



# **SUMMARY ENVIRONMENTAL IMPACT ASSESSMENT REPORT**

**Capacity Enhancement of  
Jamul Cement Works Limestone Mine  
From 1.8 MTPA to 3.0 MTPA  
Mining Lease Area 269.95 ha (No increase in ML Area)**

**&  
Installation of 1500 TPH Crusher  
at**

**Villages: Jamul, Dhaur and Kurud  
Tehsil & District Durg (Chhattisgarh)**

**by  
ACC Limited**

**AUGUST 2015**

# CONTENTS

	Contents	Page No.
1.0	Project Description	3
2.0	Description of Environment	5
3.0	Environmental Impact & Mitigation Measures	7
4.0	Environmental Monitoring Program	9
5.0	Additional Studies	10
6.0	Project Benefits	10
7.0	Environmental Management Plan	11

## 1.0 Introduction

ACC Limited is pioneer in cement manufacturing industry of India which got established in 1936. ACC established the cement plant at Jamul in Durg district, Chhattisgarh in 1965. The plant was named as Jamul Cement Works (JCW). Jamul Cement Works of ACC Limited started cement production in the year 1965 with an installed capacity of 0.25 MTPA of cement. The existing production capacity of Clinker is 0.76 MTPA (Million Tons Per Annum) and Portland Slag Cement is 1.58 MTPA. ACC proposes to increase the clinker production of Jamul Cement works from 0.76 MTPA to 3.0 MTPA in the new plant, for which Ministry of Environment & Forests (Government of India) has issued the Environmental Clearance.

ACC has four mining leases in Durg district, namely Jamul Cement Works Limestone Mine (Lease area 269.95 Ha), Pathariya Limestone Mine Lease-I (36.001 Ha), Pathariya Limestone Mine Lease-II (37.85 Ha) and Nandini Khundini Limestone mine (53.57 Ha). Additional limestone required for producing 3.0 MTPA clinker at Jamul Cement Works would be met from Jamul Limestone Mine, Pathariya Limestone Mine Lease-I & II and Nandini Khundini Limestone mine.

Limestone production in Jamul Cement Works Limestone Mine is proposed to be increased from existing 1.8 MTPA to 3.0 MTPA. The limestone from Jamul Mine is of marginal grade and will be blended with good quality limestone generated from Pathariya and Nandini Khundini mines. Limestone will be crushed in proposed 1500 TPH crusher to be located inside the Jamul Mines lease area. The crushed limestone will be transported to the Cement Plant through closed pipe belt conveyor. Jamul Cement Works is located about 3 km from Jamul Mines. Mining Lease area of 269.95 ha falling in three villages Dhaur, Kurud and Jamul was granted by the Chhattisgarh Government.

The project falls under 1(a) Category 'A' of the Schedule of EIA Notification 14-9-2006. Terms of Reference (TOR) for EIA Study has been approved by Ministry of Environment & Forests vide letter No. J.11015/434/2013-IA.II (M), dated 28-5-2015. This draft EIA report has been prepared as per the Terms of Reference (TOR) issued by the MOEF for Public Hearing. The Final EIA report will be prepared after considering the comments and suggestions obtained during the Public Hearing.

Proposed capacity enhancement of the mine will be done within the existing mine lease area of 269.95 ha. No extra land shall be acquired. No R & R is required for this project.

**Location:** The Mining Lease Area comprises 269.95 Ha falling in Jamul, Dhaur and Kurud villages of Durg Tehsil, District Durg, Chhattisgarh. Jamul village is located about 0.8 km

east of the mine site. Dhaur village is located about 1.2 km north of the mine and Kurud village is located about 1.5 km of mine. Jamul Cement Plant is at about 3 km in south direction of mine.

Bhilai is located about 5 km from the mine site in south direction. Durg town is located about 8.5 km south west direction. Nagpur-Howrah rail line passes about 6 km south of the mine site. National Highway No-6 from Mumbai to Kolkata passes through Bhilai at a distance of about 5 km south of the mine site. Nearest airport is at Raipur which is about 50 km from mine site.

No ecologically sensitive area like National park, Wildlife Sanctuary, Biosphere Reserve, Protected and Reserve forests are present inside the 10 km radius of the mine site. Tandula canal and Shivnath River are the main surface water bodies located within the 10 km area. Tandula canal passes about 1.1 km east of the mine site. Shivnath river is located about 7.0 km west of the mine site.

**Project Cost:** The estimated cost of the capacity enhancement project is Rs. 48.5 crores.

**Employment:** Total direct employment including existing and the capacity enhancement project will be for 59 people.

**Water Requirement:** Total water requirement after capacity enhancement project would be 342 m<sup>3</sup>/day. Out of the total water required, about 312m<sup>3</sup>/ day will be required for crusher and about 30 m<sup>3</sup>/day water will be required for proposed mine enhancement. This additional water requirement will be met from rain water harvested in the mined out pits located inside the ML area. Ground water will not be utilized for the mining operation.

**Power Requirement:** The additional power consumption for the Limestone Crusher and attached utilities shall be 1.8 KWH, which will be sourced from captive power plant of JCW.

**Mining Process:** Mechanized opencast mining method comprising shovel - tipper combination will be adopted. Drills, hydraulic rock breaker, hydraulic excavator and dumper trucks will be employed. Non electric delay detonators type blasting will be applied. The height of bench will be kept 5 m and width of bench will be 15 m. The ultimate depth of mine will be kept 30 m from ground level. The ultimate pit slope will be 45° from the horizontal. Overburden shall be stacked along the lease boundary on the northwest side. The height of the dump shall be 3 m. From seventh year onwards the overburden will be backfilled in mines. No external OB dump shall be created. Technically the mining methodology is based on 'Zero Waste' concept.

## 2.0 Description of Environment

Baseline data was generated during the period 1<sup>st</sup> March 2014 to 31<sup>st</sup> May 2014. 10 km area around the mines boundary was considered as study area. Data was generated by following standard procedures of the Ministry of Environment, Forests & Climate Change and the Central Pollution Control Board. Meteorological data on wind speed, wind direction, relative humidity and temperature was generated. Baseline ambient air quality was measured at 5 locations within the core and buffer zone. Noise levels were measured at 6 locations. Surface water quality of 3 locations, groundwater quality of 8 locations and soil quality of 4 locations was collected and analyzed. Data on plants and animals were collected from the published literatures and checked during field survey. Data on demography, occupation pattern, cropping pattern, infrastructure facilities were collected from District Statistics Handbook and Primary Census of India 2011. Land use, drainage and contours were prepared using the recent satellite imagery.

The study area falls under Seismic Zone II. The limestone of this area is of lower Vindhyan age occurring as flat terrain.

**Meteorology:** The predominant wind direction is from northeast direction. The average wind speed ranges from 0.5 to 8.8 m/s. Daily mean temperature varied from 19.8<sup>o</sup>C to 44.6<sup>o</sup>C. The relative humidity varied from 20 -54%. The annual rainfall is 1288 mm.

**Air Quality:** PM<sub>2.5</sub>, PM<sub>10</sub>, SO<sub>2</sub>, NO<sub>2</sub>, benzene, ozone, ammonia, carbon monoxide as well as Benzo(a)pyrene, Silica, As, Ni and Pb in PM<sub>10</sub> were monitored at eight locations in the study area. The locations were selected as per CPCB guidelines. Monitoring was done at upwind direction and various downwind directions of the project. The baseline air quality levels of all parameters are found to be within the National Ambient Air Quality Standards prescribed for residential and industrial area. Min and Max values of PM<sub>10</sub>, PM<sub>2.5</sub>, SO<sub>2</sub> and NO<sub>2</sub> at different locations of the study are tabulated below:

Location	PM <sub>10</sub> , µg/m <sup>3</sup>		PM <sub>2.5</sub> , µg/m <sup>3</sup>		SO <sub>2</sub> , µg/m <sup>3</sup>		NO <sub>2</sub> , µg/m <sup>3</sup>	
	Min	Max	Min	Max	Min	Max	Min	Max
Mine Site Office	70	84	33	41	6.0	9.2	10.8	21.6
Dhaur village	65	80	29	40	5.4	8.2	12.5	17.6
Jamul	65	78	29	37	5.2	6.8	9.6	17.2
Kurud village	60	70	24	33	4.0	6.4	9.2	12.6
Bhilai	70	86	32	42	6.2	8.8	13.6	21.8

**Noise Quality:** Ambient noise levels were monitored at six locations in the study area. The baseline noise levels are well within the National Standards for residential area and industrial area. Noise monitoring results for day time and night time is tabulated below:

Location Name	Category	Day time Leq dB(A)	Standard Day time Leq; dB(A)	Night time Leq; dB(A)	Standard Night time Leq; dB(A)
Mine Site Office	Industrial	58.4	75	49.6	70
ACC Colony	Residential	52.8	55	44.4	45
Bhilai Industrial Area	Industrial	56.6	75	51.8	70
Dhaur village	Residential	51.4	55	43.6	45
Kurud village	Residential	52.4	55	43.8	45
Bhilai Power House	Commercial	54.8	65	49.6	55

**Water Quality:** Three surface water samples and eight groundwater samples were collected from the study area for chemical and biological analysis. The pH value in ground water was found to be in normal range (7.26 to 8.10). TDS values in all the sample ranges between 338-798 mg/l and Total Hardness between 180 - 410 mg/l. Calcium content varied between 36 - 140 mg/l and Magnesium between 12.2- 46 mg/l. Chloride values ranges between 42-178 mg/l. The ground water quality did not show any evidence of oil, metallic or bacterial contamination.

Surface water quality of Shivnath River near Sirsa village and Dandesara village was found to meet the BDU Criteria of CPCB. Water quality of Tandula canal was also found to meet the BDU Criteria of CPCB. No metallic contamination was found in surface water samples.

**Soil Quality:** Four soil samples were collected from the study area and analyzed. The texture of soil is sandy loam. The organic matter, nitrogen, potassium and phosphorus content of the soil are moderate. The pH and conductivity of all the soil samples are within the acceptable range.

**Sensitive Ecosystem:** Within 10 km distance of the project site, no plant or animal species were found to be on the endangered list. No ecologically sensitive area like biosphere reserve, tiger reserve, elephant reserve, migratory corridors of wild elephant, wetland, national park, wildlife sanctuary and Forest are present within 10 km distance of the project site.

### 3.0 Environmental Impact and Mitigation Measures

**Water Environment:** Rainwater accumulated in mined out pits inside the mine area will be used in the project.

**Mitigation Measures:** The surface runoff generated during rainfall will be diverted to mined out pits inside the mine lease area. This will act as rainwater harvesting structure. Garland drains with sedimentation pits at appropriate intervals will be made around the overburden dump. Gully along the slopes will be provided with filters to arrest the silt. The slopes will be compacted routinely, soil will be spread over it and stabilized by planting herbs and shrubs. This will prevent soil and silt erosion. Domestic wastewater will be treated in septic tanks and disposed in soak pits. All water accumulated inside the mines premises will be checked to avoid breeding of mosquitoes. The spent oil and lubricants from workshop, vehicles, etc will be given to authorized re-processors. There will be no discharge of wastewater outside the mine premises.

**Air Environment:** Dust is the main pollutant generated during various mining operations, including blasting, haul roads, crusher, loading and vehicular movement.

**Mitigation Measures:** Stable roads will be made inside the mining premises for movement of vehicles. Water sprinkling system (truck mounted) and road side timer based water sprinklers will be applied for dust suppression on haul roads. Regular maintenance of vehicles and equipment will be carried out. Wet drilling and controlled blasting (using latest NONEL technology) will be adopted. Crusher will be provided with fixed type dry fog system at the unloading hopper and bag filters at the crusher point. All conveyors shall be covered and bag filters will be installed at all transfer points to control fugitive dust emission. 7.5 m wide greenbelt has been developed along the ML boundary. Small herbs and shrubs like Bawal, Bougainvillea, Kaner, Lantana, Adhusa, Ber, Custard apple, Casurina, Thor, etc. will be planted in the inner row. Thereafter trees like Shisham, Gulmohar, Peepal, Jamun, Neem, Kadamb, Mango will be planted.

**Noise Environment:** Material handling, movement of vehicle, crushing, blasting, loading and unloading are the main noise generating sources in the mine site.

**Mitigation Measures:** Material handling operations and movement of vehicles will be properly scheduled to minimize noise. Maintenance program for heavy vehicles will be routinely followed. Non-electric delay detonator will be used to minimize the ground vibrations. Workers working inside crusher house will be given ear plugs and ear muffs. Mining will be done only during day time. Therefore the noise level at the mine boundary will be below the national standard.

**Land Environment:** Overburden will be stacked at the periphery of mining lease boundary along the northeast side to form bunds of 3 m height (7.5 m inside the mine boundary). The slope will be maintained at less than 45°, with adequate number and size of steps / trenches

made. The slopes will be compacted and spread with 8-10 cm thick soil cover and grass, legumes and small shrubs will be planted along the slopes. Garbage will be collected in containers and segregated at source itself. Recyclable materials will be sorted out and sold to kabadis. Inert material will be reused as landfill. Organic and other green waste will be taken to compost pit. Use of plastic inside mine area will be prohibited. Mined out area will be suitably reclaimed after extracting the limestone.

For reducing adverse environmental impacts from other sources, following mitigation measures are recommended in the EIA report:

- Wet drilling will be practiced. The drilling machine will have inbuilt water sprinkling arrangement and dust extraction system.
- Controlled blasting technique will be followed. The site will be wetted before blasting. Blasting will be done around noon.
- Non-electric shock tube initiating system and Noiseless Trunkline Delay detonators and IKON (Digital Electronic System) will be used to keep the air blast levels to the lowest possible limits and minimize noise and vibration.
- Ground vibrations to be continuously monitored during blasting using Minimate Seismograph, through study of the peak particle velocity at different distances.
- Hydraulic rock breaker will be used to eliminate the use of secondary blasting.
- Combination of primary rock breaker and backhoe will be used for efficient collection and loading.
- Compaction, gradation and proper drainage will be provided for haul roads.
- Haul roads in mines will be stabilized. Vehicular speed in mines area will be restricted to 20 kmph.
- Depression area within the worked out site will be converted to water body. The water body will act as water reservoir.

Air quality dispersion modeling study was conducted and it showed that the ambient air and noise quality of the area will remain well within the national ambient air quality and noise standards. No wastewater will be generated during mining. No toxic chemicals will be handled in the mines. Diesel and Explosives will be stored as per approval obtained from Chief Controller of Explosives/ Petroleum Explosives & Safety Organization.

Exposure to dust and respiratory disorders, noise induced hearing loss, mechanical injury to body parts are the identified occupational hazards. The workers will be checked during employment and then regularly for any clinical complaints by the in house medical

department. Workers will be given personal protective equipment like nose mask, ear plugs/muffs, safety boots, gloves, goggles. Clean drinking water and toilet facility, canteen facility, rest room for drivers and their attendants already exists in Jamul mine. Regular training and awareness programs will be conducted for the workers so that they are aware of the work hazards, vector borne diseases, HIV, etc and will develop the behavior of using protective equipment.

The proposed mining activity will have certain negative impact on the environment. With implementation of recommended mitigation measures and safeguards, the adverse effects will get reduced to acceptable level. The groundwater level at Jamul village (near mining site) is 8.0 m during pre-monsoon. Since mining will be done upto 30 m, groundwater table of the mining area will be intercepted. However, the existing mined out pits located inside the ML boundary are full of water, which has already improved the groundwater table of surrounding villages. Blasting and mining will lead to opening up of fractures and fissures thereby improving groundwater flow. Development of secondary porosity by cracks and joints will also enhance the transmissivity and specific yield of aquifer.

The mining activity will have beneficial impacts in terms of direct and indirect employment opportunities. Jamul Cement Works will further contribute financial resources for various community development measures, which would improve the quality of life of the people living in the area.

#### **4.0 Environmental Monitoring Plan**

The existing Environmental Management Department (EMD) of Jamul Cement Works will do the routine environmental monitoring. Qualified staff has been recruited in the EMD. A common pollution monitoring laboratory has been established at JCW (Plant) for routine monitoring of plant and mine. The existing Environmental Management Department (EMD) is adequate to perform the responsibilities of the proposed enhancement.

EMD will be responsible for the following functions:

I. Regular monitoring of –

1. Ambient air quality at upwind & downwind direction inside mine and at two nearest villages throughout the year.
2. Fugitive dust emission monitoring at 10 m downwind direction of the fugitive dust generation source.

3. Collect and analyze the ground water quality of mine site (seepage water), and the surrounding four villages. The depth of the groundwater in surrounding villages shall be checked periodically as instructed by MoEF&CC / CECB. .
4. Collect and analyse the water quality of Shivnath river once during June and October.

II. Development and maintenance of greenbelt and greenery inside the mining lease area.

## **5.0 Additional Studies**

**Risk Mitigation Measures:** No new explosive storage area (magazine) and diesel storage tank will be made. All safety measures meeting IBM and DGMS norms were implemented. Ambulance and health centre is available. An effective communication system is also available at the mine site. Ground vibration measurement is done during blasting. The ground vibration (peak particle velocity) is maintained within the DGMS limit, so as to ensure safety of surrounding buildings and houses of villagers.

## **6.0 Project Benefits**

Limestone mining enhancement at Jamul will generate additional revenue for Chhattisgarh Government. The project will boost the infrastructure development of the area. 59 people will be under employment at mine after this project including existing employees. Local people will be preferred for jobs, depending upon their skill and experience. Transport business, vehicle drivers and attendants, repair workshops, grocery and retail stores, school, coaching centers, restaurants, self-employed persons like tailors, carpenters, plumbers, electricians, etc will get indirect employment opportunity from the project.

Rs.50 Lakhs per year has been earmarked for undertaking various community development activities. This money will be spent towards construction of community centers and schools, maintaining roads, rain shelters, providing drinking water facility to the nearby villages, making toilets in schools, providing free medical camps, providing scholarships to bright students and sports person, etc. Income generating schemes will be implemented for upliftment of women and poor sections of the society, which includes vocational training for mushroom cultivation, patta making, masala making and packaging, growing fruits and vegetables, development of fodder farms, etc.

## **7.0 Environmental Management Plan (EMP)**

EMP for effective management of environmental impacts due to the mining activity and ensuring overall protection of the surrounding environment through appropriate management procedures has been prepared. The capital cost for environmental management is Rs 75 lakhs. This amount shall be used for procurement of pollution control devices, mitigation measures and establishment of environment department, occupational health and safety department, environmental monitoring facilities, greenbelt and greenery development, etc. About Rs 20 lakhs would be required as annual recurring expenses to implement the EMP.

Environment Management Cell will ensure that all pollution control devices function effectively. EMD will supervise disposal of spent oil and lubricants and used batteries to the authorized vendors. Plantation will be started from day one and continue throughout the life of the project. Schemes for resource conservation, rainwater harvesting and social forestry development will be taken up. Regular environment, safety and health awareness programs for the workers will be conducted by the EMD and safety department.

EMD will also interact with the regulatory authorities, submit the monitoring reports and consent applications. The implementation of EMP would ensure that all elements of project comply with relevant environmental legislation throughout its life cycle.