

F. No. J- 11011/406/2011- IA.II (I)  
Government of India  
Ministry of Environment, Forest and Climate Change  
(I.A. Division – Industry I sector)

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Dated: 6<sup>th</sup> August, 2021

To

**Shri. Rahul Sharma,**  
Chief Executive Officer,  
M/s. Vedanta Limited,  
AT/PO:- Lanjigarh, District Kalahandi,  
Odisha - 766027.  
Email: [headhse.vll@vedanta.co.in](mailto:headhse.vll@vedanta.co.in); Tel: 7328833912

Subject: Expansion of Alumina Refinery (1 MTPA to 6 MTPA) and Captive Power Plant (75 MW to 285 MW) by **M/s. Vedanta Limited**, located at Lanjigarh **District Kalahandi Odisha - Amendment in Environment Clearance – regarding.**

Sir,

This refers to application of M/s. Vedanta Limited made online vide proposal no. IA/OR/IND/209784/2021 dated 22/04/2021 along with Form 4, submission of additional information vide letter dated 29/05/2021 and 08/06/2021 and sought for amendment in Environment Clearance accorded by the Ministry vide letter no. J-11011/406/2011/IA-II(I) dated 20/11/2015.

2. The proposal was considered by the Reconstituted EAC (Industry-I) in its 36<sup>th</sup> meeting held on 18-19<sup>th</sup> May, 2021, 37<sup>th</sup> meeting held on 31<sup>st</sup> May- 1<sup>st</sup> June, 2021 and 38<sup>th</sup> Meeting held on 15-16<sup>th</sup> June, 2021. The EAC proceedings of the said meetings are furnished as below:

**Details submitted by the project proponent**

3. M/s. Vedanta Limited submitted their application to MoEF&CC on 19/08/2014 for grant of EC for expansion of **(1MTPA to 6 MTPA)** – Phase I: 1 to 2 MTPA; Phase II: 2 to 4 MTPA and Phase III: 4 to 6 MTPA) Alumina Refinery and Captive Power Plant (from 75MW to 285MW) at Dist. Kalahandi, Odisha. As per the proposal submitted to MoEF&CC, the total project area is 1552.7 ha. Out of this total area, 833.17 + 53.5 ha is under advanced stage of acquisition and the balance 666.03 ha was yet to be acquired. Since the total land required for the project activity was not under the possession of proponent, the EC was accorded for the expansion of Alumina Refinery **(1 MTPA to 4 MTPA)** and Captive Power Plant (75 MW to 285 MW) on 20/11/2015. **As per para no. 26 of the EC dated 20/11/2015, the project need not go through a fresh appraisal process again for the Phase -III expansion from 4 to 6 MTPA and stipulated a following specific condition:**  
**“v. For Phase-III (6 MTPA), the proponent shall obtain an amendment of EC after completion of land acquisition of the balance area of 666.03ha”.**
4. The phase wise land break up for the alumina refinery as per EC dated 20/11/2015 is furnished as below.

o/c



| S. No. | Facility                               | Existing area (ha) | Addl. land for Phase I (ha) | Addl. land for Phase II                    | Addl. land for Phase III    | Total            |
|--------|--|--------------------|-----------------------------|--|-----------------------------|------------------|
| 1.     | Main Plant with green belt             | 420                | 0                           | 0  | 0                           | <b>420</b>       |
| 2.     | Red Mud Storage Pond with green belt   | 211.47             | 0                           | 53.5 ha (process of acquisition initiated) | 518.03 (yet to be acquired) | <b>783</b>       |
| 3.     | Ash Pond with Pipeline with green belt | 95.4               | 0                           | 0  | 80 (yet to be acquired)     | <b>175.4</b>     |
| 4.     | Township & Misc including green belt   | 52.5               | 0                           | 0  | 28 (yet to be acquired)     | <b>80.5</b>      |
| 5.     | Railway including Green belt           | 53.8               | 0                           | 0  | 40 (yet to be acquired)     | <b>93.8</b>      |
|        | <b>TOTAL</b>                           | <b>833.17 ha</b>   | <b>0</b>                    | <b>53.5</b>                                | <b>666.03 ha</b>            | <b>1552.7 ha</b> |

5. The instant amendment proposal is for seeking amendment in the EC dated 20/11/2015 as given below:

- i. As per the assessment done by Industrial Promotion & Investment Corporation of Odisha (IPICOL), the nodal agency of Government of Odisha through Engineers India Limited (EIL) have assessed that the total additional land required for expansion to 6 MTPA is of only 666 acres i.e. 269.52 hectare as against 666 ha prescribed in the EC dated 20/11/2015. The major additional land requirement for red mud storage got reduced **to 263.5 ha against 571.53 ha** as per EC 2015 due to adoption of new technology and conversion from Wet disposal to Dry disposal of red mud.
- ii. Technical justification for Reduction of Land requirement for Red mud storage is due to following points to be adopted for disposal of red mud.
  - a) Switching from Wet disposal to Dry disposal through red mud Filtration unit by reducing the moisture percentage to 20-25%.
  - b) Adoption of Wick drain technology in the earlier Wet red mud storage area for extraction of moisture content and utilize the area for Dry stacking.
  - c) Adoption of stage-wise dry stacking methodology with proper design analysis.
  - d) Development of a new red mud disposal area contiguous to the existing red mud disposal area so as to increase the base of the dry stacking as well as height of the stack.
  - e) Separate storage to handle the run-off water of red mud stacking area during monsoon.
  - f) It is to be noted that with dry mud stacking, the disposal area is not a pond but a dry disposal area for Bauxite Residue.
- iii. Design aspects of red mud storage area with Dry disposal with increasing Height.

M/s. Vedanta appointed M/s. Golder Associates who has experience in dry stacking of tailings. Based on M/s. Golder Associates design report, the following points need to be ensured for the safe disposal of dry red mud.

- a) Stacking height will vary from **RL 463m to RL 550m**
- b) At the center of the dry stack, the height will be 87m. The overall slop is very safe at 4.5H:1V.
- c) Height of each stack limited to 7m height.
- d) Berm width of 15m to be kept after each stack



- e) Side slope over the wick drain area to be kept 3H: 1V and in other area 2H: 1V
- f) 500mm thickness of soil blanketing to be done outer surface of the slope followed by coir mats with seeding for green vegetation.
- g) After reaching the final height of proposed stack, slope to be regraded & convert to single slope which will be kept in 4.5H: 1V.

After completion of design by M/s. Golder, for reassurance of the safety of the proposed design M/s Vedanta Limited (VL) had taken the services from IIT, Bhubaneswar for independent analysis. Dr. B Hanumantha Rao, Asst. Prof. IIT, Bhubaneswar had done the analysis through simulation for the proposed dry red mud stack. The action plan delineated by the IIT, Bhubaneswar is as below:

**Emergency Response Plan for risk management:** This report primarily comprises of emergency preparedness and response plan under an eventuality of breach in dyke of existing or proposed new solid waste red mud storage facility. The action plan is prepared considering two scenarios: breach in dyke of the red mud storage facility and rupture of red mud slurry carrying pipeline. The report highlighted Emergency Command Structure in G-shift working hours and silent hours, which comprises of combat group, Rescue team and Communication coordination group. The duties and responsibility of each group also clearly mentioned in the report.

**Checklist of monitoring tailings storage facility:** The monitoring check list comprised of reporting the present condition of tailings storage on Daily, Weekly, Monthly, and Quarterly basis, which follows a hierarchy.

**Instrumentation for monitoring of tailings storage facility:** The monitoring aspects include sliding of the slope, fluctuation in seepage and settlement of embankment. The action plan delineates monitoring of these aspects by installing vibrating wire piezometer in wick drain area, piezometer in dykes for the pore pressure measurement & calculation of FOS (factor of safety), survey monuments in the embankment and inclinometer on the slope of the starter embankment. Through these instruments, safety of the dyke will be monitored on regular basis to avoid any critical situations. It is also recommended to monitor the pore pressure so that pore pressure should not increase beyond 40KPa and 55KPa in stage-1L & 2B-2.

**Water Management:** The action plan addresses two aspects of water management: surface runoff water within the stacking area and fresh water coming from hillside catchment area. Surface runoff from the stacking area will be diverted into process Water Lake which is utilized internally by proponent. To manage the fresh water, it is first collected in the storm water pond to be constructed on the upstream side of stacking area and shall be released into natural stream or nalla. The action plan by proponent on the recommendation of IIT Bhubaneswar for utilization of fresh water is by implementation of 100% pumping system.

**Closure plan:** The action plan on Closure plan includes regrade the slope by benching, redesign of toe drain, covering the red mud with 500 mm thick natural soil, covering the natural soil with coir mats and plantation on coir mats to minimize the precipitation infiltration, to enhance the greenery, and to reduce the erosion.

**Post closure monitoring plan:** Action plan on post closure includes erosion prevention by gully formations, habitat assessment, retention of greenery by monitoring the



surveillance of plant species, quality checking of surface water and ground water on regular basis, and land use for beneficial purpose.

**Dam break analysis to minimize the impact on Environment and human habitat:**

M/s. Golder Associates vide report no.: 1786571/A.0 has submitted a detailed report on dam break analysis of red mud storage facility. Action plan of proponent is to evacuate the habitants of Bundel village and the habitants of the temporary shops developed near to the plant gate with the help of rescue team and shift the habitants to safe location. Action plan of proponent also includes to have material resources such as 3600 sandbags, 360 m<sup>3</sup> of boulders, 300 m<sup>3</sup> of stone aggregates and 120 m<sup>3</sup> of stone clips to hinder the flow of debris under contingency plan.

- iv. Total land requirement for 6 MTPA Alumina as recommended by EIL (appointed by Government of Odisha through IPICOL in October 2018 is 1102.54 ha. Out of total area, the land under possession and acquisition is 833.17ha and 269.63ha respectively. Out of 269.63 ha, 87.81 ha is in final stage of acquisition and land filed for acquisition is 183.7 ha.
- v. Following is the Configuration & capacity change granted in EC vis-a-vis with the proposed changes in configuration & capacity of units:

| S No | EC condition  | Capacity as per EC letter dated 20/11/2015  | Amendment  | Remarks   |
|------|---|---|--|---|
| 1    | Specific Condition no v of the Environmental clearance F. No. J-11011/406/2011-IA II(1) dated 20/11/2015. | "For Phase-III (6 MTPA), the proponent shall obtain an amendment of EC after completion of land acquisition of the balance area of 666.03 ha detail of which will be furnished to MoEF&CC."   | For phase-III (6MTPA), the proponent shall acquire a land of 666 acres.  | This condition for amendment from 4 MTPA to 6 MTPA. |
| 2    | Specific Condition no (xxiii) of the EC dated 20/11/2015  | Of the total area of 1552.65 ha. an area of 512.37 ha (33%) shall be developed into green belt. Of this, a total of 215.20 ha of green belt have been developed and the balance area of 297.17 ha shall also be brought under plantation, which includes plantation in a width of 15-20m along the remaining boundary wall of 3km of the 8km. | In view of proportionate reduction in Green belt land requirement by IPICOL, the condition will be read as under:<br><br>"Of the total area of 1102.54 ha. an area of 363.83 ha (33%) shall be developed into green belt. Of this, a total of 278.21 ha of green belt have been developed and the balance area of 85.62 ha shall also be | Present green belt is 29% of land in possession     |

Expansion of Alumina Refinery (1 MTPA to 6 MTPA) and Captive Power Plant (75 MW to 285 MW) by M/s. Vedanta Limited, located at Lanjigarh District Kalahandi Odisha -Amendment in Environment Clearance – regarding.



| S No | EC condition | Capacity as per EC letter dated 20/11/2015 | Amendment  | Remarks |
|------|--------------|--|--|---------|
|      |              |  | brought under plantation, which includes plantation in a width of 15-20m along the remaining boundary wall of 3km of the 8km." |         |

6. The total land estimated for production of 6.0 MTPA Alumina at the time of grant of EC was 1552.7ha. This was finally revised to 1102.54 ha by IPICOL based on the report of EIL. No additional land is required to set up the main plants covered in three phases. But additional land will be required exclusively for **(a) storing Bauxite Residue up to year 2045 after commencement of 6.0 MTPA Alumina production by year 2025, (b) development of additional green belt and (c) development of Railway line which are requirement after production is started.**
7. Detailed presentation was made by the project proponent inter-alia reduction in project area, issues related to red mud pond design & stability and lay out etc. Further, the land break up requirement as per the EC dated 20/11/2015 and proposed EC amendment is given as below.

| S. No. | Facility                              | Total land (ha) for 6 MTPA alumina refinery as per EC dated 20/11/2015 | Proposed amendment in land (ha) as per PP | Remarks  |
|--------|---------------------------------------|--|---|--|
| 1.     | Main Plant with greenbelt             | 420  | 284.5                                     | 420 ha in EC included Conveyor & Mines approach road and part of Railway siding  |
| 2.     | Red Mud Storage Pond with green belt  | 783  | 432.4                                     | Reduction in land due to Dry disposal of red mud cake to optimum height.   |
| 3.     | Ash Pond with Pipeline with greenbelt | 175.4  | 91.1                                      | As per MoEF&CC norms, 0.32 ha/MW of land comes to 92.3 ha of land requirement for 285MW power plant. EIL also considered 50% ash utilization. At present, ash utilization is 100% since last three years. With the above scenario and the utilization of ash by Fly ash brick industries, no additional land is required for Ash pond. |
| 4.     | Township & Misc including greenbelt   | 80.5   | 72.7                                      | As per EIL assessment, the exiting township area of 52.5 ha (129.7 acres) is sufficient to cater to the need of additional manpower requirement of 6 MTPA by   |

Expansion of Alumina Refinery (1 MTPA to 6 MTPA) and Captive Power Plant (75 MW to 285 MW) by M/s. Vedanta Limited, located at Lanjigarh District Kalahandi Odisha -Amendment in Environment Clearance – regarding.



| S. No. | Facility                    | Total land (ha) for 6 MTPA alumina refinery as per EC dated 20/11/2015 | Proposed amendment in land (ha) as per PP | Remarks   |
|--------|-----------------------------|--|---|---|
|        |                             |  |   | constructing multiple high-rise apartments. Remaining area is for green belt development. |
| 5.     | Railway including Greenbelt | 93.8   | 145.2                                     | EIL also considered the railway sidings of bauxite and coal inside plant.                 |
| 6.     | Air strip                   | --   | 29.2                                      | Considered in Main plant area during EC accorded on 20/11/2015.                           |
| 7.     | Conveyor & Mines            | --   | 47.8                                      |   |
|        | <b>TOTAL</b>                | <b>1552.7 ha</b>   | <b>1102.9 ha*</b>                         |   |

\*Note –Total land is 1102.9 ha inter-alia including Forest land of 26.244 ha for which stage II forest clearance has been accorded by MoEF&CC vide letter no. 5-ORC264/2015-BHU dated 12/11/2020. Out of the total land, the land under possession and acquisition is 833.17 ha and 269.63 ha respectively. Out of 269.63 ha, 87.81 ha is in final stage of acquisition and land filed for acquisition is 183.7 ha. To this effect, PP has submitted a letter number IDCO LAE-7667/2021-4760 dated 12/03/2021 issued by IDCO. In addition, PP informed that the air strip was established and commissioned after obtaining approval from Airport Authority of India on 15/05/2006 and is not meant for commercial purpose. The said air strip does not require environmental clearance under the provisions of EIA, 1994 and EIA, 2006.

8. One court case is pending at NGT, Kolkata as on date: Shri Prafulla Samantaray, a self-proclaimed environmental activist, has filed an appeal against the order of MOEF&CC granting EC for expansion of Alumina Refinery from 1 to 4 MTPA and CPP from 75 to 285 MW dated 20.11.2015. The appeal (No. 01 of 2016) has been filed before National Green Tribunal, Kolkata Bench. In the said appeal, one Misc. case (MA No. 333/2016/EZ) has also been filed for condonation of delay in filing appeal. The matter was last listed for hearing on 17/02/2021. The matter would be posted for hearing of the arguments, however the same has not been heard by the Hon'ble Tribunal. No interim order has been passed by Hon'ble Tribunal in this matter.
9. Name of the EIA Consultant: GLOBALTECH Enviro Experts Pvt. Ltd. [S.No.96 in the List of ACOs with their Certificate / Extension Letter no. NABET/EIA/2023/IA0066 Rev. 10, May 13, 2021].

#### Observations of the Committee

10. The Committee noted that the project proponent is seeking following amendments in the EC dated 20/11/2015 as per the stand taken by the Ministry during the accord of the said EC with a reduced land requirement.

#### a. Subject matter of the EC dated 20/11/2015

Expansion of Alumina Refinery (1 MTPA to 6 MTPA) and Captive Power Plant (75 MW to 285 MW) by M/s. Vedanta Limited, located at Lanjigarh District Kalahandi Odisha

- b. Total area of the project shall be 1102.54 ha in place of 1552.7 ha. The land area break up for 1102.54 ha is as below.

| S.No. | Facility                              | Total land (ha) for 6 MTPA alumina refinery |
|-------|---------------------------------------|---|
| 1.    | Main Plant with greenbelt             | 284.5                                       |
| 2.    | Red Mud Storage Pond with green belt  | 432.4                                       |
| 3.    | Ash Pond with Pipeline with greenbelt | 91.1  |
| 4.    | Township & Misc including greenbelt   | 72.7  |

Expansion of Alumina Refinery (1 MTPA to 6 MTPA) and Captive Power Plant (75 MW to 285 MW) by M/s. Vedanta Limited, located at Lanjigarh District Kalahandi Odisha -Amendment in Environment Clearance – regarding.



| S.No. | Facility                    | Total land (ha) for 6 MTPA alumina refinery |
|-------|-----------------------------|---|
| 5.    | Railway including Greenbelt | 145.2                                       |
| 6.    | Air strip                   | 29.2  |
| 7.    | Conveyor & Mines            | 47.8  |
|       | <b>TOTAL</b>                | <b>1102.9 ha*</b>                           |

\*Note –Total land is 1102.9 ha inter-alia including Forest land of 26.244 ha for which stage II forest clearance has been accorded by MoEF&CC vide letter no. 5-ORC264/2015-BHU dated 12/11/2020. Out of the total land, the land under possession and acquisition is 833.17 ha and 269.63 ha respectively. Out of 269.63 ha, 87.81 ha is in final stage of acquisition and land filed for acquisition is 183.7 ha. To this effect, PP has submitted a letter number IDCO LAE-7667/2021-4760 dated 12/03/2021 issued by IDCO. In addition, PP informed that the air strip was established and commissioned after obtaining approval from Airport Authority of India on 15/05/2006 and is not meant for commercial purpose. The said air strip does not require environmental clearance under the provisions of EIA, 1994 and EIA, 2006.

**c. Specific condition no.v of the EC dated 20/11/2015**

For phase-III (6MTPA), the proponent shall acquire a land of 666 acres.

**d. Specific condition no.xxiii of the EC dated 20/11/2015**

Of the total area of 1102.54 ha. an area of 363.83 ha (33%) shall be developed into green belt. Of this, a total of 278.21 ha of green belt have been developed and the balance area of 85.62 ha shall also be brought under plantation, which includes plantation in a width of 15-20m along the remaining boundary wall of 3km of the 8km.

- e. The Committee satisfied with the additional information submitted by the proponent with respect to red mud pond design report.

**Recommendations of the Committee**

11. In view of the foregoing and after deliberations, the Committee recommended for amendment in the EC dated 20/11/2015 as mentioned above at para number 10 subject to the stipulation of following additional specific conditions in addition to the EC conditions dated 20/11/2015:

- i. Project proponent shall abide by all orders and judicial pronouncements, made from time to time, passed by Hon'ble National Green Tribunal, in Appeal No. 1 of 2016.
- ii. Particulate matter emission from the stacks shall not exceed 30 mg/Nm<sup>3</sup> for the expansion project i.e. 4 to 6 MTPA and existing project pollution control devices shall be retrofitted to achieve PM emissions less than 30 mg/Nm<sup>3</sup> in next three years from the date of issue of the EC amendment letter.
- iii. Red Mud Pond (RMP) and Process Water Lake (PWL):
  - a. Installation of a warning system that provides immediate warning to the surrounding population and mine staff in the event of a dam break shall be provided.
  - b. Assessment of Dam Safety once a year (Dam Safety Assessment) in order to check the stability of the dykes of the RMP and the embankments of the PWL will be carried out and report submitted to the Regional Office of MoEFCC.
  - c. Avoidance of the construction of any infrastructure within the area immediately downstream of the dyke of the RMP or the embankment of the PWL in order to prevent congregations in zones where the warning time is shorter than 30 minutes.
  - d. A special Disaster Management Action Plan shall be prepared and implemented to address the risks and safety associated due to construction and operation of the red mud pond. This should also include the Site Specific Seismic Analysis. The necessary actions points arising out of this Action Plan / seismic analysis will be implemented and report submitted to the Regional Office of MoEFCC from time to time.
  - e. Mock drills exercise related to breach/failure of RMP shall be conducted once in six months and report submitted to the Regional Office of MoEFCC

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- f. All Instrumentation sensors shall have valid calibration certificate and shall be recalibrated before expiry of validation certificate.
- g. An independent agency having requisite expertise for the continuous monitoring, evaluation of the safety and environmental concerns of the proposed red mud pond shall be engaged. This shall also include, among all other things including the points listed above, study on rheology of the tailings, factor of safety analysis of red mud pond using appropriate scientific method, impact on red mud pond storage capacity, and schedule of stacking, limitation of storage capacity-based stack slope and drainage system for handling flash floods etc. Based on the reports, including monitoring reports, regularly submitted by this agency, the project proponent shall submit half yearly progress report on the status of implementation of mitigative measures to the Ministry and to its Regional Office.

**Decision of MoEF&CC**

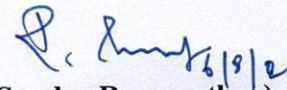
12. The undersigned is directed to inform that Ministry of Environment, Forest and Climate Change has examined the proposal in accordance with the Environment Impact Assessment (EIA) Notification, 2006 & further amendments thereto and after accepting the recommendations of the Expert Appraisal Committee (Industry-1) hereby decided for amendment in the EC dated 20/11/2015 as mentioned above at para number 10 above subject to the stipulation of additional specific conditions as mentioned above at para number 11 in addition to the EC conditions dated 20/11/2015.
13. All other terms and conditions stated in the MoEF&CC letter of even number dated 20/11/2015 shall remain unchanged.
14. The project proponent shall obtain fresh Environment Clearance in case of change in scope of the project if any.
15. This issues with the approval of the Competent Authority.

**Yours faithfully,**

  
(Sundar Ramanathan)  
Scientist 'E'

**Copy to:-**

1. Secretary, Department of Environment, Government of Odisha, Secretariat, Bhubaneswar.
2. Regional Officer, Ministry of Environment, Forest and Climate Change, Integrated Regional Office, A/3, Chandersekharpur, Bhubaneswar – 751023.
3. Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
4. Chairman, Odisha State Pollution Control Board, Parivesh Bhawan, A/118 Nilakantha Nagar, Unit-VIII, Bhubaneswar-751012.
5. Chief Wildlife Warden, Govt. of Odisha, 5<sup>th</sup> Floor, BDA Apartments, Prakruti Bhawan, Nilakantha Nagar, Nayapalli, Bhubaneswar-751012
6. Member Secretary, Central Ground Water Authority, A2, W3 Curzon Road Barracks, K.G. Marg, New Delhi-110001.
7. District Collector, Kalahandi District, Odisha.
8. Guard File/Record File/Monitoring File.
9. MoEF&CC Website

  
(Sundar Ramanathan)  
Scientist 'E'