

# PRE-FEASIBILITY REPORT

FOR

EXPANSION OF ALUMINA REFINERY (FROM 1.5 TO 3.0 MTPA)

&

CAPTIVE CO-GENERATION POWER PLANT (FROM 90 TO 150 MW)

OF

UTKAL ALUMINA INTERNATIONAL LIMITED

AT DORAGUDA, RAYAGADA DIST, ODISHA

*Submitted to*

MINISTRY OF ENVIRONMENT, FORESTS AND CLIMATE CHANGE

NEW DELHI

*Submitted by*

ADITYA BIRLA



UTKAL ALUMINA

UTKAL ALUMINA INTERNATIONAL LIMITED  
RAYAGADA, ODISHA

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### 1.1 Introduction

M/s. Utkal Alumina International Limited (UAIL), a part of Aditya Birla Group has established an Alumina Refinery at Doraguda village of Kashipur Block in Rayagada district of Odisha state.

M/s. Utkal Alumina International Limited (UAIL) was accorded Environmental Clearance (EC) for 1.0 MTPA Alumina Refinery and 50 MW CPP vide letter no. J-11011/76/94-IA.II (I) dated September 27, 1995. The project activities were started in August 2000. Subsequently application was filed for expansion of the plant before the MoEF and M/s. Utkal Alumina International Limited (UAIL) was accorded Environmental Clearance (EC) for **Expansion of Alumina Refinery from 1.0 MTPA to 3.0 MTPA** along with cogeneration power plant from 50 MW to 90 MW vide letter no. J-11011/753/2007- IA II (I) dated 29th January, 2008.

Accordingly, we have already constructed and commissioned 1.5 MTPA Alumina Refinery and 90 MW Co-generation Power Plant. Rest of the 1.5 MTPA Alumina Refinery and additional 60 MW Co-generation Power Plant need to be installed. Hence, UAIL seeks for an EC for this expanded Alumina (from 1.5 to 3 MTPA) and Power Plant (from 90 to 150 MW) capacity. Infrastructural developments stated below required for 3.0 MTPA Alumina Refinery have already been completed.

- 100% Land Acquisition of 2642.76 Acres
- R&R of 183 displaced families
- 90 MW Power Plant constructed and in operation
- Red Mud Pond, Ash Pond, Raw Water Intake and Reservoir
- Rail Linkage & associated infrastructure for 3.0 MTPA Alumina Refinery
- Diversion of Forest Land lying with in the refinery project
- Water Allocation and Water conveying pipe line
- Long Distance Conveyor (LDC) for transportation of Bauxite from Captive Bauxite Mines at Baphlimali Hill Plateau for 3.0 MTPA Alumina Refinery
- Associated Infrastructure like boundary wall & internal roads
- Site is prepared and ready for putting the rest machinery and equipment

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The need for a new EC is warranted owing to the expiry of the above granted EC and requirement of expansion of the proposed power plant.

## 1.2 Project Objectives

The primary objective is to increase the production capacity of the refinery in an environmentally sustainable basis. This will be achieved within the framework of providing a significant contribution to the socio economic development of the region which was otherwise an economically backward region of the country.

### 1.2.1 Specific objectives

- Providing a timely response to market conditions and increasing global demand for alumina;
- Securing a competitive and sustainable future for the project operations through economies of scale;
- Improving the environmental performance of the initially proposed capacity through increased efficiencies achieved by upgraded processing and operational practices; and
- Providing additional benefits to the community through business opportunities, direct and indirect employment including training and skill development, actively developing self help groups for sustainable indigenous business and investment.

## 1.3 Project Need and Benefits

India is also one of the major producers of bauxite and alumina. The contribution of the Alumina industry to the economy of the country is substantial. The global long-term Aluminium market has a high growth rate of 4-5% worldwide and an even higher (6-8%) in India. India can export the Aluminium produced in the country and earn valuable foreign exchange in the process.



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In order to tap the vastly available good quality bauxite deposits on Indian east coast and to produce high quality alumina, Utkal Alumina Project proposes to expand its operations from 1.5 MTPA to 3.0 MTPA.

To reduce the cost of production by expanding the current capacity, the project has been designed to meet the following requirements:

- Lower specific consumption of fuel, water and chemicals;
- Lower annual maintenance;
- Adequate instrumentation and automatic controls to ensure consistent quality and ease of operations;
- Improved environmental protection measures to minimize the pollution;
- To cope up with the requirements of the CREP guidelines;
- Adequate facilities to ensure safe operations of the plant;
- To meet the growing demand for Alumina in the country.

### 1.4. Alumina Refinery (Bayer's Process)

- ***Bauxite Receipt and Storage***

The primary crushed bauxite (-150mm), conveyed by about 18.11 km long conveyor connecting mines and the refinery, is discharged into transfer hopper. Belt conveyor below the transfer hopper feeds the bauxite to storage conveyor.

- ***Grinding & Digestion***

Bauxite is ground into small particles (generally less than a millimeter in size) and then mixed with a hot caustic soda solution under pressure to dissolve the available Aluminium oxide (alumina).

- ***Evaporation***

Evaporation is essential in alumina plant to counter balance the ingress of water, into the process from various sources owing to process requirement and to maintain desired caustic concentration levels at digestion and precipitation in order to maximize process yield.



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- **Precipitation**

The hot liquor is cooled and fine alumina hydrate added as 'seed'. Alumina hydrate in solution crystallizes out onto the seed. The 'spent' liquor is then recycled to digestion. Hydrate is alumina bonded to water ( $Al_2O_3 \cdot 3H_2O$ ), and in this form is the feedstock for most alumina chemicals.

- **Drying and Calcining**

The alumina hydrate crystals are washed and dried and calcined in fluid bed gas suspension Calciner at around 1000 °C to drive off the chemically combined water. The final product is Aluminium oxide ( $Al_2O_3$ ), which is the feedstock for Aluminium smelters.

### Proposed Expansion

The existing and proposed project configurations would be as follows:

Particulars	Initial Configuration at 1.0 MTPA (As per 1995 EC )	Existing Capacity (1.5 MTPA)	Final Configuration at 3.0 MTPA Capacity
Refinery	Line-I: 0.5 MTPA Line-II: 0.5 MTPA	Line-I: 0.75 MTPA Line-II: 0.75 MTPA	*Line-I: 1.0 MTPA *Line-II: 1.0 MTPA Line-III: 1.0 MTPA
CPP	50 MW	90 MW	150 MW

\*The capacity enhancement of 1.5 MTPA to 3MTPA will be achieved in three stages, i.e. i) By Process modification and capacity utilisation, the present capacity can be enhanced by about 14% (by 0.2 MTPA), ii) By adding additional equipment another 20% increase in capacity is envisaged (by 0.3 MTPA) without any capacity enhancement of the present Captive Co-generation Power Plant taking the capacity of the existing two lines to 2 MTPA, iii) One more parallel and similar line of 1 MTPA will be added to achieve the 3MTPA capacity along with 60 MW power plant.



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- *Water Requirement*

The maximum raw water requirement for 3.0-MTPA plant complex is estimated at about 22,330 m<sup>3</sup>/day which will be met from the San River and approval from Department of Water Resource (DoWR), Govt. of Odisha has already been obtained. No additional requirement is envisaged.

- *Power Requirement and Source*

Total power requirement for expanded Alumina Refinery Complex is 150 MW. Power will be sourced from Captive Co-generation Power Plant inside the plant premises.

## 2.0 Environment Management Plans


### 2.1 Construction Phase

- The construction activities for expansion of the capacity of refinery will not require displacement of people, cutting of vegetation, loss of soil etc. Entire construction activity will be under taken within the plant premises. There is no requirement for extra land for expansion.
- During the construction, the debris so generated will be used for leveling and filling of the low lying areas of the plant premises.
- The construction activity will not have any adverse impact with respect to ambient air quality. The noise will be generated mostly within the proposed plant boundary.

### 2.2 Operation Phase

#### 2.2.1 Air Environment

- Major sources of emissions are Boilers and Calciners;
- Efficient air pollution control devices such as ESPs will be deployed at the stacks of the Boilers & Calciner, Bag filters at material handling, DFS at crushers and rod mills to control fugitive emission.

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- Present ambient air quality levels are found to be well below the NAAQ standards

### 2.2.2 Water Environment

- Water is one of the major inputs for power generation and alumina production process. Its major use is in process cooling and process consumption, while domestic requirement are marginal.
- 100% waste water generated from process will be recycled and reused.
- Elimination of all significant sources of caustic seepage to ground during the operations is designed to eliminate the contamination of the ground water.

2.2.3 No process waste water shall be discharged from the plant. Only surface runoff will be allowed to discharge after neutralization during the monsoon.

### 2.2.4 Land Environment


- No geographical changes will occur due to the proposed expansion as expansion will be carried out within the own land premises.

### 2.2.5 Solid waste

- Red mud, which is a slurry containing natural substances originally present in the Bauxite- i.e. the ore residues with a residual amount of Iron, titanium, silica, alkali and other impurities - is left over from the process.
- Presently Red mud and fly ash are being disposed of using High Concentration Slurry Disposal (HCSD) system to Red Mud Pond and Ash Pond respectively provided with HDPE Liner. Facility for dry disposal system for Red Mud through Red Mud Filtration (RMF) is under progress. Similar dry disposal method for Red Mud will also be followed in the expanded unit.

### 2.2.6 Noise Environment

- Major noise generating sources are crushers, rod mills, compressors, lime handling, turbines etc.

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- During construction low noise generating machinery will be engaged.
- Controlled blasting will be adopted if required.

### 2.2.7 Traffic

- All the raw materials and finished products are being transported by Rail and road. After the expansion, the transport of raw material and finished products will be by rail too.


### 2.2.8 Hazardous Waste Management

- Spent Oil, empty barrels contaminated with Hazardous waste will be stored in Hazardous waste storage shed with spill control facility and sold to authorized recyclers registered with CPCB.
- Spent ion exchange resin will be send to secured land fill.
- Used batteries shall be returned to the authorized vendors as per the Batteries (Management & Handling) Rules, 2001 under the Environment Protection Act.

### 3.0 Man Power Requirement

The total manpower required is about 1100 which includes technical and non-technical and management staff for the 3.0 MTPA complex. Apart from that, quite a good number of contractual labors will be required during operation of the alumina complex. The details of man power are presented below.

Man Power details as on 31-03-2017		
Sl. No.	Category	No. of employees
(i) UAIL Employees		
1	Management	229
2	Supervisory	169
3	Workmen	327

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Total (a)	725
(ii) Contract Employees (b)	1775
Total (b)	1775
Grand Total (a+b)	2500

#### 4.0 Social and Community Management Plan

- As per the company CSR policy, a community development plan has been devised to improve the social well being of the surrounding community.
- The project will provide additional employment potential for unskilled, semi-skilled and skilled categories as well as potential for self-employment. Further, it will improve the Education, Health, Transportation and Infrastructure facilities of the region.
- The local community peoples are being trained for increasing their agricultural production through introduction of modern production techniques and food preservations techniques.
- Assistance to the PAPs are being given in developing entrepreneurships to meet the demand in the secondary segment including transport, restaurants, hotels, shops etc in the locality.
- Medical facilities are being extended to the local community to handle diseases especially dysentery, fever, cold/cough, toothache/headache, skin disease, and malaria. Regular health camps are being organized in nearby communities.
- UTKAL has engaged itself since 1995 in development of the host area in various community development activities and will continue to do the same.

#### 5.0 *Greenbelt Development & Afforestation*

- In-house Nursery has been developed spreading over an area of five acres having capacity of 2.0 lakh saplings
- Greenbelt around plant premises, railway corridor, red mud pond, ash pond, infrastructural areas have been developed by planting in 317

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hectares of land up to the year 2016. The same will be continued in coming years also.

- Apart from this, social forestry, avenue plantation and free sapling distribution in the region is being undertaken and will be continued in the coming years also.

#### **6.0 Post-Project Monitoring Plan**

- An independent Environment Management Cell has been established with qualified personnel responsible for environmental monitoring and environmental safe guard measures.
- Meteorological data, air quality data, noise levels inside and outside the work area, water quality and solid wastes are being monitored regularly and the same will be included for the expansion phase also.

#### **7.0 Risk Assessment & DMP**

- Adequate measures have been taken for the control of fire and explosion hazards. Further, onsite and offsite Disaster Management Plan has been prepared and implemented at site. The same will also be followed for the rest of the project. No hazardous substances will be produced.

#### **8.0 Conclusion**

Utkal is not only concerned but also committed to sustainable socio-economic development and environment management. As a leading industrial establishment of the country, UTKAL has been very keen in discharging its social obligations for maintaining the ecological balance.