

**EXECUTIVE SUMMARY**  
**OF**  
**ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**Of**  
**INTEGRATED PROJECT**  
**(CEMENT PLANT, CAPTIVE POWER PLANT**  
**& CAPTIVE LIMESTONE MINE)**

**GREENFIELD CEMENT PLANT**

**PRODUCTION: 2.72 MTPA CLINKER**  
**4.05 MTPA CEMENT**  
**65.0 MW POWER**  
**3.90 MTPA LIMESTONE**

**At**  
**Bidiyadih, Bhurkunda, Godadih & Bohardih Villages,**  
**Masturi Tehsil, Bilaspur District, Chhattisgarh**

**By**  
**ACC LTD**

## **EXECUTIVE SUMMARY**

### **1.1 INTRODUCTION**

ACC proposes to install “Chilhathi Cement Project”, an Integrated Green Field Cement Plant with 4.05 MTPA Cement production capacity near Bidiyadh & Bohardih villages, Masturi Tehsil, Bilaspur Dt., Chhattisgarh with total capital investment of Rs. 2900 Crores. The integrated plant comprises the following units:

- ☉ 4.05 MTPA Cement Plant (Clinker-2.72 MPTA)
- ☉ 65 MW Coal based Captive Power Plant
- ☉ 3.9 MTPA Limestone Mining from 582.962 ha (Non Forest) area

The limestone requirement of the cement plant will be 3.9 MTPA, which will be met from captive limestone deposit located adjacent to the mine near Bidiyadh, Bhurkunda, Godadh & Bohardih villages of Masturi Tehsil, Bilaspur District, Chhattisgarh.

### **1.2 LOCATION OF THE PLANT AND MINES**

The Mine and Plant sites are located near Bidiyadh, Bhurkunda, Godadh & Bohardih village, Masturi Tehsil, Bilaspur district of Chhattisgarh State.

### **1.3 REQUIREMENTS OF THE PROJECT**

Limestone will be sourced from the Limestone deposit (captive Mine) located adjacent to the plant site.

Total land of cement plant and colony is about 105 Ha. Present land use is mix of waste and agricultural land.

Mine area extending in 582.962 Ha falls under jurisdiction of Godadh, Bhurkunda, Bohardih and Bidiyadh villages of Masturi Tehsil, Bilaspur District, Chhattisgarh.

The total fresh water consumption of the project including colony is about 2870 m<sup>3</sup>/day

ACC has applied for the withdrawal of water from Liagarh river to the state water board permission awaited.

The power requirements of the cement plant is about 65 MW. This requirement will be met from the proposed power plant.

To augment the power requirement during exigencies, ACC will install two DG sets each of 3.0 MW.

ACC will install complete utilities and other infrastructural facilities in the cement plant.

The total manpower requirement during construction phase is estimated to be about 1000.

The total manpower requirement of the cement plant, Power plant and mine is estimated to be 200 during operation phase.

ACC will provide a common full-fledged township comprising of housing facilities for cement plant, power plant, mine and security personnel and supporting staff along with other amenities such as School, Guest House, Hospital, etc. Colony will be provided in the upwind direction.

## **1.4 PROJECT DESCRIPTION**

### **CEMENT PLANT**

The technical concept of the plant has been developed keeping in view the state-of-the-art technology in pyro-processing & grinding with high level of control & automation as well as an effective control on the level of pollution.

The cement plant is based on dry process and precalciner technology with annual clinker output of 2.72 MTPA using a single Kiln and cement of 4.05 MTPA. The Kiln will be designed to give clinker output of 7000 tonnes/day. All the units in the upstream and downstream of the kiln will be designed to meet the requirement.

### **LIMESTONE MINE**

The Limestone deposit is spread over an area of 582.962 ha.

Limestone reserves in the mine lease area of 582.962 Ha is estimated to be about 143.53 million tonnes which are sufficient for 42 years of plant operation.

The limestone excavated from the mine will be taken to the crusher through dumpers.

## **1.5 DESCRIPTION OF ENVIRONMENT**

As part of Environmental Impact Assessment study, baseline status of environmental parameters has been monitored during Summer Season 2012 covering the months of March - May '12.

## **METEOROLOGY**

The predominant wind directions during these hours were from SW-WSW-W-WNW directions accounting to about 45.4 % of the time. Calm winds of less than 1.0 kmph prevailed for 7.4 % of the time.

## **AIR ENVIRONMENT**

Ambient air quality of the study area has been assessed through a network of 10 ambient air quality locations.

The Ambient Air Quality monitored in the study area was found to be well within the limits of NAAQ standards prescribed for Industrial Residential, Rural & Other Areas.

### **AIR QUALITY IN THE STUDY AREA**

<b>S.NO</b>	<b>POLLUTANT</b>	<b>RANGE OF VALUES</b>	<b>NAAQS STANDARDS FOR INDUSTRIAL, RESIDENTIAL, RURAL &amp; OTHER- AREAS</b>
1	PM <sub>10</sub>	37-53	100
2	PM <sub>2.5</sub>	22.2-31.8	60
3	SO <sub>2</sub>	9-11.9	80
4	NO <sub>x</sub>	10.5-13.4	80

*(All the values are in  $\mu\text{g}/\text{m}^3$ )*

## **NOISE ENVIRONMENT**

Noise levels recorded were found to be in the range of 51.0 – 57.5 dB (A) during daytime and in the range of 42.3 – 50.6 dB (A) during night time.

## **WATER ENVIRONMENT**

Seventeen water samples were collected from in and around the plant and mine sites within 10 km radius. The parameters thus analysed were compared with IS –10500.

## **SOIL ENVIRONMENT**

Ten samples were collected to assess the soil quality in the 10 km study area of plant and mine sites which revealed low fertile quality

## **BIOLOGICAL ENVIRONMENT**

From the study it has been observed that there are no endangered, endemic or threatened species.

## 1.6 ANTICIPATED ENVIRONMENTAL IMPACTS & MITIGATION MEASURES

### 1.6.1 AIR ENVIRONMENT

The emission from the cement plant is mainly from clinker production of 2.72 MTPA along with cement of 4.05 MTPA and 65 MW power generation. The mine emissions are mainly fugitive dust

Predicted maximum cumulative ground level concentrations computed for 24-hour mean meteorological data of Summer season are superimposed on the maximum baseline concentrations is shown below.

#### CUMULATIVE GROUND LEVEL CONCENTRATIONS AND OVERALL SCENARIO, $\mu\text{g}/\text{m}^3$

24-Hourly Concentrations	Particulate Matter-10 (PM <sub>10</sub> )	Particulate Matter-2.5 (PM <sub>2.5</sub> )	Sulphur Dioxide (SO <sub>2</sub> )	Oxides Of Nitrogen (NO <sub>x</sub> )
Baseline concentration, max	53.0	31.8	11.9	13.4
Predicted Groundlevel Concentration (Max)	11.9	4.6	29.3	18.2
Overall Scenario	64.9	36.4	41.2	31.6
NAAQ standards for Industrial, Rural, Residential and Other areas	<b>100</b>	<b>60</b>	<b>80</b>	<b>80</b>

### AIR POLLUTION CONTROL MEASURES

**ACC** to control particulate emission will install the following pollution control equipment for main process units:

POLLUTION CONTROL EQUIPMENT		
1.	Raw Mill/Kiln	Bag House for raw mill and kiln exhaust gases
2.	Kiln feeding system	Bag filter
3.	Clinker cooler	Electro Static precipitator
4.	Coal Mill	Bag filter
5.	Cement mill	Bag filter

Bagfilters will be provided at various locations in the process line apart from Installation of above Baghouse, Bag filters and ESP, to control the dust emissions from dropping/transfer points of the belt and bucket conveyors.

- All the flue gas outlets will be provided with state of art air pollution control equipment to maintain the particulate emission level below 50 mg/Nm<sup>3</sup>
- The dust collected in the pollution control devices is recycled back to the cement plant.
- The roads in the plant will be paved to prevent dust emissions.
- To control the dust emissions from dropping/transfer points of the belt and bucket conveyors, Bag filters will be provided at various locations of the transfer points.
- All the raw material i.e flyash and cement will be stored in the silos provided with bagfilters for control of fugitive dust emissions.

### **POWER PLANT**

The proposed power plant will be operated on coal where PM, SO<sub>2</sub> and NO<sub>x</sub> are the major pollutants emitted.

The bottom ash generated in the form of clinker is collected in the hoppers. The clinker is ground into ash and used for cement manufacturing.

ACC will implement the following air pollution control measures for the 65 MW power plant.

- Electrostatic precipitators for controlling particulate emission from the 160 tph boilers.
- Installation of 100 m tall stack to exhaust the flue gases from the boiler

Burners of latest design will be incorporated to minimise the emission of Nitrogen oxides from boilers. Burning of coal will result in NO<sub>x</sub> emission of about 750 mg/Nm<sup>3</sup> from the stack of the proposed power plant. This will lead to increase of ambient NO<sub>x</sub> level. Predicted NO<sub>x</sub> level due to emission from the proposed power plant super imposed on the baseline concentrations showed the groundlevel concentrations are well within the limits of NAAQ standards.

### **FUGITIVE DUST CONTROL IN THE CEMENT PLANT**

The following measures for control of Fugitive dust as per the CPCB standards will be implemented:

1. Dust suppression system for both lime stone and clinker stock yards

2. Water spray while unloading coal in yard and dump hopper
3. Curtains around the coal dump hopper
4. All belt conveyors transfer points hoods sealing with belt curtains and metal sheets
5. Laying of Concrete roads for vehicle movement
6. Dust collectors for hopper venting
7. Fly ash transportation by closed tankers
8. Fly ash transportation pneumatically.
9. Regular sweeping of roads.

Vacuum cleaner machines will be used at packing plant for cleaning of floors & Bag cleaning device

Unloading of material will be carried out with great care by avoiding dropping of material from height, wetting the material by sprinkling water while unloading.

All raw material storage areas will be covered.

### **LIMESTONE MINE**

The following dust prone spots are identified for adopting proper control measures in the mine area

- a. Drilling
- b. Blasting
- c. Excavation
- d. Loading operation
- e. Transportation of limestone and overburden

The environmental control measure which are proposed to control the fugitive dust released are given below:

- ☞ Wet drilling to suppress the dust emission from the drill machines at its source by inbuilt water injection system
- ☞ Regular water sprinkling on blasted heaps and haul roads with water tankers.
- ☞ About 230 m<sup>3</sup>/day of water will be used for dust suppression operations at mine which will be supplied initially from Lilagarh River and later from mine pit. Domestic water required for drinking and sanitation purposes will be supplied from bore wells after proper treatment of the water.
- ☞ Use of sharp drill bits for drilling holes and arrangements for bit regrinding. Charging the holes by using optimum charge and using time delay detonator.
- ☞ Avoiding blasting during high windy periods, night times and temperature inversion periods.

- ☞ Regular grading of haul roads and service roads to clear accumulation of loose material.
- ☞ Avoiding over filling of dumpers and consequent spillage on the roads
- ☞ The vehicles and machinery will be kept in well-maintained condition so that emissions will be minimized.
- ☞ Afforestation for control of dust. To arrest the amount of airborne dust, extensive plantation will be carried out within the mines and outside the mining lease.
- ☞ Plantation of wide leaf trees, creepers, tall grass along approach roads, and on safety barrier zones will help suppress dust.
- ☞ Road berms and dumps will be turfed and planted.
- ☞ Operator cabins in all items of major HEMM equipment are enclosed, to minimize dust exposure of the operators.

### **1.6.2 NOISE ENVIRONMENT**

During installation of cement plant, no significant impact is envisaged as most of the construction equipment produce noise level below 90 dB(A). The noise generated is expected to be intermittent and of short duration.

Noise level at the plant boundary, calculated from the above equation, is expected to be less than 65 dB(A) without considering any attenuation factors. It is proposed to develop an area of about 35 ha under greenbelt in the cement plant which will act as a barrier and further reduced the noise levels.

Noise levels generated in the cement plant will be confined within the boundary and with attenuation after greenbelt and construction of boundary wall; the impact of noise levels on surroundings is negligible.

### **POWER PLANT**

All equipment in the power plant would be designed for noise levels not exceeding 90 dB(A). Proper encasement of noise generating sources will be done to control the noise levels below 75 dB(A) at plant boundary

The steam turbine generator would be provided with acoustic enclosures and silencers in the exhaust. The steam turbines would be housed in a closed building which considerably reduces the noise.

In case of maintenance, the persons working near noise prone areas would be provided with ear muffs & ear plugs.

A thick greenbelt will be developed all around the plant which acts as



noise barrier.

## **NOISE POLLUTION CONTROL MEASURES - MINE**

137.56 ha of the mine area will be brought under afforestation.

The following noise abatement measurements are proposed for control of noise

- Proper and regular maintenance of vehicles, machinery and other equipment.
- Carrying out blasting only during day time and not on cloudy days
- Limiting time exposure of workers to excessive noise.
- The noise generated by the machinery is reduced by proper lubrication of the machinery and equipment.
- The workers employed are provided with protection equipment, earmuffs and ear-plugs, as a protection from the high noise level generated at the plant site wherever required.
- Noise levels are also controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes.
- Proper and timely maintenance of mining machinery
- Noise levels are also controlled by using optimum explosive charge, proper delay detonators and proper stemming to prevent blow out of holes.
- Speed of trucks entering or leaving the mine is limited to moderate speed of 25 kmph to prevent undue noise from empty trucks.

## **CONTROL OF GROUND VIBRATIONS**

During blasting, proper blast pattern will be adapted. The latest technology of sequential blasting and non-electric delay detonators, which reduce the impact on the ground vibrations and noise generation during blasting operations

The following measures will be implemented during at the mine:

- ⌘ Blast holes are initiated by short delay detonators
- ⌘ Blasting will be done using sequential blasting machine.
- ⌘ Avoiding excessive confinement of charges
- ⌘ Care will be taken to ensure that the effective burden is not excessive and the free face are kept effective long.
- ⌘ Number of blast hole per delay will be kept minimum.
- ⌘ Blasting of maximum number of holes towards the free face.
- ⌘ Blasting will be done in only one bench at a time.

Charge weights per delay are properly adopted so as to protect different categories of structure surrounding the mine site.

### 1.6.3 WATER ENVIRONMENT

Total water consumption in the cement plant, power plant, domestic requirement, greenbelt development and colony will be about 2870 m<sup>3</sup>/day.

#### WASTEWATER GENERATION AND DISPOSAL

The overall wastewater generation from the cement plant complex after commissioning of the cement plant and Power plant including domestic consumption is estimated to be about 571m<sup>3</sup>/day.

The wastewater generated is segregated as industrial wastewater and domestic wastewater.

Industrial wastewater is mainly from power plant and is about 435 m<sup>3</sup>/day and the Domestic wastewater will be 136 m<sup>3</sup>/day.

Of the total industrial wastewater of 435 m<sup>3</sup>/day will be recycled for use in cement manufacturing process and greenbelt development. The wastewater from the DM rinse/softeners, boiler blow down and back wash from softening plant after dilution with cooling water blow down will be used for dust suppression/reuse in cement plant/gardening.

The following table gives the details of wastewater generated from various units and treatment/disposal proposed along with quantities.

#### WASTEWATER TREATMENT/DISPOSAL

	M <sup>3</sup> /day	Treatment	Disposal
Cooling water blowdown	250	Dilution with other streams	For reuse in the cement plant, dust suppression & gardening
Boiler blowdown	90		
Filter backwash	40		
DM plant rinsing water	30	Neutralisation and dilution with other streams	
Service Water	25	Oil and grease removal and dilution with other streams	
<b>Total</b>	<b>435</b>		

Hence the raw water consumption in the cement plant complex to the tune of about 435 m<sup>3</sup>/day is reduced due to reuse of wastewater. ACC will not discharge any of the wastewater generated from the plant outside the plant premises.

## **IMPACT ON SURFACE WATER BODIES DUE TO MINING**

Streams will not be disturbed due to mining activity. The accumulated rain water in the five mining pits will be released in the stream after meeting the water requirement for dust suppression, plant process requirement, colony and plant domestic use and green belt development.

## **IMPACT ON GROUND WATER TABLE DUE TO MINING**

The depth to water during the summer months in the mines will be at the depth of 7 metres (241 mRL) while during post monsoon period, it expected to be 3 metres (245 mRL) below the land surface (248 mRL). The excavated area will be backfilled as the mining progresses, and finally deeper excavations will be left as water reservoirs. It is expected that water reservoirs at the mine closure stage will occupy an area of 227 hectares accumulating 2.81 mcm of water. The inflow of ground water in the mine which will be @ 0.012 mcm and consequently, the ground water development at the conceptual stage will be 1.71% and core zone will come under safe zone.

After reviewing the lease area map, it is seen that there is no river or lake in the area of 453 m<sup>2</sup> from the boundary of sump indicating that there will not be any influence of pumping water from the sump on any other water supply source.

$$\begin{aligned} \text{Area of influence, A} &= \Pi r^2 \\ &= 3.142 \times 12 \times 12 = 453 \text{ m}^2 \end{aligned}$$

Where, R is radius of influence in metres = 12m

### **1.6.4 LAND ENVIRONMENT**

No solid waste which requires disposal is generated from the cement plant.

Ash generation from the power plant is estimated to be about 0.19 MTPA which will be used for cement production in the cement plant.

Solid waste generated from colony and sewage treatment plant will be disposed after segregating the waste into bio-degradable and non-degradable. ACC will compost the Bio-degradable waste and non-degradable waste will be land filled at identified areas.

The total waste generation during the life of the mine will be 12.483 million tonnes. This will be backfilled after the pit gets maturity.

### **AFFORESTATION**

An area of about 50.0 ha will be developed under greenbelt at cement plant and colony.

ACC will develop an area of about 137.56 ha under greenbelt within the mine.

### **RECLAMATION PLAN & POST MINING LANDUSE**

ACC will construct workshop and other infrastructural facilities. During the life of the mine an area of 263.87 ha is likely to be degraded by mining operations. After exhaust of the mineral, part of the workedout area (57.85 ha) will be backfilled and balance area (206.02 ha) will be developed as reservoir. The pit will be fenced appropriately keeping in view the most important aspect of safety.

### **1.6.5 SOCIO ECONOMIC ENVIRONMENT**

A total of about 1000 persons would be given indirect employment during construction. For operation of the plant, 400 persons (Direct & Indirect) will be recruited.

ACC proposes to setup a colony with all infrastructural facilities such as school, guest house, health center, hospital, shopping complex etc., Socio Economic Status in the study area is found to be moderate with respect to livelihood, amenities etc. Transport and other infrastructural facilities such as market centers, business establishment, recreation etc., in the area will be improved.

### **1.8 BUDGET FOR IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PLAN**

ACC has budgeted an amount of Rs. 160 Crores for implementation of environmental management plan

### **1.9 PROJECT BENEFITS**

ACC has earmarked an amount of Rs. 115 Crores for implementing CSR activities. The budget will be spent over 10 years period of commencement of construction

### **CONCLUSION**

*ACC strongly believes in the concept of ecofriendly industrialization. This has been amply demonstrated in the operational cement plants at various locations as per standards prescribed by the State and Central Pollution Control Boards. Apart from eco-friendly operations, various socio economic development activities have been undertaken to bring about overall socio economic development in the area.*

*With the same commitment and dedication, ACC will commission the new cement plant.*