, which have been accorded environmental clearance by the Ministry of Environment and Forests.	Complied	We ensure that alumina is being sourced from own refinery or from refineries in India which have been accorded Environmental Clearance by MoEF&CC. We also import alumina from other countries.	N/A	
40	Ministry of Environment and Forests shall regularly be informed about the source and quantity of Alumina procured from	Complied	The source and quantity of alumina procured during October 2022 to March 2023 is as below.	N/A	

	captive/indigenous/imported sources.		Captive - 933 Kmt Indigenous - 83 Kmt Imported - 898 Kmt		
41	Prior permission from the State Forest Department shall be obtained due to likely impact of transport of raw material and end product and gaseous emissions from the smelter on the surrounding reserve forests and wildlife. Recommendations regarding mitigative measures suggested by the State Forest Department and Chief Wildlife Warden, Govt. of Orissa shall be strictly followed.	Complied	Raw material and end products are transported through existing rail and road networks through wagons, bulkers and covered trucks. Recommendations as per approved Wildlife plan is under implementation.	N/A	
42	All the environmental conditions stipulated by the Ministry vide letter no. J-11011/144/2006- IA II (I) dated 7th March, 2007 for the Aluminium Smelter Plant (2,50,000 TPA) at Village Bhurkamunda / Brundamal, District Jharsuguda, Orissa by M/s Vedanta Aluminium Ltd. shall be satisfactorily be complied and regular compliance report submitted to the Ministry's Regional Office at Bhubaneswar.	Complied	All the environmental conditions stipulated for the Aluminium Smelter Plant (2.5 LTPA) are being complied and half yearly compliance report is being submitted to the Ministry's Regional Office.	N/A	

7. General Conditions (Proponent) :

S.No	Condition	Self Declaration	Remarks / Reason	Supporting Documents	Observation of IRO
1	The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at http:/envfor.nic.in. This should be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one sh	Complied	Necessary advertisement with information as advised by the Ministry has been released in two local newspapers one in vernacular and one in English.	N/A	
2	The project authorities must strictly adhere to the stipulations made by the Orissa State Pollution Control Board and the State Government.	Complied	The stipulations of OSPCB and the State Government is being adhered to.	N/A	
3	The Regional Office of this Ministry at Bhubaneswar/Central Pollution Control Board/ OSPCB will monitor the	Complied	Half yearly report on the status of implementation of the conditions	N/A	

	stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.		is periodically being submitted to the Ministry's Regional Office and SPCB.		
4	No expansion or modification in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	Complied	No expansion or modernization will be undertaken without prior approval of the Ministry of Environment and Forests.	N/A	
5	Adequate number of ambient air quality monitoring stations should be established in the downward direction as well as where maximum ground level concentration of SPM, SO2 and NOX are anticipated in consultation with the OSPCB. Data on ambient air quality and stack emission should be regularly submitted to this Ministry including its Regional Office at Bhubaneswar and Orissa State Pollution Control Board once in six months.	Complied	AAQ stations have been fixed in consultation with OSPCB in the downwind direction for monitoring ground level concentration of SPM, SO2 and NOx and report of the same is being submitted regularly.	N/A	
6	The Project Authorities should inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	Complied	Funds for the proposed project is from internal sources, therefore financial closure is not applicable in this case.	N/A	
7	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA / EMP /risk analysis and DMP report.	Complied	All measures suggested in the EIA/ EMP/ risk analysis and DMP are being implemented.	N/A	
8	The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from the OSPCB must be obtained for collection, storage, treatment and disposal of hazardous wastes.	Complied	The rules and regulations as prescribed under the HOWM Rules 2016, is being complied. Authorization for collection, storage, treatment and disposal of hazardous wastes has been obtained from OSPCB.	N/A	
9	As proposed in EIA/EMP, Rs. 505.00 Crores earmarked toward the capital cost and recurring the expenditure/annum for environmental protection measures shall be used judiciously to implement the conditions stipulated by the	Complied	The budget earmarked for environmental protection measures have been utilized as proposed in EIA/EMP and has not been	N/A	

	Ministry of Environment and Forests as well as the State Government. The funds so provided shall not be diverted for any other purposes.		diverted for any other purposes.		
10	Industrial wastewater should 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 should be recycled in the plant as well as utilization for plantation purposes.	Complied	Industrial wastewater is collected, treated to confirm to the standards as prescribed from time to time. Treated effluent is recycled back into the plant for further utilization.	N/A	
11	The Project Proponent should inform the public that the project has been accorded environmental clearance by the Ministry and copies of the clearance letter are available with the State Pollution Control Board/ Committee and may also be seen at Website of the Ministry of Environment and Forests at http:/envfor.nic.in. This should be advertised within seven days from the date of issue of the clearance letter at least in two local newspapers that are widely circulated in the region of which one sh	Complied	Necessary advertisement with information as advised by the Ministry has been released in two local newspapers one in vernacular and one in English.	N/A	
12	As proposed in EIA/EMP, Rs. 505.00 Crores earmarked toward the capital cost and recurring the expenditure/annum for environmental protection measures shall be used judiciously to implement the conditions stipulated by the Ministry of Environment and Forests as well as the State Government. The funds so provided shall not be diverted for any other purposes.	Complied	The budget earmarked for environmental protection measures have been utilized as proposed in EIA/EMP/and has not been diverted for any other purposes.	N/A	
13	No expansion or modification in the plant shall be carried out without prior approval of the Ministry of Environment and Forests.	Complied	Noted.	N/A	
14	Industrial wastewater should 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 should be recycled in the plant as well as utilization for plantation purposes.	Complied	Industrial wastewater is collected, treated to confirm to the standards prescribed from time to time. Treated effluent is recycled back in to the plant for further utilization.	N/A	

15	The project proponent shall also comply with all the environmental protection measures and safeguards recommended in the EIA / EMP /risk analysis and DMP report.	Complied	All measures suggested in the EIA/ EMP/ risk analysis and DMP are being implemented.	N/A	
16	The Regional Office of this Ministry at Bhubaneswar/Central Pollution Control Board/ OSPCB will monitor the stipulated conditions. A six monthly compliance report and the monitored data along with statistical interpretation should be submitted to them regularly.	Complied	Half yearly report on the status of implementation of the conditions is periodically being submitted to the Ministry's Regional Office and SPCB.	N/A	
17	The project authorities must strictly comply with the rules and regulations with regard to handling and disposal of hazardous wastes in accordance with the Hazardous Wastes (Management and Handling) Rules, 2003. Authorization from the OSPCB must be obtained for collection, storage, treatment and disposal of hazardous wastes.	Complied	The rules and regulations as prescribed under the HOWM Rules 2016, is being complied. Authorization for collection, storage, treatment and disposal of hazardous wastes has been obtained from OSPCB.	N/A	
18	Adequate number of ambient air quality monitoring stations should be established in the downward direction as well as where maximum ground level concentration of SPM, SO2 and NOX are anticipated in consultation with the OSPCB. Data on ambient air quality and stack emission should be regularly submitted to this Ministry including its Regional Office at Bhubaneswar and Orissa State Pollution Control Board once in six months.	Complied	AAQ stations have been fixed in consultation with OSPCB in the downwind direction for monitoring ground level concentration of SPM, SO2 and NOx and report of the same is being submitted regularly.	PDF	
19	The Project Authorities should inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities and the date of commencing the land development work.	Complied	Noted.	N/A	
20	The project authorities must strictly adhere to the stipulations made by the Orissa State Pollution Control Board and the State Government.	Complied	noted	N/A	

☑ *I ' VEDANTA LIMITED ' hereby give undertaking that the specific / general condition is entered by me is correct.*

E-Sign
VEDANTA LIMITED
Date : 31 May 2023 09:46:37:110

**Note : N/A - Not Available

PRINT

EC Conditions Six Monthly Compliance Report

(by Project Proponent)

Proposal No : IA/OR/IND/236646/2017

1. Name of the Entity / Corporate Office :

File No. :	J-11011/29/2007-IA II(I)	Proposal Name :	Proposed Expansion of Aluminium Smelter Production Capacity from 16 LTPA to 18 LTPA, CPP 1215 MW
Date Of EC. :	05 May 2022	EC Letter :	PDF
Name of the Entity / Corporate Office :	VEDANTA LIMITED	Email Address :	meghna.ghosh@vedanta.co.in
Address :	Meghalahalli office Complex, Bheemasamudra post, Chitradurga	Mobile No :	9303134310

2. Proponent Details :

Proponent Name :	Sunil	Designation :	CEO
Telephone No :	6645-666634	Mobile No :	+91 9937535890
Fax No :	6645-6645666427	Email Address :	envvljsgsc@vedanta.co.in
Website :		Pin Code :	768202
State :	Orissa	District :	Jharsuguda
Village/Town :			

3. Compliance Letter/Report (Proponent):

Compliance Period :	2023 / 01 Jun (01 Oct - 31 March)	Compliance Submission Date :	31 May 2023 09:58:17:737
Remarks :			
Site Visit Report :	N/A	Site Visit Date :	N/A
ATR Report :	N/A	ATR Date :	N/A
Additional Attachment (If Any) :	N/A	Additional Remarks (If Any) :	

4. Summary Status of Compliance :

Total Condition :	132		
Complied :	122	Being Complied :	8
Not Complied :	0	Partially Complied :	0
Agreed to Comply :	2		

5. Details of Production and Project Area :

Date of Commencement of Project/Activity :	07 Mar 2008	Project Area as Per EC Granted (In Case of Mine Lease):	0
Actual Project Area(In Case of Mine Lease):	0		

PRODUCTION CAPACITY :

S.No	Name of the Product	Units	As per EC granted	Production during last financial year
1	Aluminium Metal	Tons per Annum (TPA)	1800000	1686697 T
2	Power CPP - 1215 (9x135)	MW	1215	9398846 MWH
3	Aluminium Metal	Tons per Annum (TPA)	1800000	1720728 T
4	Power CPP - 1215 (9x135)	MW	1215	8786887 MWH

6. Specific Conditions (Proponent) :

S.No	Condition	Self Declaration	Remarks / Reason	Supporting Documents	Observation of IRO
1	Dust Suppression measures such as water sprinkling through mobile tankers is being carried out especially during the dry season. Ash laden trucks are covered with tarpaulin to avoid spillage.	Complied	Water sprinkling is being done for dust suppression through mobile tankers and mobile mist canon has also been deployed to arrest fugitive emissions. Tarpaulin covering is being ensured for ash truck	N/A	
2	Particulate fluoride emissions shall not be more than 0.65 mg/Nm3 and fugitive particulate fluoride emissions from pot room shall not be more than 1.85 mg/Nm3.	Complied	The particulate fluoride emission and fugitive particulate fluoride emission monitored were within 0.65 mg/ NM3 and 1.85 mg/NM3 respectively.	N/A	
3	PM levels shall be less than 30 mg/Nm3 for all units under expansion. In case of older units, PP shall initiate retrofitting/modification action to achieve the PM emission level of 30 mg/Nm3 by October, 2024.	Complied	PM levels are within the stipulated standards.	N/A	
4	Present stock of SPL carbon (36320 T) and legacy SPL stock shall be liquidated by Sep, 2023 as committed.	Complied	Around 11383 MT of SPL Carbon has been disposed till Sept 2022.	N/A	
5	Regular monitoring of Air, Water & Soil quality shall be carried out in the Ash Pond area.	Complied	The monitoring of Air , water and soil quality is being carried out regularly in the Ash Pond Areas.		
6	PP shall utilize 100% ash as per Fly Ash Notification 2021 and its subsequent amendments. Further, legacy ash shall be utilized	Complied	As per Fly ash notification, more than 100 % ash utilized along with legacy ash till Sep'22.	N/A	

	completely by 31/05/2027 as committed by PP.				
7	Performance monitoring of pollution control equipment shall be taken up yearly and compliance status in this regard shall be reported to RO.	Complied	Study is in progress by NIT Rourekela and report will be submitted within the timeline.	N/A	
8	The major emissions are from the pot room roof. The sampling frequency should be increased, and sampling is done at multiple locations. The laser-based advance technology shall be adopted to continuously monitor gaseous fluoride emissions from pot rooms on real time basis by March, 2023.	Complied	Laser Based continuous online monitoring system has been installed and commissioned at all the potrooms to monitor gaseous fluoride emissions.	N/A	
9	The area of sampling and analysis of fluoride in soil and forage should extend up to 10 kilometers radius of plant premises covering upwind and downwind directions. Further, fluoride sampling and analysis should be taken quarterly at the nearest irrigated lands growing crops, vegetables, and other products of human consumption.	Complied	Sampling and analysis of fluoride in soil and forage has been extended up to 10 Kilometers radius covering upwind and downwind directions.Reports are regularly being submitted to the statutory bodies.	N/A	
10	Three tier Green Belt shall be developed in a time frame of one year covering 33% of total area with native species all along the periphery of the project site of adequate width and tree density shall not be less than 2500 per ha. Survival rate of green belt developed shall be monitored on periodic basis to ensure that damaged plants are replaced with new plants in the subsequent years. This shall include development of green belt of 50 width from the project site towards the Jharsuguda village	Complied	Study is in progress by IIT, Bhubaneswar and reclaiming and plantation will be carried out based on the recommendation of the report.We have communicated DFO , Jharsuguda for the allocation of land.	N/A	
11	The poly-aromatic hydrocarbons (PAH) from the carbon plant (anode bake oven) shall not exceed 2 mg/Nm3. The data on PAH shall be monitored quarterly and report shall be submitted regularly to the Ministry/Regional Office at Bhubaneshwar and Odisha Pollution Control Board.	Complied	PAH is being monitored in the stack of Bake Oven and is found in the range of 0.16 to 0.23 mg/Nm3. The same is monitored and report is submitted to the Regional office of the Ministry and OSPCB.		
12	Wastes shall be sent to RAMKY TSDF located at Sukinda. Further, waste disposed in this SLF shall be evacuated and disposed to	Complied	H.wastes such as SBD,drain cleaning Sludge, H.k waste , ETP Sludge etc. are	N/A	

	authorized agency for detoxification as committed by PP.		being sent to RAMKY TSDF. SPL disposed in the SLF has been evacuated and disposed to authorized agency for detoxification.		
13	PP shall use Roof Top Rainwater Harvesting systems with a total capacity of around 10000 m3 of rainwater and re-use the water in the plant.	Complied	Roof top Rainwater Harvesting systems has been installed with capacity more than 10000 m3 and the same is being recycled back into the system.	N/A	
14	Refractory SPL stock (40000 T) stored in covered shed on concrete floors shall be disposed of Dec, 2025 as committed.	Complied	SPL refractory is being stored on concrete floors in covered shed till an approved disposal mechanism is in place.	N/A	
15	The project proponent shall abide by all orders and judicial pronouncements, made from time to time in OA No. 10/2021/EZ pending before the National Green Tribunal (NGT), Eastern Zone, Kolkata	Complied	ll the orders and judicial pronouncements by NGT in the OA No. 10/2021/EZ has been complied with.	N/A	
16	A nallah is passing through the project site, PP shall maintain the nallah in its natural form and provide the green buffer zone of 10 m on both side of the nallah.	Complied	Nallah is maintained in its natural form however we have engaged third party to conduct study which is under progress.	N/A	
17	Wheel Washing mechanism shall be provided in entry and exit gates with complete water recirculation system.	Complied	Wheel washing system has been provided at the main entry and exit gate with water recirculation system.	N/A	
18	Greening and Paving shall be implemented in the plant area to arrest soil erosion and dust pollution from exposed soil surface.	Complied	Greening and Paving has been implemented in the plant area to arrest soil erosion and dust pollution from exposed soil surface.	N/A	
19	The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report to the concerned	Being Complied	Recommedation of Wild Life Conservation Plan has been implemented at site however few recommendations which has to be implemented by DFO is in progress.	N/A	

	Regional Office of the MoEF&CC.		Implementation report from DFO is awaited.		
20	Project proponent shall maintain the Fluoride consumption less than 10 kg/tone of Aluminium production by April, 2022 and reduce further at 8.0 kg/t by April, 2023 as committed by PP.	Being Complied	Efforts are being taken to reduce Fluoride consumption. Revamping of FTP is in full swing and procurement of low soda alumina has also been initiated. Till Sep'22 10.54 kg/t of Al. achieved.	N/A	
21	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium sector shall be strictly implemented.	Being Complied	The recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium sector is being implemented at site.	PDF	
22	The project proponent shall abide by all orders and judicial pronouncements, made from time to time in OA No. 10/2021/EZ pending before the National Green Tribunal (NGT), Eastern Zone, Kolkata	Complied	All the orders and judicial pronouncements by NGT in the OA No. 10/2021/EZ has been complied with.	N/A	
23	PP shall utilize 100% ash as per Fly Ash Notification 2021 and its subsequent amendments. Further, legacy ash shall be utilized completely by 31/05/2027 as committed by PP.	Complied	As per Fly ash notification, more than 106 % ash utilized along with legacy ash in FY 2023.	N/A	
24	Three tier Green Belt shall be developed in a time frame of one year covering 33% of total area with native species all along the periphery of the project site of adequate width and tree density shall not be less than 2500 per ha. Survival rate of green belt developed shall be monitored on periodic basis to ensure that damaged plants are replaced with new plants in the subsequent years. This shall include development of green belt of 50 width from the project site towards the Jharsuguda village	Complied	Green cover on reclaimed ash ponds has been completed and certificate issued by OSPCB.We have already communicated DFO , Jharsuguda for the allocation of land for plantation.	N/A	
25	Project proponent shall maintain the Fluoride consumption less than 10 kg/tone of Aluminium production by April, 2022 and reduce further at 8.0	Being Complied	Efforts like Revamping of FTP in full swing and procurement of low soda alumina andDigital AI	N/A	

	kg/t by April, 2023 as committed by PP.		based Modelling of Sp.fl.has been initiated to reduce fluoride consumption.Till Mar'23 10.6 kg/tAl achievd		
26	All the recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium sector shall be strictly implemented.	Being Complied	The recommendations made in the Charter on Corporate Responsibility for Environment Protection (CREP) for the Aluminium sector is being implemented at site.	PDF	
27	Performance monitoring of pollution control equipment shall be taken up yearly and compliance status in this regard shall be reported to RO.	Complied	Performance monitoring of pollution control equipment has been completed and report submitted to Board vide letter no. VL/OPCB/002/202 049 dated 28th Feb 2023.	N/A	
28	A nallah is passing through the project site, PP shall maintain the nallah in its natural form and provide the green buffer zone of 10 m on both side of the nallah.	Complied	Nallah is maintained in its natural form, third party draft report finalisation is under progress.	N/A	
29	Particulate fluoride emissions shall not be more than 0.65 mg/Nm3 and fugitive particulate fluoride emissions from pot room shall not be more than 1.85 mg/Nm3.	Complied	The particulate fluoride emission and fugitive particulate fluoride emission monitored were within 0.65 mg/ NM3 and 1.85 mg/NM3 respectively.	N/A	
30	Refractory SPL stock (40000 T) stored in covered shed on concrete floors shall be disposed of Dec, 2025 as committed.	Complied	SPL refractory is being stored on concrete floors in covered shed.	N/A	
31	Regular monitoring of Air, Water & Soil quality shall be carried out in the Ash Pond area.	Complied	The monitoring of Air , water and soil quality is being carried out regularly in the Ash Pond Areas.	PDF	
32	Dust Suppression measures such as water sprinkling through mobile tankers is being carried out especially during the dry season. Ash laden trucks are covered with tarpaulin to avoid spillage.	Complied	Water sprinkling is being done for dust suppression through mobile tankers and mobile mist canon has also been deployed to arrest fugitive	N/A	

			emissions. Tarpaulin covering is being ensured for ash trucks		
33	PP shall use Roof Top Rainwater Harvesting systems with a total capacity of around 10000 m3 of rainwater and re-use the water in the plant.	Complied	Roof top Rainwater Harvesting systems has been installed with capacity more than 10000 m3 and the same is being recycled back into the system.	N/A	
34	The poly-aromatic hydrocarbons (PAH) from the carbon plant (anode bake oven) shall not exceed 2 mg/Nm3. The data on PAH shall be monitored quarterly and report shall be submitted regularly to the Ministry/Regional Office at Bhubaneshwar and Odisha Pollution Control Board.	Complied	PAH is being monitored in the stack of Bake Oven and is found in the range of 0.16 to 0.23 mg/Nm3. The same is monitored and report is submitted to the Regional office of the Ministry and OSPCB.	PDF	
35	PM levels shall be less than 30 mg/Nm3 for all units under expansion. In case of older units, PP shall initiate retrofitting/modification action to achieve the PM emission level of 30 mg/Nm3 by October, 2024.	Complied	PM levels are within the stipulated standards.	N/A	
36	Wastes shall be sent to RAMKY TSDF located at Sukinda. Further, waste disposed in this SLF shall be evacuated and disposed to authorized agency for detoxification as committed by PP.	Complied	H. wastes such as SBD, Drain Cleaning Sludge, HK waste, ETP Sludge etc. are being sent to RAMKY TSDF. SPL disposed in the SLF has been evacuated and disposed to authorized agency for detoxification.	N/A	
37	Greening and Paving shall be implemented in the plant area to arrest soil erosion and dust pollution from exposed soil surface.	Complied	Greening and Paving has been implemented in the plant area to arrest soil erosion and dust pollution from exposed soil surface.	N/A	
38	Wheel Washing mechanism shall be provided in entry and exit gates with complete water recirculation system.	Complied	Wheel washing system has been provided at the main entry and exit gate with water recirculation system.	N/A	
39	The major emissions are from the pot room roof. The sampling frequency should	Complied	Laser Based continuous online monitoring	N/A	

	be increased, and sampling is done at multiple locations. The laser-based advance technology shall be adopted to continuously monitor gaseous fluoride emissions from pot rooms on real time basis by March, 2023.		system has been installed and commissioned at all the potrooms to monitor gaseous fluoride emissions.		
40	The area of sampling and analysis of fluoride in soil and forage should extend up to 10 kilometers radius of plant premises covering upwind and downwind directions. Further, fluoride sampling and analysis should be taken quarterly at the nearest irrigated lands growing crops, vegetables, and other products of human consumption.	Complied	Sampling and analysis of fluoride in soil and forage has been extended up to 10 Kilometers radius covering upwind and downwind directions .Reports are regularly being submitted to the statutory bodies	PDF	
41	The recommendations of the approved Site-Specific Conservation Plan / Wildlife Management Plan shall be implemented in consultation with the State Forest Department. The implementation report shall be furnished along with the six-monthly compliance report to the concerned Regional Office of the MoEF&CC.	Being Complied	Recommendation of Wild Life Conservation Plan has been implemented at site however few recommendations which has to be implemented by DFO is in progress. Implementation report from DFO is awaited.	N/A	
42	Present stock of SPL carbon (36320 T) and legacy SPL stock shall be liquidated by Sep, 2023 as committed.	Complied	21684 MT of SPL Carbon has been disposed in FY 2023.	N/A	

7. General Conditions (Proponent) :

S.No	Condition	Self Declaration	Remarks / Reason	Supporting Documents	Observation of IRO
1	Project proponent shall submit a study report on De-carbonization program, which would essentially consist of company's carbon emissions, carbon budgeting/ balancing, carbon sequestration activities and carbon capture, use and storage and offsetting strategies. Further, the report shall also contain time bound action plan to reduce its carbon intensity of its operations and supply chains, energy transition pathway from fossil fuels to Renewable energy etc. All these activities/ assessments shoul	Complied	Study is in progress and the report will be submitted to authority.	N/A	
2	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend	Agreed to Comply	Agreed. Full cooperation will be extended to the Regional Office by	N/A	

	full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.		furnishing with the requisite data/information/ reports from time to time.		
3	The project proponent shall provide wind shelter fence and chemical spraying on the raw material stock piles;	Complied	We have installed mist canon and fixed rain guns at Coal Handling Plant to arrest fugitive emissions.	N/A	
4	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Complied	No such appeal against this EC with the NGT within a period of 30 days as prescribed.	N/A	
5	Ventilation system shall be designed for adequate air changes as per the prevailing norms for all tunnels, motor houses, and cement bagging plants.	Complied	The plant has been designed with proper ventilation systems.	N/A	
6	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	Complied	No expansion or modification will be carried out without prior approval of MoEF&CC.	N/A	
7	Garland drains and collection pits shall be provided for each stock pile to arrest the runoff in the event of heavy rains and to check the water pollution due to surface run off.	Complied	A detailed Surface run off management study has been conducted and will be implemented in phases.	N/A	
8	The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognized under Environment (Protection) Act, 1986.	Complied	Fugitive emissions in the plant premises are being monitored every quarter through recognized labs.	N/A	
9	The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.	Complied	The Regional Office has been informed about the final approval of the project.	N/A	
10	The project proponent shall provide leakage detection and mechanized bag cleaning facilities for better maintenance of bags.	Complied	Leakage Detection and Mechanized bag cleaning facilities have been provided for maintenance of bags.	N/A	
11	Make efforts to increase the life of pot lining through better construction and operating techniques.	Complied	Efforts are being taken to increase the pot life with better operational	N/A	

			practices & installation of graphitized cathode.		
12	The project proponent shall ensure covered transportation and conveying of ore, coal and other raw material to prevent spillage and dust generation; Use closed bulkers for carrying fly ash;	Complied	Coal, other raw material and fly ash are being transported and conveyed in covered trucks and railway rakes.	N/A	
13	The project proponent shall provide waste heat recovery system (pre-heating of combustion air) at the flue gases.	Complied	Waste Heat recovery systems such as rotary APH (air preheater) for flue gas heat recovery already incorporated in Captive Power Plant.	N/A	
14	Provide solar power generation on roof tops of buildings, for solar light system for all common areas, streetlights, parking around project area and maintain the same regularly;	Complied	One Rooftop Solar project of 10 KWH implemented in plant premises. Further, Solar projects implementation is under progress.	N/A	
15	Water meters shall be provided at the inlet to all unit processes in the cement plant.	Complied	Water meters has been provided at the inlet of the unit processes.	N/A	
16	Practice use of low-Sulphur tars for baking anodes.	Complied	Low Sulphur tar is being used for making anodes.	N/A	
17	Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.	Complied	Sewage Treatment Plant is in place for the treatment of domestic wastewater.	N/A	
18	Sufficient number of mobile or stationery vacuum cleaners shall be provided to clean plant roads, shop floors, roofs, regularly.	Complied	Vacuum Cleaners (both mobile and stationery) have been provided to clean plant roads, shop floors etc.	N/A	
19	Design the pot roofs with louvers and roof ventilators	Complied	Louvers with roof ventilators have been provided in the potrooms.	N/A	
20	The project proponent shall make efforts to minimize water consumption in the cement plant complex by segregation of used water, practicing cascade use and by recycling treated water.	Complied	The water consumption of the Smelter and power plants are being monitored on a regular basis and treated water is being recycled back into the system to the maximum extent possible.	N/A	
21	The project proponent shall monitor regularly ground	Complied	Regular ground water monitoring	N/A	

	water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognised under Environment (Protection) Act, 1986 and NABL accredited laboratories.		is being carried out all around the secured landfill site and the data is being submitted to OSPCB and Regional Office of the Ministry.		
22	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.	Complied	The copies of the environmental clearance has been submitted to the Heads of local bodies, Panchayats, Municipal Bodies and relevant Govt. Offices vide Letter No. VL/PH/007/2022-001 dated 14.05.2022.	N/A	
23	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the Programme for reduction of the same including carbon sequestration including plantation.	Complied	Study is in progress and the report will be submitted to authority.	N/A	
24	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.	Complied	Separate Environmental Cell with required qualified personnel is in place reporting directly to the Unit Head.	N/A	
25	Used refractories shall be recycled.	Agreed to Comply	Noted	N/A	
26	Provide LED lights in their offices and residential areas.	Complied	LED lights have been provided in the offices as well as residential areas.	N/A	
27	Oily scum and metallic sludge recovered from ETP shall be mixed, dried, and briquetted and reused.	Complied	ETP sludge is being disposed off to Common Hazardous Waste TSDF at Sukinda, Dist - Jajpur.	N/A	
28	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.	Complied	Emergency Preparedness Plan based on the HIRA is being implemented at site. Mock Drills are being conducted on regular basis.	N/A	
29	Adopt measures to recover fluoride gas from electrolytic cells and recycle the same in the process.	Complied	Fluoride gas from electrolytic cells are being captured through Fume Treatment Plants installed in Smelter Plants	N/A	

			and recycled back into the system.		
30	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project proponent's website permanently.	Complied	The grant of EC of the expansion project has been published in two widely circulated newspaper. The Samaja- 11th May 2022 (Odia) Orissa Post - 11th May 2022 (English)	N/A	
31	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/viola of the environmental / forest / wildlife norms / conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest / wildlife norms / conditions and /or sharehol	Complied	Environmental Policy is in place. We have a defined system of reporting the deviations if any.	N/A	
32	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.	Complied	Compliance to the stipulated EC conditions including results of monitored data are being uploaded on half yearly basis.		
33	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.	Complied	Six monthly compliance reports are being uploaded on portal.	N/A	
34	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.	Complied	Agreed.	N/A	
35	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the	Complied	Agreed	N/A	

	provisions of Environment (Protection) Act, 1986.				
36	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.	Complied	Environment Statement has been submitted on 26.09.2022 and uploaded on website.	N/A	
37	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory	Complied	Agreed.	N/A	
38	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.	Complied	Agreed.	N/A	
39	The Environment Clearance (EC) granted to the project/ activity is strictly under the provisions of the EIA Notification, 2006 and its amendments issued from time to time. It does not tantamount/ construe to approvals/ consent/ permissions etc., required to be obtained or standards/conditions to be followed under any other Acts/Rules/Subordinate legislations, etc., as may be applicable to the project.	Complied	Agreed.	N/A	
40	The project proponent shall monitor the criteria pollutants level namely; PM10, SO2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.	Complied	Agreed.	N/A	
41	Occupational health surveillance of the workers shall be done on a regular basis and records maintained.	Complied	Occupational Health Surveillance of the workers is being done on a regular basis and records are being maintained.	N/A	
42	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal	Complied	Heat stress analysis is being carried out as per the expert advice.	N/A	

	Protection Equipment (PPE) as per the norms.				
43	The project proponent shall comply with the provisions contained in this Ministry's OM vide F.No. 22-65/2017-IA.III dated 30/09/2020. As part of Corporate Environment Responsibility (CER) activity, company shall adopt nearby villages based on the socio-economic survey and undertake community developmental activities in consultation with the village Panchayat and the District Administration as committed.	Being Complied	CSR activities are under full swing and we had a word with local authorities to make model villages.	N/A	
44	The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 (G.S.R 742 (E) dated 30thAugust 1990 and further amended vide G.S.R 46 (E) dated 3rd February 2006(Aluminium); S.O. 3305 (E) dated 7th December 2015(Thermal Power Plants) as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through	Complied	Continuous effluent monitoring systems has already been installed and connected to SPCB and CPCB servers.	N/A	
45	The project proponent shall install 24x7 Continuous Emission Monitoring System (CEMS) at process stacks to monitor stack emission as well as 4 Nos. Continuous Ambient Air Quality Station (CAAQS) for monitoring AAQ parameters with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time. The CEMS and CAAQMS shall be connected to SPCB and CPCB online servers and calibrate these systems from time to time according to equipment supplier specification throug	Complied	Continuous Emission Monitoring System has been installed and connected to SPCB and CPCB servers.	N/A	
46	The project proponent shall prepare GHG emissions inventory for the plant and shall submit the Programme for reduction of the same including carbon sequestration including plantation.	Complied	Draft study report finalization is in progress and will be submitted to authority.	N/A	
47	The project proponent shall comply with the provisions contained in this Ministry's OM vide F.No. 22-65/2017-IA.III dated 30/09/2020. As part of Corporate Environment Responsibility	Being Complied	CSR activities are under full swing and opportunities have been explored through various competent	N/A	

	(CER) activity, company shall adopt nearby villages based on the socio-economic survey and undertake community developmental activities in consultation with the village Panchayat and the District Administration as committed.		agencies to make model village.		
48	The project proponent shall carry out heat stress analysis for the workmen who work in high temperature work zone and provide Personal Protection Equipment (PPE) as per the norms.	Complied	Complied.	N/A	
49	A separate Environmental Cell both at the project and company head quarter level, with qualified personnel shall be set up under the control of senior Executive, who will directly to the head of the organization.	Complied	Separate Environmental Cell is in place with required qualified personnel and Head of Environment is reporting directly to the Unit Head (CEO).	N/A	
50	Used refractories shall be recycled.	Complied	Noted	N/A	
51	Project proponent shall submit a study report on De-carbonization program, which would essentially consist of company's carbon emissions, carbon budgeting/ balancing, carbon sequestration activities and carbon capture, use and storage and offsetting strategies. Further, the report shall also contain time bound action plan to reduce its carbon intensity of its operations and supply chains, energy transition pathway from fossil fuels to Renewable energy etc. All these activities/ assessments shoul	Complied	Draft study report finalization is in progress and will be submitted to authority.	N/A	
52	The copies of the environmental clearance shall be submitted by the project proponents to the Heads of local bodies, Panchayats and Municipal Bodies in addition to the relevant offices of the Government who in turn has to display the same for 30 days from the date of receipt.	Complied	The copies of the environmental clearance have been submitted to the Heads of local bodies, Panchayats, Municipal Bodies and relevant Govt. Offices vide Letter No. VL/PH/007/2022-001 dated 14.05.2022.	N/A	
53	Occupational health surveillance of the workers shall be done on a regular basis and records maintained.	Complied	Occupational Health Surveillance of the workers is being done on a regular basis and records are being maintained.	N/A	

54	The project proponent shall submit six-monthly reports on the status of the compliance of the stipulated environmental conditions on the website of the ministry of Environment, Forest and Climate Change at environment clearance portal.	Complied	Noted.	N/A	
55	The company shall have a well laid down environmental policy duly approve by the Board of Directors. The environmental policy should prescribe for standard operating procedures to have proper checks and balances and to bring into focus any infringements/deviation/viola of the environmental / forest / wildlife norms / conditions. The company shall have defined system of reporting infringements / deviation / violation of the environmental / forest / wildlife norms / conditions and /or sharehol	Complied	HSE Policy is in place. We have a defined system of reporting the deviations if any.	N/A	
56	The project proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of monitored data on their website and update the same on half-yearly basis.	Complied	Noted.	N/A	
57	The project proponent shall monitor the criteria pollutants level namely; PM10, SO2, NOx (ambient levels as well as stack emissions) or critical sectoral parameters, indicated for the projects and display the same at a convenient location for disclosure to the public and put on the website of the company.	Complied	Noted	N/A	
58	Oily scum and metallic sludge recovered from ETP shall be mixed, dried, and briquetted and reused.	Complied	ETP sludge is being disposed off to Common Hazardous Waste TSDF at Sukinda, Dist - Jajpur.	N/A	
59	The project proponent shall make public the environmental clearance granted for their project along with the environmental conditions and safeguards at their cost by prominently advertising it at least in two local newspapers of the District or State, of which one shall be in the vernacular language within seven days and in addition this shall also be displayed in the project	Complied	The grant of EC of the expansion project has been published in two widely circulated newspaper. The Samaja-11th May 2022(Odia),Orissa Post - 11th May 2022 (English)	N/A	

	proponent's website permanently.				
60	Provide LED lights in their offices and residential areas.	Complied	LED lights have been provided in the offices as well as residential areas.	N/A	
61	Emergency preparedness plan based on the Hazard identification and Risk Assessment (HIRA) and Disaster Management Plan shall be implemented.	Complied	LED lights have been provided in the offices as well as residential areas.	N/A	
62	The project proponent shall ensure covered transportation and conveying of ore, coal and other raw material to prevent spillage and dust generation; Use closed bulkers for carrying fly ash;	Complied	Coal, other raw material and fly ash are being transported and conveyed in covered trucks and railway rakes.	N/A	
63	The project proponent shall submit the environmental statement for each financial year in Form-V to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently and put on the website of the company.	Complied	The environment statement has been submitted on 26.09.2022 and uploaded on company's website.	N/A	
64	Concealing factual data or submission of false/fabricated data may result in revocation of this environmental clearance and attract action under the provisions of Environment (Protection) Act, 1986.	Complied	Noted.	N/A	
65	Any appeal against this EC shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.	Complied	Noted.	N/A	
66	The project proponent shall inform the Regional Office as well as the Ministry, the date of financial closure and final approval of the project by the concerned authorities, commencing the land development work and start of production operation by the project.	Complied	The Regional Office has been informed about the final approval of the project.	N/A	
67	The project proponent shall monitor fugitive emissions in the plant premises at least once in every quarter through labs recognized under Environment (Protection) Act, 1986.	Complied	Fugitive emissions in the plant premises are being monitored regularly through recognized lab.	N/A	
68	The Ministry may revoke or suspend the clearance, if implementation of any of the above conditions is not satisfactory	Complied	Noted.	N/A	

69	The project proponent shall abide by all the commitments and recommendations made in the EIA/EMP report, commitment made during Public Hearing and also that during their presentation to the Expert Appraisal Committee.	Complied	Noted	N/A	
70	Ventilation system shall be designed for adequate air changes as per the prevailing norms for all tunnels, motor houses, and cement bagging plants.	Complied	The plant has been designed with proper ventilation systems.	N/A	
71	The Regional Office of this Ministry shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the requisite data / information/monitoring reports.	Complied	Noted. Full cooperation will be extended to the Regional Office by furnishing with the requisite data/information/ reports from time to time.	N/A	
72	The project proponent shall provide leakage detection and mechanized bag cleaning facilities for better maintenance of bags.	Complied	Leakage Detection and Mechanized bag cleaning facilities have been provided for maintenance of bags.	N/A	
73	The project proponent shall provide wind shelter fence and chemical spraying on the raw material stock piles;	Complied	We have installed mist canon and fixed rain guns at Coal Handling Plant to arrest fugitive emissions.	N/A	
74	The project proponent shall install 24x7 Continuous Emission Monitoring System (CEMS) at process stacks to monitor stack emission as well as 4 Nos. Continuous Ambient Air Quality Station (CAAQS) for monitoring AAQ parameters with respect to standards prescribed in Environment (Protection) Rules 1986 as amended from time to time. The CEMS and CAAQMS shall be connected to SPCB and CPCB online servers and calibrate these systems from time to time according to equipment supplier specification throug	Complied	Continuous Effluent monitoring systems have already been provided and Real time data is being transmitted to CPCB and OSPCB servers.	N/A	
75	The Environment Clearance (EC) granted to the project/ activity is strictly under the provisions of the EIA Notification, 2006 and its amendments issued from time to time. It does not tantamount/ construe to approvals/ consent/ permissions etc., required to be obtained or	Complied	Noted.	N/A	

	standards/conditions to be followed under any other Acts/Rules/Subordinate legislations, etc., as may be applicable to the project.				
76	No further expansion or modifications in the plant shall be carried out without prior approval of the Ministry of Environment, Forests and Climate Change (MoEF&CC).	Complied	Noted.	N/A	
77	The Ministry reserves the right to stipulate additional conditions if found necessary. The Company in a time bound manner shall implement these conditions.	Complied	Noted.	N/A	
78	Sewage Treatment Plant shall be provided for treatment of domestic wastewater to meet the prescribed standards.	Complied	Sewage Treatment Plant is in place for the treatment of domestic wastewater.	N/A	
79	Provide solar power generation on roof tops of buildings, for solar light system for all common areas, streetlights, parking around project area and maintain the same regularly;	Complied	One Rooftop Solar project of 10 KWH implemented in plant premises. Further, Solar projects implementation is under progress.	N/A	
80	Design the pot roofs with louvers and roof ventilators	Complied	Louvers with roof ventilators have been provided in the potrooms.	N/A	
81	The project proponent shall provide waste heat recovery system (pre-heating of combustion air) at the flue gases.	Complied	Waste Heat recovery systems such as rotary APH (air preheater) for flue gas heat recovery already incorporated in Captive Power Plant.	N/A	
82	Sufficient number of mobile or stationery vacuum cleaners shall be provided to clean plant roads, shop floors, roofs, regularly.	Complied	Mechanized Vacuum Cleaners (both mobile and stationery) have been provided to clean plant roads, shop floors etc.	N/A	
83	Garland drains and collection pits shall be provided for each stock pile to arrest the runoff in the event of heavy rains and to check the water pollution due to surface run off.	Complied	A detailed Surface run off management study has been completed and report submitted to Board vide letter no. VL/OPCB/002/202 100 dated 26th April 2023.	N/A	
84	Practice use of low-Sulphur tars for baking anodes.	Complied	Low Sulphur tar is being used for making anodes.	N/A	

85	Make efforts to increase the life of pot lining through better construction and operating techniques.	Complied	Efforts are being taken to increase the pot life with better operational practices & installation of graphitized cathode.	N/A	
86	Water meters shall be provided at the inlet to all unit processes in the cement plant.	Complied	Water meters has been provided at the inlet of the unit processes.	N/A	
87	Adopt measures to recover fluoride gas from electrolytic cells and recycle the same in the process.	Complied	Fluoride gas from electrolytic cells are being captured through Fume Treatment Plants installed in Smelter Plants and recycled back into the system.	N/A	
88	The project proponent shall install 24x7 continuous effluent monitoring system with respect to standards prescribed in Environment (Protection) Rules 1986 (G.S.R 742 (E) dated 30thAugust 1990 and further amended vide G.S.R 46 (E) dated 3rd February 2006(Aluminium); S.O. 3305 (E) dated 7th December 2015(Thermal Power Plants) as amended from time to time and connected to SPCB and CPCB online servers and calibrate these system from time to time according to equipment supplier specification through	Complied	Continuous Effluent monitoring systems have already been provided and Real time data is being transmitted to CPCB and OSPCB servers.	N/A	
89	The project proponent shall monitor regularly ground water quality at least twice a year (pre and post monsoon) at sufficient numbers of piezometers/sampling wells in the plant and adjacent areas through labs recognised under Environment (Protection) Act, 1986 and NABL accredited laboratories.	Complied	Regular ground water monitoring is being carried out all around the secured landfill site and the data is being submitted to OSPCB and Regional Office of the Ministry.	PDF	
90	The project proponent shall make efforts to minimize water consumption in the cement plant complex by segregation of used water, practicing cascade use and by recycling treated water.	Complied	The water consumption of the Smelter and power plants are being monitored on a regular basis and treated water is being recycled back into the system to the maximum extent possible.	N/A	

☑ *I ' VEDANTA LIMITED ' hereby give undertaking that the specific / general condition is entered by me is correct.*

E-Sign
VEDANTA LIMITED
Date : 31 May 2023 09:58:17:737

**Note : N/A - Not Available

PRINT

Vedanta Limited, Jharsuguda

Aluminium Smelter Plant

Status of Action Points CREP Guidelines recommended for Aluminium Smelter

Sl. No.	Issues	Action Point	Compliance Status
1	Technology	Allowing Pot lines only with Pre-baked Technology. Environment clearance new pot lines to be given by MoEF, after June 2003, only with prebaked technology	Vedanta Aluminium Limited has adopted Pre-baked technology with 320/340 KA line current in its Aluminium smelter.
2	Fluoride Emissions	Prescribing maximum size of the plant. Maximum size of the plant shall be decided based on the assimilative capacity of each plant location.	-
		Revision of fluoride emission standard. For Soderberg Technology 2.8 kg/t by December 2005 [1.0kg/t (VCS) & 1.30 kg/t 9HSS) by December 2010]	Vedanta Limited is a pre-baked Aluminium smelter.
		Phasing out Wet Scrubbing System for Fluoride. For Pre-baked Technology 0.8 kg/T by December 2006	Dry scrubbers have been installed in smelter & the total fluoride emission from the smelter is within the range of 0.8 Kg/T of Al. produced.
		Allowing new Pot lines only with Dry Scrubbing System Environmental clearance for new pot lines shall be given by MoEF, after June 2003, only with Dry Scrubbing System.	Vedanta Limited has installed dry scrubbing system in Pot lines.
		Monitoring of fugitive emissions from pot rooms To start with Indal or any other better method & submit data from January 2004, regularly to SPCBs & CPCB	Manual roof top monitoring by cassette method has been installed and is available for fugitive fluoride monitoring. The fugitive fluoride emission ranges between 0.35 to 0.39 kg/MT of Al. Additionally, laser-based fluoride monitoring system have been installed in pot room for monitoring of fugitive fluoride.

3	Fluoride Consumption	Fluoride consumption tonne of aluminum produced (as F) [For Soderberg Technology 15 kg/t by December 2005 For Pre-baked technology 10kg/t by December 2005]	Efforts are being taken to reduce Fluoride consumption as per prescribed standard. Revamping of FTP is in full swing and procurement of low soda alumina has also been initiated. Till Mar'23 we have achieved fluoride consumption of 10.59 kg/T of Al.
4	Ambient Fluoride	Forage fluoride standards * Twelve consecutive months average-40 ppm * Two consecutive months Average- 60 ppm * One month – 80 ppm Measurement of forage Fluoride To start monitoring and submit data from January 2004, regularly to SPCBs & CPCB. The locations of monitoring may be selected in collaboration with SPCBs & CPCB	Forage fluoride in the surrounding areas /villages is being measured and analyzed by a third party NABL accredited, OSPCB authorized lab. The values reported are in the range of 17.0 to 22.0 ppm on monthly basis which is within the stipulated norms.
5	Spent Pot Lining (SPL)	Setting up a centralized SPL treatment & disposal facility with aluminum fluoride recovery and utilization of SPL in steel/ cement industries Limit for pot life, (for new pots installed after December 31, 2003 2500 day (average) SPL (Carbon & Refractory) to be disposed in Secured Landfill	Permission has been sought from OSPCB for setting up of SPL treatment facility. Vedanta Limited has adopted Pre-baked technology with 320/340 KA line current. We are trying to maximize the lining life to an average of 2500 days. The SPL generated from our smelter is being sent to OSPCB authorized agency M/s Green Energy Resources located at Sambalpur for detoxification which in turn is sending the detoxified material for further utilization in various industries including cement and steel. The refractory portion is being stored under covered shed till an approved disposal mechanism is in place.
6	Red Mud	Phasing Wet disposal Red Mud utilization To achieve minimum 50% solids in red mud by Dec. 2005	Not Applicable for Vedanta Limited, Jharsuguda plant

		A proposal for practical utilization to be prepared by Aluminium Association of India within six months	
7	Anode Baking Oven	Achieving particulate matter limit of 50 mg/Nm^3 by Dec. 2005	At present, Particulate emission of Bake Oven is reported between 4.1 to 5.9 mg/Nm3.

Annexure-A (Contd....)

Thermal Power Plant

Status of Action Points CREP Guidelines recommended for Thermal Power Plant

Sl. No.	Action Point	Compliance Status
1	Implementation of Environmental Standards (emission & effluent) in non- compliant Power Plants (31 & 27) • Submission of action plan : June 30, 2003 • Placement of order for Pollution of control equipment : September, 2003 • Installation & commission: December 31, 2005.	Not applicable
2	For existing thermal power plants, a feasibility study shall be carried out by Central Electricity Authority (CEA) to examine possibility to reduce the particulate matter emissions to 100 mg/Nm3. The studies shall also suggest the road map to meet 100 mg/Nm3 wherever found feasible. CEA shall submit the report by March 2004.	Not applicable
3	New / expansion power projects to be accorded environmental clearance on or after 1.1.2003 shall meet the limit of 100 mg/Nm3 for particulate matter.	Hybrid ESP's have been commissioned and emissions are maintained below the stipulated standards of 50 mg/NM^3.
4	Development of SO2 & NOx emission standards for coal based plants by December 2003. • New/ expansion power projects shall meet the limit of SO2 & NOx w.e.f. 1.1.2005. • Existing power plants shall meet the limit of SO2 & NOX w.e.f. 1.1.2006.	Will be complied from time to time
5	Install/activate opacity meters/ continuous monitoring system in all the units by December 31, 2004 with proper calibration system.	Continuous online monitoring systems have been installed in all the units and calibration schedules are being followed for calibration of the same.
6	Development of guidelines/ standards for mercury and other toxic heavy metals emissions by December 2003.	_
7	Review of stack height requirement and guidelines for power plants based on micro meteorological data by June 2003	_
8	Implementation of use of beneficiated coal as per GOI Notification: Power plants will sign fuel supply agreement (FSA) to meet the requirement as per the matrix prepared by CEA for compliance of the notification as short term measure. Options/mechanism for setting up of coal washeries as a long term measure • Coal India will up its own washery	_

	• State Electricity Board to set up its own washery • Coal India to ask private entrepreneurs to set up washeries for CIL and taking washing charges • SEBs to select a private entrepreneur to set up a washery near pit- head installation of coal beneficiation plant	
9	Power plants will indicate their requirement of abandoned coal mines for ash disposal & Coal India/ MOC shall provide the list of abandoned mines by June 2003 to CEA	_
10	Power plants will provide dry ash to the users outside the premises or uninterrupted access to the users within six months.	We are trying to maximize the utilization by supplying fly ash to the users.
11	Power Plants should provide dry fly ash free of cost to the users	We have provision of supplying dry fly ash free of cost for other users.
12	State P.W.Ds/ construction & development agencies shall also adhere to the specifications/Schedules of CPWD for ash based products utilization MoEF will take up the matter with State Governments.	Not applicable
13	(i) New plants to be accorded environmental clearance on or after 1.04.2003 shall adopt dry fly ash extraction or dry disposal system or Medium (35-40%) ash concentration slurry disposal system or Lean phase with hundred percent ash water re-circulation system depending upon site specific environmental situation. (ii) Existing plants shall adopt any of the systems mentioned in 13 (i) by December 2004.	The unit has adopted High Concentration Slurry Disposal (HCSD) method for ash disposal. The consistency of 60% solid is maintained.
14	Fly ash Mission shall prepare guidelines/manuals for fly ash utilization by March 2004.	_
15	New plants shall promote adoption of clean coal and clean power generation technologies	_

VEDANTA LIMITED, JHARSUGUDA
SMELTER & CPP

Half Yearly Environment Quality Report
(October 2022 – March 2023)

1. Stack Emission:

a) Pot Room Fume Treatment Plant (FTP) Outlet

i. Particulate Matter (mg/Nm^3)

Stack Description	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
FTP 1- Pot Line-1	4.40	4.70	5.20	3.90	3.00	3.80
FTP 2- Pot Line-1	2.70	3.90	3.60	3.30	3.50	4.10
FTP 3- Pot Line-2	2.60	2.80	3.20	3.50	2.90	3.20
FTP 4- Pot Line-2	2.80	2.10	2.60	2.80	3.10	3.40
FTP 5- Pot Line-3	1.80	2.20	2.40	2.50	2.10	2.40
FTP 6- Pot Line-3	1.70	1.90	2.10	2.20	2.40	2.50
FTP 7- Pot Line-4	2.20	1.80	1.90	1.70	2.00	2.20
FTP 8- Pot Line-4	2.00	2.50	2.70	2.40	2.80	3.10
FTP 9- Pot Line-5	1.80	2.40	2.00	2.30	2.60	2.40
FTP 10- Pot Line-5	2.30	2.60	2.80	3.20	3.10	2.70
FTP 11- Pot Line-6	2.10	1.90	1.80	2.00	2.30	2.80
FTP 12- Pot Line-6	2.00	2.10	2.30	2.40	2.20	2.60

ii. Total Fluoride (Kg/MT. Al.)

Stack Description	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
FTP 1- Pot Line-1	0.10	0.09	0.08	0.09	0.08	0.09
FTP 2- Pot Line-1	0.09	0.10	0.09	0.10	0.08	0.07
FTP 3- Pot Line-2	0.10	0.09	0.08	0.09	0.10	0.09
FTP 4- Pot Line-2	0.09	0.08	0.10	0.09	0.08	0.08
FTP 5- Pot Line-3	0.07	0.07	0.08	0.07	0.08	0.07
FTP 6- Pot Line-3	0.07	0.08	0.09	0.08	0.07	0.08
FTP 7- Pot Line-4	0.08	0.08	0.08	0.09	0.08	0.09
FTP 8- Pot Line-4	0.07	0.09	0.08	0.10	0.09	0.09
FTP 9- Pot Line-5	0.09	0.08	0.07	0.08	0.09	0.07
FTP 10- Pot Line-5	0.08	0.09	0.09	0.07	0.08	0.07
FTP 11- Pot Line-6	0.07	0.08	0.08	0.09	0.07	0.08
FTP 12- Pot Line-6	0.07	0.07	0.07	0.08	0.09	0.08

Note: The Environment Monitoring is done by third party M/s. Visiontek Consultancy Services Pvt. Ltd. The required data is put in format from their report

b) Bake Oven Fume Treatment Plant (FTP) Outlet

i. Particulate Matter (mg/Nm^3)

Stack Description	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
FTP 1- Bake Oven	5.80	5.90	5.40	5.50	5.20	5.50
FTP 2- Bake Oven	4.60	4.80	4.60	4.20	4.60	4.30
FTP-3 – Bake Oven	4.70	4.50	4.90	4.70	4.10	4.70
FTP-4 – Bake Oven	4.40	4.60	4.50	4.80	4.50	5.10
FTP-5 – Bake Oven	4.10	4.20	4.40	4.50	4.40	4.80

ii. Total Fluoride (Kg/T)

Stack Description	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
FTP 1- Bake Oven	0.03	0.02	0.03	0.02	0.03	0.02
FTP 2- Bake Oven	0.03	0.03	0.02	0.03	0.03	0.02
FTP-3 – Bake Oven	0.01	0.02	0.02	0.02	0.02	0.02
FTP-4 – Bake Oven	0.02	0.03	0.02	0.02	0.02	0.03
FTP-5 – Bake Oven	0.01	0.01	0.01	0.02	0.02	0.02

iii. Total PAH (mg/Nm^3)

Stack Description	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
FTP 1- Bake Oven	0.18	0.20	0.18	0.16	0.18	0.18
FTP 2- Bake Oven	0.21	0.22	0.21	0.20	0.21	0.23
FTP-3 – Bake Oven	0.18	0.19	0.18	0.16	0.19	0.22
FTP-4 – Bake Oven	0.16	0.17	0.20	0.18	0.17	0.19
FTP-5 – Bake Oven	0.20	0.21	0.17	0.15	0.16	0.21

c) Captive Power Plant (CPP)

i. Particulate Matter (mg/Nm^3)

Stack Description	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
CPP- Unit 1	40	SD	44	48	41	42
CPP- Unit 2	45	44	42	44	44	46
CPP- Unit 3	43	40	48	42	47	41
CPP- Unit 4	41	47	44	44	43	45
CPP- Unit 5	45	45	40	41	42	42
CPP- Unit 6	42	44	41	44	44	43
CPP- Unit 7	43	44	43	41	45	47
CPP- Unit 8	48	39	48	47	46	42
CPP- Unit 9	41	47	48	49	44	46

ii. SO2 (mg/Nm^3)

Stack Description	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
CPP- Unit 1	1126	SD	1157	1225	1223	1446
CPP- Unit 2	1297	1153	1172	1181	1216	1334
CPP- Unit 3	1129	1273	1282	1264	1195	1238
CPP- Unit 4	1338	1227	1241	1255	1327	1295
CPP- Unit 5	1267	1296	1283	1296	1289	1311
CPP- Unit 6	1289	1325	1344	1422	1447	1455
CPP- Unit 7	1246	1319	1369	1388	1349	1416
CPP- Unit 8	1228	1265	1254	1425	1436	1426
CPP- Unit 9	1255	1337	1425	1446	1457	1381

iii. NOx (mg/Nm^3)

Stack Description	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
CPP- Unit 1	324	SD	352	361	357	372
CPP- Unit 2	322	331	342	355	350	366
CPP- Unit 3	286	286	341	351	347	345
CPP- Unit 4	359	294	298	312	334	327
CPP- Unit 5	351	363	278	383	376	385
CPP- Unit 6	322	336	370	381	385	391
CPP- Unit 7	323	347	355	362	354	372
CPP- Unit 8	374	341	338	376	382	388
CPP- Unit 9	362	381	392	398	391	386

iv. Mercury (mg/Nm^3)

Stack Description	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
CPP- Unit 1	0.014	SD	0.015	0.016	0.015	0.018
CPP- Unit 2	0.022	0.015	0.017	0.019	0.020	0.018
CPP- Unit 3	0.015	0.023	0.025	0.020	0.024	0.022
CPP- Unit 4	0.020	0.016	0.018	0.017	0.015	0.018
CPP- Unit 5	0.016	0.022	0.024	0.021	0.025	0.021
CPP- Unit 6	0.015	0.018	0.015	0.018	0.017	0.019
CPP- Unit 7	0.012	0.012	0.016	0.018	0.019	0.022
CPP- Unit 8	0.021	0.016	0.017	0.015	0.013	0.016
CPP- Unit 9	0.013	0.024	0.025	0.020	0.025	0.022

2. Fugitive Fluoride:

Stack Description	Total Fluoride (Kg/MT. Al.)					
	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Potline-1 (Section-2)	0.38	0.39	0.36	0.38	0.36	0.38
Potline-2 (Section-7)	0.36	0.37	0.39	0.35	0.39	0.36
Potline-3 (Section-1)	0.39	0.38	0.37	0.39	0.37	0.35

3. Ambient Air Quality:

i. PM 10 size <10 (µg/m³)

Sl. No.	Sampling Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		**100**					
1	Near Carbon Plant, Smelter-1	56.10	57.50	57.80	58.70	59.30	58.60
2	Near Rectifier of Expansion Pot Room	62.30	63.40	63.70	63.50	64.20	63.70
3	Near R & R colony	49.20	50.10	50.70	51.40	52.20	50.90
4	Near China Gate Weigh Bridge	60.30	61.60	62.20	64.10	64.70	64.10
5	Near Cooling Tower IPP	59.40	60.10	60.60	61.30	61.60	60.20
6	Near ETP, Smelter-1	56.80	58.20	58.80	59.30	58.70	56.70
7	Near Cast House, Smelter-1	61.80	61.50	62.20	62.70	63.30	62.80
8	Near Pot Room, Smelter-1	63.70	64.10	64.70	62.80	62.20	60.60
9	Near Coal Yard of CPP	62.60	66.40	62.80	65.10	66.20	65.90
10	Near Cooling Tower of CPP	52.40	55.30	55.90	56.30	57.40	56.80

ii. PM 2.5 size < 2.5 (µg/m³)

Sl. No.	Sampling Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		**60**					
1	Near Carbon Plant, Smelter-1	28.20	29.10	29.50	30.50	30.70	29.40
2	Near Rectifier of Expansion Pot Room	34.10	35.80	35.90	36.10	36.70	35.50
3	Near R & R colony	21.30	22.40	23.20	23.70	25.10	24.70
4	Near China Gate Weigh Bridge	31.20	31.70	31.90	32.60	32.90	32.20
5	Near Cooling Tower IPP	33.80	33.60	33.80	34.60	35.20	34.60
6	Near ETP, Smelter-1	30.90	31.70	32.30	32.50	33.10	32.30
7	Near Cast House, Smelter-1	33.70	32.90	33.40	33.80	34.50	34.10
8	Near Pot Room, Smelter-1	32.80	33.20	33.60	33.70	34.10	33.60
9	Near Coal Yard of CPP	39.10	39.80	39.90	39.70	39.80	39.30
10	Near Cooling Tower of CPP	28.90	29.50	29.80	30.10	30.70	29.80

iii. SO_2 ($\mu g/m^3$)

Sl. No	Sampling Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		**80**					
1	Near Carbon Plant, Smelter-1	21.50	21.90	22.10	22.30	22.40	22.10
2	Near Rectifier of Expansion Pot Room	23.50	23.90	24.20	24.40	24.90	23.70
3	Near R & R colony	18.20	18.70	18.90	21.90	22.30	21.90
4	Near China Gate Weigh Bridge	21.50	21.80	22.10	23.20	23.80	23.40
5	Near Cooling Tower IPP	24.70	25.20	25.60	26.10	26.70	26.10
6	Near ETP, Smelter-1	24.10	24.40	24.70	24.90	25.40	24.50
7	Near Cast House, Smelter-1	22.00	22.40	22.80	23.10	23.70	22.20
8	Near Pot Room, Smelter-1	24.60	24.80	25.10	25.40	25.80	24.90
9	Near Coal Yard of CPP	28.60	29.60	29.50	29.80	30.40	29.60
10	Near Cooling Tower of CPP	21.50	21.60	21.40	21.60	21.80	21.50

iv. NOx ($\mu g/m^3$)

Sl. No	Sampling Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		**80**					
1	Near Carbon Plant, Smelter-1	28.70	29.30	29.60	32.40	32.50	31.40
2	Near Rectifier of Expansion Pot Room	29.60	28.90	28.70	29.30	28.60	28.30
3	Near R & R colony	21.60	21.80	22.10	24.00	24.60	24.10
4	Near China Gate Weigh Bridge	31.60	31.50	31.70	32.20	32.00	31.60
5	Near Cooling Tower IPP	33.90	33.70	33.70	34.10	34.40	33.70
6	Near ETP, Smelter-1	31.50	31.60	31.80	32.30	32.70	32.20
7	Near Cast House, Smelter-1	32.40	32.70	32.90	32.60	32.80	32.60
8	Near Pot Room, Smelter-1	30.10	30.50	30.90	30.80	31.30	30.40
9	Near Coal Yard of CPP	23.50	23.90	24.10	24.40	24.70	24.40
10	Near Cooling Tower of CPP	25.40	25.20	25.70	25.90	26.30	25.90

v. CO (mg/m^3)

Sl. No.	Sampling Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		**2.0**					
1	Near Carbon Plant, Smelter-1	0.66	0.65	0.68	0.59	0.58	0.55
2	Near Rectifier of Expansion Pot Room	0.65	0.64	0.65	0.66	0.63	0.60
3	Near R & R colony	0.32	0.34	0.33	0.38	0.37	0.35
4	Near China Gate Weigh Bridge	0.75	0.77	0.78	0.76	0.79	0.76
5	Near Cooling Tower IPP	0.56	0.58	0.57	0.59	0.62	0.61
6	Near ETP, Smelter-1	0.56	0.57	0.56	0.60	0.61	0.57
7	Near Cast House, Smelter-1	0.62	0.63	0.62	0.64	0.65	0.63
8	Near Pot Room, Smelter-1	0.67	0.68	0.7	0.72	0.70	0.68
9	Near Coal Yard of CPP	0.55	0.56	0.58	0.60	0.62	0.60
10	Near Cooling Tower of CPP	0.48	0.50	0.52	0.55	0.57	0.56

vi. Pb ($\mu g/m^3$)

Sl. No.	Sampling Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		**1.0**					
1	Near Carbon Plant, Smelter-1	0.15	0.15	0.17	0.19	0.21	0.19
2	Near Rectifier of Expansion Pot Room	0.13	0.14	0.16	0.17	0.18	0.14
3	Near R & R colony	BDL	BDL	BDL	BDL	BDL	BDL
4	Near China Gate Weigh Bridge	0.15	0.14	0.17	0.18	0.19	0.17
5	Near Cooling Tower IPP	0.18	0.17	0.18	0.19	0.18	0.16
6	Near ETP, Smelter-1	0.16	0.15	0.16	0.10	0.14	0.12
7	Near Cast House, Smelter-1	0.16	0.18	0.17	0.19	0.17	0.15
8	Near Pot Room, Smelter-1	0.15	0.17	0.19	0.17	0.19	0.16
9	Near Coal Yard of CPP	0.17	0.16	0.18	0.17	0.18	0.14
10	Near Cooling Tower of CPP	BDL	BDL	BDL	BDL	BDL	BDL

vii. As (mg/m^3)

Sl. No.	Name of Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		06					
1	Near Carbon Plant, Smelter-1	BDL	BDL	BDL	BDL	BDL	BDL
2	Near Rectifier of Expansion Pot Room	BDL	BDL	BDL	BDL	BDL	BDL
3	Near R & R colony	BDL	BDL	BDL	BDL	BDL	BDL
4	Near China Gate Weigh Bridge	BDL	BDL	BDL	BDL	BDL	BDL
5	Near Cooling Tower IPP	BDL	BDL	BDL	BDL	BDL	BDL
6	Near ETP, Smelter-1	BDL	BDL	BDL	BDL	BDL	BDL
7	Near Cast House, Smelter-1	BDL	BDL	BDL	BDL	BDL	BDL
8	Near Pot Room, Smelter-1	BDL	BDL	BDL	BDL	BDL	BDL
9	Near Coal Yard of CPP	BDL	BDL	BDL	BDL	BDL	BDL
10	Near Cooling Tower of CPP	BDL	BDL	BDL	BDL	BDL	BDL

viii. Ni (mg/m^3)

Sl. No.	Name of Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		20					
1	Near Carbon Plant, Smelter-1	0.17	0.16	0.18	0.16	0.17	0.15
2	Near Rectifier of Expansion Pot Room	0.14	0.13	0.15	0.17	0.18	0.16
3	Near R & R colony	BDL	BDL	BDL	BDL	BDL	BDL
4	Near China Gate Weigh Bridge	0.13	0.16	0.17	0.16	0.18	0.19
5	Near Cooling Tower IPP	0.22	0.23	0.24	0.23	0.22	0.2
6	Near ETP, Smelter-1	0.16	0.15	0.15	0.17	0.18	0.16
7	Near Cast House, Smelter-1	0.18	0.19	0.17	0.19	0.15	0.17
8	Near Pot Room, Smelter-1	0.14	0.15	0.15	0.18	0.15	0.18
9	Near Coal Yard of CPP	0.16	0.18	0.16	0.19	0.20	0.21
10	Near Cooling Tower of CPP	0.17	0.19	0.17	0.16	0.18	0.14

ix. BaP (mg/m^3)

Sl. No	Name of Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		**01**					
1	Near Carbon Plant, Smelter-1	0.16	0.18	0.16	0.18	0.15	0.16
2	Near Rectifier of Expansion Pot Room	0.17	0.16	0.18	0.15	0.19	0.17
3	Near R & R colony	BDL	BDL	BDL	BDL	BDL	BDL
4	Near China Gate Weigh Bridge	0.19	0.17	0.17	0.19	0.15	0.13
5	Near Cooling Tower IPP	0.17	0.19	0.18	0.19	0.18	0.16
6	Near ETP, Smelter-1	BDL	BDL	BDL	BDL	BDL	BDL
7	Near Cast House, Smelter-1	0.15	0.16	0.17	0.16	0.13	0.12
8	Near Pot Room, Smelter-1	0.16	0.13	0.15	0.16	0.18	0.19
9	Near Coal Yard of CPP	0.19	0.16	0.19	0.18	0.19	0.18
10	Near Cooling Tower of CPP	BDL	BDL	BDL	BDL	BDL	BDL

x. Benzene ($\mu g/m^3$)

Sl. No	Name of Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		**05**					
1	Near Carbon Plant, Smelter-1	0.18	0.15	0.19	0.17	0.19	0.16
2	Near Rectifier of Expansion Pot Room	0.15	0.18	0.19	0.18	0.16	0.13
3	Near R & R colony	BDL	BDL	BDL	BDL	BDL	BDL
4	Near China Gate Weigh Bridge	0.15	0.14	0.17	0.18	0.19	0.17
5	Near Cooling Tower IPP	0.18	0.16	0.18	0.20	0.23	0.22
6	Near ETP, Smelter-1	0.14	0.17	0.13	0.15	0.17	0.18
7	Near Cast House, Smelter-1	0.15	0.17	0.17	0.18	0.19	0.16
8	Near Pot Room, Smelter-1	0.15	0.16	0.14	0.17	0.20	0.22
9	Near Coal Yard of CPP	0.15	0.18	0.15	0.17	0.16	0.15
10	Near Cooling Tower of CPP	0.14	0.16	0.18	0.19	0.20	0.23

xi. NH3 ($\mu g/m_3$)

Sl. No	Name of Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (24 Hours Weighed Average)		400					
1	Near Carbon Plant, Smelter-1	21.6	22.3	22.5	22.9	23.6	24.1
2	Near Rectifier of Expansion Pot Room	21.5	21.9	22.1	24.9	25.3	25.6
3	Near R & R colony	23.1	22.2	22.5	22.8	23.1	22.7
4	Near China Gate Weigh Bridge	29.2	29.6	29.1	27.9	28.2	28.2
5	Near Cooling Tower IPP	29.1	29.4	31.9	32.1	33.2	31.8
6	Near ETP, Smelter-1	28.7	28.2	30.8	31.0	32.0	30.7
7	Near Cast House, Smelter-1	26.2	26.3	25.5	25.6	26.3	25.9
8	Near Pot Room, Smelter-1	28.8	29.2	26.4	26.8	26.6	26.2
9	Near Coal Yard of CPP	27.3	27.6	27.7	28.1	28.7	27.9
10	Near Cooling Tower of CPP	21.8	22.6	22.9	23.3	24.5	23.3

xii. Ozone ($\mu g/m^3$)

Sl. No.	Name of Location	Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
Limit (8 Hours Weighed Average)		100					
1	Near Carbon Plant, Smelter-1	6.6	6.7	6.9	7.0	7.2	7.0
2	Near Rectifier of Expansion Pot Room	7.3	7.1	7.4	7.7	7.9	7.5
3	Near R & R colony	5.6	5.4	5.6	5.8	5.7	5.9
4	Near China Gate Weigh Bridge	8.2	8.3	8.3	8.4	8.6	8.2
5	Near Cooling Tower IPP	8.5	8.6	8.2	8.4	8.3	8.1
6	Near ETP, Smelter-1	7.7	7.8	8.1	8.2	8.1	7.9
7	Near Cast House, Smelter-1	7.7	7.5	7.9	8.0	8.2	8.3
8	Near Pot Room, Smelter-1	9.2	9.3	10.5	10.6	10.8	9.2
9	Near Coal Yard of CPP	7.6	7.8	7.9	7.7	7.6	7.8
10	Near Cooling Tower of CPP	6.8	6.9	7.1	7.2	7.3	7.2

4. Noise:

i. Day Time (6.00 a.m. to 10.00 p.m.)

Sl. No.	Sampling Location	Day time (6.00 a.m. to 10.00 p.m.) Noise Level in dB (A)					
		Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	In R & R colony	62.5	63.4	64.1	66.1	66.5	60.2
2	Near Boiler of IPP	67.3	68.1	67.9	71.2	70.4	74.6
3	In Green Anode Plant	68.1	68.7	68.5	69.2	73.7	72.5
4	In Cast house- Smelter 1	67.5	66.7	66.2	67.7	71.8	72.2
5	Near Boiler of CPP	64.3	67.9	71.8	70.6	72.3	72.0
6	In Pot Room –Smelter 1	64.2	65.1	65.6	64.9	65.2	67.5

ii.Night Time (10.00 p.m. to 6.00 a. m.)

Sl. No.	Sampling Location	Night time (10.00 p.m. to 6.00 a.m.) Noise Level in dB (A)					
		Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	In R & R colony	55.4	56.8	55.4	55.2	56.3	54.5
2	Near Boiler of IPP	60.8	61.2	60.6	63.5	62.4	64.9
3	In Green Anode Plant	61.9	60.7	61.1	61.6	68.2	62.5
4	In Cast house- Smelter 1	60.9	60.2	59.8	60.1	65.4	63.6
5	Near Boiler of CPP	61.2	62.6	66.2	65.4	65.7	64.1
6	In Pot Room –Smelter 1	60.7	59.5	57.6	57.2	57.2	59.3

5. Water:

a) Smelter-1 ETP Outlet:

Location of sample: Smelter ETP outlet -E1 (recycled as process make up water)									
Sl. No.	Parameters	Unit	Limit	E1					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	pH	-	6.5-9.0	7.1	7.23	7.14	7.21	7.2	7.15
2	Total Suspended Solids	mg/l	100	13.0	15	17	21	23	21
3	Dissolved Solids	mg/l	2100	107	105	102	106	110	121
4	BOD (3) days at 27°C	mg/l	30	5.7	4.8	5	6	7	9
5	COD	mg/l	250	23	21	18	19	21	24
6	Fluoride	mg/l	1.5	0.45	0.42	0.45	0.49	0.52	0.63
7	Oil and Grease	mg/l	10	ND	ND	ND	ND	ND	ND
8	Hexavalent chromium as Cr^{+6}	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL
9	Total Chromium	mg/l	2	0.04	0.05	0.06	0.048	0.049	0.043
10	Cyanide	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL
11	Free ammonia	mg/l	5	ND	ND	ND	ND	ND	ND
12	Total Nitrogen	mg/l	100	3.50	3.8	3.5	4.1	4.5	5.1

b) Smelter-2 ETP Outlet:

Location of sample: Smelter ETP outlet –E2 (recycled as process make up water)									
Sl. No.	Parameters	Unit	Limit	E2					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	pH	-	6.5-9.0	6.91	6.98	7.02	7.11	7.15	7.18
2	Total Suspended Solids	mg/l	100	47	26	50	38	58	24
3	Dissolved Solids	mg/l	2100	235	205	232	208	217	224
4	BOD (3) days at 27°C	mg/l	30	8	7	8	9	11.5	12.4
5	COD	mg/l	250	29	26	25	27	28	29
6	Fluoride	mg/l	1.5	0.59	0.63	0.59	0.6	0.62	0.7
7	Oil and Grease	mg/l	10	ND	ND	ND	ND	ND	ND
8	Hexavalent chromium as Cr^{+6}	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL
9	Total Chromium	mg/l	2	0.043	0.041	0.044	0.04	0.041	0.046
10	Cyanide	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL
11	Free ammonia	mg/l	5	ND	ND	ND	ND	ND	ND
12	Total Nitrogen	mg/l	100	4.40	4.6	4.2	3.7	4.2	4.80

c) CPP ETP Outlet:

Location of sample: CPP ETP outlet –E3									
Sl. No.	Parameters	Unit	Limit	E3					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	pH	-	6.5-9.0	7.23	7.2	6.28	6.6	6.41	6.73
2	Total Suspended Solids	mg/l	100	49	39	44	41	39	43
3	Dissolved Solids	mg/l	2100*	226	213	224	221	228	237
4	BOD (3 days at 27°C)	mg/l	30	6	7.4	7			
5	COD	mg/l	250	30	28	32			
6	Oil and Grease	mg/l	10	ND	ND	ND	ND	ND	ND
7	Diss. Phosphate (as P)	mg/l	5.0	BDL	BDL	BDL	BDL	BDL	BDL
8	Iron	mg/l	3	0.28	0.27	0.29			
9	Total Chromium	mg/l	2.0	BDL	BDL	BDL	BDL	BDL	BDL
10	Copper	mg/l	3.0	BDL	BDL	BDL	BDL	BDL	BDL
11	Zinc	mg/l	5.0	0.04	0.05	0.06	0.08	0.07	0.09

d) Surface Water:

Sampling location: SW1- Upstream of Bhedan River

Sl. No.	Parameter	Unit	Standard	SW1					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Colour	Hazen	300	15	10	10	10	10	15
2	pH	--	6.5-8.5	7.31	7.38	7.39	7.44	7.37	7.29
3	DO	mg/l	4 (min)	6.2	6	6.1	6	5.9	6.2
4	Chloride	mg/l	600	35.0	40	45	40	45.5	32.5
5	Total Dissolved Solids	mg/l	1500	186	181	182	187	182	196
6	Suspended Solids	mg/l	-	57	58	59	62	65	69
7	Oils& Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND
8	BOD (3) days at 27 ^{0}C	mg/l	3	2.1	2.2	2.4	2.6	2.4	2.1
9	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL
10	Lead as Pb	mg/l	0.1	0.016	0.018	0.019	0.018	0.017	0.015
11	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
12	Hexavalent Chromium as Cr^{+6}	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
13	Copper as Cu	mg/l	1.5	0.024	0.026	0.027	0.025	0.022	0.025
14	Zinc as Zn	mg/l	15	0.17	0.18	0.19	0.17	0.15	0.17
15	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
16	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
17	Fluoride as F	mg/l	1.5	0.21	0.22	0.23	0.25	0.23	0.29
18	Sulphates (SO_4)	mg/l	400	12.8	13.3	15.4	16.1	15.7	13.6
19	Phenolic Compounds as C_6H_5OH	mg/l	0.005	BDL	BDL	BDL	BDL	BDL	BDL
20	Iron as Fe	mg/l	50	0.14	0.16	0.17	0.15	0.18	0.24
21	Nitrate as NO_3	mg/l	50	2.32	2.37	3.38	3.45	3.36	2.12
22	Anionic Detergents	mg/l	1	ND	ND	ND	ND	ND	ND
23	Total Coliform	MPN/ 100ml	5000	220	210	220	170	150	390

Surface Water: Continue.....

Sampling location: SW2- Downstream of Bhedan River

Sl. No.	Parameter	Unit	Standard	SW2					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Colour	Hazen	300	10	12	15	15	15	20
2	pH	--	6.5-8.5	7.2	7.16	7.18	7.26	7.22	7.18
3	DO	mg/l	4 (min)	6.3	6.1	6.2	6.1	6.2	6.3
4	Chloride	mg/l	600	47.5	45	40	47.5	42.5	40
5	Total Dissolved Solids	mg/l	1500	167	163	164	166	170	183
6	Suspended Solids	mg/l	-	60	62	63	67	61	73
7	Oils& Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND
8	BOD (3) days at 27 ^{0}C	mg/l	3	2.2	2.3	2.5	2.4	2.2	1.8
9	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL
10	Lead as Pb	mg/l	0.1	0.022	0.025	0.026	0.029	0.026	0.018
11	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
12	Hexavalent Chromium as Cr^{+6}	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
13	Copper as Cu	mg/l	1.5	0.032	0.033	0.034	0.033	0.036	0.027
14	Zinc as Zn	mg/l	15	0.15	0.12	0.13	0.10	0.12	0.15
15	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
16	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
17	Fluoride as F	mg/l	1.5	0.25	0.24	0.25	0.22	0.25	0.32
18	Sulphates (SO_4)	mg/l	400	16.7	17.4	18.5	18.7	18.2	18.6
19	Phenolic Compounds as C_6H_5OH	mg/l	0.005	BDL	BDL	BDL	BDL	BDL	BDL
20	Iron as Fe	mg/l	50	0.15	0.18	0.19	0.20	0.23	0.28
21	Nitrate as NO_3	mg/l	50	1.15	1.21	2.23	2.3	2.41	1.18
22	Anionic Detergents	mg/l	1	ND	ND	ND	ND	ND	ND
23	Total Coliform	MPN/ 100ml	5000	170	140	170	190	240	470

Surface Water: Continue.....

Sampling location: SW3- Upstream of Kharkhari Nallah

Sl.No.	Parameter	Unit	Standard	SW3					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Colour	Hazen	300	15	10	15	10	15	20
2	pH	--	6.5-8.5	7.22	7.29	7.22	7.28	7.33	7.09
3	DO	mg/l	4 (min)	6.5	6.4	6.2	6.1	5.8	6.2
4	Chloride	mg/l	600	35.0	40	35	30	35	25
5	Total Dissolved Solids	mg/l	1500	196	191	192	196	192	180
6	Suspended Solids	mg/l	-	57	55	57	58	60	72
7	Oils& Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND
8	BOD (3) days at 27 0C	mg/l	3	2.2	2.4	2.5	2.4	2.3	2
9	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL
10	Lead as Pb	mg/l	0.1	0.025	0.023	0.025	0.028	0.023	0.02
11	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
12	Hexavalent Chromium as Cr+6	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
13	Copper as Cu	mg/l	1.5	0.021	0.022	0.023	0.021	0.024	0.02
14	Zinc as Zn	mg/l	15	0.14	0.15	0.17	0.18	0.19	0.18
15	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
16	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
17	Fluoride as F	mg/l	1.5	0.22	0.27	0.26	0.25	0.22	0.36
18	Sulphates (SO4)	mg/l	400	16.1	15.3	15.7	16.4	15.9	11.6
19	Phenolic Compounds as C6H5OH	mg/l	0.005	BDL	BDL	BDL	BDL	BDL	BDL
20	Iron as Fe	mg/l	50	0.16	0.14	0.15	0.18	0.15	0.21
21	Nitrate as NO3	mg/l	50	2.44	2.55	2.61	2.66	2.63	2.44
22	Anionic Detergents	mg/l	1	ND	ND	ND	ND	ND	ND
23	Total Coliform	MPN/ 100ml	5000	210	170	150	160	130	220

Surface Water: Continue.....

Sampling location: SW4- Downstream of Kharkhari Nalla

Sl.No.	Parameter	Unit	Standard	SW4					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Colour	Hazen	300	10	15	10	15	10	25
2	pH	--	6.5-8.5	7.31	7.35	7.31	7.37	7.31	7.15
3	DO	mg/l	4 (min)	6.6	6.3	6	6.1	6.1	6.6
4	Chloride	mg/l	600	35.0	37.5	40	32.5	30.5	45
5	Total Dissolved Solids	mg/l	1500	251	247	245	242	245	293
6	Suspended Solids	mg/l	-	65	62	60	63	59	78
7	Oils& Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND
8	BOD (3) days at 27 ^{0}C	mg/l	3	2.4	2.6	2.4	2.7	2.6	2.2
9	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL
10	Lead as Pb	mg/l	0.1	0.026	0.025	0.021	0.023	0.026	0.22
11	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
12	Hexavalent Chromium as Cr^{+6}	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
13	Copper as Cu	mg/l	1.5	0.033	0.035	0.032	0.035	0.032	0.022
14	Zinc as Zn	mg/l	15	0.26	0.28	0.25	0.26	0.25	0.21
15	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
16	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
17	Fluoride as F	mg/l	1.5	0.28	0.22	0.24	0.27	0.24	0.32
18	Sulphates (SO_4)	mg/l	400	26.3	25.9	26.1	25.9	25.2	20.9
19	Phenolic Compounds as C_6H_5OH	mg/l	0.005	BDL	BDL	BDL	BDL	BDL	BDL
20	Iron as Fe	mg/l	50	0.21	0.22	0.23	0.21	0.22	0.23
21	Nitrate as NO_3	mg/l	50	2.91	2.87	2.89	2.93	2.85	1.68
22	Anionic Detergents	mg/l	1	ND	ND	ND	ND	ND	ND
23	Total Coliform	MPN/ 100ml	5000	280	220	240	210	240	350

Surface Water: Continue.....

Sampling location: SW5- Upstream Hirakud Reservoir

Sl. No.	Parameter	Unit	Standard	SW5					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Colour	Hazen	300	10	15	15	10	10	10
2	pH	--	6.5-8.5	7.28	7.25	7.28	7.29	7.3	7.35
3	DO	mg/l	4 (min)	5.4	5.3	5.2	5.3	5.2	5.2
4	Chloride	mg/l	600	40.0	42	40	45	50	57.5
5	Total Dissolved Solids	mg/l	1500	247	242	243	240	243	250
6	Suspended Solids	mg/l	-	65	64	65	60	63	65
7	Oils& Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND
8	BOD (3) days at 27 ^{0}C	mg/l	3	2	2.2	2.1	2.2	2.5	2.3
9	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL
10	Lead as Pb	mg/l	0.1	0.035	0.037	0.038	0.032	0.035	0.016
11	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
12	Hexavalent Chromium as Cr^{+6}	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
13	Copper as Cu	mg/l	1.5	0.033	0.03	0.031	0.036	0.033	0.025
14	Zinc as Zn	mg/l	15	0.14	0.15	0.16	0.17	0.18	0.2
15	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
16	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
17	Fluoride as F	mg/l	1.5	0.2	0.31	0.32	0.34	0.31	0.34
18	Sulphates (SO_4)	mg/l	400	13.9	14.1	15.3	15.5	16.3	15.7
19	Phenolic Compounds as C_6H_5OH	mg/l	0.005	BDL	BDL	BDL	BDL	BDL	BDL
20	Iron as Fe	mg/l	50	0.21	0.22	0.23	0.21	0.22	0.2
21	Nitrate as NO_3	mg/l	50	4.49	4.56	5.44	5.36	5.27	2.1
22	Anionic Detergents	mg/l	1	ND	ND	ND	ND	ND	ND
23	Total Coliform	MPN/ 100ml	5000	110	120	110	150	120	280

Surface Water: Continue.....

Sampling location: SW6- Downstream of Hirakud Reservoir

Sl. No.	Parameter	Unit	Standard	SW6					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Colour	Hazen	300	15	10	10	15	15	15
2	pH	--	6.5-8.5	7.36	7.31	7.32	7.35	7.36	7.33
3	DO	mg/l	4 (min)	6	5.8	5.7	5.6	5.5	5.8
4	Chloride	mg/l	600	30.0	35	35	50	55	60
5	Total Dissolved Solids	mg/l	1500	151	153	154	159	157	164
6	Suspended Solids	mg/l	-	42	45	46	69	72	76
7	Oils& Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND
8	BOD (3) days at 27 ^{0}C	mg/l	3	2.1	2	2.3	2	2.1	2
9	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL
10	Lead as Pb	mg/l	0.1	0.02	0.021	0.022	0.027	0.03	0.02
11	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
12	Hexavalent Chromium as Cr^{+6}	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
13	Copper as Cu	mg/l	1.5	0.021	0.025	0.026	0.029	0.03	0.024
14	Zinc as Zn	mg/l	15	0.16	0.18	0.19	0.18	0.19	0.16
15	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
16	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
17	Fluoride as F	mg/l	1.5	0.26	0.24	0.25	0.24	0.26	0.37
18	Sulphates (SO_4)	mg/l	400	10.2	10.5	11.6	11.2	11.7	12.9
19	Phenolic Compounds as C_6H_5OH	mg/l	0.005	BDL	BDL	BDL	BDL	BDL	BDL
20	Iron as Fe	mg/l	50	0.12	0.15	0.16	0.18	0.17	0.22
21	Nitrate as NO_3	mg/l	50	1.14	1.19	2.21	2.24	2.2	1.35
22	Anionic Detergents	mg/l	1	ND	ND	ND	ND	ND	ND
23	Total Coliform	MPN/ 100ml	5000	140	110	140	160	210	350

Surface Water: Continue.....

Sampling location: SW7- Confluence point near Kherual bridge

Sl. No.	Parameter	Unit	Standard	SW7					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Colour	Hazen	300	10	15	10	15	10	15
2	pH	--	6.5-8.5	7.26	7.2	7.26	7.3	7.27	7.2
3	DO	mg/l	4 (min)	6	6.1	6	6	5.9	6.3
4	Chloride	mg/l	600	30.0	32.5	35	37.5	40.5	37.5
5	Total Dissolved Solids	mg/l	1500	259	262	265	269	274	286
6	Suspended Solids	mg/l	-	56	51	54	55	58	61
7	Oil & Grease	mg/l	0.1	ND	ND	ND	ND	ND	ND
8	BOD (3) days at 27 ^{0}C	mg/l	3	2.2	2.4	2.6	2.5	2.4	2.1
9	Arsenic as As	mg/l	0.2	BDL	BDL	BDL	BDL	BDL	BDL
10	Lead as Pb	mg/l	0.1	0.032	0.03	0.032	0.031	0.032	0.019
11	Cadmium as Cd	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
12	Hexavalent Chromium as Cr^{+6}	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
13	Copper as Cu	mg/l	1.5	0.04	0.041	0.044	0.041	0.037	0.026
14	Zinc as Zn	mg/l	15	0.23	0.24	0.25	0.24	0.21	0.19
15	Selenium as Se	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
16	Cyanide as CN	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
17	Fluoride as F	mg/l	1.5	0.24	0.26	0.25	0.22	0.25	0.35
18	Sulphate (SO_4)	mg/l	400	18.1	17.8	18.2	18.7	18.1	15.4
19	Phenolic Compounds as C_6H_5OH	mg/l	0.005	BDL	BDL	BDL	BDL	BDL	BDL
20	Iron as Fe	mg/l	50	0.23	0.21	0.22	0.25	0.24	0.19
21	Nitrate as NO_3	mg/l	50	2.23	2.31	2.35	2.21	2.18	2.36
22	Anionic Detergents	mg/l	1	ND	ND	ND	ND	ND	ND
23	Total Coliform	MPN/ 100ml	5000	220	210	220	210	220	430

e) **Ground Water, Secured Land Fill (SLF) Area:**

Sampling Location GW1- Secured landfill Bore well (East)

Sl. No	Parameter	Unit	Standard as per IS:10500	GW1					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	AL	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity (NTU)	-	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	pH Value	-	6.5-8.5	6.68	6.74	6.78	6.88	6.91	6.98
6	Total Hardness (as $CaCO_3$)	mg/l	300	84	81	84	88	91	76
7	Iron (as Fe)	mg/l	0.3	0.32	0.34	0.36	0.34	0.36	0.31
8	Chloride (as Cl)	mg/l	250	40.0	45	50	55	57.5	40
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND	ND	ND
10	Dissolved solids	mg/l	500	278	269	266	269	274	232
11	Calcium (as Ca)	mg/l	75	28.1	27.6	28.3	26.9	27.3	25.6
12	Copper (as Cu)	mg/l	0.05	0.036	0.037	0.039	0.036	0.035	0.032
13	Manganese (as Mn)	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL
14	Sulphate as (SO_4)	mg/l	200	9.5	10.2	10.7	11.1	11.6	12.2
15	Nitrate (as NO_3)	mg/l	45	2.29	2.33	2.4	2.5	2.1	1.98
16	Fluoride (as F)	mg/l	1	0.35	0.34	0.37	0.38	0.34	0.32
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND	ND	ND
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
25	Zinc (as Zn)	mg/l	5	0.14	0.16	0.18	0.2	0.22	0.18
26	Chromium as (Cr^{+6})	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND	ND	ND
28	Alkalinity	mg/l	200	95	90	85	90	85	72
29	Aluminium as Al	mg/l	0.03	0.05	0.051	0.054	0.057	0.055	0.042
30	Boron	mg/l	1	BDL	BDL	BDL	BDL	BDL	BDL

Ground Water, Secured Land Fill (SLF) Area: Continue.....

Sampling Location: GW2 -Secured landfill Bore well (West)

Sl. No	Parameter	Unit	Standards as per IS:10500	GW2					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agree
3	Taste	-	AL	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agree
4	Turbidity (NTU)	-	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.
5	pH Value	-	6.5-8.5	6.93	6.89	6.93	6.92	6.95	7.0
6	Total Hardness (as $CaCO_3$)	mg/l	300	78	77	79	82	85	80
7	Iron (as Fe)	mg/l	0.3	0.35	0.36	0.34	0.31	0.32	0.3
8	Chloride (as Cl)	mg/l	250	35	37.5	42.5	40	47.5	41.
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND	ND	NI
10	Dissolved solids	mg/l	500	326	321	325	322	330	24(
11	Calcium (as Ca)	mg/l	75	30.6	30.1	30.4	29.5	29.8	26.
12	Copper (as Cu)	mg/l	0.05	0.035	0.032	0.035	0.032	0.03	0.0
13	Manganese (as Mn)	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BD
14	Sulphate as (SO_4)	mg/l	200	13.1	12.7	13.3	13.8	13.5	13.
15	Nitrate (as NO_3)	mg/l	45	0.78	0.75	0.78	0.75	0.78	2.1
16	Fluoride (as F)	mg/l	1	0.32	0.31	0.32	0.3	0.31	0.3
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BD
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND	ND	NI
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BD
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BD
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BD
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BD
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BD
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BD
25	Zinc (as Zn)	mg/l	5	0.22	0.25	0.22	0.23	0.26	0.2
26	Chromium as (Cr^{+6})	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BD
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND	ND	NI
28	Alkalinity	mg/l	200	80	85	95	85	80	75
29	Aluminium as Al	mg/l	0.03	0.062	0.063	0.066	0.062	0.063	0.0
30	Boron	mg/l	1	BDL	BDL	BDL	BDL	BDL	BD

Ground Water, Secured Land Fill (SLF) Area: Continue.....
Sampling Location: GW3 -Secured landfill Bore well (North)

Sl. No	Parameter	Unit	Standards as per IS:10500	GW3					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	AL	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity (NTU)	-	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
5	pH Value	-	6.5-8.5	6.79	6.83	6.76	6.8	6.86	6.88
6	Total Hardness (as $CaCO_3$)	mg/l	300	82	85	82	78	80	87
7	Iron (as Fe)	mg/l	0.3	0.36	0.33	0.37	0.36	0.3	0.28
8	Chloride (as Cl)	mg/l	250	32.5	35	37.5	35	40.0	32.5
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND	ND	ND
10	Dissolved solids	mg/l	500	318.5	315	312	318	322	254
11	Calcium (as Ca)	mg/l	75	31.9	31.5	31.8	30.7	30.1	28.4
12	Copper (as Cu)	mg/l	0.05	0.037	0.038	0.033	0.037	0.039	0.041
13	Manganese (as Mn)	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BDL
14	Sulphate as (SO_4)	mg/l	200	14.6	13.8	13.5	13.6	13.1	14.2
15	Nitrate (as NO_3)	mg/l	45	0.81	0.84	0.88	0.82	0.86	2.3
16	Fluoride (as F)	mg/l	1	0.36	0.3	0.34	0.37	0.35	0.28
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND	ND	ND
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
25	Zinc (as Zn)	mg/l	5	0.2	0.21	0.24	0.26	0.25	0.16
26	Chromium as (Cr^{+6})	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BDL
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND	ND	ND
28	Alkalinity	mg/l	200	90	95	80	95	90	95
29	Aluminium as Al	mg/l	0.03	0.061	0.06	0.062	0.065	0.066	0.03
30	Boron	mg/l	1	BDL	BDL	BDL	BDL	BDL	BDL

Ground Water, Secured Land Fill (SLF) Area: Continue.....
Sampling Location: GW4 -Secured landfill Bore well (South)

Sl. No	Parameter	Unit	Standards as per IS:10500	GW4					
				Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0	<5.0	<5
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agree
3	Taste	-	AL	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable	Agree
4	Turbidity (NTU)	-	5	<1.0	<1.0	<1.0	<1.0	<1.0	<1
5	pH Value	-	6.5-8.5	6.82	6.78	6.88	6.79	6.73	6.9
6	Total Hardness (as $CaCO_3$)	mg/l	300	104	102	105	102	104	9
7	Iron (as Fe)	mg/l	0.3	0.32	0.35	0.32	0.35	0.34	0.
8	Chloride (as Cl)	mg/l	250	45	40	35	32.5	35	3
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND	ND	N
10	Dissolved solids	mg/l	500	336	331	328	330	335	26
11	Calcium (as Ca)	mg/l	75	34.6	33.8	34.2	34.4	33.9	29
12	Copper (as Cu)	mg/l	0.05	0.048	0.044	0.038	0.042	0.045	0.0
13	Manganese (as Mn)	mg/l	0.1	BDL	BDL	BDL	BDL	BDL	BI
14	Sulphate as (SO_4)	mg/l	200	17.5	16.4	16.9	17.2	16.9	15
15	Nitrate (as NO_3)	mg/l	45	2.08	1.96	1.91	1.96	1.91	2.
16	Fluoride (as F)	mg/l	1	0.41	0.32	0.45	0.35	0.38	0.
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BI
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND	ND	N
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL	BDL	BI
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BI
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL	BDL	BI
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BI
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BI
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BI
25	Zinc (as Zn)	mg/l	5	0.25	0.23	0.27	0.25	0.24	0.
26	Chromium as (Cr^{+6})	mg/l	0.05	BDL	BDL	BDL	BDL	BDL	BI
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND	ND	N
28	Alkalinity	mg/l	200	105	100	95	90	95	9
29	Aluminium as Al	mg/l	0.03	0.056	0.058	0.059	0.058	0.057	0.0
30	Boron	mg/l	1	BDL	BDL	BDL	BDL	BDL	BI

f) Ground Water, Ash Pond Area:

Sampling Location: GW1- Ash Pond Bore well (East), GW2- Ash Pond Bore well (West)

Sl. No	Parameter	Unit	Standard as per IS: 10500	GW1		GW2	
				Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	<1.0	<1.0	<1.0	<1.0
5	pH Value	-	6.5-8.5	6.72	7.8	7.29	6.77
6	Total Hardness (as CaCO3)	mg/l	300	108	108	96	90
7	Iron (as Fe)	mg/l	0.3	0.25	0.25	0.31	0.32
8	Chloride (as Cl)	mg/l	250	32.5	40	35	37.5
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND
10	Dissolved solids	mg/l	500	355	368	323	319
11	Calcium (as Ca)	mg/l	75	34.6	35.6	30.9	33.1
12	Copper (as Cu)	mg/l	0.05	BDL	BDL	BDL	BDL
13	Manganese (as Mn)	mg/l	0.1	0.064	0.069	0.062	0.065
14	Sulphate as (SO4)	mg/l	200	21.1	22.1	16.5	18.4
15	Nitrate (as NO3)	mg/l	45	3.29	4.41	1.81	2.7
16	Fluoride (as F)	mg/l	1	0.32	0.32	0.3	0.28
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL
25	Zinc (as Zn)	mg/l	5	0.21	0.26	0.22	0.2
26	Chromium as (Cr+6)	mg/l	0.05	BDL	BDL	BDL	BDL
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND
28	Alkalinity	mg/l	200	65	60	80	75
29	Aluminium as Al	mg/l	0.03	BDL	BDL	BDL	BDL
30	Boron	mg/l	1	BDL	BDL	BDL	BDL

Ground Water, Village Area: Continue.....
Sampling Location: GW3- Ash Pond Bore well (North), GW4- Ash Pond Bore well (South)

Sl. No.	Parameter	Unit	Standard as per IS: 10500	GW3		GW4	
				Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	<1.0	<1.0	<1.0	<1.0
5	pH Value	-	6.5-8.5	6.69	7.82	7.04	6.91
6	Total Hardness (as CaCO3)	mg/l	300	90	96	104	113
7	Iron (as Fe)	mg/l	0.3	0.32	0.33	0.36	0.36
8	Chloride (as Cl)	mg/l	250	37.5	42.5	40	45
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND
10	Dissolved solids	mg/l	500	319	314	367	367
11	Calcium (as Ca)	mg/l	75	32.4	34.8	33.6	32.7
12	Copper (as Cu)	mg/l	0.05	BDL	BDL	BDL	BDL
13	Manganese (as Mn)	mg/l	0.1	0.071	0.073	0.066	0.068
14	Sulphate as (SO4)	mg/l	200	25.2	25.3	24.8	24.2
15	Nitrate (as NO3)	mg/l	45	2.70	3.59	2.25	3.32
16	Fluoride (as F)	mg/l	1	0.35	0.35	0.31	0.33
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL
25	Zinc (as Zn)	mg/l	5	0.23	0.25	0.2	0.22
26	Chromium as (Cr+6)	mg/l	0.05	BDL	BDL	BDL	BDL
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND
28	Alkalinity	mg/l	200	75	80	70	90
29	Aluminium as Al	mg/l	0.03	BDL	BDL	BDL	BDL
30	Boron	mg/l	1	BDL	BDL	BDL	BDL

g) **Ground Water, Village Area:**

Sampling Location: GW1- Gudigaon Village, GW2- Kurebaga Village

Sl. No	Parameter	Unit	Standard as per IS: 10500	GW1		GW2	
				Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	<1.0	<1.0	<1.0	<1.0
5	pH Value	-	6.5-8.5	6.91	7.36	6.98	7.02
6	Total Hardness (as CaCO3)	mg/l	300	113	76	62	60
7	Iron (as Fe)	mg/l	0.3	0.36	0.24	0.25	0.26
8	Chloride (as Cl)	mg/l	250	45	35	35	27.5
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND
10	Dissolved solids	mg/l	500	367	272	212	219
11	Calcium (as Ca)	mg/l	75	32.7	32.8	27.1	27.7
12	Copper (as Cu)	mg/l	0.05	BDL	BDL	BDL	BDL
13	Manganese (as Mn)	mg/l	0.1	0.068	BDL	BDL	BDL
14	Sulphate as (SO4)	mg/l	200	24.2	13.6	10.7	11.2
15	Nitrate (as NO3)	mg/l	45	3.32	1.51	2.49	2.5
16	Fluoride (as F)	mg/l	1	0.33	0.24	0.29	0.33
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL
25	Zinc (as Zn)	mg/l	5	0.22	0.23	0.29	0.28
26	Chromium as (Cr+6)	mg/l	0.05	BDL	BDL	BDL	BDL
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND
28	Alkalinity	mg/l	200	90	90	60	65
29	Aluminium as Al	mg/l	0.03	BDL	BDL	BDL	BDL
30	Boron	mg/l	1	BDL	BDL	BDL	BDL

Ground Water, Village Area: Continue.....

Sampling Location: GW3- Siriapali Village, GW4- Katapali Village

Sl. No.	Parameter	Unit	Standard as per IS: 10500	GW3		GW4	
				Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	<1.0	<1.0	<1.0	<1.0
5	pH Value	-	6.5-8.5	7.3	7.27	7.44	7.41
6	Total Hardness (as CaCO3)	mg/l	300	76	78	92	94
7	Iron (as Fe)	mg/l	0.3	0.3	0.31	0.28	0.27
8	Chloride (as Cl)	mg/l	250	25	30	37.5	32.5
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND
10	Dissolved solids	mg/l	500	245	239	267	274
11	Calcium (as Ca)	mg/l	75	32.4	31.6	31.8	32.3
12	Copper (as Cu)	mg/l	0.05	BDL	BDL	BDL	BDL
13	Manganese (as Mn)	mg/l	0.1	BDL	BDL	BDL	BDL
14	Sulphate as (SO4)	mg/l	200	14.8	15.3	16.2	16.6
15	Nitrate (as NO3)	mg/l	45	1.76	1.83	1.63	1.65
16	Fluoride (as F)	mg/l	1	0.27	0.28	0.25	0.26
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL
25	Zinc (as Zn)	mg/l	5	0.26	0.3	0.22	0.25
26	Chromium as (Cr+6)	mg/l	0.05	BDL	BDL	BDL	BDL
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND
28	Alkalinity	mg/l	200	75	70	85.0	90
29	Aluminium as Al	mg/l	0.03	BDL	BDL	BDL	BDL
30	Boron	mg/l	1	BDL	BDL	BDL	BDL

Ground Water, Village Area: Continue.....
Sampling Location: GW5- Katikela Village, GW6- Bhurkamunda Village

Sl. No.	Parameter	Unit	Standard as per IS: 10500	GW5		GW6	
				Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	<1.0	<1.0	<1.0	<1.0
5	pH Value	-	6.5-8.5	7.29	7.32	7.41	7.43
6	Total Hardness (as CaCO3)	mg/l	300	80	86	76	80
7	Iron (as Fe)	mg/l	0.3	0.25	0.29	0.23	0.26
8	Chloride (as Cl)	mg/l	250	30	35	31	35
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND
10	Dissolved solids	mg/l	500	259	266	267	273
11	Calcium (as Ca)	mg/l	75	28.4	29.1	32.1	32.9
12	Copper (as Cu)	mg/l	0.05	BDL	BDL	BDL	BDL
13	Manganese (as Mn)	mg/l	0.1	BDL	BDL	BDL	BDL
14	Sulphate as (SO4)	mg/l	200	13.5	13.9	13.2	12.9
15	Nitrate (as NO3)	mg/l	45	2.26	2.32	1.45	1.42
16	Fluoride (as F)	mg/l	1	0.24	0.29	0.21	0.24
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL
25	Zinc (as Zn)	mg/l	5	0.25	0.27	0.26	0.22
26	Chromium as (Cr+6)	mg/l	0.05	BDL	BDL	BDL	BDL
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND
28	Alkalinity	mg/l	200	80.0	85	90.0	95
29	Aluminium as Al	mg/l	0.03	BDL	BDL	BDL	BDL
30	Boron	mg/l	1	BDL	BDL	BDL	BDL

Ground Water, Village Area: Continue.....

Sampling Location: GW7- R & R Colony Village, GW8- Tumbakela Village

Sl. No.	Parameter	Unit	Standard as per IS: 10500	GW7		GW8	
				Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	<1.0	<1.0	<1.0	<1.0
5	pH Value	-	6.5-8.5	6.95	6.97	7.31	7.34
6	Total Hardness (as CaCO3)	mg/l	300	64	68	72	70
7	Iron (as Fe)	mg/l	0.3	0.24	0.22	0.31	0.34
8	Chloride (as Cl)	mg/l	250	30	30	27.5	32.5
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND
10	Dissolved solids	mg/l	500	213	221	247	255
11	Calcium (as Ca)	mg/l	75	26.9	27.4	31.9	30.8
12	Copper (as Cu)	mg/l	0.05	BDL	BDL	BDL	BDL
13	Manganese (as Mn)	mg/l	0.1	BDL	BDL	BDL	BDL
14	Sulphate as (SO4)	mg/l	200	10.8	11.1	14.7	14.9
15	Nitrate (as NO3)	mg/l	45	2.47	2.47	1.77	1.81
16	Fluoride (as F)	mg/l	1	0.31	0.33	0.25	0.22
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND
19	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL
20	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL
21	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL
22	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL
23	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL
24	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL
25	Zinc (as Zn)	mg/l	5	0.28	0.29	0.25	0.26
26	Chromium as (Cr+6)	mg/l	0.05	BDL	BDL	BDL	BDL
27	Mineral oil	mg/l	0.01	ND	ND	ND	ND
28	Alkalinity	mg/l	200	65	60	70	75
29	Aluminium as Al	mg/l	0.03	BDL	BDL	BDL	BDL
30	Boron	mg/l	1	BDL	BDL	BDL	BDL

Ground Water: Continue.....

Sampling Location: GW9- Brundamal Village, GW10-Sripura Village

Sl.No	Parameter	Unit	Standard as per IS: 10500	GW9		GW10	
				Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Hazen	5	<5.0	<5.0	<5.0	<5.0
2	Odour	-	U/O	Agreeable	Agreeable	Agreeable	Agreeable
3	Taste	-	Agreeable	Agreeable	Agreeable	Agreeable	Agreeable
4	Turbidity	NTU	5	<1.0	<1.0	<1.0	<1.0
5	pH Value	-	6.5-8.5	7.41	7.46	7.32	7.38
6	Total Hardness (as CaCO3)	mg/l	300	90	92	82	86
7	Iron (as Fe)	mg/l	0.3	0.26	0.29	0.27	0.31
8	Chloride (as Cl)	mg/l	250	35	27.5	32.5	37.5
9	Residual free Chlorine	mg/l	0.2	ND	ND	ND	ND
10	Dissolved solids	mg/l	500	268	270	261	268
11	Calcium (as Ca)	mg/l	75	31.6	31.2	28.5	29.7
12	Copper (as Cu)	mg/l	0.05	BDL	BDL	BDL	BDL
13	Manganese (as Mn)	mg/l	0.1	BDL	BDL	BDL	BDL
14	Sulphate as (SO4)	mg/l	200	16.1	16.6	13.6	13.8
15	Nitrate (as NO3)	mg/l	45	1.62	1.66	2.25	2.29
16	Fluoride (as F)	mg/l	1	0.26	0.3	0.25	0.27
17	Phenolic compounds (as C6H5OH)	mg/l	0.001	BDL	BDL	BDL	BDL
18	Anionic Detergent (as MBAS)	mg/l	0.2	ND	ND	ND	ND
18	Mercury (as Hg)	mg/l	0.001	BDL	BDL	BDL	BDL
19	Cadmium (as Cd)	mg/l	0.01	BDL	BDL	BDL	BDL
20	Selenium (as Se)	mg/l	0.01	BDL	BDL	BDL	BDL
21	Arsenic (as As)	mg/l	0.05	BDL	BDL	BDL	BDL
22	Cyanide (as CN)	mg/l	0.05	BDL	BDL	BDL	BDL
23	Lead (as Pb)	mg/l	0.05	BDL	BDL	BDL	BDL
24	Zinc (as Zn)	mg/l	5	0.23	0.25	0.24	0.27
25	Chromium as (Cr+6)	mg/l	0.05	BDL	BDL	BDL	BDL
26	Mineral oil	mg/l	0.01	ND	ND	ND	ND
27	Alkalinity	mg/l	200	80	85	85	80
28	Aluminium as Al	mg/l	0.03	BDL	BDL	BDL	BDL
30	Boron	mg/l	1	BDL	BDL	BDL	BDL

6. Soil Quality:

Sampling locations:

S-1: Gudigaon Village S-2: Kurebaga Village S-3: Siriapali Village

Sl. No.	Parameters	S-1		S-2		S-3	
		Oct'22	Jan'23	Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Brown	Brown	Brown	Brown	Brown	Brown
2	Type of Soil	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
3	pH	6.89	6.87	6.93	6.92	7.18	7.2
4	Texture	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
5	Infiltration Rate (cm/hr)	6.1	6.2	5.8	5.7	6.3	6.4
6	Bulk Density (gm/cc)	1.26	1.24	1.22	1.25	1.25	1.23
7	Porosity %	16.2	16.4	20.4	20.1	21.2	21.1
8	Moisture content %	5.4	5.5	4.1	4	4.5	4.3
9	Fluoride %	0.008	0.009	0.006	0.007	0.009	0.017
10	Silica as SiO_2%	28.1	29.2	23.6	24.2	20.7	21.3
11	Chloride %	0.015	0.017	0.018	0.018	0.022	0.023
12	Sulphate %	0.17	0.19	0.31	0.32	0.22	0.25
13	Potassium as K%	0.015	0.017	0.024	0.025	0.017	0.018
14	Magnesium as Mg%	0.12	0.14	0.18	0.17	0.16	0.18
15	Calcium as Ca%	0.45	0.47	0.41	0.42	0.45	0.46
16	Manganese as Mn%	0.26	0.27	0.24	0.26	0.3	0.31
17	Iron as Fe%	0.35	0.33	0.41	0.45	0.45	0.47
18	Available Organic Carbon %	1.29	1.25	0.66	0.68	0.72	0.71
19	Available Nitrogen%	0.036	0.034	0.051	0.052	0.045	0.048

Soil Quality: Continue.....

Sampling locations: S-4: Katapali Village S-5: Katikela Village S-6: Bhurkamunda Village

Sl. No.	Parameters	S-4		S-5		S-6	
		Oct'22	Jan'23	Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Brown	Brown	Brown	Brown	Reddish	Brown
2	Type of Soil	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral
3	pH	6.81	6.84	6.77	6.78	7.39	6.78
4	Texture	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
5	Infiltration Rate (cm/hr)	6.5	6.6	6.9	6.8	5.6	6.8
6	Bulk Density (gm/cc)	1.17	1.18	1.2	1.19	1.2	1.19
7	Porosity %	20.3	20.5	20.6	20.8	24.1	20.8
8	Moisture content %	5.2	5.3	5.3	5.2	4.9	5.2
9	Fluoride %	0.008	0.009	0.005	0.008	0.011	0.008
10	Silica as SiO_2%	22.6	22.7	21.3	21.8	23.4	21.8
11	Chloride %	0.016	0.019	0.02	0.022	0.026	0.022
12	Sulphate %	0.26	0.24	0.33	0.3	0.15	0.3
13	Potassium as K%	0.016	0.017	0.013	0.015	0.022	0.015
14	Magnesium as Mg%	0.14	0.15	0.18	0.19	0.25	0.19
15	Calcium as Ca%	0.42	0.45	0.44	0.46	0.44	0.46
16	Manganese as Mn%	0.32	0.3	0.27	0.29	0.36	0.29
17	Iron as Fe%	0.38	0.36	0.43	0.42	0.44	0.42
18	Available Organic Carbon %	1.63	1.66	1.47	1.5	1.19	1.5
19	Available Nitrogen%	0.056	0.057	0.049	0.052	0.056	0.052

Soil Quality: Continue.....

Sampling locations: S-7: R&R Colony, S-8- Tumbakela Village

Sl. No	Parameters	S-7		S-8	
		Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Reddish	Reddish	Brown	Brown
2	Type of Soil	Neutral	Neutral	Neutral	Neutral
3	pH	7.25	7.28	7.26	7.29
4	Texture	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
5	Infiltration Rate (cm/hr)	6.3	6.2	5.8	5.6
6	Bulk Density (gm/cc)	1.31	1.34	1.25	1.27
7	Porosity %	24.2	24.4	23.1	23
8	Moisture content %	5.5	5.4	5.6	5.5
9	Fluoride %	0.007	0.009	0.01	0.016
10	Silica as SiO_2%	19.8	20.2	24.1	23.7
11	Chloride %	0.019	0.022	0.015	0.017
12	Sulphate %	0.16	0.19	0.14	0.15
13	Potassium as K%	0.02	0.021	0.018	0.017
14	Magnesium as Mg%	0.22	0.21	0.20	0.23
15	Calcium as Ca%	0.45	0.42	0.51	0.53
16	Manganese as Mn%	0.42	0.45	0.45	0.44
17	Iron as Fe%	0.45	0.42	0.52	0.51
18	Available Organic Carbon %	1.35	1.36	1.28	1.3
19	Available Nitrogen%	0.055	0.058	0.053	0.051

Soil Quality: Continue.....

Sampling locations: S9- Brundamal Village, S10- Sirpura Village

Sl. No.	Parameters	S-9		S-10	
		Oct'22	Jan'23	Oct'22	Jan'23
1	Colour	Brown	Brown	Brown	Brown
2	Type of Soil	Neutral	Neutral	Neutral	Neutral
3	pH	7.25	7.22	7.33	7.35
4	Texture	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
5	Infiltration Rate (cm/hr)	6.5	6.6	5.8	5.9
6	Bulk Density (gm/cc)	1.22	1.26	1.34	1.35
7	Porosity %	22.4	22.7	22.6	22.9
8	Moisture content %	5.2	5.1	5.7	5.6
9	Fluoride %	0.01	0.015	0.008	0.007
10	Silica as SiO_2%	25.2	25.5	23.7	23.9
11	Chloride %	0.021	0.02	0.022	0.025
12	Sulphate %	0.17	0.18	0.18	0.2
13	Potassium as K%	0.019	0.023	0.023	0.022
14	Magnesium as Mg%	0.18	0.16	0.21	0.24
15	Calcium as Ca%	0.47	0.48	0.45	0.46
16	Manganese as Mn%	0.43	0.4	0.48	0.49
17	Iron as Fe%	0.48	0.47	0.47	0.49
18	Available Organic Carbon %	1.15	1.19	1.34	1.35
19	Available Nitrogen%	0.057	0.056	0.052	0.057

7. Forage Fluoride:

Sl. No	Location	Fluoride (ppm)					
		Oct'22	Nov'22	Dec'22	Jan'23	Feb'23	Mar'23
1	Gudigaon	17.6	17.4	17.0	17.6	17.7	18.2
2	Kuberbaga	19	19.1	19.0	19.1	18.8	18.6
3	Siriapali	19.5	18.8	21.0	18.4	18.6	17.9
4	Katapali	19.8	17.5	19.0	18	18.3	17.4
5	Katikela	18	19.6	20.0	19.5	19.7	19.0
6	Burkhamunda	17	19.3	19.0	19.2	19.4	18.7
7	R&R Colony	20	18.8	18.0	18.8	18	18.1
8	Tumbakela	18.0	19.3	21.0	18.3	18.1	17.7
9	Brundamal	19.9	20.2	22.0	19.5	19.8	19.4
10	Sripura	20	19.4	20.0	18.2	18.5	17.6
11	Ghichimura	18	18.7	18.0	17.6	17.0	17.1
12	Lapanga	20	19.1	22.0	17.9	17.7	17.5
Average		18.9	18.9	19.7	18.5	18.46	18.26