THE INDIA CEMENTS LIMITED

EXECTIVE SUMMARY OF

ENVIRONMENTAL IMPACT ASSESSMENT AND

ENVIRONMENTAL MANAGEMENT PLAN FOR

VEERACHIPALAYAM LIMESTONE MINE (61.88.5) OF M/S. INDIA CEMENTS LTD.

Located at

Veerachipalayam and Alathur villages
Sankari Taluk
Salem District.

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Prepared by

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1. INTRODUCTION

Veerachipalayam Limestone Mine located in Salem District of Tamilnadu., spread over an extent of 61.88.5 Ha, belongs to M/s. India Cements Ltd (ICL) and produces limestone for captive consumption of the company's cement plant at Sankari west at distance of about 7 km. The location plan is given in Fig.1. This mine is planned to produce 750 tones per day from the combined areas (G.O. 878, Namakkal – 90,000 Ts/year; G.O. 878, Salem – 1, 20,000 Ts/year and G.O. 7947, Salem – 13,500 Ts/year).

According to guidelines of the Ministry of Environment and Forest for **existing mining projects**, an Environment Impact Assessment Study has been undertaken. For this purpose, the present scenario of all aspects of environment in the premises and surroundings (upto 10 km radius called study area or buffer zone) of Veerachipalayam mine have been evaluated. The seasonal data viz., post monsoon of the year 2006 have been generated for back ground assessment of the present environment. With these data the Environmental Impact Assessment has been prepared for the on-going mining activities.

The objectives of the study are:

- To establish the present environmental scenario
- To prepare a detailed action plan for implementation of mitigative measures.
- To suggest preventive-and mitigative measures to minimize adverse impacts and to maximize beneficial impacts.
- To anticipate the impacts of existing project minimize adverse impacts and to maximize beneficial impacts.
- To suggest a monitoring programme to evaluate the effectiveness of mitigative measures
- To suggest the formation of a core group responsible for implementation of environmental control and protective measures and monitoring of such implementation.
- To suggest a feedback mechanism enabling to make mid course corrections
- To prepare a capital cost for Environmental monitoring and Environmental Management Plan.

2. PRESENT ENVIRONMENTAL SCENARIO

2.1 Topography, drainage and climate

The area is undulated forming a part of rocky terrain of gentle rolling plateau with an average elevation of around 256m (AMSL). There are no marked surface features such as streams, water-bodies or tanks within the leasehold area.

Within the study area lying within 10 km radius from the core zone, the terrain is characterised by massive granitic hills with highest elevations of 631m at Suryamalai, 6 km north of core zone and 713 m is Sankari Malai 5km on the east. The regional gradient is towards west and north-west, leading to river plains with elevation below 200m. There are a number of hill knobs over the north-eastern and south-eastern parts of the area.

The core zone drains towards west to nearby seasonal streams, which flow towards west or south west.

In the buffer zone, the western slopes of Suryamalai and adjoining hilly areas drain towards west to Sarbhanga River, which is fed by surplus waters from Peria Eri, a lake situated on the northern periphery of the buffer zone, besides other seasonal streams. Sarbhanga joins River Cauvery at 9 km Northwest of core zone. The eastern slopes of Suryamalai and other hillocks nearby drain to seasonal streams flowing towards north-east. There are a number of small ponds along the course of streams.

The study area is situated in the warm climatic belt with moderate humidity. During the summer the temperature ranges from 32°C to 40°C while during winter it varies between 22°C to 32°C. The rainfall is mostly due to the SW and NE monsoon season with the average precipitation of 1103.1 mm per year. The maximum rainfall is generally experienced in the months of August, September and October. The following meteorological parameters have been studied on the basis of data obtained from IMD station - Salem.

2.2 Ecology

The lease area does not present a picture of natural species of vegetation due to cultivation. Hence except for diversion of agricultural land, there will be no perceptible effect by the mining activities. The generation of fugitive dust and airborne dust are controlled at source, settling of dust over the crop land or vegetation is also minimized over the surrounding buffer zone.

The reserve Forests at Suryamalai and Mangamalai situated at a distance of over 2 km is degraded having a density of less than 0.2 and it is in the from of scrub land with xerophytic shrubs and trees, which could withstand the

existing harsh climatic conditions. Hence no perceptible effect is anticipated by the proposed mine operations.

2.3 Hydrological Condition

a. Surface water

Surface Water flow is confined to river Cauvery only. The Surbhanga River is only seasonal. There is a small pond in the near by Veerachipalayam Village, where water sampling was done during October 2006.

b. Ground Water

Since ground water drawn from hand pumps, open wells and water supply systems at selected areas are the main sources for domestic use, seven locations were selected for sampling.

The region is predominantly rocky with scanty vegetation and soil cover. The climate is arid with low rainfall. These factors coupled with absence of good acquifers are not conducive to rich ground water resources.

According to the information obtained from PWD Irrigation Department, Salem, the rock formations in general are compact with less intergranular porosity and fractures. The depth of water table varies from 180 to 260 m from the surface level. The yield is less than 1 litre/second. Depending upon the depth of weathered rocks, existing porosity and fractures, limited or confined ground water pockets may be observed at a shallower depth of 10-20 m in the study area. At mine site the interpolated depth of water table in 110 m from surface.

c. Water Availability

The mine pit stores the rain water and allows it to percolate as recharge of ground water. Considering the 14.0 Ha. area of the pit as catchment area, the recharge in computed as 116 lit/minute during the day season with an average of 248 mm rain and 338 lit/minute during rainy season with an average of 720 mm rainfall. The actual requirement of 31 m^3/day for the mine is very negligible. The mine, thus, has the advantage of recharging ground water potential as otherwise, the rainwater would have escaped as run off.

2.4 Quality of Water

Total hardness of the water within the study area is considered to be under desirable limit. It can be used for drinking if the dissolved solids are not high and if the iron present in them is less than 1 ppm. The ground water at Karumapurathanur was found to contain about 353 mg/l of total dissolved solids which is beyond permissible limits as per IS 10500: 1991 of drinking

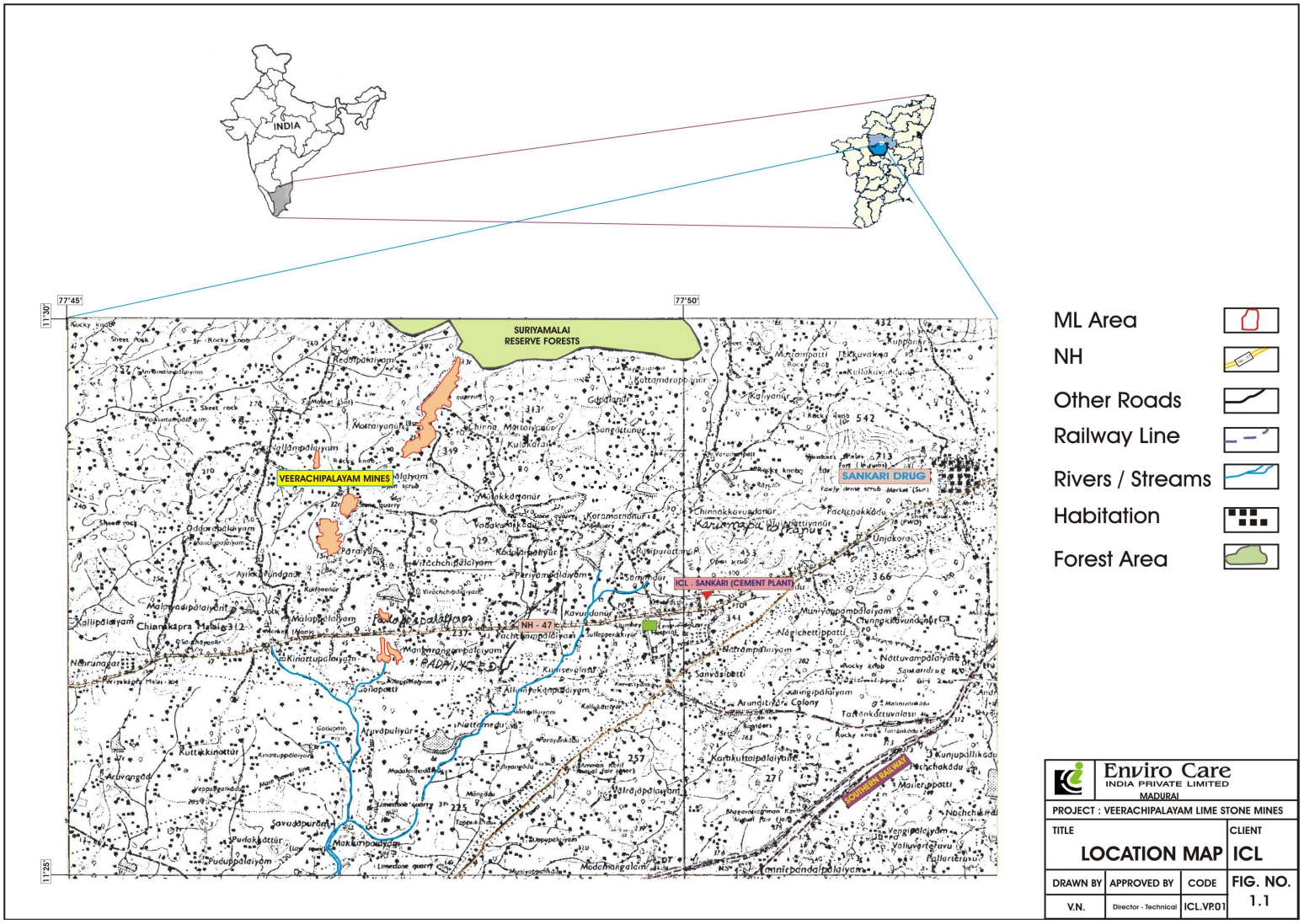
water specification. In places like Sanyasipatti and Padaiveedu (well water), the total dissolved solids were found to be 1329 and 1435 mg/l respectively. People of western part of the study area utilise water from the Cauvery river, which also contains 626 - 872 mg/l dissolved solids. In other places, especially Veerachipalayam and Chinnagoundanur (well) water was found to contain dissolved solids of 513 mg/l and 741 mg/l respectively, being not suitable for drinking purpose.

Though the dissolved solids are higher, the iron content was found to be negligible in all the samples. People in these areas utilise ground water. It was found that ground water shows no sign of contamination.

2.5 Air Quality and noise levels

Air quality was studied at five locations spread over the study area including the mine site. Micrometeorological parameters were also recorded at site. It is found that suspended particulate mater (SPM) or air borne dust at the mine (core zone) and village around (buffer zone) were 45.2 µg/m^3 and 157.7 µg/m^3 respectively against the permissible values of 500 µg/m^3 and 200 µg/m^3 for these areas. The concentration of NOx and SO2 are negligible.

Background noise levels were measured in and around the site using Bruel and Kjaer 2230 sound level meter along with octave filter 1625. This instrument satisfies IEC recommendations (651). The noise level recorded around the site is given in the Table 3.10. During the observation it was found that the noise level was well within the permissible limit.


INDIA
77°45'
77°50'
11°30'
11°25'
SURIYAMALAI
RESERVE FORESTS
VEERACHIPALAYAM MINES
SANKARI DRUG
ICL - SANKARI (CEMENT PLANT)
NH - 47
SOUTHERN RAILWAY
ML Area
NH
Other Roads
Railway Line
Rivers / Streams
Habitation
Forest Area
Enviro Care
INDIA PRIVATE LIMITED
MADURAI
PROJECT : VEERACHIPALAYAM LIME STONE MINES
TITLE
LOCATION MAP
CLIENT
ICL
DRAWN BY
V.N.
APPROVED BY
Director - Technical
CODE
ICL.VP.01
FIG. NO.
1.1

2.6 Land use pattern

Mining lease area

The land use pattern in the Mining lease area is given in the following table. The land is an uncultivable waste land.

LAND USE PATTERN OF Mining lease area

District/ State	Taluk	Village	Total Area – 61.88.5 Ha.				Land category
			Under Mining & dumps	Roads & Builtup Area	Green belt	Undisturbed Area	
Salem/ Tamil Nadu	Sankari	Veerachipalayam & Alathur	24.26	0.22	1.43	35.97.5	Waste land

Buffer Zone

The total area of buffer zone falls in two taluks (Sankari & Trichengode) of two district i.e. Salem & Namakkal respectively. Detailed break up of land use pattern in buffer zone based on 2001 Census records, is given below.

LAND USE DETAILS OF BUFFER ZONE (10 km radius)

LAND USE	AREA (Ha.)	% OF TOTAL AREA
Forest with in revenue land	1313	4.18
P.F. Forest under State Forest Dept.	1329	4.23
Uncultivable waste land	1114	3.55
Area not available for cultivation	4308	13.72
Irrigated agricultural land	7667	24.42
Unirrigated agricultural land	15669	49.90
TOTAL	**31400**	**100.00**

2.7 Socio – economic conditions

In buffer zone of the study area, 28 villages have been studied. As per the senses 1991, the total population of the villages is 152808 over an area of pf 31400 sq.km, hence, having a density of 4.86 per sq.km. The main workers constitute 50.04% marginal workers 6.02% and non workers 43.94%. Out of the main workers cultivators and agricultural labour constitute 54.08%, while only 2.63% are in house hold industry. This shows that the major source of income of local population is agriculture.

2.8 Places of religious/historical/architectural importance

There are no places of historical/tourism/religious importance in either core zone or study area. However, there are local places of worship at some villages.

3. ENVIRONMENTAL IMPACT ANALYSIS

3.1 Air quality

The air pollutants level at present is within the permissible limits for rural and residential areas. The mining operations like drilling, blasting, loading and transportation will increase the pollution load, particularly SPM but marginally, since water sprinkling is being done at all the source of dust generation.

There is also no of marked increase in other pollutants viz. SO_2, NO_x and CO, due to the limited extent of mining. It is well below the National Ambient Air Quality Standards prescribed by the Central Pollution Control Board (CPCB).

3.2 Water resource

Water for drinking purpose is received from factory – RO system, and for sprinkling, rain water collected at mine pit is used. ICL is presently using about 31 m^3/day of water for all operations including green belt development within the mine area. (Water required for sprinkling on Haul roads is 20 m^3/ day, Greenbelt 10 m^3/day and domestic consumption 1 m^3/day, totaling 31m^3/day).

3.3 Water Quality

Lime stone excavated from the mines will be directly used for cement manufacturing. Mineral beneficiation process is not envisaged in the mine due to direct usage in the process. Due to this reason, no tailings or process wastes will be generated from the mines.

There is no trade effluent generation from this mine. Only domestic sewage to the tune of 0.8 m^3/day will be generated which will be treated in a suitable septic tank of size 3.0 x 2.0 x 2.0 m followed by dispersion trench of size 5.0 x 2.0 x 2.5 m.

3.4 Land degradation

The l mining lease area is 61.88.5 Ha. of which 24.48 Ha. will be disturbed and 1.43 Ha. will be used for tree plantation. There will remain 35.97.5 ha. Undisturbed land. The excavated area will be used for refilling.

The wastes generated during mining are dumped at specified dump sites. The dump slopes less than the angle of repose and further stabilized by tree plantation. The garland drains are being made and addition peripheral bunds with boulders are also constructed.

The reclaimed and afforested areas will be protected from cattle menace, soil erosion, plant diseases etc. Plants will be protected from diseases by the application of proper pesticides. Soil working, manuring etc. will be done whenever necessary. Fencing and proper watch and ward may be provided depending upon the area.

3.5 Noise level and ground vibration

Since the application of drilling, blasting, haulage / transportation will be to a very limited extent; increase in ambient noise level will also be very marginal. Certain amount of ground vibration is anticipated due to drilling, blasting and haulage operations. The noise level is found to be well within the Damage risk criteria for hearing loss, occupational safety and health administration (OSHA) and the **Ambient Noise level standards as per EPA notification GSR 1063 (E) dt. 16.12.1989.**

As stated in the para 3.9, National institute of Rock Mechanics, KGF has conducted a detailed study on Ground vibration at Karumapurathanur Limestone Mine. The recommendations given by National Institute of Rock Mechanics, KGF indicating the maximum charge per delay for the corresponding distances as given below will be followed in this mine.

RECOMMENDED MAXIMUM EXPLOSIVE CHARGE PER DELAY

Distance (m)	Maximum charge per delay (Kg)
50	5
75	12
100	21
125 and beyond	30

The hydraulic drills of 32 to 45 mm diameter can be continued for bench blasting. Free faces should be maintained properly for satisfactory breakage and reduced ground vibration. The same recommendations are followed to minimize ground vibration.

The management has conducted during this year a study on Blast induced Vibration, Air over pressure, Fly rock and optimum charge & blasting pattern for controlled blasting for this mine, the permission has been obtained from the Directorate General of Mines Safety to carryout blasting within 100 m of building not belonging to the owner of the mine, through the National Institute of Rock Mechanics, Kolar Gold Fields, Karnataka.

Based on the above factors, regular monitoring of ground vibration is done with minimate instrument and the vibration levels are found to be within safe limits.

3.6 Socio – economic impact

No house holds is displaced or required to be rehabilitated. Mining will result in loss of waste land only. This land is already in possession with ICL. The service sector may raise some employment of local people.

There is a dedicated road to the plant from the mines for the transportation of lime stone. It crosses the public road only at two places without causing any problem in public traffic.

ENVIRONEMTNAL MANAGEMENT PLAN

In order to mitigate the environmental impact due to mining and its allied activates, a comprehensive environmental management plan (EMP) has been formulated. All the likely parameters that will be affected by mining have been addressed and these are briefly mentioned in the following paragraphs:

3.1 Land degradation control measures

The limestone deposit is narrow in the lease area and extends depthwise, the minerable depth being 90 m. The pit remains in operation over almost entire area during the life of the mine. This does not allow the normal practice of phasewise excavation and reclamation by refilling of mined out area with the waste generated during later periods. However, an area of 270 m by 250 m will be refilled with the waste materials generated from 5 to 10^{th} years on the southern side between sections V3 & V4. The mine will be refilled with waste material partly and the rest of the area will be left out as water body.

The terrain is rocky without much top soil cover. Moreover, no soil cover area is further required for mining. Hence top soil generation and preservation area not involved.

The wastes generated during mining are dumped at specified dump sites. The dump slopes would be maintained less than the angle of repose and further stabilized by tree plantation. There is a proposal for digging garland drains and peripheral bunds with boulders to prevent solid flow to surrounding lower level areas.

So far we have planted 1200 saplings over an extent of 1.6 ha. A total of 400 trees are planned to be planted for the next 5 years within the mining lease area covering an area of 1.40 ha out of the total mining leases area of 61.88.5 Ha. The species recommended for plantation include Vambo, Teak, tamarind, Vagha, Karuvel, etc, as well as several shrubs and grasses.

3.2 Air Pollution control measures

As already discussed in Chapter – 4, the ground level concentration of SPM, SO_2, CO and NO_x are well within limits. However, efforts are necessary to contain the dust generation at source for improvement of environmental conditions, as given below.

- Dust extraction system provided in drill machines.
- The cuttings will be wetted by wet drilling wherever possible.
- Using sharpened drill bits with efficient flushing system.
- Dust suppression on mine working areas, haul roads and the road leading to the factory for limestone transport by periodical water sprinkling. This is of highest importance.
- Proper maintenance of all earthmoving and transport equipments / vehicles for control of gaseous emissions.

3.3 Control measures for water pollution

Since the major cause of surface water pollution during the opencast mining activities in this mine is the wash off from the freshly excavated areas and fresh outside/inside dumps, the programme to prevent water pollution, therefore, shall focus on controlling wash off from these areas. Since the annual rainfall is low in these areas, wash off it will be very much limited. Further the analysis of water from various points like nalas, wells and rivers presented earlier reveals that all the parameters are well below the limits prescribed by CPCB. Still in order to prevent degradation and to maintain the quality as prescribed by MOEF, adequate control measures are required to check the wash off from the freshly excavated areas and soil erosion from dumps.

Control measures to be adopted are:

- The peripheral bunds will help in such a way that the soil is not carried away by storm water.
- A water gradient of about 1 in 100 shall be kept at every bench towards inside of the bench to prevent formation of gullies in the bench slopes which cause serious erosion.
- Stabilization of bund slope to prevent erosion.
- To prevent surface and ground water contamination by oil/grease, leak proof containers shall be used for storage and transportation of oil/grease. In the store also, the container containing oil/grease shall be kept in empty, safe open container of higher volume than the containers to avoid oil/grease spillage on the ground. The floors of the areas wherever oil/grease is handled shall be kept effectively impervious. Any wash off from the oil/grease handling area or workshop shall be drained through impervious drains, collected in specially constructed pit and treated appropriately before releasing it into the natural drains.

  As the area receives very poor rainfall the water table is very low. However, during the rainy season, the rain water collected in the mine will be dewatered and it will be used for plantation and other works. There is no natural spring and stream course in the locality.

3.4 Control measures for noise level and ground vibration

The noise level monitoring carried out in and around the mine has revealed that the ambient noise levels are well within the prescribed limits.

The levels of ground vibration and noise are best controlled by techniques called controlled blasting practice by minimizing explosive charges per delay during blasting. As described under para 4.6, the recommendations of The National Institute of Rock Mechanics shall be followed strictly.

Further, the Management is adopted to improved methods of drilling and blasting as stated below, keeping in mind the hard nature of limestone and close interrelations of pegmatite and Calcgneiss rocks

- Drilling of 32 – 45 mm dia holes for blasting.
- Charging the holes with minimum explosives just to dis-lodge the strata with cracks developed.
- Sizing of rock blocks by using a rock-breaker selectively and separate loading of limestone and waste rocks.

This method has ensured economy on consumption of explosives and optimal removal of waste resulting in better quality control of lime stone produce. It will also help in minimizing the generation of dust as well as vibration and noise level due to blasting. These methods are highly recommended, since they are site specific, and more environment friendly.

The drilling pattern and charging of explosives will be as per the recommendations of the NIRM, and as such, the practice to be followed will ensure minimum ground vibration and noise level.

Tree plantation around the working areas will act as noise barrier. Regular preventive maintenance of machinery and transport vehicles. Particularly the noise generating parts will help in controlling noise levels and emissions. Introduction of air silencers of suitable type which can modulate the noise of engines can be tried.

Ear muffs should be given to those who work with noise levels around 90 dB(A) at source and wearing of the ear muffs should be ensured.

3.5 Socio-economic condition

As no habitation is going to be effected by the project, no rehabilitation package is necessary for resettlement of people. The amenities created for project employees will also be available for the inhabitants of adjoining villages. Job opportunities will be much limited with in the project but avenues for marketing of day-to-day material for the project employees, service industries, and various other activities around the project will tend to raise the standards of living of local population.

3.6 Places of religious/historical/architectural importance

Since there are no important historical or religious structures in the study area, hence, there will be no impact and therefore, no control measures are required.

4. ENVIRONMENTAL CONTROL AND MONITORING ORGANIZATION

An appropriate team is existing and is proposed to be continued to take care of pollution monitoring aspects and implementation of control measures. A schedule has been spelt out for periodical monitoring. The total investment on environmental improvement works is envisaged as Rs.30.45 lakhs and recurring expenditure during the stage of production is Rs.8.75 lakh per year.

5. DISASTER MANAGEMENT PLAN

Appropriate disaster management plan has been spelt out in the EIA/EMP to take care of the following:

- Risk of inundation
- Disaster due to failure of pit slope
- Disaster due to failure of dump slopes
- Danger due to storage of explosives

Hence, no danger of any kinds is anticipated.

For The India Cements Ltd.

Vice – President (Manufacturing)