

Pre-Feasibility Report

1.0 EXECUTIVE SUMMARY

Shree Cement Ltd. is proposing the amendment in existing Environment Clearance of expansion of Limestone Production capacity in Sheopura-Kesarpura limestone mine (ML Area – 856.8 ha) from 2.0 Million TPA to 4.0 Million TPA with respect to mention the existing crushers and no ground water intersection, near Villages – Sheopura and Kesarpura, Tehsil – Masuda, District – Ajmer (Rajasthan)

EC was granted on 31/3/2005 on the basis of modified mining scheme approved on 4/6/2004 as mentioned in EC letter. In EC only drilling and blasting activities are mentioned whereas all submitted documents and modified mining scheme. Complete mining activities such as drilling, blasting, hauling, crushing are mentioned at page no 33, 34 & 40 of modified mining scheme and page no. 12 of EIA/EMP report.

In the EC, ultimate working depth of 81 m bgl and intersection with ground water table is mentioned whereas as per the submitted modified mining scheme (ref page no. 46) general ground level and ultimate working depth is 500 MRL and mining will not touch the ground water table.

TABLE -1: SALIENT FEATURES OF THE PROJECT

S. No	PARTICULARS	DETAILS
1.	Nature & Size of the Project	Amendment in existing Environment Clearance of expansion of Limestone Production capacity in Sheopura-Kesarpura limestone mine (ML Area – 856.8 ha) from 2.0 Million TPA to 4.0 Million TPA with respect to mention the existing crushers and no ground water intersection, near Villages – Sheopura and Kesarpura, Tehsil – Masuda, District – Ajmer (Rajasthan)
2.	Category of the Project	As per the EIA Notification dated 14.09.2006 and circular dated 06.02.2007, the integrated project falls in Category “A”.
3.	Location	

S. No	PARTICULARS		DETAILS
	Village		Sheopura & Kesarpura
	Tehsil		Masuda
	District		Ajmer
	State		Rajasthan
4.	Latitude & Longitude	Mine	26° 01' 35'' to 26° 05' 25'' N 74° 22' 40'' to 74° 25' 25'' E
	Topo sheet No.		45 J/8
5.	Project Requirement		
	Mining Lease Area	Total Lease Area	856.8ha.
		Green Area	At the conceptual stage: - 158 ha.
	Power Requirement	Power Consumption: 19500 KW/day (Source : Captive Power Plant)	
	Manpower Requirement	240 Nos.	
6.	Climatology		
	A. Temperature	23 °C to 43 °C	
	B. Relative Humidity	7 to 60 %	
	C. Wind Speed	2 to 14 m/sec	
	D. Dominant Wind Direction	Towards NNW	
	C. Rain Fall	395 mm	
7.	Project Site Vicinity Details		
	Nearest Railway Station	Beawar at a distance of ~ 11 km in SE direction	
	Nearest National Highway/State highway	NH – 8 at a distance of ~ 6.0 Km in SE direction State Highway-.0.5 Km in N direction	
	Nearest Town / City	<ul style="list-style-type: none"> ▪ Nearest Town- Masuda at a distance of ~ 10.0 Km in E Direction. ▪ Nearest City- Beawar at a distance of ~ 11.0 Km in W Direction. ▪ District Head Quarter- Ajmer at a distance of ~ 65Km in NE direction. 	
	Nearest Airport	Jodhpur Airport at a distance of ~ 172 km in W direction	
	Nearest River	There is no river	

S. No	PARTICULARS	DETAILS			
	Reserved/ Protected Forest within 10 km radius	List of Reserved and Protected Forests (Open mixed jungle & Scrub type)			
		S. No.	Name	Distance from Project Site (in Km.)	Direction from Boundar of Project Site
		1.	RF	~1.5	SW
		2.	PF	~5.5	E
		3.	PF	~6.5	E
		4.	PF	~8.8	NW
	Ecological Sensitive Areas	No National Park, Biosphere Reserve, Wild Life Sanctuary falls within 10 km radius the study area.			
	Seismic Zone	Zone – II			

2.0 INTRODUCTION OF THE PROJECT/ BACKGROUND INFORMATION

(i) Identification of project and project proponent

Shree Cement Ltd. is proposing the amendment in existing Environment Clearance of expansion of Limestone Production capacity in Sheopura-Kesarpura limestone mine (ML Area – 856.8 ha) from 2.0 Million TPA to 4.0 Million TPA with respect to mention the existing crushers and no ground water intersection, near Villages – Sheopura and Kesarpura, Tehsil – Masuda, District – Ajmer (Rajasthan).

Project Proponent

Shree Cement Limited (SCL) is energy conscious and environment friendly business organization, started its journey in the year 1979, and today it is among India's leading cement manufacturing companies. Having witnessed an exponential growth since last three decades, our endeavour continues to expand our capacity in the cement and power sector.

Cement manufacturing facilities

Presently, our cement production capacity stands at 27.2 million MTPA. The Company's Cement and Clinker manufacturing facilities are located at Beawar & Ras in Rajasthan and Raipur in Chhattisgarh. It has split grinding units at seven locations viz. Khushkhera, Suratgarh, Jobner in Rajasthan, Roorkee in

Uttarakhand, Aurangabad in Bihar, Bulandshahr in Uttar Pradesh and Panipat in Haryana.

Power Generation Facilities

SCL is active in power generation with power generation capacity of 612 MW, including 111 MW of WHR based power plants(Largest in world, after China). Power generated from captive power plants is primarily utilized in its own cement plants and excess is sold to the govt., discoms, etc.

Products

The Company pursues with multi-brand portfolio strategy consisting of three brands viz ;Shree Jang Rodhak Cement, Bangur Cement and Rockstrong Cement. The Company currently enjoys the highest market share in Rajasthan, Delhi and Haryana and possess distinguished top position in states of Punjab, West Uttar Pradesh and Uttarakhand.

Corporate Sustainability

At SCL, sustainability is an integral part of business and forms the core of future growth strategy. We have always envisioned a growth which is inclusive and aimed towards total prosperity of all the stakeholders. We have inculcated sustainability as a business culture and all our efforts attempt to focus upon fostering innovation, ensuring prosperity, creating happiness and building trust in people.

Sustainability has led us towards the enrichment of corporate values through innovation and sound business practices. This approach has helped us to proactively address challenges to our growth. Integration of sustainability in our day to day business activities has helped us in identifying, analyzing, implementing control measures and mitigating the multiple risks that SCL faces. Sustainable business practices have endorsed optimal utilization of resources which enhances stakeholders' value.

Responsible towards the community

We believe that a company's prosperity is linked with its neighbouring communities. We better the lives of the communities that surround our operations either on our own or in partnership with government bodies and the community at large. Empowerment of communities and upliftment of their lifestyle and social strata is n central element of our approach that is deeply

engrained into our business. The vision is to become a catalyst to positive change in the society.

Our approach towards development of the local community has been focused on the below priority areas:

- ❖ Healthcare
- ❖ Education
- ❖ Infrastructure development
- ❖ Livelihood generation
- ❖ Women empowerment

Recognitions

- World's first cement company to receive a 5-star rating in the 18 years benchmarking history of Whitehopeleman.
- First Indian Cement Company to join Cement Sustainability Initiative of WBCSD.
- First company in the World to use innovative techniques to utilize 100% petcoke in its operations.
- First Cement Company in the World to fetch Certified Emission Reductions (CER's) on its Clean Development Mechanism project "Optimal Utilization of Clinker".
- First Indian cement company to issue Corporate Sustainability Report following the highest level "A+" for reporting triple bottom line performance.
- SCL ranked 2nd Best Company in the World on Carbon related matrix-2015, by CDP, London.

Awards

- 2016-17 Sustainability Disclosure Leadership Award 2016 by World CSR Congress
- 2016-17 Best Employer 2015 Award by the Employees Association of Rajasthan
- 2016-17 Excellence in Community Impact by Society of Human Resource Management, India
- 2016-17 Overall Excellence in Procurement and Outstanding Procurement Team by CPO forum India by Institute for Supply Management and Conference Asia
- 2016-17 Golden Peacock Environment Management by Institute of Directors
- 2016-17 State Level Bhamashaha Samman for Corporate Social Responsibility 2016 by Government of Rajasthan

- 2016-17 GreenCo Best Practices Award 2016 for Best Practices in Renewable Energy & GHG Emission Reduction by CII
- 2016-17 National award for Cost Management by Institute of Cost Accountants of India
- 2015-16 ABP News CSR leadership Award for Best Environment Friendly Project
- 2015-16 Green World Ambassador Award 2016 by the Green Organization London
- 2015-16 First prize in Cement Sector for Energy Conservation of Rajasthan Renewable Energy Conservation
- 2015 -16 NCCBM award for Best Improvement in Thermal Energy Performance 2013-14.
- 2015-16 NCCBM award for Best Improvement in Electrical Energy Performance 2013-14.
- 2015-16 NCCBM award for Best Quality Excellence 2013-14
- 2015-16 NCCBM award for Second Best Quality Excellence 2014-15

(ii) Brief description of nature of the project

Shree Cement Ltd. is proposing the addition of its existing crushers of captive Sheopura-Kesarpura limestone mine near village Sheopura, Kesarpura, Jhak, Lulwa & khimpura, Tehsil Masuda, Dist. Ajmer (Rajasthan).

As per EIA Notification dated 14th Sep, 2006 as amended on 1st December 2009, the project falls under Category "A".

(iii) Need for the project and its importance to the country and or region.

With respect to the importance of the project to the nation, it can be well said that in a developing nation like India, cement is essential for infrastructure development. Thus, keeping in mind this requirement, mining of limestone is essential for the nation's growth.

To meet the demand and supply of cement at the national, regional and state level, Shree Cement Ltd. is producing from captive Sheopura-Kesarpura limestone mine near village Sheopura, Kesarpura, Jhak, Lulwa & Khimpura, Tehsil Masuda, Dist. Ajmer (Rajasthan) to achieve the required clinker production.

(iv) Demand – Supply

The limestone demand is being & is being fulfilled from the captive limestone mine.

(v) Demand – Supply Gap.

As per the requirement of the cement plant the demand is being full filled, thus no demand supply gap.

(vi) Export Possibility

As it is a captive limestone mines so there is no export possibility

(vii) Domestic/export market

The proposed limestone mine is for captive use.

(viii) Employment Generation (Direct and Indirect) due to the project sourcing

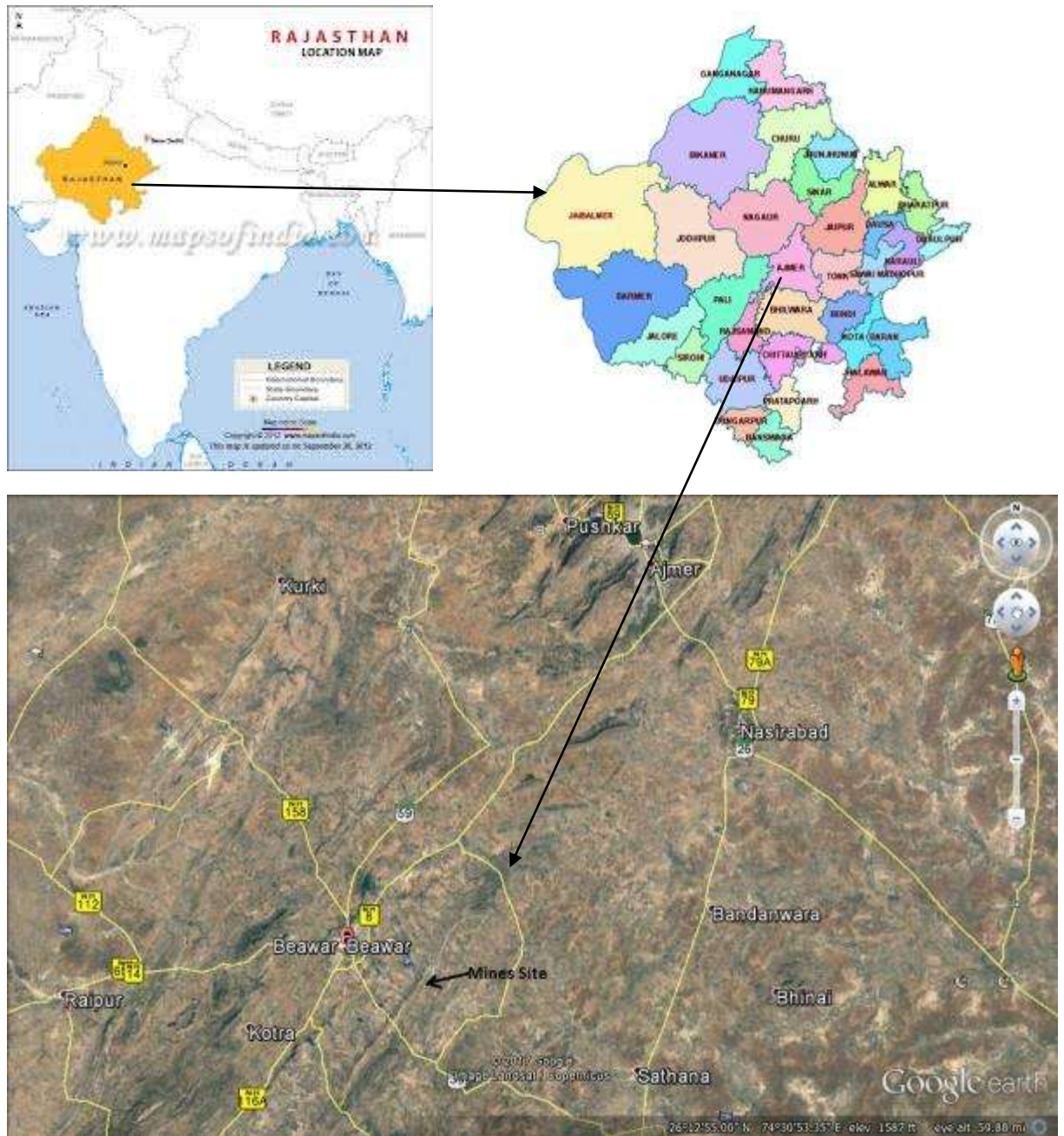
SCL follows the “son of the soil” policy, wherein the maximum possible staffing is from local area. Only where skills are not available locally will staff be hired from outside. Total manpower is 240 nos.

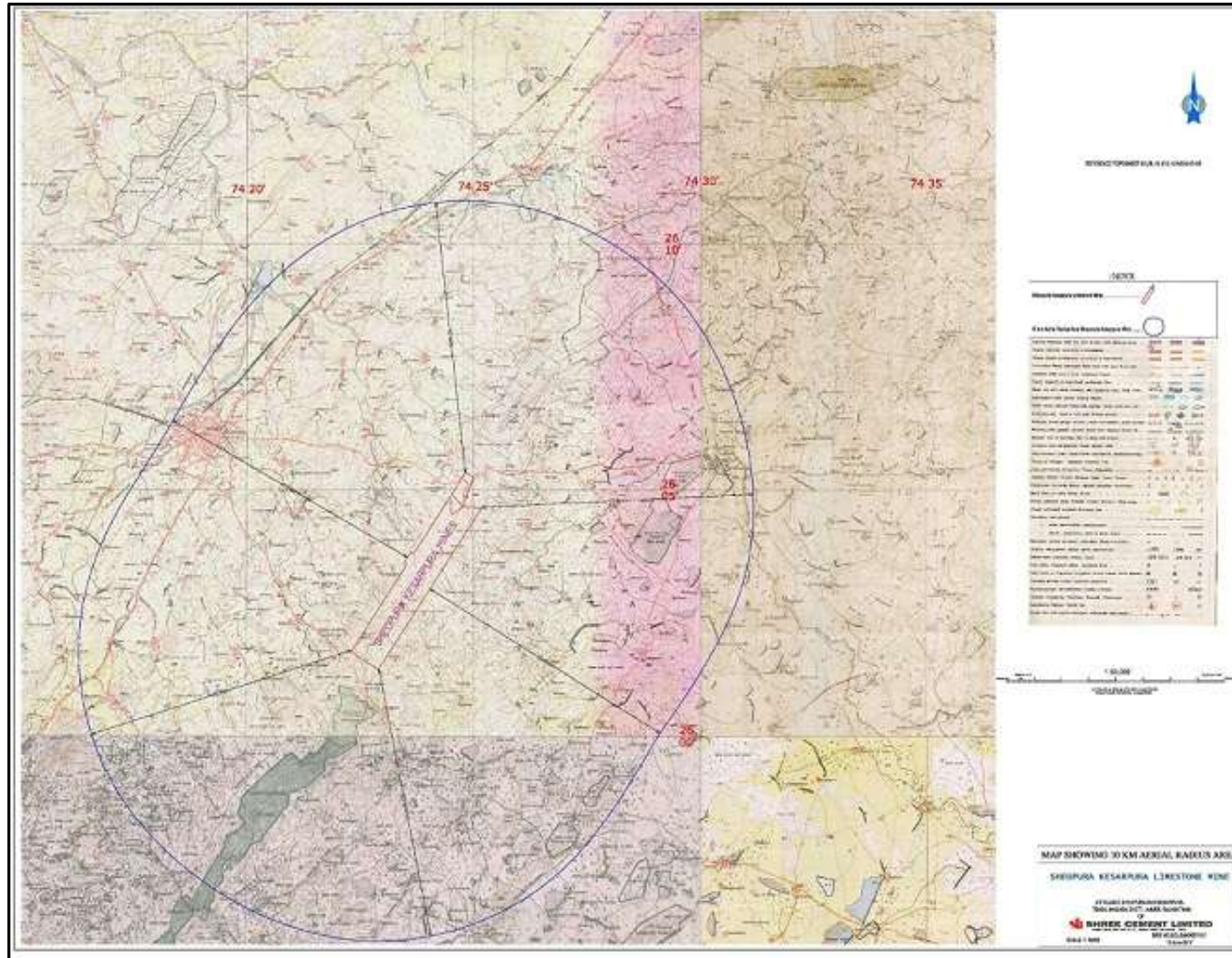
3.0 PROJECT DESCRIPTION

(i) Type of Project including interlinked and independent projects if any

Limestone is being used as raw material for clinker manufacturing in integrated cement plant.

(ii) Location (map showing general location, specific location, and project boundary & project site layout) with coordinates





Key Plan

(iii) Details of alternative site consideration and basis of selecting the proposed site particularly the environmental considerations gone sound be highlighted.

No alternate site has been considered as the proposal is for amendment in the EC.

(iv) Size or magnitude of operation

Shree Cement Ltd. is proposing the amendment in existing Environment Clearance of expansion of Limestone Production capacity in Sheopura-Kesarpura limestone mine (ML Area – 856.8 ha) from 2.0 Million TPA to 4.0 Million TPA with respect to mention the existing crushers and no ground water intersection, near Villages – Sheopura and Kesarpura, Tehsil – Masuda, District – Ajmer (Rajasthan)

The process includes basic raw material requirement, sizing of equipment, utilities and services, infrastructure facilities and sources of waste generation, their quantity, treatment and safe disposal of the waste.

(v) Project description with process details

The brief technical details of limestone mining are as follows:

PROCESS DESCRIPTION

- The mining method mechanized open cast mining method with maximum bench height of 9 m and minimum bench width of 9 m.
- Bench height of 9 m is planned according to maximum boom height of Hydraulic Excavator (Loading Equipment)
- The working bench width is being kept 20 m wide for safe movement of HEMM.
- Ultimate pit angle slope is proposed to be kept at 45°.
- The working is being maintained in such a way that all quality limestone is being available for blending.
- Each bench is being kept at least 20 m advanced ahead of respective bottom bench.
- As such there is no top soil & over burden in rocky form. However the inter burden is being mined out simultaneously.

Mineral processing:

The ROM Limestone is fed to crushers installed within the lease area, where it is crushed to -90 mm size. No Screening is done.

EQUIPMENT DETAILS

Equipment Selection

A list of equipment is given below. In selecting a particular type of equipment, the following issues have been considered:

- Equipment costs
- Energy consumption
- Sizes in which the equipment is available
- Lead times for particular types of equipment
- Operating experience with various types of equipment
- Ease of operation of equipment
- Site conditions
- Local skills available
- Environmental issues

Main machineries detail for 4.0 MTPA is as under:

S.No.	Equipment	Nos.
1.	Excavator	7
2.	Rock Breaker G-100	6
3.	Excavator for Rock Breaker	6
4.	Dumper	15
5.	Loader	2
6.	Dozer	2
7.	Drill Machine & Compressor	0
8.	Explosive Van	0
9.	Maintenance Van	2
10.	Ambulance Van	1
11.	Water Tanker	1
12.	Tractor	1
13.	Jeep	1

14.	Workshop Equipment	0
15.	Crushers	2
16.	Lease hold land & site development	0
	Total	46

(vi) Raw material required along with estimated quantity, likely source, marketing area of final products, mode of transport of row material and finished product.

Slurry explosives & ANFO is being used for blasting. Bottom initiation is done by the use of down line detonator in combination of noise less trunk line detonator on surface. The product limestone is being transferred from face to crusher by dumpers and then crushed limestone from crusher to existing cement plant by conveyor belt for clinker manufacture.

(vii) Resources optimization/ recycling and reuse envisaged in the project, if any, should be briefly outlined.

Use of diesel and lube oil in HEMM is being optimized for efficient use. Water used for wet drilling, crusher spray and haul road spray is being optimized by providing efficient jet atomized spray system. Workshop water generated from washing of HEMM is being used for spray in crusher after removal of oil contents. The inter burden of mine is being stacked at earmarked place at external waste dump yard or for back filling.

(viii) Availability of water its source, energy /power requirement and source should be given.

Water Requirement and Source

Water consumption is 200 KLD which is being sourced from the rain water collected in mine pit.

Power Requirement and Source

19500 KW/day

Sourced: Captive Power Plant

(ix) Quantity of waste to be generated (liquid and solid) and scheme for their management/disposal

The total waste generation in Quarry would be 34.8 million tones Waste disposal is being done by end tipping method and is being continued in future also while forming terraces of 10m in height. The sequence of buildup is being such bottom terrace formed first & then upper terraces are formed. The confinement of the dumping site is done by digging garland drains. For stability of waste dumps, terraces of 10m height are formed. Whenever the dumping area gets matured, plantation is done on it.

At the end of the life of mine the waste available in the area shall be backfilled in part of worked out pit. Rest area of worked out pit is being converted into water reservoir.

Waste water generated from mines workshop which is being used for dust suppression in crusher after separation of oil & grease. Waste water is being discharge from office utilities which is being disposed in Soak Pit via Septic Tank Used oil is being generated from plant machinery/Gear boxes which are being sold to the CPCB authorized recycler.

4.0 Site Analysis

(i) Connectivity

Road

The existing mine lease area fall near to NH 8 km (~ 11 Km in W direction) and State Highway (0.5 Km in N direction); it thus has excellent road connectivity.

Rail

The nearest railway station is the Beawar at a distance of ~ 11.0 km in W direction

Air

The nearest airport is at Jodhpur approximately 172 km in W direction

The site is well connected with communication facilities like telephone, fax, wireless and telex and as such, no constraints are envisaged.

(ii) Land from Land use and land ownership

The proposed limestone production is being within the existing mining lease of 856.8 ha.

(iii) Topography

The topography of the area is hilly consisting of series of hillocks. The maximum and minimum elevations are 582m and 510m respectively. A detailed analysis of slope in the area has been carried out. It has been observed that topography of the area is undulating with a hillocks running in the NE-SW direction.

There is no river/canal in the mining lease area. Many nallah are found in the mining lease area, which are seasonal and rainwater flows through the nallah's and accumulates to water pond nearby village.

- (iv) Existing land use pattern (agriculture, non-agriculture, forest, water bodies (including area under CRZ)), shortest distances from the periphery of the project to periphery of the forests, national park, wild life sanctuary, eco sensitive areas, water bodies (distance from the HFL of the river), CRZ. In case of notified industrial area, a copy of the Gazette notification should be given.**

Table – 2: Environmental Settings of the Area

PARTICULARS	DETAILS																				
Nearest River	▪ There is no River																				
Reserved/ Protected Forest within 10 km radius	<p>List of Reserved and Protected Forests (Open mixed jungle & Scrub type)</p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Name</th> <th>Distance from Project Site (in Km.)</th> <th>Direction from Boundary of Project Site</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>RF</td> <td>~1.5</td> <td>SW</td> </tr> <tr> <td>2.</td> <td>PF</td> <td>~5.5</td> <td>E</td> </tr> <tr> <td>3.</td> <td>PF</td> <td>~6.5</td> <td>E</td> </tr> <tr> <td>4.</td> <td>PF</td> <td>~8.8</td> <td>NW</td> </tr> </tbody> </table>	S. No.	Name	Distance from Project Site (in Km.)	Direction from Boundary of Project Site	1.	RF	~1.5	SW	2.	PF	~5.5	E	3.	PF	~6.5	E	4.	PF	~8.8	NW
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3.	PF	~6.5	E																		
4.	PF	~8.8	NW																		
Ecological Sensitive Areas	No National Park, Biosphere Reserve, Wild Life Sanctuary falls within 10 km radius the study area.																				

(v) Existing Infrastructure

Infrastructure like workshop, machinery stores, time and security office, dispensary and parking is already developed in the existing lease area.

(vi) Soil Classification

The topsoil is very scanty and if encountered during excavation is being and is being immediately used for plantation at plantation site to protect the humus content of the soil.

(viii) Climatic data from secondary sources

The area has generally moderate climate. The temperature variation is from 23 °C to 43 °C. The average annual rainfall in the area is 395 mm. The relative humidity varies between - Maximum 60% & Minimum 7%.

5. Planning Brief

(i) Planning Concept (type of industries, facilities, transportation etc.) Town and Country Planning /Development authority classification.

Shree Cement Ltd. is proposing the amendment in existing Environment Clearance of expansion of Limestone Production capacity in Sheopura-Kesarpura limestone mine (ML Area – 856.8 ha) from 2.0 Million TPA to 4.0 Million TPA with respect to mention the existing crushers and no ground water intersection, near Villages – Sheopura and Kesarpura, Tehsil – Masuda, District – Ajmer (Rajasthan).The blasted material of limestone is being transported to Crusher Hopper and waste rock is being transported from working face to Back Filling area / Waste dump yard by means of rear dump trucks (Dumper). The crusher is being connected to stack yard in Plant area through conveyor belt.

(ii) Population Projection

No Influx of people is being there as all persons are in existing employment.

(iii) Land use planning

The mining lease area is 856.8 ha and about 158 ha of the total project area developed as green belt to increase aesthetic beauty of the area.

(iv) Assessment of infrastructure demand (Physical & Social)

SCL has assessed the demand of infrastructure (Physical & Social) in nearby area of the plant which is developed under corporate social responsibilities programs.

(v) Amenities/Facilities

SCL has developed the Amenities/Facilities in nearby area of the plant as per requirement of local people of the nearby area under corporate social responsibilities programs.

6) Proposed Infrastructure

(i) Industrial Area (processing area)

Infrastructure like workshop, machinery stores, time and security office, dispensary and parking is already developed in the existing lease area. No additional processing area required.

(ii) Residential Area (Non processing area)

Colony is already near Plant.

(iii) Green Belt

The mining lease area is 856.8 ha and about 158 ha of the total project area is being developed as green belt to increase aesthetic beauty of the area.

(iv) Social Infrastructure

Expansion project will result in growth of the surrounding areas by increased direct and indirect employment opportunities in the region including ancillary development and supporting infrastructure.

The installation of proposed plant will lead to the development of certain local ancillary facilities and consequent employment opportunities. Further the proposed expansion will also lead to the enhancement of existing market, trade centers, activities etc.

In addition to the above, SCL has a track record of engaging the local communities and extending several social services to the nearby villages.

(v) Connectivity

Road

The existing mine lease area fall near to NH 8 km (~ 6 Km in W direction) and State Highway (0.5 Km in N direction); it thus has excellent road connectivity.

Rail

The nearest railway station is the Beawar at a distance of ~ 11.0 km in W direction

Air

The nearest airport is at Jodhpur approximately 172 km in W direction

The site is well connected with communication facilities like telephone, fax, wireless and telex and as such, no constraints are envisaged in this aspect as the Tehsil and District headquarters are near to the site.

(vi) Drinking Water

Drinking water has been sourced from ground water which is treated in RO unit present in integrated cement plant.

(vii) Sewerage system

The domestic waste water is being discharge from office utilities which is being disposed in Soak Pit via Septic Tank

(viii) Industrial Waste management

Waste water generated from mines workshop which is being used for Dust suppression in crusher after separation of oil & grease.

(ix) Solid waste management

The total waste generation in Quarry would be 34.8 million tones Waste disposal is being done by end tipping method and is being continued in future also while forming terraces of 10m in height. The dump is being formed in advancing manner. The sequence of buildup is being such bottom terrace is being formed first & then upper terraces are being formed. The confinement of the dumping site is being done by digging garland drains and the same practice is being adopted in future also. For stability of waste dumps, terraces of 10m height are being formed. Whenever the dumping area gets matured, plantation is being done on it.

It is proposed at the end of the life of mine the waste available in the area shall be backfilled in part of worked out pit. Rest area of worked out pit is being converted into water reservoir.

(x) Power requirement and source

19500 KW/day

Sourced: Captive Power Plant

7.0 Rehabilitation and Resettlement (R & R) Plan

(i) Policy to be adopted (Central/State)in respect of the project affected persons including home oustees, land oustees and landless laborer (brief outline to be given)

Not Applicable

8.0 Project Schedule and Cost Estimates

(i) Likely date of start of construction and likely date of completion (time schedule for the project to be given)

No additional mining machineries is being required.

(ii) Estimated project cost along with analysis in terms of economic viability of the project

As limestone is main ingredient in cement manufacturing, its cost should be economical in respect of cement manufacturing. In cement manufacturing the Raw Material Cost should be below 15% of total turnover & we are well within economics.

The present cost of Mining is Rs. 265 per MT inclusive of royalty & cess etc.

There would not any additional investment.

9.0 Analysis of proposal

The state of Rajasthan will get revenues in terms of taxes, local people will get opportunity in terms of indirect employment, in short nearby people will get opportunity to improve their livelihood.

10.0 ENVIRONMENTAL MANAGEMENT PLAN

10.1 Air Pollution Control

The major sources of pollution are particulate matter from cement plant.

- Drilling machines is being equipped with wet drilling arrangements to prevent dust from getting air borne.
- Blasting is being done by latest blasting technique using stock tube detonator (Down line detonator in combination with noise less trunk line detonators.)
- Use of Rock breaker in place of secondary blasting to reduce generation of fly rocks and ground vibration. The system is ECO friendly.
- Large capacity excavators are used with dumpers.
- The haul roads are being kept wide to support easy traffic movement. The roads are being properly maintained by road compactor and regular water spraying is being done during work hours to prevent generation of dust from vehicular movement.
- Waste dumping sites is being thickly vegetated by suitable plantation to prevent air pollution during stormy winds.

- Gaseous emissions generated from HEMM and blasting is being kept within limits by proper maintenance of all machineries and controlled blasting with suitable explosives.
- In order to reduce air pollution in the surrounding, Green Belt is being developed around mine office, approach roads, pit peripheries and waste dump yards and along the boundary.
- Periodic air quality survey is being carried and the records are being maintained properly.

10.2 Water Pollution Control

- Garland drains and de-silting pit (Check Dam) are made all around the OB dumps.
- Waste water generated from the office toilets is being disposed off in soak pit via septic tank.
- Waste water generated from the work shop is after oil and grease separation is used in crushed for dust suppression.

10.3 Solid Waste Management

The total waste generation in Quarry would be 34.8 million tones Waste disposal is being done by end tipping method and is being continued in future also while forming terraces of 10m in height. The dump is being formed in advancing manner. The sequence of buildup is being such bottom terrace is being formed first & then upper terraces are being formed. The confinement of the dumping site is being done by digging garland drains and the same practice is being adopted in future also. For stability of waste dumps, terraces of 10m height are being formed. Whenever the dumping area gets matured, plantation is being done on it. At the end of the life of mine the waste available in the area shall be backfilled in part of worked out pit. Rest area of worked out pit is being converted into water reservoir.

10.4 Hazardous Waste Management

Used oil generated from mines machinery/Gear boxes is sold to the CPCB authorized recycler.

10.5 Noise Pollution Control

To maintain the noise level well within the prescribed limit inside the plant (85 dB (A)) and at the plant boundary (day time 75 dB (A) and Night Time 70 dB (A)) the following measures is being taken:-

- 1 Proper maintenance and lubrication of plant machineries
- 2 Plantation in the lease area.
- 3 Sharp drill bit with wet drilling arrangements.
- 4 Controlled blasting by latest blasting technique using stock tube detonator (Down line detonator in combination with noise less trunk line detonators.)
- 5 Use of Rock breaker in place of secondary blasting.
- 6 Use of personal protective equipments like ear plug and ear muffs to all working persons at the site.

10.6 Green Belt Development/Plantation

- 1 Plantation has been done in and around the lease area. The total area covered is 57.7 ha.
- 2 The mining lease area is 856.8 ha and about 158 ha of the total project area is being developed as green belt till the end of life of mine.
- 3 80% survival rate has been maintained with all possible efforts.
- 4 Local plant species have been preferred.

11.0 CONCLUSION

Shree Cement management recruits the semi-skilled & unskilled workers from the nearby villages i.e. Lasodiya, Khimpura, Andheri Devori, Balad, Jhunjharon Ki Bari, Sarkhana, Mundoti, Jhak, Lulwa etc., due to local labours rapidly increasing the social status of the villagers. The management supports the local administration and other form of assistance for the development of public amenities in this region. Mainly they are providing the basic amenities to nearby villagers for water distribution, building of schools, hospitals etc. Adult Education programmes are proposed up-gradation of literacy level. Plantation is very much developed inside the mine site and also cement plant site and colony.



**ENVIRONMENTAL IMPACT
ASSESSMENT REPORT**

&

ENVIRONMENTAL MANAGEMENT PLAN

OF

**SHEOPURA-KESARPURA
LIMESTONE MINE
(AREA 856.8 HECTARES)**

FOR

**(EXPANSION OF LIMESTONE PRODUCTION
FROM 2.0 MTPA TO 4.0 MTPA CAPACITY)**

AT

**VILLAGE – LULWA,
POST OFFICE – ANDHERI DEVORI
TEHSIL – MASUDA
DISTRICT – AJMER**

APPLICANT

M/s. SHREE CEMENT LTD.

**BANGUR NAGAR, BEAWAR,
DISTT. AJMER (RAJ.)**

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APPLICATION FOR ENVIRONMENT CLEARANCE

(Ministry of Environment and Forest – Notification dated
27th January 1994 & 4th May 1994)

1. GENERAL

- a** Name and Address of the project proposed : Sheopura-Kesarpura Limestone Mine
M/s. Shree Cement Ltd.,
Post Box No. 33, Bangur Nagar,
Beawar, Ajmer (Raj.)
- b** Location of the project : The Limestone deposit is connected by road at a distance of 11 km. SE of Beawar city. The Beawar Masuda tar road is passing through the northern part of lease area, Beawar – Vijaynagar tar road is passing nearby southern lease boundary.
- Name of the Place : Village Lulwa (Sheopura and Kesarpura),
- Tehsil : Masuda,
- District : Ajmer
- State : Rajasthan
- Latitude / Longitude : Latitude 26° 1' 35" to 26° 5'25" (N)
Longitude 74° 22'40" to 74° 25'25" (E).
- Nearest Airport / Railway Station : Air Port (Jodhpur)
Rly. Station – Beawar on Dehi-Ahmedabad broad gauge section.
- c** Alternate sites examined and the reasons for selecting the proposed site. : No alternate site has been examined, the site is selected as the cement plant is adjoining to the mine and availability of cement grade of limestone and there is no eco-system in the area.
- d** Does the site conform to stipulated land use as per local land use plan : The site is located on Limestone and shale bearing rocky land devoid of vegetation. Such land are usually lease out for mining of minerals and setting of industries

2 . OBJECTIVE OF THE PROJECT

The objectives of the Project are as under :-

- To produce limestone of desired quality and quantity for 3.2 MTPA capacity of Cement Plant called “Shree Cement Ltd”. as per the requirement.
- To utilise local natural resources for general economic growth in this backward area.

3 . LAND REQUIREMENT

(a) Details of land requirement.

Total land	856.8 Hacts.
Agricultural land	153.1 Hacts.
Forest Land	Nil
Govt Waste land	703.7 Hacts.
Others	Nil

(b) (i) Land use in the catchments / within 10 kms radius of the proposed site.

LAND UTILIZATION IN STUDY AREA (10 K.M. OF STUDY AREA)

S. No.	Particulars	Area in Hectares	Percentage to total Area
01.	Forest	3612.74	9.5%
02.	Irrigated Area	1491.19	3.93 %
03.	Unirrigated Area	14687.69	38.63%
04.	Culturable Waste	4974.43	13.08%
05.	Area not available for cultivation	13253.46	34.86%
	Total	38022.51	100.00

(ii) **Topography of the area indicating gradient, aspects and altitude:**

There is no reserve forest in the lease area. A major portion of the area is *rocky* and thus there is no vegetation. The East of the area represents an undulating topography with small mounds and hillocks followed by prominent chain of hills extending in North East – South West Direction. In fact on the top of this hill the highest RL is 582 mtrs. and bottom RL is 510 mtrs. There occurs two parallel ridges of limestone extending all along the length of the area, in between two ridges. Thorny Bushes are found on the hill slopes and Nallah cuttings.

(iii) **Erodibility classification of the proposed land.**

Open planed and lowly dipping limestone rocks are least susceptible to erosion. The shale band and joint plane provide scope for watering and washing for rocks which give rise to some rugged surfaces and deep sub-surface cavities retaining water.

(c) **Pollution sources existing in 10 km radius and their impact on quality of air, water and land:**

There is Shree Cement Plant at 3 km. from the mine since the existing quality of air water and land is within the limit so there is no adverse impact on the existing environmental conditions due to the operation of existing plants and mines

(d) Distance of the nearest National Park / Sanctuary / Biosphere Reserve / Monuments / Heritage Site / Reserve Forest.

4 No. of small forest at about 1.5 to 8.0 km from the lease boundary.

(e) Rehabilitation plan for quarries / borrow areas

This mined out area has been converted into water reservoir. Due to scarcity of water in local region, this water reservoir will be immensely beneficial to the plant and locality, as it will help in recharging the surrounding area.

The waste dumps will be stabilized and plantation will be taken up on them. The non-mineralized area will be used for heavy plantation. It will improve greenery and aesthetic beauty of the area, which will be advantageous for surrounding Eco-System.

(f) Green belt plan

A well-planned green belt programme has been developed for lease area. Plantation work has been planned for overburden dump as well as for non-mineralized zone. Above-mentioned green belt will help in minimizing air and noise pollution.

(g) Compensatory afforestation Plan : Not Applicable

4 . CLIMATE AND AIR QUALITY

(a) Wind rose at site : **Enclosed Annexure-I**

(b) Max/Min/Mean temperature **Enclosed Annexure-II**

Maximum temperature : 43°C

Minimum temperature : 23°C

Mean temperature : 33°C

(c) Frequency of inversion : Not observed

(d) Frequency of cyclones / tornadoes / cloud burst

No cyclone / tornado / cloud burst has been reported in the area.

(e) Ambient air quality data **Enclosed Annexure-III**

The average concentration of SPM for all the 11 AAQM stations ranges between 116.04 to 248.2 $\mu\text{g}/\text{m}^3$. At mine site the maximum concentration of SPM was monitored to be 298 $\mu\text{g}/\text{m}^3$ and minimum of 215 $\mu\text{g}/\text{m}^3$ and the maximum average concentration of RSPM was monitored to be 64.04 $\mu\text{g}/\text{m}^3$ and minimum of 31.83 $\mu\text{g}/\text{m}^3$ for all the eleven AAQM stations.

As far as the gaseous pollutants SO_2 and NO_x are concerned, the promulgated CPCB limit of 80 $\mu\text{g}/\text{m}^3$ for residential and rural areas was never exceeded at any station. The SO_2 average concentrations are in the range of 5.87 $\mu\text{g}/\text{m}^3$ to 13.98 and the NO_2 average concentration in the range of 8.95 $\mu\text{g}/\text{m}^3$ to 21.75 $\mu\text{g}/\text{m}^3$ for all the eleven AAQM stations.

- (f) Nature & concentration of emission of SPM, Gas (CO , CO_2 , NO_x , CH_n etc.) from the project.

Due to mining activities the level of suspended particulate matter (SPM) is likely to go high causing slight deterioration in the ambient air quality. Background SPM level of the mining area, ranges 215-290 microgram/ m^3 . This is due to release of dust from crusher, transportation, drilling and blasting. The emission level shall be kept as low as possible within the permissible limits by proper Environmental Management Plan (EMP).

5 . WATER BALANCE

- (a) Water balance at site

Input source	Mines sump	200 KLD
Consumption	Spray on Haul Road, Drilling, crushing and workshop	150 KLD
	Plantation and office utility	50 KLD

- (b) Lean season water availability and water requirement

We will meet our requirement from the sump of the existing mine.

- (c) Sources to be tapped with competing users (Rivers, Lake, Ground, Public supply)

Not Applicable.

- (d) Water Quality

Water samples were collected from 5 stations and the analysis of the samples shows that the concentration of Total Dissolved Solids ranges between 245 mg/l to 1420 mg/l, pH varies from 7.2 to 7.9 and Total Hardness from 273 mg/l to 391 mg/l.

- (e) Changes observed in quality and quantity of ground water in the last 15 years and present charging & extraction details:

There are hardly any changes in the quality of water in the area but the area in general has been showing gradual decline of water table during last few years during pre and post monsoon periods. Presently annual recharge rate is 0.27 mcm and withdrawal rate is 0.21 mcm.

- (f1) Quantum of waste water to be released with treatment details } The source of wastewater will be generation of wastewater from office toilets, which will be disposed off into soak pit via septic tank.
- (f2) Quantum of quality of water in the receiving body before and after disposal of solid wastes } Approximately 4.0 KLD of wastewater will be generated.
 } Also 5.0 KLD waste water will be generated from workshop. This waste water will have some traces of oil and grease which will be separate out by passing the water from upflow filter and treated water will be used for dust suppression.
- (f3) Quantum of waste water to be released on land type of land. }
- (g1) Details of reservoir water quality with necessary catchments treatment plan : N.A.
- (g2) Command area development plan : N.A.

6 . SOLID WASTES

- (a) Nature and quantity of solid wastes generated

The generation of solid waste at the mines in form of unusable interburden rocks, comprising of low grade Limestone, Calc Schists etc. The expected quantity of waste rock generation is approx. 30% of the production. The total quantum of overburden is anticipated about 34 million Tones till the end of life of the mine.

- (b) Solid waste disposal method

The overburden rock will be stacked in specified dump yards over non mineralized zone.

7 . NOISE AND VIBRATIONS

(a) Sources of noise and vibrations

In the mines, noise arises due to different mining activities like drilling blasting, haulage, operation of earth moving equipment, crushing plant etc. Ground vibration occurs due to blasting.

(b) Ambient noise level : 40 dB (A) to 64 dB (A)

(c) Noise and vibration control measures proposed

Measures For Noise Control

To keep ground vibration due to blasting well within the above mentioned prescribed limits of DGMS, following measures have been taken.

- i) Drilling and blasting is done in the supervision of qualified persons.
- ii) Not more than 50 holes are blasted at a time and there delay timing in each hole by using surface noise less truck line detonators.
- iii) Down line detonators (Shock Tube) in combination with noise less trunk line detonators are used.
- iv) ANFO/Slurry explosive is used which has low velocity of detonation, which reduces ground vibrations.
- v) Non-electric blasting system is used to reduce ground vibrations.
- vi) Use of Hydraulic rock breaker has reduced noise level.
- vii) By using bottom initiation system, there is no problem.
- viii) Stemming length is kept 1/3 of the hole depth for optimum utilization of explosives as well to reduce fly rock.
- ix) The faces are cleared for loose rocks before blasting which may be sources of fly rocks.
- x) Detonating fuses containing fewer explosives per meter length is used.
- xi) The blasting safety zone is clearly marked on the ground. This zone is cleared from strays animals and men by pasting security guards before blasting. Before blasting siren is blown to inform the people about blasting.
- xii) The vibrations and air blast are monitored. The results of such data are regularly sent to DGMS.

8 . POWER REQUIREMENT INDICATING SOURCE OF SUPPLY

- (a) Complete environmental details to be furnished separately, if captive power unit is proposed:

The power required of mining activities at 4.0 MTPA will be 19500 KW/day This power is made available from existing 36 MW Captive Power Plant.

9 . PEAK LABOUR FORCE TO BE DEVELOPED GIVING DETAILS OF:

The Maximum labour working will be 240.

- (a) Endemic health problems in the area due to waste water / air / soil borne diseases:

N.A

- (b) Health care system existing and proposed:

The company is having full-fledged medical facilities at existing Shree Cement Plant at Bangur Nagar, Beawar and first aid facility with Jeep is provided at the mine site. This facility is open for all the employees of the company as well as villagers from nearby villages. Company is develop a full-fledged dispensary with availability of ambulance at Shree Cement Ltd.

10. DISPLACEMENT AND REHABILITATION:

- (a) Number of village and population to be displaced. Nil

- (b) Rehabilitation master plan: Not Applicable

11. RISK ASSESSMENT REPORT AND DISASTER MANAGEMENT PLAN

Details of risk assessment report and disaster management plan is enclosed in **Annexure-IV**

12. REPORTS AS PER GUIDELINES OF CENTRAL GOVERNMENT:

- (a) Environment Impact Assessment / : Enclosed
Environmental Management Plan of
Approved Mining Plan
- (b) Detailed Feasibility Report : Enclosed
- (c) Duly filled in Questionnaire : Enclosed

13. DETAILS OF ENVIRONMENTAL MANAGEMENT CELL

The total environmental management of Sheopura – Kesarpura Limestone Mines is looked after by the Sr. G.M. (Mines). He is suitably qualified person with vast experience at senior level in similar type of mines. He will be assisted by Dy. General Manager (Maintenance), Senior Manager (Mines operation), Geologist and Environment Scientist. Under these will be a number of other personnel to execute day-to-day operations including environmental protection, control and monitoring.

I hereby give an undertaking that the data and information given above are true to the best of my knowledge and belief and I am aware that if any part of the data / information submitted is found to be false or misleading at any stage, the project be rejected and the clearance given, if any, to the project is likely to be revoked at our risk and cost.

Date:-
Place

S.C. Suthar
Sr. G.M. (Mining)
M/s. Shree Cement Ltd.,
Bangur Nagar, Beawar,
Ajmer (Raj.)

CHAPTER – I

INTRODUCTION

1.1 GENERAL INTRODUCTION

Shree Cement Ltd. is committed to provide clean & green environment to all of its units for environment protection. We are committed to Eco-friendly mining activities and to maintain clean & green environment.

Mining of minerals is no doubt essential for industrial growth and for providing better standard of living. But, there are environmental concerns related to mining activities i.e. land degradation, pollution of air, water, soil & noise affecting biological environment and socio-economic environment. It has been experienced that in the past, due to unplanned exploitation and inadequate regard to the environment, mining operations have caused lot of damage to the mother earth.

In order to maintain the balance in the eco-system, legislation have been enacted compliance of which would not only allow sustainable development for current needs but also leave options open for the posterity. With these objects in view, approval of mining plan and environmental clearance from concerned authorities is of utmost priority for each mining project.

1.2 ABOUT SHREE CEMENT

Shree Cement Limited belongs to Bangur Group (Shri B.G. Bangur combine). It was promoted by three group concerns i.e. Shree Digvijay Cement Co. Ltd., Graphite India Limited, and Gloster Industries in 1979 for setting up a cement plant of ordinary Portland cement and pozzolona Portland cement near Beawar, at village Andheri Devari (Distt. Ajmer).

1.3 PROJECT PROPOSALS AND GENERAL INFORMATION

1.3.1 INTRODUCTION

Mining Lease for limestone namely Sheopura-Kesarpura Limestone Mine was sanctioned in favour of M/s. Shree Cement Limited, Beawar in the year 1978. The Mining lease deed was registered on 28th August 1978 for the period of 20 years. The Mining Lease was renewed for further period of 20 years and will expire on 27-08-2018. The company has installed a Cement Plant adjoining the lease area in the name of SHREE CEMENT LIMITED. Indian Bureau of Mines, Ajmer upto 31st March 2003, has approved the Mining Plan of the mine. The consent to operate has been obtained from Rajasthan State Pollution Control Board, Jaipur vide letter no. F-12 (1-85

RPCB/Group-III/ 4495 of dated 25-11-2002 to produce two million tones/annum / (6000 TPD) cement grade limestone upto period 30-09-2005 and now Shree Cement proposes the expansion of mineral production from 2.0 million tonnes per annum to 4.0 million tonnes per annum from existing Mining Lease.

1.3.2 STATUS OF APPLICANT

Shree cement Ltd is a Public Limited company engaged in cement manufacturing, marketing & mining of limestone. The company has wide experience in the field of mining. S.C.L. is running the Cement Plant & Mines with latest eco-friendly technology and has been credited for lowest power consumption in the country. The company has two cement plants in Rajasthan accredited with ISO-9002 & ISO-14001. The company has a very strong market & vibrant financial condition and well-qualified team of professionals, which includes Mining Engineers, Geologist, Surveyor and qualified cement technocrats.

1.3.3 DETAILS OF MINING LEASE

Village	-	Lulwa (Sheopura and Kesarpura)
Post Office	-	Andheri Deori
Tehsil	-	Masuda
District	-	Ajmer
Area of Mining Lease	-	856.8 Hectares
Renewal of the lease	-	28.08.98
Date of Validity of Lease	-	27-08-2018.

1.4 LOCATIONS AND ACCESSIBILITY

1.4.1 SALIENT FEATURES OF THE AREA (REFER PLATE No. 1)

District and State	:	Distt. Ajmer, State, Rajasthan
Taluka/Tehsil	:	Beawar & Raipur
Village	:	Jhak, Lulwa, Kheempura.
Khasara Number	:	Khasara numbers are shown in plate No. 2.
Lease Area	:	856.8 Hectares.
Whether the area is recorded :		Area falling has no including
Owner ship/Occupancy	:	Ownership of land is as under

a) Govt. Land 856.8 Hect.

Existence of Public road / Railway line, if any nearby : The Limestone deposit is connected by road at a distance of 11 km. SE of Beawar city. The Beawar Masuda tar road is passing through the northern part of lease area, Beawar – Vijaynagar tar road is passing nearby southern lease boundary

Topo Sheet Number with : The area lies on survey of India Topo Sheet No. 45 J/8 in between latitude 26°5'25" and 26° 1' – 35" N and longitudes SW 74°22' – 40" to 74°25' - 25" E

Land Use Pattern : Land use pattern: in the area consists of Barren, Agricultural land as shown in the Plate No. 2.

1.4.2 INFRASTRUCTURE

1.4.2.1 Location and Approach to the Mines

Limestone Mining Lease is located on Toposheet No. 45 J/8. It is 11 Km from Beawar Town on Beawar-Masuda State Highway, south-east of Beawar town. The Mining Lease area extends over an area of 856.8 hectares between Khimpura village (26°5' : 74°26') in North East and Sheopura village (26°1' : 74°22'30") in South West. There are two villages Lulwa (26°3'30": 74°24'30") in the central portion and Jhak (26°2' : 74°22'30") in southern portion of the lease. The lease extends over a length of 7840 mtrs and width of 1200 mtrs forming a rectangle block. Nearest Railway Station is Beawar.

The Sheopura-Kesarpura Limestone Mine is connected by road at a distance of 11 km. SE of Beawar city. The Beawar-Masuda tar road is a passing through the northern part of the lease area and the Beawar-Vijaynagar tar road is passing nearby southern lease boundary near Pillar D of mining lease area.

The mining lease area falls in revenue land of villages Sheopura and Kesarpura. The lease area falls in Govt. Waste Land. There is no forestland in the lease area.

1.4.2.2 Power

The Power requirement at mines is mainly for crushing plant, belt conveyor, workshop equipments and for general illumination of mines office and mine working area at our existing mine.

The daily power requirement at 2.0 MTPA capacity is approx. 1000 KW per day and at 4.0 MTPA will be approx. 19500 KW per day. This power is made available from existing captive thermal power plant.

1.4.2.3 Water

Water at mines is mainly required for spraying over mines roads, drilling, plantation, workshop crusher and drinking purposes.

The daily water requirement will be approx. 200 KL per day. This water requirement will be made available from rainwater collected in abandoned mining pits.

Drinking water is supplied from existing cement plant.

1.4.2.4 Mines Office, Workshop etc.

A full fledged mine office complex has been developed at existing leasehold area of Cement Limestone Mines. It contains all modern facilities like workshop with modern tools, VT Centre, First Aid Station, Latrine and Urinals, Service Station, Rest shelter, Cycle stand etc.

1.4.2.5 Transport of men and material

A full-fledged colony with infrastructure facilities has been provided for mine workers. Colony is common for both cement plant and mines.

Officers and Staffs are also staying in Staff colony. Employees will report to the duty site on their own vehicle. One full time Jeep has been provided at Mines site in case of emergency requirements.

1.4.2.6 Communication

Internal Telephones have been provided at mines office and workshop and are connected with plant and colony.

1.4.2.7 Fire Fighting

Fire Extinguishers have been provided at all fire prone areas including all heavy earth moving equipment. One fire tender is kept ready at Plant for 24 hours in case of emergencies.

1.4.2.8 Medical Facilities

One Hospital equipped with all medical facilities like X-Ray machine, Pathological Laboratory and other amenities has been provided at

colony. One Ambulance is kept ready for 24 hours for emergencies at main gate of plant and also first aid medical facility is provide at mines office.

1.4.2.9 Security Arrangements

Security posts have been set at suitable locations to guard security of man and machinery working at Mines.

1.4.2.10 Explosives Magazine

Explosive Magazine has been provided as per Explosives Act.

1.5 ENVIRONMENTAL IMPACT ASSESSMENT REPORT

The purpose of Environmental Impact Assessment report is to assess the beneficial and adverse impacts of the proposed mining project on the existing environmental parameters, so that suitable control measures could be taken to reduce the impacts. This is a rapid EIA report and contains the base line collected within 10 km. radius. This includes base line information's of air, water, noise, flora, fauna, hydrology, socio-economic study etc. as well information's of the proposed mining site, mining process, impacts and management plan.

1.6 METHODOLOGY ADOPTED

On the basis of a quick assessment of the environmental conditions at the mine site and the nature of adjoining area, it was found that the area lying within the 3 km. radius with mining lease site as its center was considered to be the dominant zone where fugitive emission of the mining activity can have an impact on physical and biological environments. Area within 3 to 5 km. radius circle from mine boundary was considered to be the intermediate zone where some impact may be observed. Area within 5km and 10 km. radius circle was considered as buffer zone, where only slight impact may be observed occasionally.

1.7 INSTRUMENT USED

The following instruments were used at the site for environmental baseline data collection work.

1. Respirable Dust Collector with attachment for gaseous Pollutants, Envirotech APM 460.
2. Digital D.O. Meter Model – 831 E.

3. Wind Direction Van – One
4. Dry and Wet Bulb Thermometer.
5. Sound Level Meter Model SL – 4010
6. Anemometer Model AM – 4201

1.8 DATA COLLECTED

Meteorological data collection instruments were set at the mine site. Expert field team stayed in this area during the study period. Micro Meteorological data were collected at the two synoptic hours i.e. 8.30 and 17.30 hours for summer season, without any interruption. A large number of air, water and soil samples were collected and analyzed. Analyzed samples include the following:-

1. Ambient air quality samples at 11 locations in different directions at different distances.
2. Water samples collected from wells and hand pumps, locations of the sampling station were decided with the ground water static data observations.
3. Soil samples from 5 different locations.
4. Noise level measurement was carried out by a precision sound level meter (Model SL – 4010) at the 11 sampling stations.

In addition to the above samples collected, the data on land use, vegetation and agricultural crops were also collected by the field team by meeting with a large number of local inhabitants in the study area and different Government departments / agencies. This provided an excellent opportunity to the members of the field team for obtaining an intimate feel of the environment of the study area.



CHAPTER – II

GEOLOGY & RESERVES

2.1 TOPOGRAPHY

There is no reserve forest in the lease area. A major portion of the area is rocky and thus there is no vegetation. The East of the area represents an undulating topography with small mounds and hillocks followed by prominent chain of hills extending in North East – South West Direction. In fact on the top of this hill the highest RL is 582 mtrs. and bottom RL is 510 mtrs. There occur two parallel ridges of limestone extending all along the length of the area, in between two ridges. Thorny Bushes are found on the hill slopes and Nallah cuttings.

2.2 MINE DRAINAGE

- a) Likely depth of water table based on observations from nearby wells and water bodies:- Water table varies from 20 to 45 M depth from general ground level.
- b) Working expected to be: 20 mtrs. above water table by the year 2003.
- c) Quantity and quality of water likely to be encountered, the pumping arrangements and places where the mine water is finally proposed to be discharged.

The rain water outside working area does not flow towards mine working area. Rain water is collected in abandoned mining pits.. Encountered at the bottom bench of working area. This water is pumped out side the working area and this water is utilized for spray on haul road, crusher & loading point. This water is not potable.

2.2.1 MINE DRAINAGE PATTERN

Mine working area is above the general ground level, so, seasonal and rainwater of outside working area does not flow towards the working area. The seasonal or rainwater of working area flows through top bench towards lower bench and accumulated at bottom bench. This rainwater accumulated at bottom bench is pumped out wherever necessary. We are also using this water for water spray on haul road, crusher hopper and irrigation to plants.

There is no river/canal in the mining lease area. Many nallah are found in the mining lease area, which are seasonal and rainwater flows through the nallah's and accumulates to water pond near village Jhunjharon-Ka-Baria and village Andheri Deori.

The villagers are mainly dependent on rains and underground water. The water is used for drinking and irrigation. Drinking water is arranged from wells, and rainwater is main source for irrigation purpose. The depth of underground water level varies between 20 to 45 m. from general ground level. The R.L. of ground level is about 500m., hence the R.L. of underground water level varies from 470 to 475 m. Our future planning of limestone mining is proposed upto R.L. 500 M. Hence there will be no problem in mining due to underground water. The rainfall in the area is erratic and variable. During summer, recharge of well very slow and thus the area shows scarcity of water.

2.3 REGIONAL GEOLOGY

The earliest studies on the geology of the Beawar area was carried out by the geological survey of India, in 1914-1916. The geological formations of the area belong to Delhi Super Group of precambrians of Indian stratigraphy. The formations of Delhi Super Group extend from near about Delhi in N-E running across Beawar and Banas upto Danta Palanpur (Guj.) in southwest. The stratigraphical sequence deciphered by Geological Survey of India is as follows:

STRATIGRAPHICAL SEQUENCE

Recent	Alluvium
Malani series	Erinpura granite Pegmatite Amphibolite Epidiorite
Ajabgarh series	Calc gneiss, calciphn Limestone, phyllite, Schist with amphibloite
Alwar series	Quartzite
Railo series	limestone & marble Quartzite & conglomerat

2.3.1 LOCAL GEOLOGY

The rock types occurring in the mining lease area belong to the Ajabgarh Group of Delhi Super Group consisting of calc schist, calc gneiss and limestone.

The rock types encountered in the lease area are described below:

LIMESTONE

Limestone is medium to coarse grained, metamorphosed showing recrytstallisation of carbonate minerals with minor occurrences of Ferro silicate mineral such as biotite, muscovite.

CALC SCHIST:

Calc-schist is the product of regional metamorphism of calcite and quartz matrix in association of Ferro silicate mineral such as muscovite, chlorite, iron oxide etc. The texture of the calc schist is medium to fine grained. The calc schist is having the general strike of N 33°E – S 33°W and dip varies from 30° to 50° WNW, where as the limestone shows dip varies from 45° - 60° due WNW. Structurally the area represents a tight isoclinal synclinal fold where limestone constitute two limbs of fold. These two limbs are separated by a shallow valley. Where alluvium/soil deposited which is suitable for supporting local agriculture. The width of the valley varies from 150 M to 350 M. The limestone constituting the western limb of fold is known as Western Zone and the limb on eastern side of Eastern Zone.

CALC-GNEISS:

Medium to fine grain, compact, thin laminated with micaceous minerals such as biotite. Calcium carbonate percentage is very low ranging from 62 to 70%.

ALLUVIUM:

The Alluvium is medium to fine grained, main constituent are as follows:

Silica varies from 15 to 25%, $MgCO_3$ varies from 2.5 to 4.0%, and $CaCO_3$ varies from 55 to 65%.

2.4 GEOLOGY OF THE MINING LEASE AREA

A major portion of the area is rocky & thus there is no vegetation. The highest R. L. is 582 m & lowest R. L. is 510 m above M.S.L. There occur two parallel ridges of Limestone extending all along length of the lease area. The strike direction of the lease is N30°E and its dip is N60°W. The rock type occurring in the Mining Lease area belongs to the Ajabgarh group of Delhi Super Group consisting of calc-schist, calc gneiss & limestone. Limestone is medium to coarse grained metamorphosed, showing re-crystallization of carbonate minerals with minor occurrences of Ferro silicate minerals such as biotite and muscovite. The limestone deposit is in the form of bands having thickness of 5 m to 20 m separated by calc schist & gneiss of almost same thickness.

2.5 RESERVES

2.5.1 EXPLORATION

During exploration, topographic plan of the whole lease area was prepared on Scale 1:5000 with contour interval of 5 m. This surface plan was taken as the base plan for preparation of Surface Geological Plan on a Scale 1:5000. The whole area was divided in IX blocks. The area was prospected by diamond core drilling and the reserves have been estimated.

2.5.2 COMPREHENSIVE METHOD OF ESTIMATION OF RESERVES

The method of estimation of reserves is cross sectional area method. The reserves are estimated bench wise and section wise. For this purpose cross sectional area of limestone for each bench level at different section lines of block were measured. From these a series of volume for corresponding level between two section lines were calculated by multiplying the mean cross sectional area by distance between two section lines. The volume derived is converted into tonnage by using volume to weight conversion factor, which is

The geological reserves are categorized into inferred, indicated and measured categories:

1. Measured Reserves: - Reserves under this category are established on the basis of adequate numbers of closely spaced boreholes and/or other sampling pits. These will be the ultimate purpose of prospecting operations.
2. Inferred Reserves: - This refers to estimate of grade and amount of limestone deposit calculated purely on the basis of data available and supplemented by surface exploration.
3. Indicated reserves: - under this category grade and amount of limestone are calculated on the basis of widely spaced boreholes and other available information such as trenching, pitting etc. The grade and tonnage are calculated partly from actual sampling data such as boreholes and partly from projection of the mineral.

2.5.3 GEOLOGICAL RESERVES (AS ON 1.04.2004)

The category wise geological reserves established on the basis of boreholes data are as under:

Block No.	Geological reserves		Up to roof level
	Measured	Indicated	
I	24.80	-	500 m
II	2.65	-	545 m
III	14.37	-	500 m
IV	-	6.23	527 m
V a	10.72	-	500 m
Total	52.54	6.23	

Besides these measured and indicated reserves there are inferred reserves in block V b, IV and VII which were not estimated in scheme of mining because at present mining in those blocks is restricted due to H. T. Power line, state highway and area covered by thickly populated villages. The inferred reserves in these blocks are estimated to be:

Block No.	Inferred Reserves up to 50 m Depth
IV	26.10
V b	9.08
VI	57.33
VII	30.70
Total	123.20

2.5.3 GRADE

ROM quality of limestone varies from 72.0% C. C. to 74.66% C. C. The analysis is given below: -

SiO ₂	14.00%
Al ₂ O ₃	4.20%
Fe ₂ O ₃	2.50%
CaO	40.00%
MgO	2.10%
Na ₂ O	0.35%
K ₂ O	0.70%
Loss of Ignition	34.00%

Overburden

There is no overburden over the deposit, but the interburden is in the form of calc schist and gneisses. The bands of interburden run parallel to the limestone bands along the strike and dip. The chemical analysis of this waste rock is given below: -

SiO ₂	18.00 to 20.00%
Al ₂ O ₃	5.00%
Fe ₂ O ₃	3.00%
CaO	36.00%
MgO	2.50%
Na ₂ O	0.40%
K ₂ O	1.10%
Loss of Ignition	29.00%

2.5.4 LIMESTONE GRADE AND R.O.M. QUALITY

The analysis results of cores obtained from boreholes gives the quality of clean washed material. This quality may suit manual mining where there is possibility of sorting and removing even small bodies of waste rocks associated with the limestone. But it does not hold good for mechanized mining, where it would not be possible to isolate and remove thin bands and lenses of friable waste rock not to speak of interstitial clays. In order to recover all the cuttings from drill holes, percussion drilling (DTH) is preferred. The holes are drilled using a dust collector and the cuttings are systematically collected, sampled and analyzed. The quality of the cuttings, which represent the entire composition of the strata, should compare with the run- of – mine quality. The analysis of percussion hole cutting as a matter of fact, approximate to the quality of the material as should be obtained on blasting provided the recovery of cutting is cent percent.

In order to obtain an idea of the quality of the stoned on mechanized mining of limestone, mine down the hammer holes were drilled in block I of the western zone by S.C.L. The data obtained from DTH cutting only those DTH holes were considered which were drilled adjacent to the boreholes. In this connection it would be noted that while comparing the result of samples obtained from inclined boreholes with that of vertical DTH hole, the true thickness of the corresponding strata was taken into account.

We should now compare the quality of limestone separately for 3 limestone bands from the two types of drill holes i.e. borehole and DTH hole, placed adjacent to each other.

It may be mentioned here that recovery of DTH cutting in some cases work out to more than 100%. This atonally could have been avoided by obtaining samples of cuttings at shorter interval & complete flushing out of cutting at the end of the drill runs.

2.5.5 MINEABLE RESERVES AND LIFE OF MINE

The Geological reserves in the area have been given in para 2.5.4. The reliability of measured indicated and inferred reserves has been assumed to be 90%, 80% and 50%. The mineable reserves are tabulated as below:

Measured	47.29 Million Tones
Indicated	4.98 Million Tones
Inferred	61.60 million tones

Total	113.87 Million tones
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Thus the total mineable reserves are about 113.87 Million Tones as on 1.04.2004. These reserves will give a life of about 29 years to the mine with targeted production of 4.0 million tones / annum.



CHAPTER – III

MINING

3.1 MINERALS TO BE WORKED

It is a Kesarpura-Sheopura Limestone Mines of Shree Cement Ltd., Cement Grade Limestone having more than 40% CaO is required for manufacturing cement. In this Kesarpura-Sheopura Limestone Mines, limestone of different grades i.e., low grade and cement grade.

3.2 METHOD OF WORKING

The mining of limestone is being done by fully mechanized opencast method. The deposit is in hilly terrain. The mining is done by formation of benches of 9.0 mtrs height. Presently, the mining of limestone is being done at 2 places. The distance between the workings is 2.0 km. The limestone produced from these working pits is fed to separate stone crushers of 350 TPH and 800 TPH capacities. The limestone is excavated by deep hole drilling & blasting and is excavated by latest technology in the world i.e. RAMMER make G-100 Primary Rock Breakers fitted on hydraulic excavators, which is most environment friendly in the mining industry. The waste produced during mining is stacked on non-mineralized zone.

3.2.1 REQUIREMENTS OF FUTURE DEVELOPMENT

The mine planning has been done to produce about 4.0 million tonnes per annum and waste rock is about 1.2 million tonnes per annum. All the benches have been joined with main ramp. The company proposes to increase the production 2.0 to 4.0 million tones/annum.

3.2.2 TYPE OF DEPOSIT AND TOPOGRAPHY OF THE AREA

Mine Planning is being influenced by type of deposit. The details of type of deposit have been described in Chapter-2. The main highlights of deposit are as under:

1. The Limestone deposit permits full mechanization.
2. The deposit provides different qualities of Limestone ranging from cement grade to low grade and needs constant blending.

Based on above factors, following provisions has been included into mine planning.

- Full mechanization will be introduced.
- Benches are designed considering dip and strike of deposit & topography of area.
- Water drainage system has been designed considering topography and strata of deposit.
- The mine to be opened across strike direction at N – W corner of ultimate pit limit and then advanced along strike.

3.2.3 AVAILABILITY OF LAND

The land acquisition of total lease area will be carried out in phased manner, and bears many administrative, economic and social considerations.

For mining purposes land should be continuous and should provide sufficient space for mine working and should have desired quality of Limestone and shall be free from villages and public properties.

3.2.4 ENVIRONMENT CONDITIONS

Environment base line information has been collected, environment impact of mining has been estimated from present working and environment management plan has been prepared to minimize the effect of mining on existing environment and has been detailed in chapter-6.

3.2.5 REQUIREMENT OF MINES ACT & RULES

While designing mine layout and mine working, all safety rules and regulations has been considered. Benches and roads have been designed as per guidelines given under MMR, 1961. At every stage and in every operation due care will be taken for compliance the provisions of Mines Act and Rules.

3.2.6 REQUIREMENTS OF MINERAL CONSERVATION & DEVELOPMENT RULES 1988

All the guidelines/provisions laid down in MCDR, 1988 has been considered while preparing the Mining plan and the execution of work will be carried out accordingly.

3.2.7 AVAILABILITY OF EQUIPMENTS IN INDIAN MARKET

After careful study for availability of different models and capacity of equipment available in the market, selection of equipment will be done to suit our deposit and our requirements. Also equipment in operation at present in our working leases will be used depending on it's availability.

Mine planning has been done by considering adoption of latest technology available and known to us in order to carryout scientific mining with least cost, maximum safety and minimum environment impact.

3.3 MINE WORKING

The mode of working will be open-cast mining by regular and systematic benching. The height of benches shall be maintained 9.0 M. and width will be maintained more than 15 M. the development and production by deploying HEMM.

3.3.1 LAY OUT OF MINE WORKING

The working bench of removal of waste rock will be kept minimum of 30 M. in advance from nearby working bench of limestone to ensure free movement of mining equipment and there will be easy movement of dumpers. One hydraulic excavator will be working at waste rock bench & 2 dumpers will be attached to this excavator for transport of waste rock. The two hydraulic excavator & five dumpers (35 tonne will be deployed for production & transportation of limestone. There units of DTH drill machine & compressor will be deployed at advancing benches.

3.4 EXTENT OF MECHANISATION

3.4.1 REMOVAL OF OVERBURDEN

Practically, there is no overburden or top soil over the deposit. The waste is in the term of interburden.

3.4.2 EXCAVATION OF LIMESTONE

A part of limestone & waste rock is being excavated by deep hole drilling & blasting of 115 & 165 mm diameter holes. The holes are drilled at suitable spacing & burden, range from 4.0 to 6.0 mtrs. Each hole is charged with slurry explosives like Toe blast & ANFO in the ratio of 20 : 80 respectively. We are using the Toe blast & OCG as booster charge and ANFO column charge. We are using cordex for joining the blast holes in series and delay detonators in each row for better fragmentation.

After several years of research and trial I.D.L. and I.C.I has developed Down Line Detonators & Noise Less, Trunk line detonators. Recently we have introduced this new blasting technique mentioned above – at our mines in block I and III. This blasting technique has following advantages:-

- A. Fly Rock – It is reduced & covers hardly a radius of 50 M.
- B. To reduce noise – It is much less than normal blast.
- C. To reduce Ground Vibration – With the same parameter the vibration is reduced to a great extent.
- D. Better Fragmentation.

- E. Reduced height of the blasted material.
- F. No Toe problem.

In this system Down Line Detonators are lowered in hole with primer cartridge & use of cordex is avoided.

3.4.3 MACHINERIES PROPOSED TO BE USED IN MINING

The Kesharpura-Sheopura Limestone Mine is fully mechanized and heavy earth moving machineries are being used for loading and transport etc. A well-equipped workshop has been maintained at the mine for maintenance of equipments.

The detail of machineries used at existing mining capacity 2.0 MTPA and proposed for expanded capacity at 4.0 MTPA is enclosed **Annexure-1**.

3.4.4 LOADING

The mineral and waste produced during mining are loaded into dumpers of 35T & 25 T capacity by the hydraulic excavators of 2.5 m³ to 3.8 m³ bucket capacity. The waste rock is separately handled by hydraulic excavators and loaded into dumpers and dumped at waste dump yards, which have been selected on non-mineralized area.

3.4.5 HAULAGE/TRANSPORT

Limestone loaded into dumpers by hydraulic excavators is fed to crushers installed at Mines. There are two crushers of L & T make of 350 TPH & 800 TPH capacity . Distance from mines face to crusher varies from 0.5 Km to 1.5 Km. Waste rock is also loaded separately with excavators into dumpers.

3.4.6 PROPOSED PRODUCTION

Present limestone production varies from 1.7 to 2.0 million tonnes per annum and waste rock is about 0.50 to 0.60 million tonnes per annum. In view of expansion of mineral production, we propose production of limestone 4.0 million tonnes per annum and waste rock of 1.2 million tonnes per annum with a stripping ratio of Limestone : Waste Rock 1.0 : 0.30

3.4.7 DISPOSAL OF WASTE

The limestone bands of block III are interbedded with low grade rocks & calc schist which contain low lime content (below 33% CaO) with impurities such as ferrosilicate minerals, quartz, iron, biotite, chlorite, muscovite etc.

There is no mineral rejects. There is only disposal of waste rock which is not useful for cement manufacturing.

There is no top soil, the out crop of limestone bands is exposed on the surface.

3.4.7.1 Selection of Dumping Site

Selection of suitable dumping sites are based on following points

- The site should be located on a secure and impervious solid rock.
- The location should ensure minimum leaching effects due to natural precipitation.
- The sites should be as far as possible, away from natural water courses, shallow aquifers etc.
- Such dumps should not become a major visual feature of local landscape.
- Selection of dumps is done on barren land. Where mineral limestone does not occur, i.e. non mineralized zone.
- For safeguard of dump site, it is proposed to take following precautions :-
 - i) Constructing a parapet wall near dumping yard having close proximity to the nallah.
 - ii) A garland drain has been proposed at the limit of waste dump to save the waste dump from wash off.
 - iii) It is proposed to put check dam in nallah and prepare parapet wall near nallah.

The configuration of dumps year wise is shown in plan and section.

Considering the above factors, we have selected site for waste dumping.

We have only one type of waste rock. The CaCO₃ percentage of waste rock varies form 55% to 59%. The quantities of waste rock to be handled year wise.

The nature of waste is quite hard & compact, hence drilling and blasting is done in waste rock. The loading of waste rock in dumpers is done by hydraulic excavator. This waste rock is transported by the dumpers to the waste dump yard. The waste dump yard is estabilized and plantation is done on the in active waste dump yard. Where the height of the waste dump is approx. 30 mtr. Benches are formed with the help of dozer.

3.4.7.2 *Maximum Height and spread of dumps*

The height of the waste dump is proposed 30 m. height in 3 benches of 10 m. each.

3.4.7.3 *Stacking of Subgrade Minerals:*

There is no generation of sub-grade mineral, therefore sub-grade stacking is not required.

3.4.8 SITE SERVICES

Following site services are in use for smooth operation.

3.4.8.1 *Statutory Obligation*

(A) First Aid Station / Room

First-Aid room is provided in the mine office building with equipments specified in Second Schedule of Mines Rules, 1955. A qualified and experienced person is incharge of the First-Aid room. In addition of this, first aid boxes containing the necessary equipments and medicines as specified in Third Schedule of Mines Rules, 1955 and have been provided at different points e.g. Time Office, Crusher, Workshop etc.

(B) Rest Shelter

Rest shelter is provided in the mine office which is equipped with electric power, fans and also with drinking water and sitting facility for taking food and rest or the employees on duty.

(C) Canteen

A clean, modern canteen with all amenities i.e. furniture, gas stove, utensils, necessary electric and water fittings is provided for the benefit of the employees. The canteen serves tea, snacks at subsidized rates to the employees. The canteen is located in mining area near office building.

(D) Urinals and Latrines

Three latrines and five urinals have been provided to facilitate persons working at different locations i.e. mines office, workshop, crusher building etc.

(E) Adequate Lighting Arrangement

Adequate lighting arrangement will be made at quarry, quarry faces and haulage roads as per the statutory requirements. The lighting towers will be erected at appropriate places inside mine.

(F) Drinking Water

Water is taken from cement plant by pipe line. Drinking water is got tested from time to time by local as well as from private lab for its portability. Water bags have been issued to all workers of mines, earthen pots are also provided at all the working places and mine office beside this water coolers are also provided in mine office and crusher area for supply of cool and clean drinking water to persons working in the mines.

(G) Dispensary:

A well equipped dispensary is provided with male and female indoor patient rooms, and maintained for mines and factory, located outside mining lease but inside the colony of the company. It is managed by one qualified doctor and other paramedical staff i.e. Nurse, Compounder and hospital boy. Free medical aid and medicines are available nearby needy villagers.

(H) Vocation Training Centre:

The vocational training center as required under Mines V.T. Rules, 1966 has been provided. It is under the charge of part time vocational training officer, a part time instructor and trainer to help in training the employees as per the vocational training rules. The vocational training center is well equipped with furniture, black board, posters, books, models etc. Initial and refresher training as stipulated under the Rules is imparted to all the employees – both at the V.T. center as well as on the job.

3.4.8.2 Maintenance Requirement

Effective preventive maintenance of the heavy earth moving machinery is the keystone of high productivity and safety of any mine. A well equipped workshop cum repair shed has been provided near the mines where all types of repairs and maintenance of heavy earth-moving machineries and light vehicles are carried out.

Workshop and repair shed is well equipped with different machines such as welding shop, machines tools shop, type repair shop, engine room, gear box repair section, overhead cranes, chain blocks, electrical shop, battery charging room etc. The workshop and repair shed is handled by qualified experienced and skilled officers and mechanics etc.

3.4.8.3 Administration

The administration building is situated near the mines where the time office, V.T. Centre etc. are also located. Two diesel storage tank have been provided to dispense diesel in dumpers, jeep, explosive van etc.

3.4.8.4 Welfare Amenities and Recreational Services

A. Houses:

Well constructed houses, with electricity and water connections are provided to the employees in the colony.

B. Schools

Company has provided an English medium school up to 10th standard in the colony. For higher education bus facility is provided from plant site to Beawar.

C. Communication:

Company has provided one STD booths in shopping center and EPBAX system in the factory. Recently company has introduced e-mail system for quick and easy going communication network.

D. Bank:

A branch of State Bank of India is provided at Banger Nagar.

E. Co-operative Society:

An employee Co-operative society has been formed and functioning well to provide household commodities and controlled items at reasonable rates.

F. Recreations

The company maintains well equipped club and one Manoranjan Kendra with out door and indoor games, library, cable TV and play grounds for employees and their families

G. Children's Park:

A well equipped park has been provided for the entertainment and recreation of the children.

3.5 CONCEPTUAL PLAN

Conceptual mining plan prepared at the scale of 1: 5000. The ultimate pit limit is marked. Infrastructures are shown on the plan such as crusher, office, bunker hopper, canteen, workshop. Rest shelter, dispensary, ropeway loading station etc.

The proposed site for plantation and proposed site for waste dump and shown in the above plan the details description is given below :-

Ultimate pit limit :-

Ultimate pit limit at the end of the life of mine is shown with pink colour line in above plan. The limestone and lowgrade limestone strata are dipping towards western direction and it is also proposed to mine upto 500 R.L., hence approximate depth of the pit will be 63 mtrs. , so pit limit is marked at a distance of about 75 mtrs. From limestone boundary on western side and at a distance of about 25 mtrs. On eastern side of the limestone boundary.



CHAPTER – IV

BASE LINE DATA & IDENTIFICATION OF IMPACTS

4.0 INTRODUCTION

The chapter contains information on existing environmental scenario for the following parameters.

1. Water Environment.
2. Meteorology.
3. Air Environment.
4. Noise Environment.
5. Soil Environment.
6. Land Environment
7. Biological Environment.
8. Socio-economic Environment.

4.1 STUDY AREA AT A GLANCE

1. General Particulars:

- Location : Latitudes 26°1'35" to 26°5'25" (North)
Longitudes 74°22'40" to 74°25'25" (East)
- District H.Q. : Ajmer

2. Demography

- Total Population : 179646 (as per 1991 Census)
- Literate : 49.01%

3. Land use Pattern in study area

(as per district census handbook 1991 of Ajmer)

Total Area	:	38022.51 Hect.
i) Irrigated Area	:	1491.19 Hect.
ii) Unirrigated Area	:	14687.69 Hect.
iii) Cultivable waste land	:	4974.43 Hect.
iv) Area not available for Cultivation	:	13253.46 Hect.
v) Forest	:	3612.74 Hect.

4. Climatology (IMD Data Table enclosed)

- i) Average annual rainfall : 395 mm (up to 1999)
- ii) Mean monthly maximum Temperature (May) : 41.5°C

- iii) Mean monthly minimum : 12.7°C
Temperature (Jan.)
- iv) Relative Humidity (Annual Mean)
 - 8.30 hours : 59%
 - 17.30 hours : 41%

4.1.1 LAND USE PATTERN OF MINING LEASE AREA

The lease area falls in revenue land of villages Kesharpura-Sheopura, Tehsil Beawar, Distt. Ajmer. The total lease area is 856.8 hect. and falls in Govt. waste land. There is no forest in the lease area.

4.2 TOPOGRAPHY

A detailed analysis of the study area has been carried out. It has been observed that the topography of the study is undulating with a ridge running in the NE-SW direction having a maximum elevation of 467 m. The slope of the study area ranges from 0°-18° and that of project area varies between 0° and 5°.

4.3 PHYSIOGRAPHY

There is no river in and around the lease area and generally drainage is towards North and NNW. There is no perennial water source in the area. Rain water from the area drains through water courses and is collected in the ponds of Balad and Andheri Devori village. The strike of the limestone is N 33° E – S 33° W and direction of dip N 57° W and amount of dip various from 45° – 60°.

There is no forest in the lease area. A major portion of the area is rocky and thus there is no vegetation. East of the area represents an undulating topography with small mounds and hillocks followed by prominent chain of hills extending in North East – South West direction. In fact on the top of this hill range the highest RL is 582 mtrs and bottom RL is 510 mtrs. There occurs two parallel ridges of limestone extending all along the length of the area. A shallow valley in which there is alluvium soil deposit, which is suitable for supporting local agriculture, separates the two ridges from one another. Thorny Bushes are found on the hill slopes and nallah cuttings.

4.4 WATER ENVIRONMENT

4.4.1 HYDROLOGY

The villagers are mainly dependent on rains and ground water. The water is used for drinking water irrigation. Drinking water is arranged from wells, and for irrigation purpose villagers mainly depend on rainwater. The depth of

water table varied between 20 to 45 m. The rainfall in the area is erratic thus the area shows scarcity of water.

During the survey various samples of water within 10 km. radius were analyzed as explained in subsequent paragraph. The water level of the study area is not affected. The irrigated land constitutes only 3.93% of the study area and water requirement for irrigation purposes is met from the rain water mainly. So there is no impact on the ground water level. Moreover, water requirement for domestic purposes is meager to have any affect on the water table. The water resources are characterized into two groups i.e. surface water and ground water.

4.4.1 SURFACE WATER QUALITY

There is neither water stream nor lake as a surface water source

4.4.2 GROUND WATER SURVEY

The project study area is known to be water scarcity area. There is no flowing water stream or lake as a surface water source. Requirement of water in the area is mostly met from underground sources through hand pumps. There are a few water reservoirs.

All parameter values of ground water sources are well and within the excessive limits of Ministry of Health, Govt. of India, for potable water. The villagers are mainly dependent on rains and underground water. The water is used for drinking water and irrigation. Drinking water is arranged from wells, and for irrigation purpose villagers mainly depend on rainwater. The depth of water table varied between 20 to 45 m. Requirement of water in the area is mostly met from underground sources through hand pumps. Also there are a few water reservoirs.

4.4.3 GROUND WATER QUALITY

The quality of groundwater has been ascertained from the chemical analysis results of water samples collected from representative dug wells of five sampling stations located on the map live Andheri Devori, Shivpura Ghata, Khimpura, Mundoti and Mine Site etc. The range of different chemical constituents in the ground water is given below:

Water samples were collected from 5 stations and the analysis of the samples shows that the concentration of Total Dissolved Solids ranges between 245 mg/l to 1420 mg/l, pH varies from 7.2 to 7.9 and Total Hardness from 273 mg/l to 391 mg/l.

Fluorides and nitrates are within the permissible limits. Heavy metals were not detected in any of the samples and were reported absent in all the ground water samples.

**TABLE – 4.4.3
GROUND WATER ANALYSIS
(SUMMER SEASON)**

S. No	PARAMETERS	Mine Site	Andheri Deori	Shivpura Ghata	Mundoti	Khimpura
1.	pH	7.2	7.7	7.2	7.9	7.0
2.	Total Suspended Solids (as TSS), mg/l.	42	22	16	55	25
3.	Total Dissolved Solids (as TDS), mg/l.	1420	968	245	1042	1011
4.	BOD	1.3	1.1	2.2	1.2	1.5
5.	COD	2.3	7.3	10	5.5	7.1
6.	Sodium (mg/l.)	364	201	155	354	75
7.	Chlorides (as Cl), mg/l.	198	465	111	243	294
8.	Nitrates (as N) mg/l.	30	21	14	23	17
9.	Calcium, mg/l.	156	99	121	51	131
10.	Magnesium (as Mg), mg/l.	96	50	186	112	191
11.	Fluorides (as F), mg/l.	0.40	0.51	0.59	0.43	0.61
12.	Hardness (as CaCO ₃), mg/l.	312	273	362	289	391
13.	Sulphates (as S), mg/l.	120	62	42	53	34
14.	Potassium, mg/l.	4.3	3.4	2.8	3.1	3.6
15.	Iron	0.22	0.51	0.58	0.23	0.29

All parameter values in ground water sources are well and within the excessive limits of Ministry of Health, Govt. of India, for potable water. The villagers are mainly dependent on rains and underground water. The water is used for drinking and irrigation. Drinking water is arranged from wells, and for irrigation purpose villagers mainly depend on rainwater. Requirement of water in the area is mostly met from underground sources through hand pumps. There are a few water reservoirs; during study period almost all of the reservoir were found dry.

4.5 METEOROLOGY

Meteorology plays a vital role in affecting the dispersion of pollutants, once discharged into the atmosphere. Since meteorological factors show wide fluctuations with time, meaningful interpretation can be drawn only from long-term reliable data. Such source of data is the Indian Meteorological Department (IMD), which maintains a network of meteorological stations at several important locations. The nearest IMD station to the study area is located at Ajmer. The meteorological parameter recorded from this station is temperature, humidity, rainfall, wind speed, wind direction, visibility and cloud cover recorded at two synoptic hours i.e. 8.30 and 17.30 hours.

4.5.1 CLIMATE

The climate of the district of Ajmer is semi arid with an average annual precipitation of around 395 mm and low humidity. The coldest month is

January and the hottest month is May. The rainfall is mostly distributed between the months of July and August.

The micro meteorological conditions at the proposed site will determine the transport and diffusion pattern of air pollutants released into atmosphere. The principal variables include horizontal connective transport (average wind speed and direction) vertical convective transport (atmospheric stability) and topography of the area.

The data on various meteorological parameters at the Mine site were collected with the help of a semi-automatic weather station installed at site during ambient air monitoring period. Meteorological data such as wind speed, wind direction, dry bulb temperature and wet bulb temperature, and relative humidity were recorded simultaneously at an hourly interval.

The climate of region in summer season is characterized by intense heat with occasional dust storms, the winter on the other hand is severely cold. The atmospheric day-time temperature during winter varies from 20°C to 26°C while that in summer ranges from 32°C to 44°C. The area experiences a moderate temperature during the rainy season.

4.5.2 RAINFALL

The normal annual rainfall was recorded 52.73 cm. while the actual rainfall was 42.33 cm. in 1989. The rainfall generally increases from the north-west to the south-east. Kekri gets more rain than other parts of the district. About 90 percent of the annual rainfall is received during the period June to September, July and August being the rainiest months. The variation in annual rainfall from year to year is very large. On an average there are 26 rainy days in a year. During the south-west monsoon season, the relative humidity is generally over 60 percent and during the rest of the year, the air is dry.

**TABLE - 4.5.2.1
RAINFALL**

Year	Date	Rainfall
1999	17.02.99	7 mm
	23.05.99	17 mm
	21.06.99	136 mm
	30.07.99	185 mm
1998	17.03.98	14 mm
	28.06.98	56 mm
	15.07.98	292 mm
	28.08.98	348 mm
	23.09.98	525 mm
	17.10.98	663 mm
1997	02.12.97	908 mm
1996	05.10.96	812 mm
1995	05.09.95	548 mm
1994	25.12.94	873 mm
1993	24.10.93	266.4 mm
1992	30.12.92	509 mm
1991	23.12.91	455 mm
1990	13.10.90	753 mm

Source – Tehsil Head Quarter Beawar

4.5.3 METEOROLOGICAL DATA

The meteorological data collected at IMD station Ajmer from February 2002 to January 2003 are given in **Annexure -2**

4.5.4 MICRO-METEOROLOGY AT SITE

Meteorological station was set-up at site, to record surface meteorological parameters Summer 2002.

The wind recorded during the survey period at the site is more or less according to the trend indicated in windrose diagram.

4.6 AIR ENVIRONMENT

The baseline air quality status was established by monitoring air quality during the summer season, at the following stations:

- A1. Mine site
- A2. At Village Andheri Devori
- A3. At Village Shivpura Ghata
- A4. At Village Khimpura
- A5. At Village Mundoti
- A6. At Village Rupaheli
- A7. At Village Sarkhana
- A8. At Village Lasoriya
- A9. At Village Ganeshpura
- A10. At Village Sahaspura
- A11. At Village Suhawa

The ambient air quality monitoring stations were set up at the following locations:

**TABLE – 4.6.1
LOCATIONS OF AAQ MONITORING STATIONS
(SUMMER SEASON)**

Station	Sampling Location	Direction from Mine site	Aerial distance km. from centre of the mine site
SA1	Mine Site	-	-
SA2	Village Andheri Devori	NW	3.75 km.
SA3	Village Shivpura Ghata	S	4.75 km.
SA4	Village Khimpura	E	4.5 km.
SA5	Village Mundoti	W	3.0 km.
SA6	Village Rupaheli	NW	4.0 km.
SA7	Village Sarkhana	ESE	<0.5 km.
SA8	Village Lasoriya	NW	6.5 km.
SA9	Village Ganeshpura	NNW	9.5 km.
SA10	Village Sahaspura	NW	7.0 km.
SA11	Village Suhawa	NNE	7.5 km.

4.6.1 SAMPLING PROGRAMME

As stated earlier the sampling at the 11 above stations was carried out during summer season. The sampling frequency was twice a week for 24 hours for a period of one season.

Table 4.6.2 shows the maximum, minimum and average values of the pollutant monitored along with the cumulative percentiles.

The stations are selected and located with due consideration to the meteorological conditions of the region. Major air pollutants viz, Suspended Particulate Matter (SPM), Respirable Suspended Particulate Matter (RSPM), Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO_x), representing the basic air pollutants in the region were identified for Ambient Air Quality Monitoring (AAQM). The samples were collected as per the CPCB norms during study period. Gaseous pollutants viz, SO₂ and NO_x were collected on 8-hour basis three times a day through the respective absorbing media. SPM and RSPM was collected as 24 hours average through Wattman glass micro fiber filter paper(GFA grade). The samples for gaseous pollutants as well as for SPM were collected as per the prescribed standard procedures.

PROCEDURE FOR DETERMININGARIOUS AIR QUALITY PARAMETERS

Parameters	Testing Procedure
SPM & RSPM	Gravimetric Method using Respirable Dust Sampler Envirotech RDS-APM 460 IS:5182 (Part-IV), 1973
Nox	Absorption in dill NaOH and then estimated calorimetrically with sulphanilamide and N (I-Nephyle) Ethylene diamine Dihydrochloride and Hydrogen Peroxide (IS: 5182 1975, Part-VI).
SO₂	Absorption in Potassium Tetra Chloromercurate followed by Chlorimetric estimation using P-Rosaniline hydrochloride and Formaldehyde (IS: 5182 Part - II, 2001).

The ambient air quality data for the aforesaid locations are summarized in table 4.6.2.

**TABLE – 4.6.2
BACK GROUND AMBIENT AIR QUALITY**

(Summer 2002)

(Unit in $\mu\text{g}/\text{m}^3$)

STATION	SAMPLING LOCATION	SPM		SO ₂		NO _x		RPM	
		MAX.	MIN.	MAX.	MIN.	MAX.	MIN.	MAX.	MIN.
A1	Mine Site	298	215	17	8	24	14	53	41
A2	Village Andheri Devori	168	146	19	10	28	16	59	43
A3	Village Shivpura Ghata	151	132	15	8	22	11	49	33
A4	Village Khimpura	146	140	16	7	20	10	58	41
A5	Village Mundoti	149	135	13	5	18	9	47	35
A6	Village Rupaheli	126	120	11	6	13	7	44	39
A7	Village Sarkhana	120	112	8	4	13	10	43	40
A8	Village Lasoriya	136	130	8	5	11	8	32	30
A9	Village Ganeshpura	121	110	9	5	13	10	57	47
A10	Village Sahaspura	121	113	9	5	12	7	66	59
A11	Village Suhawa	120	115	7	5	12	9	65	60

4.6.2 RESULT

The average concentration of SPM for all the 11 AAQM stations ranges between 116.04 to 248.2 $\mu\text{g}/\text{m}^3$. At mine site the maximum concentration of SPM was monitored to be 298 $\mu\text{g}/\text{m}^3$ and minimum of 215 $\mu\text{g}/\text{m}^3$ and the maximum concentration of RSPM was monitored to be 64.04 $\mu\text{g}/\text{m}^3$ and minimum of 31.83 $\mu\text{g}/\text{m}^3$ for all the eleven AAQM stations.

As far as the gaseous pollutants SO₂ and NO_x are concerned, the promulgated CPCB limit of 80 $\mu\text{g}/\text{m}^3$ for residential and rural areas was never exceeded at any station. The SO₂ concentrations are in the range of 5.87 $\mu\text{g}/\text{m}^3$ to 13.90 $\mu\text{g}/\text{m}^3$ and the NO₂ concentration in the range of 8.95 $\mu\text{g}/\text{m}^3$ to 21.75 $\mu\text{g}/\text{m}^3$ for all the eleven AAQM stations.

4.7 NOISE ENVIRONMENT

Noise often defined as unwanted sound, interferes with speech communication, causes annoyance, distracts from work, disturb sleep, thus deteriorating quality of human environment. Noise Pollution survey has therefore been carried out. Noise levels were measured at 5 locations in the study area to establish present scenario.

There are several sources in the 10 km radius buffer zone, which contributes to the local noise level of the area. Traffic, Cement Factory, Mineral Grinding units activities at stone quarries as well as activities in near by villages and agricultural fields add to the ambient noise level of the area.

Noise monitoring data are presented in Table 4.7.1 along with relevant standards.

**TABLE-4.7.1
AVERAGE NOISE LEVEL
DURING STUDY PERIOD (SUMMER SEASON)**

S.No	LOCATIONS	NOISE LEVEL dB (A)	
		Day Time	Night Time
1.	Mine Site	64	48
2.	Andheri Devori	52	41
3.	Shivpura Ghata	52	40
4.	Khimpura	51	42
5.	Mundoti	52	47
6.	Village Rupaheli	54	48
7.	Village Sarkhana	52	44
8.	Village Lasoriya	55	42
9.	Village Ganeshpura	58	47
10.	Village Sahaspura	60	51
11.	Village Suhawa	52	46

**TABLE – 4.7.2
CPCB NOISE STANDRDS**

AREA CODE	CATEGORY OF AREA	LIMITS IN dB (A)	
		DAY TIME	NIGHT TIME
(A)	Industrial area	75	70
(B)	Commercial area	65	55
(C)	Residential area	55	45
(D)	Silence zone	50	40

4.8 SOIL ENVIRONMENT

4.8.1 BASELINE DATA

Soil is the media for supplying the nutrients for plant growth. Nutrients are available to plants at certain pH and pH of soils can reflect by addition of pollutants in it either by air, or by water or by solid waste or by all of these. In order to establish the baseline status of soil characteristics soil samples were collected at six sampling sites were selected. Samples collected from identified locations indicate that the soil is alkaline, pH value ranging from 8.2

to 9.1 with organic matter from 0.0214 to 0.0383%. Soil texture is mostly sandy loam to loam. Conductivity ranging from 685 to 1148.

Table – 4.8.1

**SOIL ANALYSIS REPORT
(SUMMER SEASON APRIL-JUNE 2002)**

S. NO.	PARAMETERS	LOCATIONS				
		MINE SITE	ANDHERI DEVORI	SHIVPURA GHATA	KHIMPURA	MUNDOTI
01.	pH	8.5	8.2	9.1	8.3	8.5
02.	Bulk Density, gm/ml	1.556	1.652	1.781	1.456	1.472
03.	Water Holding Capacity	5.110	5.324	5.473	4.561	4.322
04.	Soil Texture	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
05.	Soil Colour	BROWN	BROWN	BROWN	BROWN	BROWN
06.	Nitrogen as N %	0.065	0.061	0.045	0.039	0.154
07.	Phosphorus %	0.078	0.074	0.067	0.074	0.062
08.	Potassium as K %	0.045	0.019	0.036	0.023	0.031
09.	Calcium as Ca%	0.456	0.412	0.291	0.234	0.376
10.	Magnesium as Mg %	0.231	0.312	0.085	0.089	0.105
11.	Sodium as Na %	0.145	0.083	0.104	0.093	0.176
12.	Conductivity (umho/cm)	998	845	1148	685	1062
13.	Organic matter (%)	0.0333	0.0314	0.0367	0.0383	0.0214
14.	Silica (ug/gm)	86.22	66.8	84.6	77.45	103.21
15.	Chloride (%)	0.787	0.211	0.767	0.621	0.339

4.9 BIOLOGICAL ENVIRONMENT

4.9.1 INTRODUCTION

Anthropogenic activities tend to bring instability in the species composition and functioning of ecosystem. The first component to be affected directly as well as indirectly and in a short, medium and long time span would be the biotic component of the area. This sets a cyclic process, which may aggravate the situation unless corrective measures are adopted.

Generation of base-line data and knowing the types and extents of pollutants would be the first step of the environmental study report. The biological assessment is trustworthy and acceptable method to understand the impact of surroundings. This leads to suggesting remedial measures for minimizing impact. The aim of environment management plant is to manage the ecosystems with least alterations because only this can make ecosystem stable.

4.9.3 FLORA AND FAUNA

The mining lease area is located in a landform, which at this time is surrounded by low productivity hills. This area is relatively calm and there are no sources of high noise level. A team of scholars of Zoology carried out a casual survey. It was found that a variety of animals inhabit this area. The preliminary survey revealed that the following animals could be observed on a casual visit.

JUNGLE BABBLER	–	TURDOIDES STRIATUS
Common babber	–	Turdoides caudatus
Gree lee-eater	–	Merops trientalis
Redvented bulbul	–	Pyenonotus cafer
House crow	–	Corvus splendens
Jungle Crow	–	Corvus maerorhynchos
Indian tree pie	–	Dendrocitta vagabunda
Indian cuckoo	–	Cuculus micropterus
Indian ring dove	–	Streptopelia decaocto
Turtli dove	–	Streptopelia turtur
Senegal dove	–	Streptopelia sevegolensis
Blue role pigeon	–	Columba livia
Black drongo	–	Dicrurus odrimilis
Pond heran	–	Ardeola grayii
Cattle egret	–	Bubuleus ibis
Sarus crane	–	Grus antigone
House sparrow	–	Passer domesticus
Moopoe	–	Upupa epaps
White breasted kingfishes	–	Haliyon smyrnesis
Comman Myna	–	Acridotheres trists
Black myna	–	Acridotheres ginginianus
Rose ringed parakeet	–	Psittacula krameri
Grey partridge	–	Francolinus pondiceriamus
Indian white buded vulture	–	Gyps bengalensis

The red data book of species does not include any of these species. The author draws an inference that animal species. However, biotic inference in this area will pose a problem of migration of these animal species. As the above given species are not endemic, rare or endangered, an inevitable developmental activity may be undertaken with all the precautionary measures of ecological sustainability e.g. controlled noise level, controlled air pollution and green belt development.

A pilot survey was carried out around the mines site. The preliminary survey of this ecosystem revealed that the dominating plant species are ephemeral and annual. The structure of this ecosystem comprises very common plant species of semi-arid area. This does not inhibit any such (endemic species) endangered that the vegetation occurring in this area is characteristically of scrub jungle type and vegetation formed on sand dunes. The densities of these plant species also seem to be thin. Following species are recorded from the given area.

Heliotropium marifolium Retz. Naharsunda
Indigofera cordifolia Heyne ex Roth Nakali Neel
Indigofera linnaei Ali
Indigofera linifolia Var Campbell Wt. Ex Baker
Tephrosia hamiltonia Drumm Dhamasa
Boerhaavia diffusa Linn (santh) punrnava
Crotalaria burnhia Busch-Ham ex Benth Desert grass
Leptadaenia pyrotechnica Kheep
Aerva tomentosa (Burm. F.) Juss. *Aerva* (Desestic)
Citrullus colocynthis (Linn) Schrad (Khurbooj)
Eragrostis pylosa (Linn) P. Beauv (Desert grass)
Zizyphus nummularia (Burm f.) Wt. et Arn.Ber (Jharben)
Chenopodium album Linn Battua
Aragemone mexicana Linn. Fibre plant DC.
Corchorus aestuans Linn. Fibre Plant (tilliaceup)
Aragemone mexicana Linn (Piladhutura) Pilikatel
Acacia nilotica (Linn) Del (Babul)
Prosopis juliflora (Khejari) P Cineraris
Azadirachta indica A. Juss (Nim)
Prosopis cineraria (Linn) Druce Khejri

Removal of these herbaceous plant species causes reduction in biomass of the area and of course the physical (micro) environment will be altered. Sufficient vegetation cover through a forestation will be required. For afforestation the choice of plant species should be suitable for the given area. Indigenous plant species e.g. *Prosopis cineraria*, *Tecomella undulata*, *Dalbergia sissoo*, *Ailanthus excelsa*, *Zizyphus nummularia*, *Azadirachta indica* should be preferred and the plantation of these species should be encouraged.

Authentic list of flora & fauna collected from DFO Ajmer is enclosed as annexure 9

4.10 LAND ENVIRONMENT

4.10.1 INTRODUCTION

Land use planning is aimed at minimizing the adverse impact of mining activities on environment and also helps in economy of the project as well as effective restoration and enhancement of land surface values at the end of mining activities in the area. This needs detailed study of the area from various angles before starting of the mining project as well as during the mining operation for collecting baseline data and analysis of possible environmental impact. Based on the baseline data and environmental impact assessment, a detailed environmental management plan will help in minimizing the impact of mining activities on its surrounding. This will also help in reclamation and restoration of the area when mining activity in the area is over.

4.10.2 PRESENT LAND USE PATTERN OF THE AREA

For collecting base line data / information about the mining lease area and its surrounding, various survey works i.e. topographical, geological, meteorological, ecological, occupational & land use pattern of the area have been carried out. Based on these information's, environmental impact assessment & management plan have been prepared.

A macro level study was conducted to find out the land use pattern within 10 km. buffer zone. The buffer zone mainly consist of human settlement, slab quarries, Rocky terrain agricultural land, factory area, metalled Road leading to Beawar to Vijainagar and Beawar to Masuda, Railway line, power line. Small villages are found scattered in the area. The small colonies scattered in the area are known as baria. The quantity of agriculture land is less as compact to other land but agriculture land is fertile.

TABLE – 4.10.1
LAND UTILIZATION IN STUDY AREA (10 K.M. OF STUDY AREA)

S. No.	Particulars	Area in Hectares	Percentage to total Area
01.	Forest	3612.74	9.5%
02.	Irrigated Area	1491.19	3.93 %
03.	Unirrigated Area	14687.69	38.63%
04.	Culturable Waste	4974.43	13.08%
05.	Area not available for cultivation	13253.46	34.86%
	Total	38022.51	100.00

4.11 CROPPING PATTERN

Base line data collected from agriculture department Beawar and observed that area around the area is majoraly distributed with following crops-

Kharif crops -Kapas, Makka, Bajra, Jawar, Till, Mongh, Chowla, Hari Mirchi, Tamatar.

Rabi Crops -Wheat, Jow, Chawal, Tarameeera, Sarson, Bindi, matar, tomato, palak, moli, groundnut, Jeera etc.

Cropping pattern of the area depends upon the climatological conditions and need of the local population of the area. Sometimes cropping pattern may get changed during construction and operational phase because of particular requirement of specified anthropogenic activities.

Detail Cropping pattern of Kharif and Rabi seasons are given in Table 4.10.1

**TABLE 4.11.1
AREA OCCUPIED BY DIFFERENT CROPS**

Crops	Area (in hect.)			
	Irrigated	Unirrigated	Total	%
RABI				
Wheat	974	19	993	6.90
Barley	288	61	349	2.40
Gram	3	703	706	4.90
Others	768	400	1,168	8.10
KHARIF				
Maize	36	2,694	3,000	20.90
Bajra	0	2,041	2,041	14.20
Jawar	1	3,296	3,296	22.90
Others	585	2,241	2,826	19.70
Total	2,655	11,424	14,379	100.00

As shown in the figures, a maximum of 6.9% of the area is occupied by wheat during Rabi season followed by grams (4.9%). During the Kharif season, Jawar occupies the maximum area (22.9%) followed by maize (20.9%) and bajra (14.2%). It may be noted that cultivated land is less than 40% hence it is not intensively cropping area. The discussions with local people could not lead to the conclusion that there has been any decrease in the crop yield.

4.12 SOCIO-ECONOMIC ENVIRONMENT

An integral part of environmental study, which deals with the total environment, is socio-economic environment incorporating various facts related to socio-economic condition in the area. These includes demographic structure of the area, provision of basic amenities viz., housing, education, health and medical services, occupation, water supply, sanitation, communication transportation, prevailing diseases pattern as well as feature of aesthetic significance such as temples, historical monuments etc. at the baseline level. This would help in visualising and predicting the likely impact depending upon the nature and magnitude of the project.

Beawar is the chief town of the area previously known as Marwar. It is the second most important wool exporting centre of India. There are several cotton textile industrial establishments, big and small, in the town. 'Til-Patti' is a special delivery of Beawar, which is sent to various places in India and abroad. Besides, three big cotton mills i.e. Krishna Mills, The Edward Mills and Mahalaxmi Mills, there is a large number of small factories in the town. There is a post-graduate college and a training school for teachers. Some of the picnic sports and places of interests in and around Beawar town are Mataji-ki-Dungri, Chang-Ki-Dhani, Balad's Jain Temple and Sheopura Ghata. Makreda and Jalia water works are famous as picnic sports while Todgarh is an old fort.

Apart from the places mentioned above, the other famous in the district are Masooda an ancient village founded by Salazer Ghazi, Commander-in-chief of Sahabuddin Ghori, and named after his daughter Masud Ghazi.

4.12.1 DEMOGRAPHY

The population as per 1991 census is 179646 (for 10 km zone). Scheduled Caste fraction of the population of the study area (10 km) is 15.5% and scheduled tribe 0.7%. Percentage of literacy is 49.01% (62.98% in urban area and 28.55% in rural area of total population) and that of workers those actually engaged in occupation is 34.38% (including marginal workers)

4.12.2 DENSITY OF POPULATION

Looking to the size of each Panchayat Samiti within the district, it will be seen that Bhinay Panchayat Samiti has the maximum share with 14.91 percent followed by Pisangan Panchayat Samiti with 14.76 percent proportion in the total rural areas of the district. Jawaja Panchayat Samiti ranks at the bottom covering only 8.12 percent of the total rural areas of the district.

4.12.3 SEX - RATIO

The population of females in the population of the district as a whole has always been on the lower side as compared to males. If we compare the trend of sex ratio in the rural and urban areas, we notice that only in 1901 the sex ratio was favouring females in the urban areas of the district. A study of the patter of sex-ratio in all the Panchayat Samities of the district would reveal that in 1991, the proportion of females to total male population is highest in Jawaja Panchayat Samiti, the sex-ratio being 986, followed by Kekri Panchayat Samiti i.e. 943 and the lowest sex-ratio is recorded in Masooda Panchayat Samiti, the sex-ratio being 919.

4.12.4 SCHEDULED CASTES AND SCHEDULED TRIBES

Analysing the dispersal of rural scheduled caste population at Panchayat Samiti level. It is evident that the highest concentration (15.79 percent) is found in Pisangan Panchayat Samiti followed by 15.32 percent in Kekri Panachayat Samiti and lowest 7.17 percent found in Jawaja Panchayat Samiti.

4.12.5 BASIC AMENITIES

Shree Captive Mine study area came in Jawaja & Masuda Panchayat Samiti. These area are developed area, in which Education facilities are 76.68% & 79.56% respectively, Medical facilities are 19.69% & 27.01% respectively, Drinking water facilities are 98.45% & 100% respectively, Post & Telegraph facilities are 21.24% & 23.36% respectively and power supply are 47.67% & 73.72% respectively.

4.12.6 Conclusion

Shree Cement management recruits the semi skilled & unskilled workers from the nearby villages i.e. Lasodiya, Khimpura, Andheri Devori, Balad, Jhunjharon Ki Bari, Sarkhana, Mundoti, Jhak, Lulwa etc., due to local labours rapidly increasing the social status of the villagers.

The management supports the local administration and other form of assistance for the development of public amenities in this region. Mainly they

are providing the basic amenities to nearby villagers for water distribution, building of schools, hospitals etc.

Adult Education programmes are proposed up-gradation of literacy level.

Plantation is very much developed in side the mine site and also cement plant site and colony.



CHAPTER-V

ENVIRONMENTAL IMPACT ASSESMENT

5.1 INTRODUCTION

The environmental parameters likely to be affected by mining are related to many factors, i.e., physical social, economic, agriculture and aesthetic. Opencast mining involves extraction of underneath minerals, its dumping and dumping of waste along with other operations, viz, traffic network, and other vehicular movements. All the operations can disturb environment of the area in various ways, such as removal of mass, change of landscape, displacement of human settlement, flora and fauna of the area, surface drainage, change in air, water and soil quality. While for purpose of development and economic upliftment of people, there is need for establishment of industries and mining, but these have to be environmentally friendly. Therefore it is essential to assess the impacts of mining on different environmental parameters, before starting the mining operations, so that abatement measures could be planned in advance for eco-friendly mining in the area.

The increasing awareness among the people about ecological imbalance and environmental degradation has raised many apprehensions. Opencast mining involves extraction of underneath minerals, its duping and dumping of waste along with other operations such as traffic network and other activities related to mining. All the operations can disturb environment of the area in various ways, such as removal of mass, change of land scape, displacement of human being, influx of out side labour and change in air, water and soil quality of the area. This is a small mine and will be worked without blasting, therefore, this will not leave much impacts on environmental parameters of the area. The impacts on different environmental parameters due to this mining project are discussed below:

5.2 IMPACT ON SOIL AND LAND USE PATTERN

5.2.1 IMPACT OF MINING ON SOIL ENVIRONMENT OF THE AREA

However, there may be pollution to soils adjacent to mining area if proper care is not taken. The anticipated pollution to soil environment due to mining activities is as follows.

- i) Changes in soil texture due to settling of air borne dust or due to wash off of solid particulates by surface or ground water. This will lead to change in porosity, permeability & other such physical characteristics of soil of the area.
- ii) Changes in soil chemistry due to addition of foreign material from polluted air and water due to mining activities in the area.

- iii) Soil erosion due to pumping of water from mines pit or due to wash off from waste dumps.

There will be no impact on soil of the study area located beyond the working area of the present mining project as there will be no pollution to air & water, which are the distant carriers of solid, liquid & gaseous matters. Soil samples are collected and tested at regular intervals for the near by areas. This shows that there is no impact on the soil environment of the study area due to the present mining activities.

5.2.2 IMPACT ON LANDUSE PATTERN

Major impact on land use pattern in the area will be mainly in core zone, where actual mining activities will take place. The mining will not affect the land use pattern of study area of 10 km. radius. The land use pattern at the end of life of the mine has been shown on Plate No. 4. The details of land use pattern at the end of life of the mine is given below:

S.No.	Land Use	Area of Land Required (Hect.)
1.	Quarry Pit Area	225.0
2.	Storage of overburden waste rock & reject grade mineral	88.0
3.	Area kept intact	316.2
5.	Infrastructure (road, crushing plant, electrical installations, office, workshop etc.)	4.5
6.	Agriculture land	153.1
7.	Green Belt Development / Plantation	70.0
	Total	856.8

5.3 IMPACT OF MINING ACTIVITIES ON AGRICULTURAL PRACTICE OF THE AREA.

The anticipated impacts of mining activities on agricultural practice are as follows.

- ❖ Reduction of agricultural land
- ❖ Soil pollution
- ❖ Water pollution
- ❖ Air pollution

These impacts may reduce yield of crops in the area if proper precautions are not taken.

However, there will be no adverse impact of the present mining activity on agricultural practice or crop yield at district or tehsil level or even beyond the boundary of mining lease area. In the core zone, the agricultural land is very less. Most of the land is rocky land or wasteland. In mine planning proper care has been taken minimize the impact on agricultural land coming under the core zone.

5.3.1 IMPACT OF MINING ACTIVITY ON FLORAL ENVIRONMENT OF THE AREA

i) Floral environment is affected by mining activities due to

- Air Pollution i.e. both dust & gaseous pollution
- Water pollution
- Land Pollution

In the present study area, there will be absolutely no pollution to fauna at district level and even beyond the boundary of mining lease area in the 10 km. radius buffer zone. This is because sources of pollution i.e. dust, gaseous emanations, solid & liquid effluents will be minimized at the generation point itself and adequate measures will be taken to prevent their impact on environment. So, there will be no pollution to distant carriers like air and water.

ii) Again, there is no forest in the core zone of mining lease area. So, there will be no deforestation due to mining. The mining lease area consists of mainly rocky land and is sparsely vegetated. Strict control measures to prevent air & water pollution will lead to absolutely no adverse impact on the floral environment of the adjacent area.

iii) The mining lease area is devoid of vegetation. So, the greenery to be developed under green belt development programme will improve the floral environment of the area.

5.3.2 IMPACT OF MINING ACTIVITIES ON FAUNAL ENVIRONMENT OF THE AREA

Buffer zone area is sparsely vegetated or devoid of vegetation. So there is no big animal in the core zone area small animals like Hare, Squirrels, Snakes, Desert, lizards etc. are accordingly found in the core zone area. But, the development of green belt in the area will bring back the birds, insects, reptiles and other small animals, which might go away for the time being.

5.4 IMPACT ON WATER REGIME

5.4.1 SURFACE WATER

There is no major river or lake & canal in or around the mining lease area. In general, deposition and sedimentation can be caused due to waste disposal. However, in the present case it is expected to be negligible as the waste material consists mainly of lumps of hard rock forming the interburden. There is hardly any overburden and fine clay materials are very less.

5.4.2 GROUND WATER

The water table in the wells varies from 20 to 45 m. below from ground level. The wells were dug mostly in calc-gneiss zone as the limestone in the area was not found to be a good aquifer. As there is no wastewater is discharged from the mining operation, only wastewater is generated from office toilets, which is discharged in to sock pit via septic tank. Therefore there is no significant impact on either the hydraulic gradient or the flow rates in the wells due to the mining operations in limestone area.

5.4.3 SOURCES OF LIQUID EFFLUENT

The probable sources of water effluents in Sheopura – Kesarpura Limestone Mines are discussed below:

- i) Rain water anticipated to be collected in the mine pits during rainy season. The water collected in the mines pit will be preserved in lower most bench of the mine. The water will be consumed in plantation and spraying etc. The excess water, discharged from this Wash off and Leacheates from waste dumps.

The wash off and leacheates from the waste dumps and sub-grade mineral, during rainy season may cause silting in agriculture fields and water reservoirs down the slopes. Therefore proper waste management is required.

- iii) Sewage water of Domestic use

The sewage water is only from office toilets, which will discharged in to sock pit via septic tank.. Total quantity will be approx. 4KLD

- iv) Waste Water Generated from workshop

The workshop will be used for washing and maintenance of machineries. This water will have some traces of oil and grease which will be separated by passing through upflow filter. Treated water will be used for dust suppression. Total waste water quantity will be 5KLD.

5.5 IMPACT ON AIR QUALITY

5.5.1 AIR POLLUTION DUE TO MINING

(i) ***Gaseous Pollution***

The gaseous pollutants (SO₂, NO_x and CO) are anticipated by HEMM like, excavator, drill machine dumpers, dozer, compressor and other transport vehicles. The ambient air quality were measured on 24 hourly basis to the gaseous pollutants within limits.

(ii) ***Suspended Particle Matter***

The generation of dust is anticipated from various mining activities i.e. dozing, drilling, blasting, loading, haulage and other transport activities related to mining.

These will increase SPM/RPM in the area if no mitigative measures are taken.

(iii) ***Pollution due to mineral Crushing***

At Sheopura - Kesarpura Limestone Mines, beneficiation of mineral involve crushing of ROM limestone. The limestone is crushed in fully covered and pollution free stone crusher and crushed limestone is transported through conveyor belt and ropeway system. These activities may increase SPM/RPM level if no proper mitigative measure is taken.

(iv) ***Prediction of Impact on air quality***

Impact on ambient air quality due to the various mining activities is predicted by using ISCST 3 Area Source Model. Report **enclosed as annexure 9**.

5.6 IMPACT OF NOISE

5.6.2 NOISE AND VIBRATION PROBLEMS

5.6.2.1 **Source**

Several mining and mineral processing activities generate obnoxious levels of noise and vibration. In opencast mines, heavy earth moving machineries like excavators, drills, dumpers, dozer and crusher are prominent sources of noise pollution in neighboring communities.

Ground vibration and air blast takes place due to blasting. This may be harmful to nearby buildings or structures, if they are not kept within safe limits. Blasting also generate air vibration wave (air blast). Vibration may cause structural damages, which depends upon the periodical acceleration due to vibration. Air blast can damage structurally unsound building and cause window glass failure. Vibration can also be a cause of annoyance to human beings. Blasting may generate fly rock, which may cause damage to both life and wealth. But appropriate steps towards this will eliminate probability of any such damage.

Noise and vibration are primarily occupational health problem for people working within active mining zone. However, public at large are not exposed to noise level due to mining activity.

5.6.2.2 Effect of Ground Vibration on Structures

Blasting damage has been classified into four categories:

S.N.	Category	Description of Damage
1	NO APPRECIABLE DAMAGE	No formation of noticeable cracks (PPV <17mm / sec.)
2	THRESHOLD	Formation of fine cracks, fall of plaster, opening & lengthening of old cracks, loosening of joints, dislodging of loose objects, etc. (PPV - 17.75mm / sec.)
3	MINOR	Superficial not affecting the strength of structures – broken windows. Hairline cracks in masonry around openings near partition, broken windows. Fall of loose mortar etc. (PPV – 30 mm / sec)
4	MAJOR	Formation of several large cracks, serious weakening of structures, shifting of foundation, fall of masonry, ruptures of opening vaults, etc. (PPV– 40 – 60 mm / sec)

5.6.2.3 Effect of Ground Vibration on Human Body

Human body can also be considered as complicated arrangements of independent mass spring system. Human body as a whole has its own natural frequency depending on the attitude of the person involved: (Standing 5 – 12 Hz, Prove 3 – 4 Hz and sitting 4 – 6 Hz) Resonance at 4 – 5 Hz will lower a person threshold of disturbance and discomfort and lead to complaints. Studies conducted by Garesh Rennie revealed that frequencies of 10.5 – 13.75 Hz induce peak resonant effects in both building structures and their occupants.

5.6.2.4 Ground Vibration (Impact on Environment due to blasting)

The ground vibrations are generated due to blasting. These vibrations may be harmful to nearby buildings etc. if not kept within limits.

The ground vibrations generated due to blasting will be measured by Seismograph DS – 407 Minimate. Measurement of peak particle velocity (mm/sec) frequency (Hz), air over pressure and noise levels will be made on the exposed ground surface and near building structures etc.

The established vibration predictor equation for the mine concerned is.

$$V = -1969.28 (D/Q^{1/2}) - 1.82916$$

R = Correlation coefficient = 0.98

Id = Index of determination = 0.85

This indicates that in 95 percent cases, the value predicted by the equation will match with the actual situation.

The sources of noise pollution are Tractors and transport vehicles. Thus measures are required to minimize the same, though noise due to Tractors, dumpers and trucks is within permissible limits.

5.7 SOCIO-ECONOMIC IMPACT

5.7.1 SOCIAL DEMOGRAPHIC PROFILE

The social demographic profile of the area is not likely to be affected, because displacement of people is not involved. The mining in the area has created rural employment. It has been observed that conditions of the villages around mining areas are better than that of distant villages.

There are 71 villages with in the mining lease area in core zone and buffer zone. Since the agricultural output is low the local people mainly depend on quarrying of slabs and cattle searing. The mining activity in the region has positive impact on the social economic condition of the area by providing employment to the local in habitants, wages paid increase the per capita income. The density of population in the nearby area increased due to improved economic conditions such as frequent transportation and medical facilities.

5.7.2 OCCUPATIONAL HEALTH AND SAFETY

There will be some health and safety hazards, which will effect the persons employed in the mine. The people may suffer from professional diseases or may get injured while working in the mine. Therefore, measures are required to protect the persons from these hazards.

5.7.3 HUMAN SETTLEMENT

Near by surrounding villagers being affected from the mining activities, such as dust pollution, noise pollution and ground vibration.

About 90% local inhabitants are reported to be economically poor. As the area is generally barren with rocky terrain and irrigation facilities are scarcely available, the agriculture output is low. The local people mainly depend on quarrying of slabs and cattle rearing. The nearby villagers will be rehabilitate to some other safe place out side danger zone. The mining settlement by providing employment opportunity to the location inhabitants. Bulk of the jobs

created went to the people of the surrounding areas. Besides, it opened up avenues of domestic employment by Shree Cement Ltd. Managerial cadres. The density of population in the nearby areas may to some extent be affected by dust and particulates.

5.7.4 HISTORICAL MONUMENTS

There is no historical monuments within the mining lease area core zone and buffer zone. Hence there will be no impact on above.



CHAPTER-VI

ENVIRONMENTAL MANAGEMENT PLAN

6.0 INTRODUCTION

The mining activities in area will involve, dozing, drilling, blasting, excavation, loading, haulage, crushing, screening and transportation of limestone to cement plant. These activities lead to generation of air borne dust, which can cause air pollution in and around the mining lease area, if appropriate control measures are not taken. Similarly mining causes land degradation, noise, water pollution etc. in the area.

In order to minimize impacts of mining on different environmental parameters and to keep air and water quality within prescribed limits of CPCB, a comprehensive environmental management plan (EMP) has to be prepared. This will help in resolving all environmental and ecological issues due to mining in the area. The environmental management plan will include all measure and safety precautions necessary for safe mining of required limestone along with rehabilitation measures for mined out areas.

6.1 MANAGEMENT PLAN FOR SITE DEVELOPMENT

There is no human settlement within the lease area therefore rehabilitation is not required. The total lease area is 856.8 hectares. This employment will be provided to local people on merit basis subject to availability of vacancies. Apart from providing employment, the company will also extend general benefits by way of development work in the project affected area directly as well as through respective GRAM PANCHAYATS. The company is already supporting in community development work like, health care, education, etc. in consultation with Gram Panchayats and authorities.

6.1.2 PLAN DURING DEVELOPMENT STAGE

The main activities to be carried in mining lease are during development stage are:

- (i) Site clearing & road making.
- (ii) Foundations & other construction work.
- (iii) Mechanical erection.
- (iv) Material handling, storage & water utilization.
- (v) Transportation and HEMM movement.

The protective measures to be adopted during site development are discussed below:

- (i) The generation of dust due to excavation of roads and ramps is minimized by spraying water before excavation. The generation of dust due to transport spraying water on haul roads will control vehicles.
- (ii) The accommodation with suitable amenities like drinking water, medical etc. is provided to the employed persons.

6.2 EMP DURING OPERATION PHASE

6.2.1 AIR ENVIRONMENT

The ambient air quality survey of the present buffer zone is marginally affected due to mining operations. The individual operations, which generate particulate, include drilling, blasting, dozing, excavation, loading, unloading and transportation, crushing etc. The general air pollution in case of mining operation include dust, smoke, organic gases, oxides of carbon, sulfur, nitrogen etc. Gaseous emission due to blasting and exhaust from diesel engines of the machinery deployed also pollute the atmosphere marginally. These can have adverse effects on the human health conditions, depending upon the concentration, particle size and duration of the above pollutants.

The result of the air quality survey and parameters tested proves that the SPM concentration is nearly within the permissible limit but after starting mining activity the SPM concentration may become high close to the source at about 0.5 Km. But beyond this the concentration will be well within the permissible limit. Ambient air quality monitoring conducted around the study area revealed that the concentration of SPM is in the range of 132 $\mu\text{g}/\text{m}^3$ to 298 $\mu\text{g}/\text{m}^3$. These values are well within the prescribed limits of Central Pollution Control Board (CPCB). As far as SO_2 and NO_x are concerned, they are also well within the CPCB limits for residential and rural areas. However, strict measures is adopted to maintain the air pollution with in the prescribed norms.

6.2.1.1 Prevention and Control of Air Pollution

A. Dust Pollution

The main pollutant in air is suspended particulate matter (SPM), which is generated due to various mining activities. However, to reduce the impact of dust pollution the following steps have been taken during various mining activities.

- a) During drilling operations

- i) Sharp drill bits are used for drilling and regrinding is done periodically to reduce generation of dust.
 - ii) Drilling machines are equipped with wet drilling system to prevent dust to get air borne.
 - iii) The drill machines are kept leakage free.
 - iv) Drill operator and his helper are equipped with personal protective appliances.
- b) During blasting operation
- i) Nitrate mixture Slurry Explosive and ANFO are used as explosive for blasting.
 - ii) The amount of explosive used per round of blasting is low.
 - iii) Blasting is done in most scientific manner with the use of latest technology like using stock tube detonator (Down line detonators in combination with noise less trunk line detonators) to control & prevent the dust to get air borne and to control the fly rock.
 - iv) Blasting is done in controlled manner with millisecond delay, cord relay to control and prevent the dust to get air borne and to limit the fly rocks within 50-60 m.
 - v) Use of Rock breaker has reduced the generation of dust considerably.
 - vi) With the good blasting system, dozing of broken rocks is less where by dust due to dozing is less.
 - vii) Blasting is carried out during 2 p.m. to 4 p.m. During this period, movement of man and animal is comparatively less. However, proper signal and warning is given as per mines act.
 - viii) Competent persons carry out blasting and all the precautions laid under MMR, 1961 and Explosive Act are followed.
 - ix) Time to time scientific studies regarding ground vibration, noise level, flying rocks and other blasting hazards is conducted through experts of the subjects.

- x) Results of the blasting are monitored by Government agencies like Director General of Mines Safety, Indian Bureau of Mines.
- c) During loading operation
 - i) Latest loading equipments like hydraulic excavators of large capacity are used with dumpers. This reduces the number of buckets to fill from height and thus have comparatively less dust generation. The propagation of this dust will be confined to loading point only and does not affect any person both the operators of excavator and dumpers who are sit in closed chamber and are equipped with dust mask.
 - ii) Skilled operators are operating excavators.
 - iii) Over burden is removed prior to working in the face.
 - iv) Water sprinkling is done on working faces to reduce generation of dust.
- d) During Transport operation
 - i) All the haulage roads including the main ramp from crusher to mines pit are kept wide, leveled, compacted with road roller, properly maintained and watered regularly during the shift operation to prevent generation of dust due to movement of dumpers, water tankers, etc.
 - ii) Morrum is used on haul roads instead of clay / dust, which is comparatively heavy and chances of generation of dust becomes less.
 - iii) The crushed material from crushing plant is transported to cement plant by conveyor belt and ropeway system to minimize the dust generation. Water is sprayed in side the crusher to make crushed lime stone sufficient moistened to avoid the dust generation during transfer.
 - iv) To minimize dust pollution double crapping under belt cleaning device is used.
 - v) To minimize dust pollution, hoods have been provided at transfer points and chutes is designed properly, which minimizes generation of dust during transportation of limestone through belt conveyor system.

- vi) Vulcanizing of conveyor belt joints is done properly, which minimizes generation of dust.
- e) During crushing operation
 - i) For removal of dust from the crusher and conveyor belt loading points, water is sprayed in side the crusher
 - ii) Automatic water sprinkling system is provided at crusher hopper where water sprinkles automatically during dumper unloading operation and the crusher hopper is also covered with GI sheet, which also helps to avoid the drift of dust generated during unloading of limestone at crusher hopper.
- f) Plantation work carried out
 - i) In order to reduce air pollution in the surroundings, green belt is developed around the crushing plant, belt conveyor, mines office, workshop, and mine approach road etc.
 - ii) Dumpsites of waste rock, low-grade mineral, etc. are thickly vegetated by plantation on and around them to prevent dust pollution during stormy wind.
- g) Monitoring of air pollution
 - i) Periodic air quality survey is being carried out to monitor the changes consequent upon mining activities as per the norms of Rajasthan Pollution Control Board.

B. Prevention and control of Gaseous Pollution

In mining activities, the only source of gaseous emissions is from blasting and the engines of Heavy earth moving machines (HEMM). Blasting of explosive result in increase of nitrogen oxides, which gets diluted by the wind. Controlled blasting and optimization of use of explosive energy will help in reducing the above emissions. The emissions from the diesel engines of the machinery could be visible as smoke or invisible gases such as sulphur dioxide, oxides of nitrogen, carbon monoxide and unburnt hydrocarbons. Due to incomplete combustion of the fuel the reasons may be quality of fuel improper operation of the engine, etc. Doing proper maintenance of machines, which improves combustion process, reduction in the pollution. Good maintenance and monitoring of fuel and oil do not allow the gaseous emissions to be appreciably higher than the ambient condition. The effect of these gases is limited to the surrounding of the equipment in operation only and will not affect the human

being since the available person at that point will be operator of the equipments, who will be sitting inside a closed chamber with protective mask.

6.2.1.2 Protection of Sites of Cultural, Historical and Scenic Importance due to mining activity.

These sites do not exist in study area therefore measures are not required.

6.2.2 NOISE ENVIRONMENT AND GROUND VIBRATION

6.2.2.1 Noise Abatement and Control

The latest HEMM is used in mining and due care will be taken to minimize generation of noise.

- i) Under the ISO 14001 concept, all types of maintenance i.e. scheduled maintenance and preventive maintenance of all machines is carried out. This helps in reducing generation of noise during working of machines.
- ii) The practice of wet drilling is carried out with the help of sharp drill bits. This helps in reducing noise generation during drilling.
- iii) Controlled blasting is done with the help of latest blasting technique using shock tube detonator (Down line detonators in combination with noise less trunk line detonator), which reduce generation of noise.
- iv) Use of Rock breaker has reduced the noise level.
- v) Crushing of run-off-mines limestone is done in a closed environment, which helps in minimizing generation of noise.
- vi) Limestone is transported from crushing plant to cement plant through belt conveyor system and ropeway that minimizes generation of noise.
- vii) Plantation is done around crushing plant, on the sides of approach roads, on both sides of belt conveyor system, around office complex and workshop area This is arresting noise at source due mining activities in the area.
- viii) In order to reduce the effect of noise pollution, earmuffs are provided to all operators and employees working at mining site as a safety measure.

- ix) Periodical monitoring of noise level of mining machines and at some locations in the mining site is being conducted.

6.2.2.2 Vibration Abatement

Sources of vibration due mining activity in the area are anticipated mainly due to operation of Blasting. In addition vibration is also generated due to crushing plants, Heavy Earth Moving Machines like excavators, dozers, dumpers, drill machines etc. However, following precautions are taken for abatement of vibration due to present mining project. The factors affecting ground vibration include, geological structures, explosive charge per delay, blast design parameters, method of initiation, explosive type used etc.

A. Vibration due to Machines

Vibrations due to machines are minimized by taking following measures.

1. Proper selection of machines like crushing plant, dozer, excavators, drill machines, etc. at the time of their procurement from the market, has been done in such way that they produce least vibration compared to other available models in the market at that time.
2. Proper maintenance, oiling and greasing of machines at regular intervals reduce generation of vibration due to machines.
3. Machines are operated by trained operators.
4. Footing of crusher has been made in such a way, which reduces transmission of ground vibration.

B. Ground Vibration due to Blasting

Depending on the type of structures and the dominant excitation frequency, the peak particle velocity (ppv) on the ground adjacent to the structures shall not exceed the values given below in the table as per the DGMS guidelines.

Permissible standards of ground vibration due to blasting as per guidelines of Director General of Mines Safety (DGMS), Dhanbad are as follows.

TYPE OF STRUCTURE	DOMINANT EXCITATION FREQUENCY, HZ		
	<8 HZ	8-25 HZ	>25 HZ
A. Buildings / Structures not belong to the owner			
Domestic houses / structures (Kuchha, Brick & cement)	5	10	15
Industrial Buildings (RRC & Framed structures)	10	20	25
Objectives of historical importance & sensitive structures	2	5	10
B. Buildings belonging to owner with limited span of life			
Domestic houses/structures (Kuchha, brick & cement)	10	15	25
Industrial buildings (RRC, Framed structures)	15	25	50

*Source – DGMS Tech Circular No.7 of 1997

To keep ground vibration due to blasting well within the above mentioned prescribed limits of DGMS, following measures have been taken.

- i) Drilling and blasting is done in the supervision of qualified persons.
- ii) Not more than 50 holes are blasted at a time once in a week and there delay timing in each hole by using surface noise less truck line detonators.
- iii) Down line detonators (Shock Tube) in combination with noise less trunk line detonators are used.
- iv) ANFO/Slurry explosive is used which has low velocity of detonation, which reduces ground vibrations.
- v) Non-electric blasting system is used to reduce ground vibrations.
- vi) Use of Hydraulic rock breaker has reduced ground vibration and noise .
- vii) By using bottom initiation system, there is no problem.
- viii) Stemming length is kept 1/3 of the hole depth for optimum utilization of explosives as well to reduce fly rock.
- ix) The faces are cleared for loose rocks before blasting which may be sources of fly rocks.

- x) Detonating fuses containing fewer explosives per meter length is used.
- xi) The blasting safety zone is clearly marked on the ground. This zone is cleared from strays animals and men by pasting security guards before blasting. Before blasting siren is blown to inform the people about blasting.
- xii) The vibrations and air blast are monitored. The results of such data are regularly sent to DGMS.

6.2.3 WATER ENVIRONMENT

The liquid effluents can contaminate surface and ground water bodies, soil and biological environment, where proper care is not taken. The following measures are being taken to minimize adverse impacts for water effluents.

(A) Mine Water

The rainfall is very scanty, no beneficiation is proposed and there is no changes of ground water quality during ensuing five year. This water is stored and used in plantation and spraying on the haul roads. The following precautions will be taken to prevent adverse impact of mine water.

- (i) Garland drains have been provided around the working pits to prevent entry of rainwater. The rainwater is diverted into natural water channels.
- (ii) There is no perennial water body inside the mining lease area from where seepage may take place into mine workings.
- (iii) Rainwater and ground water encountered in the workings is collected in lower most benches for its use in mining operations and plantation. The excess water, if any to be pumped out is diverted in seasonal nallahs. The area is water scare zone and pumped out water will be very useful.
- (iv) The strata of the area contain limestone, which do not generate toxic substance at any stage of mining.

(B) Leachates / wash-offs from waste rock/low grade mineral dumps

There is no perennial water body or watercourse in the area, which may get affected by waste dumps. Water table in the area is varying between 20 – 30 m below the ground surface throughout the year except in rainy season. So, there is little chance of interactions between waste dumps & water table of the area.

The seasonal nallahs flowing across the mining lease area gets water only in rainy season. The following measures have been planned to minimize the effect of leachates / wash-offs from future waste dumps on the environment.

- i) The site of dumps has been kept away from water course.
- ii) Selection of dumpsites has been done on non-mineralized zone of mining lease area where outcrop of rock is found. The little soil cover, if found, will be removed by dozing. This will help in quick flow of water percolating through the dumps into the garland drains, which will help in reducing leaching action of water as well as in seepage of water to ground water bodies.
- iii) Garland drains have been provided to prohibit entry of water during monsoon.
- iv) Garland drains have been provided around dumps to retain the water coming from waste dumps for settling of solid particles.
- v) Maintaining proper slope & compaction of dumps help in quick flow of water pouring on dumps without giving much time to percolate inside the dumps, which minimize the wash-offs & leachates.
- vi) Dense plantation around the dumpsite will restrict flow of water. At the same time plantation will be carried out on waste dumps itself, which gives stability to dumps as well as restricts flow of water.
- vii) Erosion is caused by run off water during the monsoon period. This rain water flows through natural water courses into nalla. The rain water also gets accumulated in the sump at the bottom bench which will be used for dust suppression, i.e. water spray on haul road, crusher hopper, drilling side. This water will have slightly different values in terms of pH, sulphate, total alkalinity, calcium etc. However, these constituents will be well within permissible limits for any discharge into the surface water, though the same can't be used for drinking purpose.

(C) Sewage Water

The source of sewage water is office toilets which will be discharged in the soak pit via septic tank.

(D) Waste Water Generated from Workshop

The workshop for washing and maintenance of machineries will be provided at the site. This water after separating the oil and grease by passing through upflow filter will be used for dust suppression.

(E) Acid Mine Drainage

The mineral, proposed to be worked in the lease area is limestone, which is alkaline in nature and does not create acidic effect in the water.

6.2.4 LAND ENVIRONMENT

6.2.4.1 Management for Land use

Detailed topographical and geological survey of the area has been carried out. The detailed exploration work in the lease area has also been carried out with appropriate grid pattern by core drilling to estimate mineable reserves. According to reserves, mine planning has been done in the mineralized zone only. This helps in proper planning from the beginning and also helps in proper use of land.

6.2.4.2 Reclamation Plan for Land use in Mining

At the Sheopura – Kesarpura Limestone quarry, the excavated area is not immediately proposed to be back filled, as limestone occurs even below the 500 m. level, upto which mining activity was so far carried out and it may still be economically feasible to mine from further lower levels at a later date. There is a continuity of limestone below 500 m. R.L. in view of mineral conservation point of view, the reclamation is not proposed. It is, therefore, proposed to convert the worked out area into a pond where seasonal fish breeding can be attempted, at the end of life of mine.

In case of abandoned quarries/pits, it is proposed that there will be reservoirs.

The plantation will also be done in the area not used for mining. The reclamation has been shown conceptual plan (Plate No. 4).

The conceptual plan of mining lease area has been prepared on basis of detailed exploration work carried out for optimum utilization and conservation of natural resources. This ensures that mining area is kept minimum possible and undesired utilization of land is avoided.

The waste material produced from the mine has been used in making ramps, parapet wall around working area, preparation of roads as well as leveling of undulating areas. The balance waste material has been dumped at specific non-mineralized zone as per plan approved by IBM. Maximum height of the dumps have been proposed 30 m. with 3 terraces (benches) each of 10 m. high 10 m. width. There is no top soil in the area therefore no separate place for its stacking has been earmarked.

The left over waste material likely to be generated during the life of the mine will be inadequate for back filling of the excavated areas. At the end of life of the mine, on reaching upto economic depth the pit will be converted into water reservoir as post mining land use. This pit will get filled with rain water during rainy season and is utilized in cement plant and mining activity. This will also recharge the ground water table of the area.

Plantation in the un-mineralized zone, dumping yard and periphery of the mine will improve aesthetic beauty of the area.

However, on reaching techno economic depth, it will be re-examined whether a part excavated area can be restored with left over waste material.

6.2.4.3 Measures planned to minimize impact on soil environment of the area.

The topography of the lease area consists of rocky terrain. The limestone exposed on the surface and there is no topsoil within mine working area. Hence it is not proposed for storage and preservation of topsoil.

Green belt development around the area, shown in Plate - 4, will minimize the impact of mining on soil characteristics like its texture, chemistry & even soil erosion in the area.

6.2.4.4 Environmental Management Plan to minimize impact on agricultural practice of the area.

- ◆ Due care has been taken during initial planning stage i.e. while preparing conceptual plan of the mining lease area, to minimize use of agricultural land for mining activity.
- ◆ All possible measures have been taken to reduce air, water and land pollution.
- ◆ Plantation work to be carried out in the area for green belt development and gardening will help in retention of water in the area and will also help in increase in moisture level of the atmosphere.

6.2.5 BIOLOGICAL ENVIRONMENT

6.2.5.1 Green Belt Development

The proposed green belt in the lease area is to be designed taking into consideration the availability of area as the efficiency of green belt in pollution control mainly depends on its width of green belt, distance from pollution sources, side of the habitat from working place and tree height. The proposed green belt has been designed to control SPM, gaseous pollutants, noise, surface run off and soil erosion etc. At the end of mine life 70 hectare land of non mineralized mining lease area

will be developed for green belt. In addition to this green belt will be developed on 88 hect. Land proposed for waste dump yard. Total no. of plantation will be 62965 no.s and the survival rate is expected to be 90 %

While considering the above aspects due care has been taken for selecting the suitable characteristics plant species as those fast growing, with thick canopy cover perennial and evergreen trees, trees with large leaf area, locally suitable plant species, those resistant to specific pollutant and those which would maintain the regional ecological balance, soil and hydrological conditions.

The plantation works for green belt development will be carried out under guidelines of Environmentalist Cum Botanist. The details of recommended species in the area are given in Annexure-3. Consultation of local Horticulturist and Forest Department has also been taken for plantation work.

6.2.5.1.1 General Guidelines for Green Belt Development

- i. Trees growing upto 5 mtrs. or more in height will be planted around the installation.
- ii. Plantation of trees will be undertaken in appropriate encircling rows around the installation in alternating rows to prevent horizontal pollution dispersion.
- iii. Trees will be planted along roadsides, to arrest auto-exhaust and noise pollution, and in such a way that there is no direct line of sight to the installation when viewed from a point outside the foliage perimeter.
- iv. Since tree trunks are normally devoid of foliage (upto 3 mt.), it will be appropriate to have shrubbery in form of such trees to give coverage to this portion.
- v. Fast growing trees with thick perennial foliage will be grown, as it will take many years for trees to grow to their full height.

In order to facilitate the proper growth of vegetation, limited measures involving preparation of seedbed with suitable amount of fertilizers and treatment with mulches will be taken. The topsoil will be used for green belt development / revegetation.

Vegetation cover in and around the mine workings generally helps in :

- i. Stabilizing erodible slopes to minimize pollution.
- ii. Control of dust.

- iii. Enhancement of aesthetic value.
- iv. Maximizing evapo-transpiration, which helps minimizing run off.
- v. Reducing noise.

For revegetation, the plants and saplings suitable for the existing soils and site conditions may be considered. It is recommended to plant fast growing local plant species, which can adapt to the local climate.

This has to be done in consultation with local government horticulturist.

6.2.5.2 Proposed Plantation Programme

The management proposes for plantation in side mining lease area. The plantation programme proposed in the area is given in table 6.2.5.3.

**TABLE – 6.2.5.3
PROGRESSIVE GREEN BELT PLAN UPTO END OF MINE LIFE**

YEAR	PLANTATION WITHIN M.L. AREA
Upto 2004 -05	32131
2005 -06	863
2006 -07	971
2007-08	1000
2008-13	5000
2013-18	6000
2018-23	6000
2023-28	6000
2028-32	5000
TOTAL	62965

The survival rate in the area is anticipated 90%.

6.2.5.3 Measures for Minimizing Impact on Flora

However, all possible steps will be taken to prevent pollution of air, water and soil environment due to mining activity in the area.

Plantation will be carried out for developing gardens and green belt in at the mines site & colony site to arrest dust at source. Under green belt development programme, those botanical species, which are locally suitable, will be planted. This green belt will add to the faunal environment of the area and at the same time it will help in preventing environmental pollution which will help in reducing adverse impact on the indigenous plant species found in the area.

6.2.5.4 Measures for Minimizing Impact on Fauna

The mining lease area is in non-forest land where presence of fauna is very rare. As such, there will be no adverse impact of the mining activity on animals found beyond the mining lease area. However, following measures will be taken to minimize the impact of mining on faunal environment of the area.

- i) Precautions will be taken to curb pollution to air, water, land & noise environment to zero level.
- ii) Greenery development around the colony and mines area will help in creating habitats for local faunal species and to attract birds, insects and reptiles from distant places.

6.2.6 SOCIO-ECONOMIC ENVIRONMENT

6.2.6.1 Management plan for Socio-Economic Environment

In general, socio-economic environment will have positive impact due to the mining project in the area. In order to improve the socio-economic conditions of the people of the area, a detailed programme for development of the area has been framed. The salient features of the programme are as follows.

- i) A well-laid plan for employment of the local people has been prepared by giving priority to those villagers, whose land falls in the project area.
- ii) Social welfare programme like provision of medical facilities educational facilities, recreational amenities for the employees as well as for nearby villagers.
- iii) Supplementing Govt. efforts in health monitoring camps, social welfare and various awareness programmes among the rural population.
- iv) Dust control measures:

Mining is being carried out in controlled manner to minimize the generation of dust at source. Again, green belt will be developed around the mining zone as well as around the roads to minimize the impact of dust on human health. Medical facilities are made available for health checkup of employees as well as villagers.
- vii) Local people have been taken into confidence in all activities to redress their grievances, if any, and to meet their aspirations.
- viii)

6.2.6.2 Employment:

In the recruitment process of the organisation, local people are given preference. In employment, priority is given to those villagers whose land falls in the project area.

Population of the study area is very less. As such the job seekers are also very less. Most of the deserving candidates have already been absorbed.

6.2.7 Township for the Project

The mining activities are located in remote areas, therefore a well-planned township with all adequate modern facilities is the essential part of project. The residential colonies of this mining project have been constructed jointly with that of the cement plant. These colonies are well planned with all modern infrastructures like wide illuminated road, drinking water facility, sanitation facility with sewage water treatment plant, gardening, green belt development, etc. The township is provided with independent water treatment plant for safe drinking water. A well planned sanitary system with sewage water treatment facility for safe disposal of sewage and garbage. The treated water is used in green belt development as the study area is water scarcity area.

The periphery of the is fenced and used for green belt development and there is no possibility of development of slums or temporary settlements near the residential /project site.

All the mines workmen and staff entitled has been provided residential facility in above township.

6.2.8 Industrial Hygiene, Occupational Hazards and Safety

The working conditions in the mines are governed by the enactments of the Director General of Mines Safety (DGMS) and Indian Bureau of Mines (IBM). As per the guidelines of the Mines Act, the management of Sheopura – Kesarpura limestone Mines, M/s Shree Cement has taken all necessary precautions. Normal sanitary, bathing and cleaning facilities have been provided within the plant. The management carries out periodic health check up of workers of all sections. Till date in the entire medical check ups, no abnormal disease, which can be caused due to mining activities, has been noticed.

Occupational hazards involved in mines are related to dust pollution, noise pollution, blasting and injuries from moving belt conveyors, equipments, fall from high places and electric shocks. DGMS has given necessary guidelines for safety against these occupational hazards. The management strictly follows these guidelines.

All necessary first aid and medical facilities are provided to the workers. The mine is well equipped with proper fire protection and fire fighting equipment.

All operators and mechanics have been trained to handle fire-fighting equipments. Further all the necessary protective equipments such as helmets, safety goggles, safety shoes, ear plug, ear muff, etc. are provided to persons working in hazardous areas.

6.2.9 Recreational Facilities

Immigration of people to the region has resulted in increased water demand for drinking and other public utilities. The local economy of the region has thus improved, by setting up of township comprising school, dispensary, market, communication facilities etc. will result in the development of the region. The housing activities in the surrounding village will also increase ultimately resulting into overall prosperity, immigration of the people from different parts will improve traditional culture.

The important public building, monuments sites of historical importance, national park or tourist places does not exist.

However, certain local belief places like Devra, Masjid Chhatri, Temple, Panchayat Bhawan, Patwar Ghar, School etc. are found at a distance of about more than two Kms. Hence there will be no impact on public buildings, places and monuments due to proposed mining activities.

6.3 REHABILITATION AND RESTORATION PLAN FOR MINING AREA IN POST OPERATIONAL PHASE

Opening of pit for mining of mineral and dumping of waste rock and low-grade material in the mining lease area may disturb Land environment and aesthetics of the area. However, proper care has been taken to minimize the impact throughout the life of the mines. The following measures have been planned for rehabilitation and restoration of the mining area in post operational phase.

- The waste material produced from the mine has been used in making ramps, parapet wall around working area, preparation of roads as well as leveling of undulating areas. The balance waste material has been dumped at specific non-mineralized zone as per plan approved by IBM. Maximum height of the dumps have been proposed 30 m. with 3 terraces (benches) each of 10 m. high 10 m. width. There is no top soil in the area therefore no separate place for its stacking has been earmarked.
- The smaller pits where mineral is available at lower depth will be filled with the waste. This filled area will be reclaimed by plantation.
- The left over waste material likely to be generated during the life of the mine will be inadequate for back filling of the excavated areas. At the end of life of the mine, on reaching upto economic depth the pit will be converted into water reservoir as post mining land use. This pit will get filled with rain water during rainy season and is utilized in cement plant

and mining activity. This will also recharge the ground water table of the area.

- Dense plantation work has been planned, in side the mining lease area.
- The waste dumps will be converted into green carpeted raised grounds by dense plantation of shrubs and trees on them.
- The above mentioned water reservoir along with the plantation around them as well as on the raised grounds will help in attracting birds and animals to the site. This will help the area to serve as a “Sight Seeing Spot”. Developing a park in the area will further enhance importance of the area.
- The enclosed conceptual plan in Plate - 6 shows the detailed proposed planning for post mining phase.

6.4 ENVIRONMENTAL MONITORING

6.4.1 AIR POLLUTION MONITORING

Ambient air quality monitoring will be carried out as per State and Central Pollution Control Board’s guidelines by the following methods:

1. Suspended Particulate Matter (SPM): By High Volume Sampler
IS 5182 (Part 4) : 1999
2. Sulphur Dioxide (SO₂) : ISI 5182 (Part II) : 2001
3. Nitrogen Oxides (NO_x)
: ISI 5182 (Part VI) : 1975

6.4.2 WATER QUALITY MONITORING

As there is no effluent water is discharged from the mining activity, only sewage water is generated from the office toilets which is discharged in to sock pit via septic tank. Therefore there is no impact on ground water quality.

6.4.3 ENVIRONMENTAL QUALITY LABORATORY

A full-fledged environmental quality laboratory is in operation to monitor the various pollutants.

This laboratory has the facilities to monitor ambient air, stack and domestic as well as other wastewater pollutants.

6.5 ENVIRONMENTAL MANAGEMENT ORGANIZATION

The organization for environmental management at Sheopura - kesarpura Limestone Mines is as follows.

The total environmental management of Sheopura – Kesarpura Limestone Mines is looked after by the Sr. Vice President (Mines). He is suitably qualified person with vast experience at senior level in similar type of mines. He will be assisted by Dy. General Manager (Maintenance), Senior Manager (Mines operation), Geologist and Environment Scientist. Under these will be a number of other personnel to execute day-to-day operations including environmental protection, control and monitoring.

6.6 REGULATORY STANDARDS AND APPROVALS

6.6.1 REGULATORY STANDARDS

6.6.1.1 Air Quality

The Central Pollution Control Board (CPCB) has promulgated the limits for Ambient Air Quality.

Pollution Control Board vides their circular dated 20th. April 1994 are shown in table 6.6.1.

6.6.1.2 Noise and Ground Vibration

The limits of occupational safety and health administration (OSHA) for noise quality are presented in Table 6.6.2. The safe values of ground vibrations for various structures as recommended by CMRS, are in Table 6.6.3.

6.7 APPROVALS

M/s. Sheopura – Kesarpura Limestone Mine has already obtained necessary approvals from the Indian Bureau of Mines (IBM), the Chief Inspector of explosives – Nagpur and the Director General of Mines Safety.

**TABLE –6.6.1
NATIONAL AMBIENT AIR QUALITY STANDARDS**

Pollutant	Time weighted average	Concentration in ambient air			Method of measurement
		Industrial area	Residential Rural & other areas	Sensitive area	
Sulphur Dioxide (SO ₂)	Annual Average *	80 µg/m ³	60 µg/m ³	15 µg/m ³	1. Improved West and Gacke method. 2. Ultraviolet fluorescence
	24 hours **	120 µg/m ³	80 µg/m ³	30 µg/m ³	
Oxides of Nitrogen as NO ₂	Annual Average *	80 µg/m ³	60 µg/m ³	15 µg/m ³	1. Jacob & Hochheiser (Na-Arsenite) Method 2. Gas phase Chemiluminescence
	24 hours **	120 µg/m ³	80 µg/m ³	30 µg/m ³	

Suspended Particulate Matter (SPM)	Annual Average *	360 µg/m ³	140µg/m ³	7 µg/m ³	High volume sampling (Average flow rate not less than 1.1 m ³ /minute)
	24 Hours **	500µg/m ³	200µg/m ³	100µg/m ³	
Respirable Particulate Matter (size less than 10 mm) (RPM)	Annual Average*	120µg/m ³	60 µg/m ³	50 µg/m ³	Respirable particulate matter sampler
	24 Hours **	150 µg/m ³	100µg/m ³	75 µg/m ³	
Lead (Pb)	Annual Average *	1.0µg/m ³	0.75µg/m ³	0.50µg/m ³	AAS Method after sampling using SPM 2000 or equivalent filter paper.
	24 Hours **	1.5µg/m ³	1.00µg/m ³	0.75µg/m ³	
Carbon Monoxide (CO)	8 Hours**	5.0 mg/m ³	2.0 mg/m ³	1.0 mg/m ³	Non depressive infrared spectroscopy
	1 Hours	10.0mg/m ³	4.0 mg/m ³	2.0 mg/m ³	

* Annual Arithmetic mean of minimum 104 measurements in a year taken twice a week 24 hourly at uniform interval.

** 24 hourly / 8 hourly values should be met 98% of the time in a year. However 2% of the time, it may exceed but not on two consecutive days.

NOTE:

1. National Ambient Air Quality Standard. The levels of air quality necessary with an adequate margin of safety, to protect the public health, vegetation and property.
2. Whenever and wherever two consecutive values exceeds the limit specified above for the respective category, it would be considered adequate reason to institute regular / continuous monitoring and further investigations.
3. The State Government / State Board shall notify the sensitive and other areas in the respective states.

**TABLE –6.6.2
DAMAGE RISK CRITERIA FOR HEARING LOSS: OCCUPATIONAL
SAFETY AND HEALTH ADMINISTRATION (OSHA)**

MAXIMUM ALLOWABLE DURATION (HOURS PER DAY)	NOISE LEVEL dBA (SLOW RESPONSE)
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
0.5	110
0.25 or less	115

**TABLE –6.6.3
SAFE VALUES OF GROUND VIBRATION FOR DIFFERENT
STRUCTURES RECOMMENDED BY CMRS**

TYPE OF STRUCTURE	PEAK PARTICLE VELOCITY (mm/s)
Steel or reinforced concrete structure i.e. factories, bridges, steel towers, etc. (at all ground)	50.0
Building with foundation walls and floors, in concrete, concrete walls or good quality thick masonry walls like industrial buildings of low height (8 – 10m)	25.0
Buildings with masonry walls and wooden ceiling and housing i.e. poor repair, residential buildings of low heights (8-10m).	12.5
Object of historical importance or other sensitive structure of mud or kutcha houses having roof and without joints.	5.0

CONCLUSION

Our Mining operations are being done as per the Mining Plan approved by Indian Bureau of Mines, Govt. of India. All efforts have been made to collect and generate baseline data in detail, which help in assessing the impact of mining activities on the surroundings. At the same time, Environmental Management Plan has reduced the adverse impact of mining on Environment.

Environmental monitoring work carried out in our existing Shree Cement Ltd. over the years shows that there is no adverse impact of mining activities on the surroundings. This indicates that working strictly as per the stringent actions planned in the EMP of approved mining plan and mining scheme helps us in further minimizing the impact of mining activities on environment. Our endeavor is always maintain “Clean and green environment” and work in harmony with nature to manage ecological balance, i.e. eco-friendly mining.



PROFORMA FOR ENVIRONMENTAL APPRAISAL OF MINING PROJECTS
(*MINING SECTOR PROJECTS*)

Note 1: All information given in the form of Annex/s should be properly numbered and form part of reply to this file proforma.

Note 2: Please enter ✓ in appropriate box where answer is Yes/No

Note 3: No abbreviation to be used – **Not available** or **Not applicable** should be clearly mentioned.

Note 4: Core zone is the mining lease area

Buffer zone in case of ML area up to 25 ha. Is to be considered as **5 km.** all around the periphery of the core zone and for ML area above 25 ha. an area **10 km.** all around the periphery of the core zone.

Note 5: Adopt **Scoping process** in carrying out EIA study.

Note 6: Please indicate source of data.

1. General Information

(a) Name of the Project : Sheopura – Kesarpura Limestone Mines

(i) Name of the proponent : M/s Shree Cement Ltd.

Mailing Address : Post Box no 33, Bangur Nagar, Beawar,
Ajmer Rajasthan

E-mail : Shreebwr@datainfosys.net
Shreebwr@shreecementltd.com

Telephone : (01462)228101-6

Fax No. : (01462) 228117 -19.

(b) Objective of The Project : To supply required quantity and quality of

Limestone to Shree cement plant (Unit-1 and Unit – 2)

(c) Location of mine (s)

Village(s)	Tehsil	District	State
Sheopura, Kesarpura	Masuda	Ajmer	Rajasthan

(d) .Does the proposal relate to:

(i) New mine Yes No

(ii) Expansion

– Increase in ML Area Yes No

– Increase in annual Production Yes No

(iii) Renewal Yes No

(iv) Modernization Yes No

(e) Site Information : It is situated at a distance of 11 km South East from Bewar City.

(i) Geographical Location

Latitude	26° 1'35" to 26° 5'25" N	
• Longitude	74° 22'40" to 74° 25' 25" E	
• Survey of India Topo Sheet No (optional)	45 J/8	
• Elevation above Mean Sea Level	500-581 Meter	
• Total lease Area (in ha.)	856.8 Hectares	

(ii) Dominant nature of terrain

• Flat	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
• Undulated	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
• Hilly	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>

2. Land usage of the lease Area (in ha.)

(a) Agriculture	153.1
(b) Forest	Nil
(c) Waste land	703.7
(d) Grazing	—
(e) Surface water bodies	—
(f) Other (Specify)	—
Total	856.8

3. Indicate the seismic zone in which ML area falls. In case of zone IV & V, details of earth quakes in last 10 years:- Area falls in zone - I

(a) Severity (Richter scale)

(b) Impact i.e. Damage to

▪ Life	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
▪ Property	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>
▪ Existing mine	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

4. Status of mining lease area (in ha.)

Purpose	Mining Lease Area				Total	Area Acquired				Area to be acquired			
	Government		Private			Government		Private		Government		Private	
	Forest	Others	Agri.	Others		Forest	Others	Agri.	Others	Forest	Others	Agri.	Others
1. Area to be excavated	—	225	—	—		—	—	—	—	—			
2. Storage for top soil	—		—	—		—	—	—	—	—		—	—
3. Overburden/Dumps	—	88.0	—	—		—	—	—	—	—		—	—
4. Mineral storage	—	—	—	—		—	—	—	—	—		—	—
5. Infrastructure (Workshop, Administrative Building)	—		—	—		—	—	—	—	—		—	—
6. Roads	—	4.5	—	—		—	—	—	—	—		—	—
7. Railways	—	—	—	—		—	—	—	—	—		—	—
8. Green Belt (non mineralized zone)	—	70.0	—	—		—	—	—	—	—		—	—
9. Tailings pond	—		—	—		—	—	—	—	—		—	—
10. Effluent treatment plant	—		—	—		—	—	—	—	—		—	—
11. Coal handling plant/ mineral separation plant	—		—	—		—	—	—	—	—		—	—
12. Township area	—		—	—		—	—	—	—	—		—	—
13. Other (non mineralized Govt Waste Land)	—	316.2	—	—		—	—	—	—	—		—	—
Total		703.7	153.1	—	856.8	—	—	—	—	—		—	—

5. Township (outside mine lease): Not Applicable

(a) Total Area (in Ha.)

(b) No. of dwelling units

(c) Distance from mine site

6. Distance of water bodies (in Km) Not applicable

Distance of	River Bank *	Other Water bodies * Sea / creek / lake etc. (specify)
Mine lease boundary	Not Applicable	Not Applicable
Ancillary facilities	Not Applicable	Not Applicable

*From highest flood line / high tide line

7. for projects falling within CRZ

Whether the mineral to be mined is of rare nature and not available outside CRZ?

Yes

No

If so, annex a scaled location map showing low tide line (LTL), high tide line (HTL) duly demarcated by one of the authorized agencies* [*Director, Space Application Centre, Ahmedabad: Centre for Earth Sciences Studies, Thiruvananthapuram: Institute of Remote Sensing, Anna University, Chennai: Institute of Wetland Management & Ecological Designs, Kolkata: Naval Hydrographer's Office, Dehradun: National Institute of Oceanography, Panjim, Goa: and National Institute of Ocean Technology, Chennai], boundary of mining lease area, distance of ML area LTL and HTL CRZ boundary and CRX classification of the project area as per the approved Coastal Zone Management Plan, and settlements, sand dunes, mangroves, forest land/patches, turtle breeding and nesting sites etc., if any, in the project area.

8. Indicate aerial distance from the periphery of core zone / buffer zone of following (upto 10 km.)

S. No.	Areas	Name	Aerial Distance (in km.)	
			CORE ZONE	BUFFER ZONE
1.	National Park / Sanctuary	Not Applicable	—	—
2.	Biosphere Reserve / Tiger Reserve / Elephant / any other Reserve	Not Applicable	—	—
3.	Forest (RF / PF / unclassified)	Not Applicable	—	4 No. from 1.5 to 8.0 km from the lease boundary.
4.	Habitat for migratory birds	Not Applicable	—	—
5.	Corridor for animals of schedule I & II of the Wildlife (Protection) Act, 1972	Not Applicable	—	—
6.	Archaeological sites ▪ Notified ▪ Others	Not Applicable	—	—
7.	Defence installation	Not Applicable	—	—

8.	Industries/Thermal Power Plant	Shree Cement Ltd and Shree Power plant	—	3 Km
9.	Other Mines	Not applicable	—	
10.	Airports	Not applicable	—	
11.	Railways Lines	Not applicable	—	
12.	National / State Highways	National Highway No 8	—	9 Km

[* Buffer zone in case of ML area up to 25 ha. is to be considered as 5 km. all around the periphery of the core zone and for ML area above 25 ha. and 10 km. all around periphery of the core zone].

9. Description* of flora & fauna in the core and buffer zones. Authentic list enclosed (Annexure 17)

[* Consult the Wildlife (Protection) Act, 1972 as amended subsequently and list species with (1) Common name (2) Scientific name and (3) under which schedule of the wildlife (Protection) Act the identified species fall. Get the list authenticated by an Expert in the field / credible scientific institute / Chief Wildlife Warden office. Information to be based on field survey.]

A. Flora	Core Zone	Buffer Zone
1. Agricultural crops	—	Maize, Wheat, Jwar, & Bajra etc.
2. Commercial crops	—	Onion, Garlic and local vegetables
3. Plantation	—	Neem, Babool, Khejri etc
4. Natural vegetation / forest type	—	Shrubs, Bushes.
5. Grass lands	—	--
6. Endangered species	—	—
7. Endemic species	—	
8. Other (specify)	—	—
B. Fauna		
1. Total listing of faunal elements	Rabbit, Lizard, Snake	Fox, Hare, Squirrel, Snakes, Lizards, Monkeys, Jungli Pig , Neel Gai Owl , Blue bull, Parrot Koel, Kite,Pigeons, Jackal.
2. Endangered species	—	—
3. Endemic species	—	—
4. Migratory species	—	—
5. Details of aquatic fauna, if applicable	—	Not applicable

10. Details of mineral reserves

(As on 1.04.04)

Quantity (in Million tones)

(a) Proven	52.54
(b) Indicated	6.23
(c) Inferred	123.20
(c) Mineable reserves	113.87

11. Major geological formation / disturbances in the mine area

- | | | | | | |
|-----|-------------------------------------|-----|-------------------------------------|----|--------------------------|
| (a) | Geological maps submitted | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| (b) | Geomorphological sections submitted | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| (c) | Contour map submitted | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |

(Geomorphological features and contours have been shown in Geological & structural map)

- | | | | | | |
|-------|----------------------------------------|-----|-------------------------------------|----|-------------------------------------|
| (d) | Whether the presence, if any, noted of | | | | |
| (i) | Faults | Yes | <input type="checkbox"/> | No | <input checked="" type="checkbox"/> |
| (ii) | Dykes | Yes | <input type="checkbox"/> | No | <input checked="" type="checkbox"/> |
| (iii) | Shear Zone | Yes | <input type="checkbox"/> | No | <input checked="" type="checkbox"/> |
| (iv) | Folds | Yes | <input checked="" type="checkbox"/> | No | <input type="checkbox"/> |
| (v) | Other weak zones | Yes | <input type="checkbox"/> | No | <input checked="" type="checkbox"/> |

(e) Source of data (Indicate)

Outcrops of rocks found on surface and bore holes drilled during detail prospecting work.

12. Production of mineral(s) and life of mine

- | | | | |
|-------|----------------------------------------------------------------------------------------------------|---------------------------------------------------|-------------------------------------|
| (a) | Rated capacity of mine mineral wise (tones/annum) | <input type="text" value="4.0MT"/> | |
| (b) | Life of mine at proposed capacity (Years) | <input type="text" value="29 years"/> | |
| (c) | Lease period (Years) | <input type="text" value="20 years"/> | |
| (d) | Date of expiry of lease (D /M /Y) | <input type="text" value="27.08.2018"/> | |
| (e) | In case of existing mines | | |
| (i) | Date of opening of mine | <input type="text" value="1984"/> | |
| (ii) | Production in the last 5 years from year 1.4.98 to year March 2003. | 1 st year | 5 th year |
| | | <input type="text" value="8.467 Million tonnes"/> | |
| (iii) | Projected production for the next 5 years from year 1.4.2003 to year March 2008 in million tonnes. | <input type="text" value="13.2 Million tonnes"/> | |
| (iv) | Whether mining was suspended after opening of the mine? | Yes | <input type="checkbox"/> |
| | | No | <input checked="" type="checkbox"/> |
| | If yes, details thereof including last production figure and reason for the same. | | |
| (f) | Whether plans & sections provided? | Yes | <input checked="" type="checkbox"/> |
| | | No | <input type="checkbox"/> |

13. Type and method of mining operations

TYPE		METHOD	
Open-Cast	✓	Manual	–
Underground	–	Semi-mechanized	–
Both	–	Mechanized	✓

14. Details of ancillary operations for mineral processing

- (a) Existing Drilling, Blasting, Rock Breaking and Crushing operations
- (b) Additional Nil

15. Mine details

(a) Open - cast mines

- (i) Stripping ratio (mineral to over burden in tones / m³) 1:0.30
- (ii) Ultimate working depth (in m bgl) Up to general ground level i.e. 500MRL
- (iii) Indicate present working depth in case of existing mine (in m bgl) 9m above ground level
- (iv) Thickness of top soil (in m.)
- Minimum -
 - Maximum -
 - Avg. -
- (v) Thickness of overburden (in m.)
- Minimum -
 - Maximum -
 - Avg. -
- (vi) Mining Plan
- Height and width of the bench in Overburden/waste. 9.0 mtr and more than 9.0 mtr
 - Height and width of the bench in Ore body / coal seam. 9.0 mtr and more than 9.0 mtr
 - Proposed inclination / slope of the sides of the opencast mine (separately for overburden, coal/ ore and overall slope of the pit sides) both while operating the mine as well as at the time of closure of the mine. 60°
 - Whether transverse sections across the opencast mine at the end of fifth year and at the end of the life of the mine have been submitted? Yes ✓ No

(vii) Type of blasting, if any, to be adopted. : -Down line detonators (Shock Tube detonators) in combination with noise less trunk line detonators resulting less vibration, noise and fly rock and dust emission.

(b) Underground mines Not Applicable

(i)	Seam/ Ore body	Min. Depth (m)	Max. Depth (m)	Avg. thickness (m)
		<input type="text"/>	<input type="text"/>	<input type="text"/>
		Rate of dip in degree	Direction of dip	
		<input type="text"/>	<input type="text"/>	

(ii) Mode of entry into the mine

- Shaft
- Adit
- Incline

(iii) Details of machinery to be used

- On surface
- At Face
- For transportation
- Others

(iv) Method of stopping (metalliferrous mines)

- Open
- Filled
- Shrinkage
- Caving
- Combination of above
- Others (Specify)

(v) Extraction Method

- Caving
- Stowing
- Partial extraction

(vi) Subsidence

- Predicted max. subsidence (in m)
- Max. value of tensile strain (in mm/m)
- Max. slope change (in mm/m)
- Whether identified possible subsidence area(s) superimposed on Surface Plan has been submitted?
- Major impacts on natural features

Like natural drainage pattern, houses, Buildings, water bodies roads, forest,etc.

- Salient features of subsidence Management (monitoring and control)

16. Surface drainage pattern at mine site

(a) What is the pre-mining surface drainage pattern at the site?

There is no river / nallah existed within the mining lease area.

(b) Do you propose any modification/diversion in the existing natural drainage pattern at any stage? If yes, when. Provide location map indicating contours, dimensions of water body to be diverted, directions of flow of water and proposed route/changes, if any i.e. realignment of river/nallah/ any other water body falling within core zone and its impact. Yes No

17. Embankment and / or weir construction Not Applicable

(a) Do you propose, at any stage, construction of

(i) Embankment for protection against flood? Yes No

(ii) Weir for water storage for the mine? Yes No

(b) If so, provide details thereof.

(c) Impact of embankment on HFL and settlement around.

(d) Impact of weir on down stream users of water.

18. Vehicular traffic density (outside the ML are)

		Type	No. of vehicles per day
a)	Existing	Dumpers	200
b)	After the proposed activity	Dumpers	400
c)	Whether the existing road network is adequate? If no, provide details of alternative proposal?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>

19. Loading, transportation and unloading of mineral and waste rocks on surface:

(a) Manual Not Applicable

(b) Tubs, mine cars etc. Not Applicable

(c) Shovels, dumpers/trucks. Tata Hitachi/Dumpers/Trucks

(d) Conveyors (belt, chain etc.) Not Applicable

(e) Others (specify) Not Applicable

20. Mineral(s) transportation from the mine site

	Qty. (in TPD)	Percentage (%)	Length (in km)
(i) Road	—		
(ii) Rail	—	—	
(iii) Conveyors	10000	75	2.0
(iv) Ropeway	3333	25	2.5
(v) Water ways	—	—	
(vi) Pipeline	—	—	
(vii) Others (Specify)	—	—	
Total	13333	100	

Or 13500 TPD

21. Baseline Meteorological & Air Quality data

(a) **Micro-meteorological data** : Enclosed Annexure-1
 (Continuous monitoring through autographic instrument for one full season other than monsoon)

(i) Wind rose pattern for one full season (16 points of compass i.e. N, NNE, NE --) based on 24-hourly data. For coastal area also furnish day-time and night time data - Enclosed Annexure –2

- Day time
- Night time
- 24 – hours period

(ii) Site specific monitoring data Year: 2002

Month	Wind Speed (Kmph)			Temperature (°C)			Relative Humidity (%)			Rainfall* (mm)			Cloud Cover** (Octas of sky)
	Min.	Max.	% of calm	Mean (Dry Bulb)	Highest	Lowest	Mean	Highest	Lowest	Total	24-hurs Highest	No. of Rainy Days	Mean
April, May and June 2002	2	14	0.8%	33	43	23	34	60	7	—	—	—	2.0

* 24 – Hours rainfall should be reported from 08.30 hrs. IST of previous day to 08.30 hrs. IST of the day.

* Rainy day is considered when 24 hrs. rainfall is ≥ 2.5 mm.

**Visual observation of cloud cover should be recorded four times a day at regular intervals.

(iii) Indicate name and distance of the nearest IMD meteorological station from which climatological data have been obtained for reporting in the EIA report, if any. Meteorological Station at IMD Ajmer is about 45 km. from the site.

21.2 Ambient air quality data* (RPM, SPM, SO₂, NO_x, CO)

[* Monitoring should be carried out covering one full season except monsoon – same season as in 21 (a) (i)].

[*Frequency of sampling: Sampling to be done twice a week for the entire season 24 hourly for SPM & RPM. For gaseous pollutants 24-hourly data be given irrespective of the sampling period.] Enclosed Annexure- 3

(i) Season & period for which monitoring has been carried out. April to June 2002 (Summer)

(ii) No. of samples collected at each monitoring station 24 samples/station

Name of monitoring equipment used			SPM			RPM			SO ₂			NO _x			Pb**		
			Envirotech 451/460			Envirotech 451/460			Envirotech 451/460			Envirotech 451/460			Envirotech 451/460		
Equipment sensitivity			0.5-10 μ in filter Paper >104 in sample bottle			0.5-10 μ in filter Paper >104 in sample bottle			0.5-10 μ in filter Paper >104 in sample bottle			0.5-10 μ in filter Paper >104 in sample bottle			0.5-10 μ in filter Paper >104 in sample bottle		
Permissible AAQ standard (CPCB)			R			200 μg/m ³			100 μg/m ³			80 μg/m ³			80 μg/m ³		
			I			500 μg/m ³			150 μg/m ³			120 μg/m ³			120 μg/m ³		
			S			100 μg/m ³			75 μg/m ³			30 μg/m ³			30 μg/m ³		
Monitoring Location	No. of samples Drawn	Category (R, I, S)	Min.	Max.	95% tile	Min.	Max.	95% tile	Min.	Max.	95% tile	Min.	Max.	95% tile	Min.	Max.	95% tile
Core Zone																	
Mine Site		I	215	298	292	41	53	52	8	17	16	14	24	23			
Buffer zone																	
Andheri Devori		R	146	168	162	43	59	58	10	19	18	16	28	26			

Shivpura Ghata		R	132	151	151	33	49	48	8	15	15	11	22	22			
Khimpura		R	140	146	146	41	58	57	7	16	15	10	20	19			
Mundoti		R	135	149	148	35	47	46	5	13	13	9	18	17			
Rupaheli		R	120	126	125	39	44	43	6	11	8	7	13	12			
Sarkhana		R	112	120	119	40	43	43	4	8	7	10	13	12			
Lasoriya		R	130	136	135	30	32	32	5	8	8	8	11	10			
Ganeshpura		R	110	121	120	47	57	54	5	9	8	10	13	12			
Sahaspura		R	113	121	120	59	66	66	5	9	8	7	12	12			
Suhawa		R	115	120	119	60	65	64	5	7	7	9	12	12			

*R = Residential; I = Industrial; S = Sensitive

**Pb for mineral specific sites only.

Annex a location map indicating location of AAQ stations, their direction & distance w.r.t. project site. Enclosed Annexure-4

22. Stack and emission details, if any

Not Applicable.

S.No	Process / unit of operation (eg. DG Set, Boiler)	Height of Stack (m)	Internal top dia. (m)	Flue gas velocity (m/sec)	Emission rate (kg/hr)				Heat emission rate from top of stack (K.cal/hr)	Exhaust / Flue gas			
					SPM	SO ₂	NO _x	CO		Temp °C	Density	Specific Heat	Volumetric flow rate (m ³ /hr)

23. Details of fugitive emissions during mining operations

Fugitive emission is generated during drilling, blasting, crushing and transportation. To control the fugitive emission following measures are provided:

- i) Drilling machine is equipped with dust extractor system and water injection system.
- ii) Blasting is done by latest blasting technique - down line detonators (Shock Tube detonators) in combination with noise less trunk line detonators resulting less vibration, noise and fly rock and dust emission.
- iii) In place of secondary blasting is Rock breaker is used resulting reduction in dust emission, noise vibration and fly rocks.
- iv) All the haulage roads are kept wide, made with the Morrums and properly leveled, compacted with Road Roller and properly maintained and water spray is being done regularly.
- v) Dust collector and water spray system will be installed at limestone crusher and screening plant.

24. Air Quality Impact Prediction (AQIP): Enclosed as Annexure 16

- (a) Details of model(s) used for AQIP including grid.
Size, terrain features, and input meteorological data
- (b) Maximum incremental GLC values of pollutants based on Prediction exercise.

(in $\mu\text{g}/\text{m}^3$)

S.No.	Pollutants	Incremental value	Ambient air quality	Resultant air quality
1.	SPM			
2.	SO ₂			
3.	NO _x			

[* Question Number 22, 23 and 24 need not be filled in for mines having ML area of 25 ha. Or less]

[**Information on item No. 2 & 3 to be provided in cases with captive power generation of 500 KVA and above]

25. **Water requirement (m3/day) :**

Purpose	Avg. Demand	Peak Demand
Mine Site		
▪ Mine Operation	–	–
▪ Land reclamation	–	–
▪ Dust suppression & workshop	150KL	
▪ Drinking	50KL	
▪ Green Belt		
▪ Beneficiation	–	–
▪ Washeries	–	–
▪ Fire Service	–	–
Township		
▪ Green Belt		
▪ Domestic		
▪ Other (specify)	–	–
TOTAL	200 KL	

26. **Source of water supply* :**

S.No.	Source	M ³ / day
1.	River (name)	–
2.	Ground Water	
3.	Mine Water (sump / pit)	200
4.	Other surface water bodies – own Tube Wells	

[*Annex a copy of sanction letter/permission from the concerned authority (Central Ground Water Authority in case of ground water abstraction is from notified area / State Ground Water Board in case of non-notified area / State Irrigation Department for surface water pumping) for drawing water.]

27. **Lean season flow in case of pumping from river/nalla (cumecs)** Not Applicable

28. **Ground Water potential of the study area**

28.1 **Ground water availability**

(a) Range of water table (m bgl) Average water table-20 to 45 mtrs

- (i) Pre-monsoon :
- Core Zone 45
 - Buffer Zone 45
- (ii) Post-monsoon :
- Core Zone 20
 - Buffer Zone 20

- (b) Total annual replenishable recharge (million m³/year)
- By ground water table fluctuation method
 - By rainfall infiltration factor method

(c) Annual draft excluding estimated draft through mine discharge (million m³/year)

- (d) Estimated draft through mine discharge (million m³/year)
- (e) Net annual ground water availability (million m³/year)
- (f) Stage of ground water development in %

28.2 Water demand - Competing users of the water source Not Applicable.

S. No.	Usage	Present Consumption (m ³ /day)		Additional proposed as per local plan (m ³ /day)		Total (m ³ /day)	
		Surface	Ground	Surface	Ground	Surface	Ground
1.	Domestic						
2.	Irrigation						
3.	Industry						
4.	Mining						
5.	Others (specify) Mines						
Total							

29. Water Quality*

- (a) Annex physico-chemical analysis of water at intake point**

Physical Analysis

Appearance : Clear
 Odour : Odourless
 pH : 7.3
 TDS : 477 ppm

Chemical Analysis

Chloride (as Cl) : 74 ppm
 Total Hardness (as CaCO₃) : 324 ppm
 Calcium Hardness (as Ca) : 73 ppm
 Magnesium Hardness (as Mg) : 28 ppm
 Dissolved Iron (as Fe) : 0.16 ppm
 Total Sulphate (as SO₄) : 158 ppm
 Total Alkalinity : 176 ppm
 Phenolic Compound (as C₆H₅OH) : NIL

- (b) In case of existing mine, annex report on quality of water discharge i.e. complete physico – chemical analysis**

[*For non-discharging mines at least four ground water samples to be taken preferably from downstream direction of the mine in pre-monsoon and post-monsoon periods and analysed. For discharging mines six samples are to be analysed]

**All parameters as per BIS 10500. Indicate name of Methodology, Equipment used for analysis, and Detection Level (DL) for each parameter.

***Wherever any analytical parameter is below detection level "BDL" (Below Detection Level) should be written instead of 'NIL'.

30. Impact on ground water regime / stream / lake / springs due to mine dewatering*. Not applicable

- (a) Radius of influence (in m)

[To be estimated based on analysis of pumping

test data and application of empirical formula]

(b) Whether saline water ingress will take place? (applicable to coastal areas) Yes No

(c) Impact on stream / lake / springs

[*Provide a comprehensive hydro-geological assessment report if the average mine dewatering is more than 100 m³/day and or going below water table in non-monsoon period. The report should be based on preferably latest one year pre-monsoon and post-monsoon baseline data covering information on ground water situation, aquifer characteristics, water level conditions (April – May and November), estimate of ground water resources, predicted impact of the project on ground water regime and detailed remedial / conservation measures such as artificial recharge of ground water etc. The report should be based on actual field inventory out of existing wells, at least 30 observation wells in the buffer zone with supplementary information from secondary sources (mention name). For estimation** of ground water resource (refer question no. 28 above) de designated study area of the buffer zone may be sub-divided into command and non-command areas, watershed-wise (in case of hard rock / consolidated formations) / block-wise / mandal-wise in case of alluvial / unconsolidated formations].

[**For estimating ground water resources in the area follow the Ground Water Estimation Committee recommendations of 1997]

31. Waste Water Management

Mine

(a) Daily discharge (m³/day) from different sources

(i)	Mine water discharge during	
	Lean period	<input type="text" value="-"/>
	Monsoon period	<input type="text" value="-"/>
(ii)	Workshop	<input type="text" value="5 KLD"/>
(iii)	Domestic (from office toilet)	<input type="text" value="4 KLD"/>
(iv)	Beneficiation/Washeries	<input type="text" value="-"/>
(v)	Coal Handling Plant	<input type="text" value=""/>
(vi)	Tailings pond	<input type="text" value="-"/>
(vii)	Others (Specify)	<input type="text" value="-"/>
	Total	<input type="text" value="9KLD"/>

(b) Waste water treatment plant; flow sheet for treatment process attached Yes No

Waste water generated from the office toilets will be discharged into soak pit via septic tank. Waste water generated from workshop will have some traces of oil and grease will be separated by passing the water through up flow filter and treated water will be used for dust suppression.

(c) Quantity of water recycled/reused/
to be recycled in

- Percentage
- M³/day

(d) Point of final discharge

Final Point	Quantity discharged (in m ³ /day)
Surface <ul style="list-style-type: none"> ▪ Agricultural land ▪ Waste land ▪ Forest land ▪ Green belt 	-
River	-
Lake	-
Estuary	-
Sea	
Dust suppression	-

(e) Users of discharge water

- | | | | | | |
|-------|------------------|------------------|-------------------------------------------|----|-------------------------------------------------------------------------|
| (i) | Human | Yes | <input style="width: 50px;" type="text"/> | No | <input style="width: 50px; text-align: center;" type="text" value="✓"/> |
| (ii) | Livestock | Yes | <input style="width: 50px;" type="text"/> | No | <input style="width: 50px; text-align: center;" type="text" value="✓"/> |
| (iii) | Irrigation | Yes | <input style="width: 50px;" type="text"/> | No | <input style="width: 50px; text-align: center;" type="text" value="✓"/> |
| (iv) | Industry | Yes | <input style="width: 50px;" type="text"/> | No | <input style="width: 50px; text-align: center;" type="text" value="✓"/> |
| (v) | Others (specify) | Dust suppression | | | |

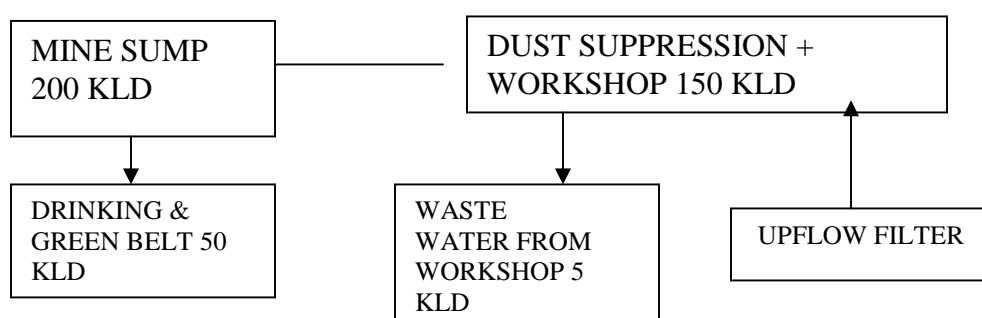
(f) Details of the river/ nalla, if final effluent is/will be discharged (cusecs): N.A.

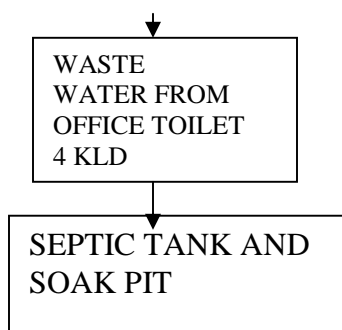
- (i) Average flow rate : -
- (ii) Lean season flow rate
- (iii) Aquatic life
- (iv) Analysis of river water 100 meters upstream and 100 meters downstream of discharge point.

Township: N.A.

- (a) Waste water generation from township (m³/day)
- (b) Are you planning to provide sewage treatment plant? Yes No
- (c) Usage of treated water

32. Attach Water balance statement in the form of flow diagram indicating input source (s), consumption (section-wise) and output.





33. Ambient Noise level leq dB (A)

Location of sampling station	Noise Level	
	Day Time	Night Time
A. Core Zone		
Mine Site	64	48
B. Buffer Zone		
Andheri Devori	52	41
Shivpura Ghata	52	40
Khimpura	51	42
Mundoti	52	47
Village Rupaheli	54	48
Village Sarkhana	52	44
Village Lasoriya	55	42
Village Ganeshpura	58	47
Village Sahaspura	60	51
Village Suhawa	52	46

- Abatement measures

Following measures have been taken for controlling noise level.

- i. HEMMS are provide with silencers
- ii. Proper maintenance of mining machineries.
- iii. By wet drilling with sharp drill bits.
- iv. Controlled blasting is practiced to minimize noise generation during blasting.
- v. Careful handling of materials during mining operations.
- vi. Ear protectors or earplugs have been provided to persons working in areas of higher noise level.
- vii. Plantation has been carried out at approach mines roads and mines office to arrest noise.
- viii. Regular monitoring of noise level is done and corrective actions are taken whenever necessary.

34. Solid Waste

(a) Top soil and Solid waste quantity and quality

Name (Lump/fines/slurry / sludge/others)	Composition	Quantity (m ³ /month)	Method of disposal
1. Mining activity			
a. Top Soil	-	-	-
b. Over burden	Calc-schist, Calcgneiss etc.	42000 M ³	Overburden being dumped in approved waste dump yard by using Shovel and dumpers.
2. Effluent Treatment Plant (sludge)	Not applicable	Not applicable	Not applicable

[*Annex layout plan indicating the dump sites] Enclosed.

(b) (i) Does waste (s) contain any hazardous/toxic substance/ radioactive materials or heavy metals? Yes No

(ii) If yes, provide details and Precautionary measures? Not Applicable.

(c) Recovery and recycling possibilities: Not Applicable.

(d) Possible user (s) of the solid waste: Green belt will be developed and waste Dump yard.

(e) (i) Is the solid waste suitable for Backfilling? Yes No

(ii) If yes, when do you propose to start backfilling?

We have not proposed for back filling because limestone is continue below & pit will be left open for storage of rain water to use for Mines.

(in million m³)

Solid waste (s)	Accumulated (A) (Million tones)	To be generated (B) (Million Tones)	% of A & B to be backfilled	
			A	B
Over burden			NA	
Others (Specify)	—	—	—	—

Land Reclamation Plan

Opening of pit for mining of mineral and dumping of waste rock and low-grade material in the mining lease area may disturb Land environment and aesthetics of the area. However, proper care has been taken to minimize the impact throughout the life of the mines. The following measures have been planned for rehabilitation and restoration of the mining area in post operational phase.

- The waste material produced from the mine has been used in making ramps, parapet wall around working area, preparation of roads as well as leveling of undulating areas. The balance waste material has been dumped at specific non-mineralized zone as per plan approved by IBM. Maximum height of the dumps has been proposed 30 m. with 3 terraces (benches) each of 10 m. high 10 m. width. There is no top soil in the area therefore no separate place for its stacking has been earmarked.
- The smaller pits where mineral is available at lower depth will be filled with the waste. This filled area will be reclaimed by plantation.
- The left over waste material likely to be generated during the life of the mine will be inadequate for back filling of the excavated areas. At the end of life of the mine, on reaching up to economic depth the pit will be converted into water reservoir as post mining land use. This pit will get filled with rain water during rainy season and is utilized in cement plant and mining activity. This will also recharge the ground water table of the area.
- Dense plantation work has been planned, in side the mining lease area.

(f) In case waste is to be dumped on the ground, indicate

The waste dump site selected is in non-mineralized area. This has been confirmed from bore-holes drilled during detail prospecting work.

(i) Associated environmental problems: Land degradation, Air pollution due to dust generated during stormy wind, silting of natural drainage during rainy season.

(ii) Number & type of waste dumps 3 waste dumps yard

No. of external dumps

Max. Projected height of dumps (in m) 3 bench of 10 m. each height

No. of terraces and height of each stage

Overall slope of the dump (degree)

Proposed reclamation measures

(iii) Section of the waste dump in relation to the adjacent ground profile attached. Yes No

35. Fuel / Energy requirements

[*To be furnished for mines having ML area more than 25 ha. or captive power generation 500 KVA and above]

(a) Total power requirement (MW)

	Mine site	Township	Others (specify)	Total
Present	10,000 KW per day	—	—	—
Proposed/ additional	9500 KW per day			
Total	19,500 KW per day			

- (b) Source of power (MW) *Power will be made available from Captive Thermal Power Plant (36 MW) situated at premises of existing cement plant.

	SEB/Grid*	Captive power plant	D.G. Sets
Present			
Proposed			
Total			

[*Annex a copy of the sanction letter from the concerned authority is annexed]

Power requirement will be 2.0 MW.

- (c) Details of fuels

Fuel**	Daily Consumption		Calorific value (Kcals/kg)	% Ash	% Sulphur
	Existing	Proposed			
HSD	3800	3200	Not Applicable	-	-
Sp. Gelatin	-			-	-
Detonator	-			-	-

36. Storage of inflammable / explosive materials:-

Name	Number of storage	Consumption	Maximum Quantity at any point of time
Fuels (HSD)	Diesel (2 tanks)	7000 l/day	10 to 35 KL storage tank
Explosives (Magazine)	1	2 -3 TPM	15 ton

37. Human Settlement (10 km. Radius)

	Core Zone	Buffer Zone
Population *		179646
Number of Households		

(* based on 2001 census record)

38. Rehabilitation & Resettlement (R&R) Plan Not Applicable

[*Provide a comprehensive rehabilitation plan, if more than 1000 people are likely to be displaced, other-wise a summary plan]

- (a) Village falling within the study area

- (i) Core zone : Nil
- (ii) 500 m from the blasting site (s) : Nil
- (iii) Township site : Nil

- (b) Details of Village(s) in the core zone: :

S.No.	Village name (within mine lease)	Population		Occupation	Average Income per annum
		Tribal	Others		

[*As per 2001 census/actual survey]

(c) Population to be displaced and / or land oustees: Not Applicable

Name of Village(s) falling within	Number of oustees		
	Land (only)	Homestead (only)	Land and Homestead (Both)
<u>Mining Lease</u>			
<u>Township Site</u>	-	-	-

(d) Whether R&R package has been finalized? Not Applicable
If yes, salient features of R&R plan for oustees.

- (i) Site details where the people are proposed to be resettled & facilities existing / to be created.
- (ii) Funds earmarked for compensation package.
- (iii) Agency / Authority responsible for their Resettlement.
- (iv) Time of commencement of resettlement of Project Affected People (PAP)
- (v) Period by which resettlement of PAP will be over.

39. Lease – wise Plantation details

a)	Lease area (in hect.)	Existing Mine	New Mine
i)	Area broken up	40.9 Hect.	
ii)	To be broken up	184.10 Hect	
iii)	Unbroken area	631.8 Hect	
b)	Township area (in ha.)	Not applicable	

c) Area afforested and proposed (in ha.)

S. No	Description	Peripheral	Dumps	Roads	Township	Others
1	Existing	10.0	10.0	5.0	-	17.6
2	Proposed	10.0	78.0	5.0	-	23.0

(d) No. And type of trees planted & proposed

(i) Existing

When plantation was started?

Month / year

1985

No.

32131

Survival rate %

90 %

Type of species

Enclosed

Avg. height

5.0 M

(ii) Proposed (At the end of mine life)

62965

Heliotropium,
Zizyphus
Acacia nelotica
Chenopodium etc.

No.

Type of species

40. Environmental health and safety

- | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (a) What major health and safety hazards are anticipated? | Main occupational health hazard is due to dust generated in mining activities, hearing problem due to noise generated in HEMM operation and Blasting operation. |
| (b) What provisions have been made/proposed to be made to conform to health and safety requirements? | Periodical medical checkup of all the employees are carried out at company's health center. The entire possible safety requirement is taken to reduce safety hazards due to dust, noise, etc. Employees are provided with personal protective equipments. |
| (c) In case of an existing mine, furnish a comprehensive report on health status of the workers.
(i) Comprehensive report on health status of the workers as under the Mine Act annexed | Periodical medical checkup of all the employees is being carried out at company's health center and not a single case of any occupational disease is found. |
| (d) Mineralogical composition of RPM (dust) | Not Applicable |
| (e) Details of personal protective equipment Safety Boots, Helmets, Mask and provided/to be provided to the workers. | All employees are provided safety helmet, safety shoes, dust mask, ear plug, safety goggles etc. |
| (f) Information on radiation protection measures, if applicable. | Not Applicable |

41. Environmental Management Plan

Salient features of environmental protection measures.

S. No	Environmental issues*	Already practiced, if applicable	Proposed
1.	Air Pollution	<ul style="list-style-type: none"> - Use of latest blasting technique down line detonator (shock tube detonator) in combination with noise less trunk line detonators. - Wet drilling and dust extractor system. - Controlled blasting - Water spraying on haul road - Green belt around mines area - Use of Rock breaker in place of blasting 	Existing practice will be continued.
2.	Water Pollution	<ul style="list-style-type: none"> - Soak pit and Septic Tank are provided for the dispose off office toilet outlet. 	Existing practice will be continued.
3.	Water Conservation	-	
4.	Noise Pollution	<ul style="list-style-type: none"> - Controlled blasting - Green belt around mining area - Use of latest blasting techniques i.e. down line detonator in combination with noise less trunk 	Existing practice will be continued.

		<ul style="list-style-type: none"> line detonators. – Use of rock breaker for mining. – Personal protective equipment 	
5.	Solid waste/ Tailings	– Solid waste is handled by shovel and dumpers and disposed off in approved waste dump yard.	As per the approved mining plan by IBM.
6.	Land degradation	– Excavated area is not immediately proposed to be backfilled and is used for rainwater harvesting.	Existing practice will be continued.
7.	Erosion & Sediment	– Green belt development around the area, minimizes the impact of mining on soil erosion in the area	Existing practice will be continued.
8.	Top soil	– There is no topsoil in the area, therefore, no separate place for its stacking has been earmarked.	—
9.	Ground Vibration	<ul style="list-style-type: none"> – Controlled blasting – Green belt around mining area – Use of latest blasting techniques i.e. down line detonator in combination with noise less trunk line detonators. – Use of rock breaker for mining. – Personal protective equipment 	Existing practice will be continued.
10.	Wildlife conservation	–	
11.	Forest protection	–	
12.	Others (specify)	–	

42. Compliance with environmental safeguards (For existing units)

- (a) Status of the compliance of conditions of environmental clearance issued by MOEF, if any, enclosed. Yes No
- (b) Status of the compliance of 'Consent to Operate' issued by SPCB, if any, enclosed. (Annexure – 14) Yes No
- (c) Latest 'environmental statement' enclosed (Annexure – 15) Yes No

43. Scoping of EIA

Whether environmental impact assessment of the project has been carried out by Following scoping process? Yes No

If yes, a copy of scoping of EIA Annexed. Enclosed Annexure-5 Yes No

44. Mine closure

- (a) Have you planned mine closure Yes No
- (b) Submitted a conceptual mine closure plan. (under IBM approval) Yes No
- (c) If yes, indicate estimated amount for implementing the same (in Rs. Lakhs)

Rs. 15 Lacs from April 2003 to March 2008

45. Capital cost of the project (in Rs. Lakh) (based on latest estimate)

1064

46. Cost of environmental protection measures

S. No.		Capital cost		Annual recurring cost	
		Existing	Proposed	Existing	Proposed
1.	Pollution Control (Separately provide break-up)		5.0		0.8
2.	Pollution Monitoring (Separately provide break-up)		3.0		1.0
3.	Occupational Health		2.0		0.2
4.	Green Belt (ML) <ul style="list-style-type: none"> ▪ Mine ▪ Township 		10.0		3.0
5.	Reclamation / Rehabilitation of mined out area				
6.	Others (specify)				

47. Amount earmarked / proposed for socio-economic welfare measures for the nearby villages other than R&R plans.

Drinking water, Sustaining Animal life, Medical, Education etc. Approx. Rs. 10 Lacs is proposed for nearby villages.

48. Public Hearing

- (i) Date of Advertisement : 26th April 2003 & 27th April 2003
- (ii) Newspapers in which the advertisement : Rajasthan Patrika & Rashtrdoot (Annexure-6)

- (iii) Date of hearing : 28.5.2003
- (iv) Public Hearing Panel chaired by & members : Enclosed Annexure - 7 presents
- (v) No. of people attended the public hearing meeting and number of people from the lease area. : Enclosed Annexure-8
- (vi) Summary/details of public hearing : Enclosed Annexure-9

Issues raised by Public	Response/Commitment of Project Proponents	Suggestions of the Panel

49. Whether the following approvals (wherever applicable) have been obtained or not?

- | | | |
|---------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------|
| (i) Site clearance from MOEF | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| (ii) Consent for Establishment from State Pollution control Board | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| (iii) NOC from State Pollution Control Board /consent (Annexure- 10) | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |
| (iv) NOC from Atomic Energy Division | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| (v) Mining plan approval from IBM (Annexure- 11) | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |
| (vi) Forestry clearance under FCA, 1980 (Annexure- 12) | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |
| (vii) NOC from Chief Controller of Explosives (Annexure- 13) | Yes <input checked="" type="checkbox"/> | No <input type="checkbox"/> |
| (viii) Commitment regarding availability/ Pumping of water from the concerned State Authorities | Yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |
| (ix) In case of ML area falling in notified areas of the Central Ground Authority, NOC from them. | yes <input type="checkbox"/> | No <input checked="" type="checkbox"/> |

(* Annex copies of approvals and number them)

50. Was / is there any court case relating to the project or related activities? N.A.
If so, provide details present status

Verification: The data and information given in this Performa are true to the best of my knowledge and belief.

For Shree Cement Ltd.,

Date:
Place: Beawar

S.C.SUTHAR
G.M. (Mining)

Bangur Nagar, Beawar, Ajmer (Raj.)

SCOPING OF EIA

Scoping of EIA includes detail characterization of various environmental components such as Air, Noise, Water, Land, Biological and Socio-Economic within the mine area and in the 10 km. radius around the Sheopura-Kesarpura Limestone Mine at village Sheopura, Kesarpura, Tehsil Masuda, Distt. Ajmer (Raj.).

The main steps involved in the Environmental Impact Assessment study are given below:

1. Identification of baseline status of various environmental parameters in the impact zone with the present limestone production.
2. Identification of environmental impacts on air, water, noise and soil parameters for the increased limestone production of 4.0 MTPA.
3. Implementation of the designed environmental management plan for the ultimate production.

The main objectives of characterization of environmental components are:

- a) Assessment the existing baseline status of air, water, noise, land, biological and socio-economic environment (in and around the mine in 10 km. radius).
- b) Identification of significant impacts due to various operations on various environmental components.
- c) Evaluation of the beneficial and adverse impacts of the ultimate limestone production
- d) Evaluate and check the Environmental Management Plan (EMP) detailing control technologies and measures to be adopted for mitigation of adverse impacts if any, as a consequence of the ultimate limestone production.
- e) Check and make necessary changes required for Post Project Monitoring Programme for regulating the environmental quality within the limits in the ultimate production phase of the Limestone Mine and help in sustainable development of the area.

ANNEXURE-1

HOURLY METEOROLOGICAL DATA

Date:01.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	25.3	9	2.0	SSW	0
1	24.0	10	2.5	SW	0
2	25.0	9	4.5	WSW	0
3	26.3	11	3.5	WSW	0
4	27.4	12	3.5	WSW	0
5	28.3	10	5.5	WSW	0
6	29.5	10	5.7	WSW	2
7	30.2	10	6.5	WSW	0
8	30.9	9	7.8	WSW	0
9	31.5	10	3.5	WSW	2
10	32.0	8	5.5	WSW	0
11	32.8	7	6.5	SSW	0
12	33.6	5	9.0	SW	2
13	34.8	6	9.0	SSW	0
14	35.8	4	8.0	SSW	0
15	33.6	5	4.0	SSW	0
16	33.5	3	5.0	NW	2
17	32.4	6	6.0	W	0
18	31.8	6	7.0	ESE	0
19	30.4	7	9.0	NE	2
20	29.5	9	7.0	NW	0
21	28.1	10	7.0	W	0
22	27.6	10	6.5	W	2
23	26.4	11	7.9	W	0

Date:02.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	27.3	12	5.0	WSW	0
1	28.0	14	6.0	WSW	0
2	28.7	15	8.0	WSW	0
3	29.4	13	8.5	SW	0
4	30.1	11	7.5	SW	0
5	30.9	10	9.0	WSW	2
6	31.5	11	10.0	WSW	0
7	31.9	10	11.0	W	0
8	32.0	11	12.0	W	0
9	32.8	11	11.5	SW	0
10	33.6	12	8.5	SSW	0
11	33.9	10	6.5	SW	0
12	34.0	10	10.5	WSW	0
13	34.9	9	12.5	WSW	0
14	33.5	10	11.0	WSW	0
15	32.9	11	9	W	2
16	31.5	10	12.0	NW	0
17	30.8	9	11.0	SE	0
18	29.4	8	9.3	ESE	0
19	29.0	10	7.0	WNW	0
20	28.4	11	6.5	WNW	0
21	27.3	10	4.5	NW	0
22	26.5	9	8.5	NW	0
23	27.0	10	10.5	WNW	0

Date:03.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.2	15	6.0	WSW	0
1	30.9	15	5.0	WSW	0
2	31.2	14	7.0	WSW	0
3	31.8	14	9.5	WSW	0
4	31.9	14	6.5	WSW	0
5	32.5	12	8.0	WSW	2
6	33.8	13	9.8	WSW	0
7	33.9	11	10.0	WSW	0
8	33.9	10	11.0	WSW	0
9	34.4	11	12.5	WSW	0
10	35.7	9	9.3	WSW	0
11	35.9	9	7.1	WSW	2
12	36.2	9	9.8	WSW	0
13	36.9	10	10.3	SSW	0
14	37.0	8	12.2	SSW	0
15	36.2	9	14.0	SSW	0
16	35.9	10	12.3	WSW	0
17	35.4	10	14.0	WSW	2
18	34.2	8	16.3	WSW	0
19	33.6	7	8.7	WSW	0
20	33.0	9	7.5	WSW	0
21	32.5	10	6.5	WSW	0
22	31.5	11	5.5	WSW	0
23	31.0	12	9.8	WSW	2

Date:04.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	33.2	19	6.2	WSW	3
1	33.9	20	6.3	WSW	0
2	34.0	21	5.4	WSW	0
3	34.8	20	7.9	WSW	3
4	35.4	19	8.5	WSW	0
5	36.6	18	7.6	WSW	0
6	35.5	19	8.2	WSW	0
7	35.8	18	9.6	WSW	0
8	36.5	17	9.8	SSW	0
9	37.4	18	10.6	SSW	2
10	38.5	19	10.2	SSW	0
11	38.6	17	8.6	SSW	0
12	39.5	16	8.4	WSW	0
13	38.6	15	11.4	WSW	0
14	36.5	12	10.6	WSW	2
15	37.5	13	12.7	WSW	0
16	36.6	14	15.3	SE	0
17	35.0	15	16.3	SE	0
18	35.4	16	18.6	ESE	0
19	35.2	17	11.4	NE	2
20	35.6	19	8.6	NW	0
21	34.8	20	9.7	NW	3
22	32.3	22	6.5	NW	0
23	33.0	21	7.6	NW	0

Date:05.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	32.1	16.2	9	SSW	0
1	33.0	17.2	8	SSW	0
2	33.8	15.6	7	SSW	0
3	34.5	14.2	6	SSW	2
4	35.0	15.4	8	SSW	1
5	35.8	13.9	5	SSW	2
6	35.9	14.0	7	SSW	0
7	36.0	15.8	6	SSW	2
8	36.7	16.8	4	SW	1
9	36.9	15.4	5	SW	0
10	37.2	14.6	5	SW	0
11	37.9	13.2	5	SW	2
12	38.0	15.7	7	WSW	0
13	38.9	14.8	6	WSW	0
14	37.5	16.2	5	WSW	0
15	36.8	17.3	6	WSW	0
16	35.2	16.0	8	NE	2
17	34.1	15.6	7	ENE	0
18	34.9	15.8	5	NW	0
19	33.5	14.9	6	NW	0
20	32.1	15.7	4	NW	2
21	32.8	14.0	6	SW	0
22	31.5	16.0	7	SW	2
23	33.0	15.2	8	SW	0

Date:06.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.2	22.2	5.2	WSW	0
1	30.9	21.6	8.2	WSW	0
2	31.5	19.7	7.6	WSW	0
3	32.4	22.5	8.2	WSW	2
4	33.8	23.0	6.7	WSW	1
5	33.9	22.0	8.7	SSW	2
6	34.0	21.0	10.8	SSW	0
7	34.7	21.5	10.4	WSW	2
8	34.9	20.3	11.6	WSW	1
9	35.1	21.4	9.0	WSW	0
10	35.8	20.2	9.6	WSW	0
11	36.5	21.6	7.6	WSW	2
12	36.9	19.4	9.8	WSW	0
13	36.9	18.6	11.4	WSW	0
14	37.8	18.5	12.7	WSW	0
15	38.7	17.3	14.2	WSW	0
16	37.5	16.0	11.5	NNE	2
17	36.4	15.6	12.6	NE	0
18	35.9	15.8	10.6	NW	0
19	34.1	14.9	8.4	NW	0
20	33.3	15.7	7.2	NW	2
21	32.8	14.0	5.6	SW	0
22	31.0	16.0	7.3	SW	2
23	30.0	15.2	9.6	SW	0

Date:07.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	32.6	17	5	WSW	0
1	33.2	15	6	WSW	0
2	33.9	15	4	WSW	0
3	34.5	14	2	WSW	0
4	34.9	16	5	WSW	0
5	35.0	17	3	WSW	0
6	36.7	16	4	WSW	0
7	36.9	14	5	WSW	0
8	37.2	15	6	WSW	0
9	37.9	12	5	WSW	0
10	38.7	13	4	SW	0
11	39.0	14	5	SW	0
12	40.1	12	3	SW	0
13	39.2	10	5	SW	0
14	38.9	9	5	SW	0
15	38.4	10	5	SW	0
16	37.5	11	6	NE	0
17	36.2	12	5	NW	0
18	35.4	15	5	NW	0
19	34.8	16	5	NW	0
20	33.0	15	5	SE	0
21	33.9	17	5	SE	0
22	32.5	15	6	SW	0
23	32.9	14	3	SW	0

Date:08.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	33.7	19.0	5.2	WSW	0
1	33.9	20.5	5.6	WSW	0
2	34.2	21.3	6.4	WSW	0
3	35.8	20.3	6.8	WSW	0
4	36.5	20.9	6.9	WSW	2
5	36.9	19.5	8.2	WSW	0
6	37.0	17.6	8.7	WSW	0
7	37.2	18.4	9.4	SW	0
8	37.9	16.2	9.8	SW	0
9	38.5	16.9	9.2	SW	0
10	39.5	15.4	9.6	SW	0
11	39.9	15.9	8.6	SSW	0
12	40.2	15.8	8.7	SSW	1
13	41.2	14.5	9.6	SSW	0
14	42.8	13.6	9.8	SSW	0
15	41.5	12.8	8.9	SSW	1
16	40.3	14.6	6.8	WNW	0
17	39.8	16.8	7.8	WNW	0
18	38.2	17.6	8.8	WNW	0
19	37.2	18.6	9.6	WNW	1
20	36.2	19.8	7.6	SSE	0
21	35.4	20.3	7.7	SSE	0
22	34.2	19.6	7.9	SSW	0
23	33.0	20.6	7.6	SSW	0

Date:09.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	35.0	12	6.9	SSW	0
1	35.2	14	6.2	SSW	0
2	35.1	13	5.8	SSW	0
3	35.3	15	5.2	SSW	0
4	35.6	17	6.2	SSW	0
5	35.3	18	7.9	SSW	0
6	35.3	18	6.9	SSW	1
7	36.2	18	8.5	WSW	0
8	36.1	17	9.3	WSW	0
9	36.5	17	8.6	WSW	0
10	36.4	17	9.1	WSW	0
11	37.3	17	9.9	SW	0
12	38.2	17	10.2	SSW	0
13	38.9	15	9.6	SW	2
14	37.5	15	8.3	WSW	0
15	36.5	16	8.7	SW	0
16	36.9	15	8.8	WNW	0
17	36.9	15	9.3	NW	0
18	35.2	13	6.6	WNW	1
19	35.4	12	5.8	W	0
20	35.9	11	6.7	S	0
21	34.2	10	8.4	S	0
22	35.6	11	7.7	SW	1
23	35.2	10	7.9	SW	0

Date:10.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	36.0	22	5.8	SSW	0
1	36.1	21	6.4	SSW	0
2	36.2	22	5.8	SSW	0
3	36.3	21	6.3	SSW	0
4	36.6	23	5.7	SSW	0
5	37.5	21	6.9	SSW	0
6	37.1	22	7.8	SSW	0
7	36.5	22	8.2	SSW	0
8	35.2	22	8.8	SSW	2
9	36.2	19	7.4	SSW	0
10	35.9	18	8.6	SSW	0
11	35.5	19	9.3	WSW	1
12	36.2	17	7.3	WSW	0
13	36.8	15	8.5	WSW	0
14	36.2	16	7.6	WSW	0
15	36.7	13	8.8	WSW	0
16	36.3	12	9.5	WSW	2
17	37.2	14	8.3	SE	0
18	36.8	16	8.7	SE	0
19	36.3	18	6.9	SW	0
20	36.8	19	6.3	SW	0
21	36.3	20	8.6	SW	0
22	36.7	21	7.3	SSW	0
23	36.9	20	7.4	SSW	0

Date: 11.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	38.1	25	6.2	WSW	0
1	38.2	24	6.9	WSW	0
2	38.6	24	5.7	WSW	0
3	38.4	23	5.6	WSW	2
4	37.9	21	6.7	WSW	0
5	37.5	19	5.9	WSW	0
6	38.6	18	6.4	WSW	0
7	38.4	19	7.3	WSW	0
8	38.6	18	8.2	WSW	0
9	38.4	17	8.6	WSW	2
10	39.6	15	8.4	WSW	0
11	38.9	16	8.9	SW	0
12	39.4	15	7.6	SW	0
13	39.6	14	6.8	SW	0
14	39.7	13	7.9	SW	1
15	38.6	12	8.9	SW	0
16	38.7	11	7.9	SW	0
17	38.9	10	6.6	SW	2
18	38.7	14	6.9	SW	0
19	37.6	18	7.3	SW	0
20	37.9	19	6.9	SW	0
21	38.9	21	7.2	SW	0
22	38.4	22	8.6	SSW	0
23	38.9	23	8.9	SSW	0

Date: 12.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	35.2	20.1	2.6	SW	0
1	35.9	19.6	2.4	SW	0
2	36.5	19.1	4.2	SW	0
3	37.6	19.2	4.4	SW	0
4	38.0	20.2	2.3	SW	0
5	38.7	21.6	3.2	SW	0
6	39.2	22.1	2.4	SW	0
7	39.6	21.3	2.1	SW	0
8	39.9	19.3	2.3	SW	0
9	40.1	22.4	2.2	SW	0
10	40.5	23.4	3.4	SW	0
11	40.8	25.6	3.8	SW	0
12	40.9	25.4	4.1	SW	0
13	41.2	24.6	4.0	SW	0
14	42.6	25.3	4.2	SW	0
15	40.9	22.3	4.3	SW	0
16	39.8	24.2	4.8	SW	0
17	38.7	25.1	4.2	SW	0
18	37.5	24.1	4.1	SW	0
19	36.9	22.4	3.0	SW	0
20	35.4	23.2	2.0	SW	0
21	34.2	21.3	2.4	SW	0
22	35.8	19.6	2.6	SW	0
23	35.0	20.1	3.9	SW	0

Date: 13.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.5	11.2	4.0	NW	0
1	32.5	10.2	4.0	NW	0
2	32.9	14.2	4.2	NW	0
3	34.5	15.3	3.2	NW	2
4	35.0	16.5	4.0	NW	0
5	35.4	14.6	4.0	NW	0
6	35.9	15.7	3.6	NW	0
7	36.8	11.3	3.2	NW	0
8	37.9	16.8	3.7	NW	0
9	38.9	19.6	3.0	NNW	2
10	39.5	19.4	4.0	NNW	0
11	39.9	19.5	4.2	NNW	0
12	40.1	18.7	4.6	NNW	0
13	41.3	18.4	4.0	NW	0
14	41.6	18.2	4.0	NW	0
15	41.8	16.7	4.0	NW	2
16	39.6	17.6	4.5	NW	0
17	39.4	17.4	4.0	NW	0
18	38.9	16.2	4.0	NW	0
19	38.2	18.4	4.8	NW	0
20	36.4	16.9	4.0	NNW	0
21	36.8	18.2	4.0	NW	0
22	36.7	19.4	4.0	NW	0
23	33.2	16.8	4.0	NW	0

Date: 14.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.2	15.2	6.1	W	0
1	31.6	15.9	6.3	W	0
2	32.0	16.3	6.8	W	0
3	32.9	17.2	6.7	W	0
4	33.5	17.4	6.2	W	0
5	34.8	18.3	7.6	W	0
6	35.7	22.2	8.0	W	0
7	36.8	21.1	8.0	W	0
8	37.5	19.3	7.6	SW	0
9	38.6	22.1	7.4	SW	0
10	38.5	20.1	7.3	SW	0
11	39.0	19.6	7.5	SW	0
12	39.5	15.7	7.7	SW	0
13	39.8	16.3	8.0	SW	0
14	39.5	17.5	8.0	W	0
15	39.4	20.3	7.6	W	0
16	38.4	24.6	6.3	W	0
17	38.2	23.8	6.8	SW	0
18	37.6	25.6	7.8	SW	0
19	35.7	24.9	7.9	SW	0
20	34.6	22.6	7.3	SW	0
21	31.8	19.7	6.7	SW	0
22	31.4	16.7	6.3	W	0
23	29.4	17.2	6.9	W	0

Date: 15.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	26.2	15.1	6.2	SW	0
1	26.7	15.3	6.1	SW	0
2	27.3	16.3	6.9	WSW	0
3	28.6	18.2	6.4	WSW	0
4	28.4	15.6	6.3	WSW	0
5	26.4	16.3	6.8	WSW	0
6	27.6	17.2	5.2	SW	0
7	29.7	18.6	6.0	WSW	0
8	32.5	17.4	6.5	SW	0
9	33.6	17.6	6.9	SW	0
10	34.2	18.6	7.6	SSW	0
11	38.5	22.3	7.9	SSW	0
12	39.4	21.6	8.0	SSW	0
13	38.3	25.4	6.4	SSW	0
14	37.3	24.3	5.0	SSW	0
15	36.2	23.6	6.8	SW	0
16	35.6	23.9	7.3	SW	0
17	34.0	22.5	6.9	WSW	0
18	33.5	20.3	6.2	WSW	0
19	32.5	19.8	6.8	WSW	0
20	30.3	18.4	6.9	SW	0
21	29.7	16.3	7.5	SW	0
22	28.6	14.5	7.4	SW	0
23	26.9	15.0	6.8	SW	0

Date: 16.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	27.3	16.3	6.0	SW	0
1	26.9	15.2	6.3	SW	0
2	26.2	15.4	6.5	SW	2
3	27.4	15.9	6.2	SW	0
4	27.6	16.3	6.1	SW	0
5	28.9	16.8	6.9	SW	0
6	29.6	16.4	7.0	SW	1
7	29.4	16.2	7.1	SW	0
8	29.1	16.4	6.9	SW	0
9	29.3	18.9	7.0	SW	2
10	31.9	18.6	7.7	WSW	0
11	32.6	17.2	6.5	WSW	0
12	33.2	16.5	6.4	WSW	0
13	34.5	15.6	6.2	WSW	1
14	35.3	14.3	6.9	WSW	0
15	36.7	14.6	7.4	WSW	0
16	37.6	15.6	7.6	WSW	0
17	36.3	15.9	7.4	SW	1
18	35.4	14.8	7.8	SW	0
19	34.5	14.0	6.0	SW	0
20	33.5	15.6	6.3	W	0
21	32.6	16.5	6.4	W	1
22	31.0	17.6	6.9	W	0
23	29.6	18.3	6.3	SW	0

Date: 17.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	27.2	16.0	6.1	SSW	0
1	26.4	15.1	6.0	SSW	0
2	26.8	15.6	6.4	SSW	0
3	26.2	15.8	6.3	SSW	0
4	27.8	16.4	6.6	SSW	0
5	28.1	16.2	6.0	SSW	0
6	29.3	16.1	6.9	SSW	0
7	30.4	16.0	7.0	SW	0
8	32.2	16.0	6.7	SW	0
9	33.6	18.4	6.8	SW	0
10	35.4	18.3	6.3	SW	0
11	36.4	21.4	6.2	SW	0
12	37.3	24.3	6.8	SW	0
13	38.6	24.1	6.4	SW	0
14	39.5	26.4	6.3	SSW	0
15	40.6	26.3	6.7	SSW	3
16	41.6	24.1	6.2	SSW	0
17	39.8	22.3	6.7	W	0
18	37.6	21.3	6.4	W	0
19	35.4	29.6	6.2	W	0
20	34.5	18.4	6.8	SW	2
21	33.3	16.5	6.6	SW	0
22	31.0	15.3	6.3	WSW	0
23	29.6	16.2	6.4	WSW	0

Date: 18.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	27.3	10.2	3.0	SW	0
1	27.1	11.6	3.1	SW	0
2	27.6	10.2	2.3	SW	0
3	27.3	12.3	2.0	SW	0
4	27.6	10.6	2.1	WSW	0
5	28.4	10.2	2.2	WSW	0
6	28.6	10.8	2.5	WSW	0
7	29.6	11.0	2.4	SSW	0
8	29.4	14.0	2.6	SSW	2
9	30.6	16.6	2.7	SSW	0
10	32.6	14.6	2.4	SSW	0
11	31.5	16.2	2.4	SSW	2
12	32.2	18.6	2.6	SSW	0
13	33.3	18.4	2.7	SSW	0
14	33.9	17.3	2.0	WSW	0
15	34.5	16.5	2.9	WSW	0
16	37.8	15.3	2.0	WSW	0
17	38.8	14.3	3.2	SW	0
18	36.5	13.3	3.1	SW	2
19	35.4	14.6	3.5	SW	0
20	33.5	15.6	2.6	SSW	0
21	32.4	13.6	2.7	SSW	0
22	30.2	12.8	2.9	SSW	0
23	28.6	11.6	3.4	SSW	0

Date: 19.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	32.1	14.6	2.4	SW	0
1	33.5	12.9	2.1	SW	0
2	33.9	12.1	2.0	SW	0
3	34.5	12.2	2.2	SW	0
4	35.7	13.6	2.0	SW	2
5	36.8	15.9	2.0	SW	0
6	37.4	16.7	2.0	SW	0
7	38.4	12.3	2.0	SW	1
8	38.9	11.4	2.0	SW	0
9	39.6	14.2	0.0	CALM	0
10	39.9	12.6	0.0	CALM	0
11	40.3	14.6	0.0	CALM	0
12	41.6	15.2	2.1	WSW	0
13	40.6	15.9	2.4	SSW	0
14	41.6	16.3	4.0	SSW	0
15	41.7	16.7	3.8	SSW	0
16	40.3	16.9	3.4	SW	0
17	36.3	17.2	3.6	WSW	1
18	36.4	16.5	3.4	WSW	0
19	34.5	16.9	3.4	WSW	0
20	36.4	15.6	0.0	CALM	0
21	31.1	17.3	0.0	CALM	0
22	32.7	16.3	0.0	CALM	0
23	33.3	16.2	3.6	SW	0

Date: 20.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.2	17.3	4.0	SSW	0
1	32.6	15.3	4.0	SSW	0
2	32.9	16.5	3.6	SSW	0
3	33.3	15.9	3.4	SSW	0
4	34.5	15.8	4.0	SSW	0
5	35.6	16.4	4.0	SSW	0
6	36.9	15.8	4.0	SSW	2
7	37.9	16.8	4.0	SSW	0
8	38.2	14.3	4.0	WSW	0
9	38.8	14.5	4.0	WSW	0
10	39.2	14.9	4.0	WSW	0
11	39.9	14.9	4.0	WSW	0
12	40.2	15.6	4.0	WSW	0
13	40.1	16.3	3.2	WSW	1
14	40.3	16.4	3.7	WSW	0
15	41.8	16.9	3.2	WSW	0
16	41.9	15.6	3.3	WSW	0
17	40.2	15.9	3.5	SSW	0
18	39.4	15.8	3.1	SSW	2
19	38.6	15.8	3.3	SSW	0
20	37.4	14.3	4.0	SW	0
21	33.6	15.6	4.0	SW	0
22	36.1	16.2	4.0	SW	0
23	32.4	17.6	3.8	SW	0

Date: 21.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	29.3	12.6	4.2	WSW	0
1	30.2	14.6	4.4	WSW	0
2	31.5	11.4	4.2	WSW	0
3	32.9	12.2	4.8	WSW	0
4	33.6	13.2	4.4	SSW	0
5	34.5	11.4	4.6	SSW	0
6	35.8	14.3	4.8	WSW	0
7	36.8	16.3	4.2	WSW	0
8	37.6	18.4	4.4	WSW	0
9	38.5	17.3	6.0	SSW	0
10	39.0	16.5	6.2	SSW	0
11	40.0	16.9	6.3	SSW	0
12	41.0	17.5	6.2	SSW	0
13	40.5	16.5	5.3	SSW	0
14	39.6	16.9	5.6	SW	0
15	38.4	15.4	4.2	W	0
16	36.0	14.3	3.6	W	0
17	35.0	13.5	3.9	W	0
18	35.8	14.9	4.0	W	0
19	34.0	13.5	4.5	W	0
20	33.0	12.3	5.2	SSW	0
21	32.0	11.0	5.6	SSW	0
22	31.0	12.6	6.2	WSW	0
23	30.2	15.6	4.6	SSW	0

Date: 22.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.2	11.1	4.0	SSW	0
1	32.6	12.8	4.2	SSW	0
2	33.3	14.6	4.0	SSW	0
3	34.6	11.4	4.4	SSW	0
4	35.6	14.6	4.6	SSW	0
5	35.9	12.6	4.0	SSW	0
6	36.4	13.2	4.2	SW	0
7	36.9	15.1	4.6	SW	0
8	37.2	16.4	4.8	SW	0
9	37.9	15.3	6.2	SW	0
10	38.4	16.9	6.0	SW	0
11	39.0	17.5	6.4	SW	0
12	41.4	17.9	6.1	SW	0
13	40.6	16.5	5.1	W	0
14	39.8	15.2	5.6	W	0
15	38.3	14.6	6.3	W	0
16	36.4	14.8	6.9	W	0
17	35.3	13.2	7.0	W	0
18	35.7	12.3	7.2	SW	0
19	34.4	12.9	7.4	SW	0
20	33.4	11.3	6.3	SW	0
21	32.6	12.6	6.5	W	0
22	31.2	13.5	6.7	W	0
23	30.4	15.6	4.3	W	0

Date: 23.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.2	15.3	2.0	SW	0
1	31.2	14.2	2.2	SW	0
2	31.8	14.4	2.0	SW	0
3	31.	14.2	2.4	SW	0
4	32.2	14.0	2.6	SW	0
5	33.3	14.6	2.0	SW	0
6	33.9	14.1	2.2	SW	0
7	34.6	16.6	2.6	WSW	0
8	36.1	16.3	3.8	WSW	0
9	36.8	18.3	5.2	WSW	0
10	36.4	18.2	6.0	WSW	0
11	36.9	20.0	4.4	WSW	0
12	36.4	22.4	4.1	SSW	0
13	38.9	22.6	4.5	SSW	0
14	38.4	20.3	6.2	SW	0
15	41.2	21.5	7.2	SW	0
16	41.6	19.8	7.9	SSW	0
17	39.6	18.6	8.2	W	0
18	39.4	17.6	8.8	SSW	0
19	38.4	14.5	7.5	WSW	0
20	35.0	15.9	8.3	WSW	0
21	33.6	16.0	7.5	SW	0
22	32.4	15.4	6.7	SW	0
23	31.6	14.3	6.3	SW	0

Date: 24.04.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	29.4	15.3	2.0	SW	0
1	29.2	14.2	2.2	SW	0
2	28.7	14.4	2.0	SW	0
3	30.2	14.2	2.4	SW	0
4	31.2	14.0	2.6	SW	0
5	31.9	14.6	2.0	SW	0
6	32.5	14.1	2.2	SW	0
7	33.3	16.6	2.6	WSW	0
8	34.5	16.3	3.8	WSW	0
9	35.8	18.3	5.2	WSW	0
10	36.5	18.2	6.0	WSW	0
11	37.0	20.0	4.4	WSW	0
12	37.9	22.4	4.1	SSW	0
13	38.2	22.6	4.5	SSW	0
14	38.9	26.7	6.2	SW	0
15	38.5	28.4	5.3	SW	0
16	38.2	26.3	6.5	SSW	0
17	38.9	24.3	5.8	W	0
18	36.1	22.5	6.9	SSW	0
19	34.2	19.8	5.5	WSW	0
20	32.4	18.5	6.3	WSW	0
21	36.2	17.6	7.5	SW	0
22	32.5	16.3	6.7	SW	0
23	30.2	15.0	6.3	SW	0

Date:25.04.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.5	14.3	4.4	SW	0
1	28.6	15.2	5.5	SW	2
2	27.4	14.9	4.5	SW	0
3	27.5	15.2	5.4	SW	0
4	29.2	16.3	7.4	SW	0
5	29.3	14.2	7.4	SW	0
6	30.4	12.2	5.6	SW	0
7	31.5	13.1	6.8	SW	0
8	32.5	11.7	5.5	SSW	0
9	33.4	14.5	6.5	WSW	0
10	34.2	12.8	6.7	SW	2
11	34.6	11.6	7.5	SW	0
12	36.8	10.4	5.6	SW	0
13	38.7	9.4	4.4	SW	2
14	38.8	9.6	4.2	SW	0
15	38.8	10.4	6.3	SW	2
16	38.5	9.5	5.2	SW	0
17	38.4	11.2	4.6	SW	0
18	36.5	14.3	5.0	SW	0
19	34.2	15.1	5.6	SW	0
20	33.5	13.4	5.3	SW	0
21	32.1	14.8	6.4	SW	0
22	30.2	14.2	5.1	SW	2
23	29.5	15.2	5.3	SW	0

Date:26.04.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	24.5	12.5	4.8	SW	0
1	23.4	13.5	4.8	SW	2
2	24.2	12.9	5.3	SW	0
3	25.4	11.9	4.3	SW	0
4	26.3	12.7	4.6	SW	0
5	28.5	13.5	5.9	SW	0
6	29.5	14.8	4.3	SW	0
7	29.4	15.2	4.6	SW	0
8	30.2	10.3	4.2	SW	0
9	31.6	9.1	5.3	SW	0
10	33.1	10.4	2.8	SW	2
11	34.5	10.4	4.6	SW	0
12	35.2	12.5	4.6	SW	0
13	36.2	9.6	4.6	SW	2
14	37.8	10.5	4.2	SW	0
15	38.9	11.2	4.6	SW	2
16	36.2	10.6	4.2	SW	0
17	35.2	9.8	4.7	SW	0
18	34.0	9.5	4.2	WSW	0
19	32.6	11.9	4.6	SSW	0
20	30.5	13.5	4.3	WSW	0
21	28.9	12.8	4.4	SW	0
22	27.6	14.2	4.1	SW	2
23	25.0	12.2	4.3	SW	0

Date:27.04.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	25.4	15.4	4.8	SW	0
1	26.5	14.5	4.8	SW	2
2	25.2	15.6	4.3	SW	0
3	26.4	16.7	5.3	SW	0
4	27.6	14.7	4.6	SW	0
5	27.5	17.6	3.2	SW	0
6	26.4	15.6	3.6	SW	0
7	27.4	14.4	4.2	SW	0
8	27.2	12.7	2.6	SW	0
9	27.4	13.6	3.2	SW	0
10	28.2	12.7	4.6	SW	2
11	30.4	11.8	2.6	SW	0
12	31.2	10.7	2.6	SW	0
13	32.4	9.8	2.6	SW	2
14	35.4	10.5	2.2	SW	0
15	36.4	12.2	2.6	SW	2
16	38.2	13.6	4.2	SW	0
17	37.2	12.3	2.7	SW	0
18	36.5	11.5	4.2	SW	0
19	34.9	10.2	2.6	SW	0
20	33.5	12.6	2.3	SW	0
21	31.4	11.5	4.4	SW	0
22	29.4	15.2	2.1	SW	2
23	27.5	16.2	2.3	SW	0

Date:28.04.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.5	11.2	9.8	SW	2
1	31.4	10.2	9.8	SW	2
2	30.5	13.2	8.3	SW	0
3	32.9	12.6	10.3	SW	0
4	30.6	12.9	9.6	SW	0
5	29.5	12.8	8.3	SW	2
6	28.4	13.6	9.6	SW	0
7	29.4	12.0	9.6	SW	0
8	30.2	11.3	8.2	SW	0
9	32.4	12.4	10.3	SW	0
10	34.2	11.2	9.8	SW	2
11	34.4	10.4	9.6	SW	0
12	35.2	9.5	8.6	SW	0
13	35.4	9.6	7.6	SW	2
14	36.4	10.5	9.2	SW	0
15	37.4	10.2	8.6	SW	2
16	38.2	12.6	9.2	SW	0
17	25.6	13.8	8.7	SW	0
18	33.9	15.4	9.2	WSW	0
19	32.2	15.5	8.6	SSW	0
20	32.9	14.4	8.3	WSW	0
21	31.5	12.8	8.4	WSW	0
22	30.2	11.2	9.1	SW	2
23	31.0	12.2	9.3	SW	0

Date:29.04.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	26.4	12.3	9.2	CALM	2
1	26.5	13.6	8.8	SW	2
2	27.2	14.6	7.3	SW	2
3	28.4	13.5	7.3	SW	4
4	28.6	14.2	8.6	SW	2
5	29.5	12.3	5.9	SW	2
6	29.4	13.5	6.5	CALM	0
7	30.4	14.0	6.9	WSW	0
8	31.2	15.3	5.3	SSW	0
9	32.4	17.1	6.5	WSW	0
10	32.2	16.4	6.1	WSW	0
11	33.4	17.4	7.6	SSW	0
12	35.2	15.5	8.6	SSW	0
13	36.4	15.6	8.6	SSW	2
14	37.4	16.5	9.2	SSW	0
15	38.4	17.2	7.6	WSW	2
16	39.2	16.6	8.2	WSW	0
17	41.3	15.8	7.7	SSW	0
18	39.9	14.5	5.2	WSW	0
19	36.5	14.9	9.6	SSW	0
20	34.8	13.5	8.3	WSW	0
21	32.5	12.8	8.4	WSW	0
22	30.5	11.2	9.1	WSW	2
23	28.9	12.2	8.3	WSW	0

Date:30.04.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.5	17.5	4.8	SW	2
1	32.6	16.4	4.8	SW	2
2	33.9	17.4	4.3	S	2
3	34.5	16.5	2.3	S	0
4	34.9	15.5	4.6	SW	2
5	35.4	16.4	4.9	SW	2
6	36.5	15.5	2.3	SW	0
7	36.9	15.4	4.6	SW	2
8	37.8	14.5	4.2	SW	2
9	37.9	17.4	4.3	SW	2
10	38.0	15.5	4.8	SW	2
11	39.6	16.4	2.6	SW	0
12	40.2	15.2	2.6	SW	0
13	41.9	16.4	2.6	SW	2
14	42.5	15.2	4.2	S	0
15	41.5	14.8	2.6	S	2
16	40.5	13.8	2.2	SW	0
17	39.1	15.5	2.7	S	0
18	38.2	16.5	4.2	S	2
19	36.2	15.3	2.6	S	2
20	35.5	14.8	4.3	S	2
21	34.5	15.3	2.4	SW	0
22	33.5	16.8	4.1	SW	2
23	32.4	17.0	2.3	SW	0

Date:01.05.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	34.3	16	8.0	SW	0
1	34.2	15	4.0	SW	2
2	33.0	13	6.0	SW	2
3	33.6	14	2.0	SW	0
4	34.6	16	7.0	SW	4
5	34.9	12	8.0	SW	0
6	35.0	13	10.0	SW	0
7	36.3	11	11.0	SW	2
8	37.6	09	8.0	SW	0
9	37.9	07	9.0	SW	0
10	38.4	10	6.0	SW	0
11	38.9	12	3.0	SW	2
12	39.0	11	2.0	SW	2
13	39.8	09	4.0	WSW	4
14	39.6	08	6.0	WSW	0
15	40.2	06	4.0	WSW	0
16	40.6	09	7.0	WSW	0
17	41.6	12	9.0	WSW	2
18	40.2	11	10.0	WSW	4
19	39.3	14	11.0	WSW	0
20	38.2	16	12.0	WSW	0
21	37.3	18	7.0	WSW	0
22	36.2	17	6.0	WSW	0
23	35.9	15	6.3	WSW	0

Date:02.05.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	32.3	23	4.0	WSW	3
1	33.1	21	5.0	WSW	2
2	34.6	19	6.0	WSW	3
3	34.9	20	5.0	WSW	4
4	35.0	24	5.0	WSW	2
5	35.6	22	3.0	WSW	3
6	35.9	21	6.0	WSW	2
7	36.2	19	8.0	WSW	4
8	36.9	18	7.0	WSW	3
9	37.0	18	8.0	WSW	5
10	37.5	17	6.0	WSW	4
11	37.9	16	5.0	WSW	3
12	38.1	15	5.0	WSW	2
13	38.7	15	6.0	WSW	2
14	38.9	15	7.0	SSW	4
15	39.4	14	7.0	SSW	4
16	38.9	13	5.0	WSW	3
17	37.5	12	4.0	SSW	4
18	36.9	12	5.0	WSW	4
19	35.4	11	6.0	SSW	3
20	34.9	10	5.0	SW	2
21	33.2	14	6.0	SW	3
22	33.9	16	8.0	SW	2
23	32.0	18	6.0	SW	2

Date:03.05.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.3	22	4.0	SW	0
1	28.9	23	2.0	SW	0
2	29.0	21	3.0	SW	2
3	29.8	20	6.0	SW	3
4	30.2	19	2.0	SW	4
5	31.2	18	2.0	WSW	3
6	31.9	17	2.0	SW	2
7	32.5	17	2.0	WSW	2
8	32.8	16	4.0	SW	2
9	33.8	15	3.0	SSW	2
10	34.5	14	4.0	SSW	2
11	35.9	15	5.0	SW	2
12	36.4	14	6.0	SW	3
13	37.8	13	8.0	SW	2
14	36.8	12	4.0	SW	4
15	35.8	10	5.0	SW	4
16	34.6	13	2.0	SW	2
17	33.6	14	3.0	NW	4
18	32.8	15	4.0	NW	2
19	31.5	15	2.0	NW	2
20	31.9	16	4.0	N	2
21	30.5	17	2.0	N	2
22	29.4	18	3.0	NW	4
23	29.0	20	3.0	SW	4

Date:04.05.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.2	21	1	SW	2
1	32.5	22	0	CALM	2
2	33.4	19	2	SW	2
3	32.4	15	2	SW	2
4	34.6	18	2	SW	2
5	36.5	20	1	SW	3
6	37.2	21	1	SW	2
7	37.3	22	0	CALM	4
8	38.2	18	2	WSW	2
9	39.1	16	1	WSW	2
10	40.1	15	3	WSW	4
11	41.3	17	2	WSW	2
12	41.2	18	4	SW	2
13	42.8	20	1	SW	2
14	43.6	21	0	CALM	2
15	44.5	22	0	CALM	2
16	44.2	20	1	SSW	2
17	43.8	18	1	WSW	2
18	42.6	15	2	SSW	2
19	39.8	13	2	SSW	3
20	38.5	14	1	WSW	3
21	39.6	15	0	CALM	4
22	36.7	17	1	SSW	2
23	37.8	18	2	SW	2

Date:05.05.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.2	20	9	WSW	2
1	32.5	21	8	WSW	2
2	33.9	19	7	WSW	2
3	34.5	18	9	CALM	3
4	35.3	20	7	CALM	3
5	36.8	21	8	CALM	2
6	37.5	22	6	WSW	2
7	38.5	20	6	WSW	2
8	39.5	21	5	SW	2
9	40.1	22	7	SW	4
10	42.3	20	6	SW	4
11	43.2	18	5	SW	4
12	43.8	19	6	SSW	2
13	44.2	16	7	WSW	2
14	44.1	14	8	SW	2
15	43.8	10	8	WSW	3
16	42.4	14	8	WSW	3
17	41.2	17	9	SW	3
18	40.2	16	7	WSW	4
19	38.6	15	6	SW	4
20	36.9	17	7	WSW	2
21	35.8	18	5	SSW	4
22	34.8	20	7	SW	4
23	32.6	21	9	SW	2

Date:06.05.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	39.3	18	5.8	WSW	4
1	39.2	20	5.8	WSW	6
2	38.5	19	4.3	WSW	4
3	38.4	21	4.3	SSW	4
4	39.5	18	5.6	SSW	2
5	39.5	17	4.9	WSW	4
6	38.2	18	5.3	SSW	4
7	40.4	17	4.6	WSW	4
8	41.2	17	5.2	WSW	4
9	41.3	16	6.3	WSW	4
10	42.5	15	7.8	WSW	6
11	42.4	14	8.6	WSW	2
12	43.7	12	5.6	SSW	4
13	44.5	13	7.6	SSW	4
14	34.2	12	8.2	WSW	4
15	35.4	11	8.6	WSW	2
16	35.2	13	5.2	WSW	4
17	34.4	15	6.7	SSW	2
18	36.6	16	6.2	WSW	6
19	35.5	17	6.6	SSW	4
20	36.5	16	5.3	WSW	4
21	34.4	15	5.4	WSW	6
22	32.4	14	6.1	SW	2
23	33.6	39.2	6.3	SW	4

Date:07.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	37.2	17	8.8	WSW	2
1	36.2	16	6.2	WSW	2
2	36.2	17	6.2	WSW	2
3	36.2	16	5.2	WSW	0
4	36.6	15	5.6	SW	2
5	37.5	16	4.9	SW	2
6	38.4	15	2.3	SW	0
7	39.4	15	4.6	SW	2
8	39.2	14	4.2	WSW	2
9	39.4	13	4.3	WSW	2
10	40.2	12	4.8	WSW	2
11	42.2	13	2.6	WSW	0
12	40.2	10	2.6	SW	0
13	40.4	10	2.6	SW	2
14	38.4	11	4.2	WSW	0
15	37.4	12	2.6	WSW	2
16	38.2	12	2.2	WSW	0
17	40.2	12	2.7	WSW	0
18	38.2	13	4.2	WSW	2
19	36.2	13	2.6	SW	2
20	35.5	13	4.3	SW	2
21	34.5	13	2.4	SW	0
22	33.5	14	4.1	SW	2
23	32.4	14	2.3	SW	0

Date:08 .05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	33.6	20	5.8	WSW	2
1	34.1	22	5.1	WSW	2
2	35.5	19	5.4	WSW	0
3	36.4	18	4.5	WSW	0
4	37.0	17	4.5	SW	0
5	37.6	18	4.1	SW	0
6	38.5	16	6.4	SW	0
7	39.4	17	6.5	SW	2
8	39.5	19	6.4	WSW	2
9	40.6	20	6.4	WSW	2
10	40.3	17	5.2	WSW	0
11	41.3	15	5.4	WSW	0
12	42.2	14	4.4	SW	0
13	41.2	16	4.6	SW	2
14	40.2	13	4.5	WSW	0
15	39.4	12	2.5	WSW	2
16	38.1	11	4.5	WSW	0
17	40.1	12	4.5	WSW	0
18	38.3	13	4.5	WSW	2
19	36.2	14	2.2	SW	2
20	35.5	14	4.3	SW	2
21	34.4	13	4.4	SW	0
22	33.5	14	4.1	SW	2
23	32.4	14	2.3	SW	0

Date:09.5.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	32.5	29	6.2	SW	2
1	33.6	28	7.2	SW	2
2	34.5	28	7.2	SW	2
3	36.9	30	5.2	SW	0
4	37.1	31	5.5	WSW	2
5	37.5	31	6.5	WSW	2
6	38.4	34	7.1	SW	0
7	39.4	35	6.3	SW	2
8	39.2	32	6.1	WSW	2
9	40.4	31	5.6	WSW	2
10	40.2	30	5.4	WSW	2
11	41.2	28	5.4	WSW	0
12	41.2	29	5.2	SW	0
13	40.4	27	6.7	SW	2
14	39.4	25	6.5	SW	0
15	38.4	20	5.6	SW	2
16	38.2	19	5.8	SW	0
17	40.2	15	6.4	SW	0
18	38.2	10	6.2	WSW	2
19	39.2	12	6.1	SW	2
20	37.5	15	5.5	SW	2
21	36.5	17	4.9	SW	0
22	35.5	20	4.1	SW	2
23	34.4	21	4.6	SW	0

Date:10.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	32.9	39	5.8	SW	0
1	34.6	36	5.2	SW	0
2	35.8	39	6.2	SW	0
3	36.1	37	5.2	WSW	0
4	36.9	38	5.6	SW	0
5	37.2	39	5.9	SW	2
6	37.5	38	4.1	SW	0
7	37.4	33	4.6	WSW	2
8	38.8	37	4.2	WSW	2
9	38.7	38	4.3	SW	0
10	39.6	33	4.8	WSW	2
11	40.3	34	4.6	WSW	0
12	41.4	33	5.6	WSW	0
13	42.5	31	5.6	SW	2
14	41.0	33	4.2	SW	0
15	39.8	30	4.6	WSW	2
16	38.2	29	4.2	WSW	0
17	36.9	28	5.7	WSW	0
18	35.6	27	5.2	WSW	2
19	34.8	26	4.6	WSW	0
20	34.0	29	4.3	WSW	0
21	33.8	33	4.4	WSW	0
22	33.0	36	4.1	WSW	2
23	32.2	32	4.3	SW	0

Date:11.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	33.6	47	11.4	SW	3
1	33.9	45	10.5	SW	2
2	34.2	46	9.2	SW	0
3	35.6	48	8.2	SW	0
4	35.9	45	8.6	WSW	0
5	36.8	42	7.9	WSW	0
6	37.2	41	7.3	SW	0
7	37.9	40	7.6	SW	2
8	38.0	41	7.2	SW	0
9	38.3	38	8.3	SW	0
10	38.5	35	8.8	SW	0
11	39.4	36	9.5	SW	0
12	40.5	34	9.6	SW	0
13	40.3	36	7.6	SW	2
14	38.2	38	6.2	WSW	0
15	37.8	39	6.6	WSW	2
16	37.4	40	5.2	WSW	2
17	38.9	42	7.7	WSW	2
18	37.8	41	7.2	WSW	2
19	36.7	43	8.6	SW	2
20	35.5	48	8.3	SW	2
21	34.6	50	7.4	SW	0
22	33.5	50	6.1	SW	2
23	32.4	51	5.3	SW	0

Date:12.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	34.6	50	9.8	SW	0
1	35.4	47	8.2	WSW	0
2	35.9	48	8.2	SW	0
3	36.8	46	9.2	WSW	0
4	37.0	45	8.6	WSW	2
5	37.3	45	7.9	WSW	4
6	38.2	44	7.3	WSW	4
7	38.9	42	7.6	SW	2
8	39.0	41	7.2	WSW	2
9	39.5	40	8.3	WSW	4
10	40.3	42	8.8	WSW	2
11	41.1	41	9.6	WSW	0
12	42.3	36	9.6	SW	0
13	43.4	38	9.6	SW	2
14	42.6	39	9.2	WSW	0
15	39.5	37	9.6	WSW	2
16	38.5	40	8.2	WSW	0
17	39.1	41	8.7	WSW	0
18	40.1	45	8.2	WSW	2
19	38.3	44	9.6	SW	2
20	37.3	46	8.3	SW	2
21	36.4	47	9.4	SW	2
22	35.4	48	8.1	SW	2
23	34.7	47	7.3	SW	0

Date:13.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	34.5	42	7.5	WSW	4
1	35.6	44	7.4	WSW	4
2	36.8	45	7.7	WSW	2
3	37.1	47	6.8	WSW	0
4	38.8	49	6.8	SW	0
5	39.5	48	6.8	SW	0
6	40.3	47	4.7	SW	0
7	41.3	49	4.4	SW	2
8	41.9	45	4.5	WSW	2
9	42.0	44	4.6	WSW	0
10	42.3	42	4.8	WSW	0
11	42.2	38	5.6	WSW	0
12	41.5	35	6.6	SW	0
13	40.4	36	7.5	SW	2
14	38.4	35	8.5	WSW	0
15	37.4	32	8.6	WSW	2
16	38.2	30	5.4	WSW	0
17	37.8	32	7.3	WSW	0
18	38.2	31	7.5	WSW	2
19	36.2	30	5.4	SW	0
20	35.5	32	4.4	SW	0
21	34.5	35	5.2	SW	0
22	33.5	39	5.3	SW	2
23	32.4	37	5.2	SW	0

Date:14.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	34.5	52	9.8	SW	4
1	35.2	48	8.2	SW	2
2	36.5	50	11.2	SW	4
3	37.0	48	10.2	SW	0
4	37.8	50	10.6	SW	2
5	38.0	48	11.9	SW	2
6	38.4	46	12.3	SW	0
7	39.0	45	14.6	SW	0
8	39.7	47	12.2	WSW	0
9	40.2	48	10.3	WSW	2
10	41.0	48	11.8	WSW	2
11	42.3	47	12.6	WSW	2
12	42.9	46	10.6	SW	0
13	43.0	44	12.6	SW	2
14	42.3	43	11.2	WSW	4
15	41.6	40	11.9	WSW	2
16	40.5	39	10.2	WSW	0
17	39.8	36	9.7	WSW	0
18	38.9	39	12.3	WSW	2
19	36.5	41	11.6	SW	4
20	35.1	45	12.3	SW	2
21	34.9	47	13.4	SW	0
22	33.5	43	9.1	SW	2
23	32.0	44	9.3	SW	0

Date:15.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.3	44	6.8	WSW	2
1	28.9	45	7.2	WSW	0
2	29.6	47	8.2	WSW	0
3	30.2	45	5.2	WSW	0
4	31.5	50	6.6	WSW	0
5	32.6	54	7.9	WSW	2
6	33.0	55	6.3	WSW	2
7	34.5	57	5.6	WSW	2
8	34.9	53	6.2	WSW	0
9	35.0	48	6.3	WSW	0
10	36.8	45	5.8	WSW	0
11	37.9	44	6.6	WSW	0
12	38.0	39	6.6	SW	0
13	38.7	38	7.6	SW	2
14	39.4	35	5.2	WSW	4
15	37.9	33	6.6	WSW	2
16	36.5	31	6.2	WSW	0
17	35.3	32	9.7	WSW	0
18	34.6	32	8.2	WSW	2
19	33.2	33	11.6	SW	2
20	32.1	35	9.3	SW	0
21	31.5	38	8.4	WSW	0
22	30.1	40	10.1	WSW	2
23	29.8	42	9.3	WSW	0

Date:16.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	32.1	44	7.8	WSW	2
1	32.9	45	6.2	WSW	2
2	33.0	47	7.2	WSW	2
3	33.7	48	6.2	WSW	4
4	34.0	47	6.6	SW	4
5	34.9	46	7.9	WSW	2
6	35.6	48	7.1	SW	4
7	36.8	46	7.6	WSW	2
8	36.9	45	6.2	WSW	2
9	37.5	48	6.3	SW	0
10	37.9	46	6.8	WSW	2
11	38.9	48	5.6	WSW	4
12	39.0	45	5.6	WSW	4
13	38.4	43	5.6	SW	2
14	37.5	40	4.2	SW	0
15	36.4	38	4.6	WSW	2
16	35.9	40	4.2	WSW	2
17	34.8	41	5.7	SW	2
18	33.6	38	5.2	SW	2
19	33.9	35	4.6	SW	0
20	32.6	30	5.3	WSW	2
21	31.6	35	6.4	WSW	2
22	32.0	40	6.1	WSW	2
23	33.0	42	6.3	SW	0

Date:17.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	32.9	36	6.3	SW	2
1	33.0	37	5.5	SW	3
2	33.9	38	5.2	SW	2
3	34.5	39	6.2	SW	2
4	35.5	35	5.4	WSW	2
5	35.9	33	5.4	WSW	2
6	36.0	32	6.3	SW	4
7	36.2	31	5.5	SW	2
8	36.9	31	5.2	SW	0
9	37.8	30	6.5	SW	0
10	38.1	30	5.5	SW	2
11	38.9	25	6.4	SW	2
12	39.2	24	5.4	SW	2
13	39.9	21	6.5	SW	2
14	38.8	19	5.4	WSW	0
15	38.2	15	5.4	WSW	2
16	37.4	13	6.5	WSW	4
17	38.2	15	5.5	WSW	4
18	37.4	18	4.4	WSW	4
19	36.2	20	6.4	SW	4
20	35.4	25	5.4	SW	2
21	36.2	28	6.5	SW	0
22	36.4	30	5.4	SW	2
23	32.4	35	6.5	SW	0

Date:18.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.2	40	10.7	WSW	3
1	30.2	42	9.7	SW	3
2	31.9	39	9.2	SW	3
3	32.4	35	8.2	SW	2
4	33.0	36	9.4	SW	2
5	33.9	40	8.5	SW	4
6	34.5	41	8.5	SW	4
7	34.9	39	9.4	SW	2
8	35.0	38	9.5	WSW	2
9	35.8	39	9.4	WSW	4
10	36.1	42	9.5	WSW	2
11	37.0	45	8.4	WSW	1
12	37.8	45	8.2	SW	0
13	38.0	46	8.4	SW	2
14	37.9	36	9.5	WSW	0
15	36.6	39	8.8	WSW	0
16	35.5	36	8.5	WSW	0
17	34.9	35	8.5	WSW	0
18	33.6	35	9.5	WSW	2
19	32.6	40	9.7	WSW	2
20	31.5	40	9.3	WSW	2
21	31.0	41	8.3	WSW	2
22	32.0	41	8.8	WSW	2
23	31.8	42	8.3	WSW	0

Date:19.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	32.9	48	10.5	SW	3
1	33.0	50	9.4	SW	2
2	33.5	51	9.7	SW	2
3	33.9	52	9.8	SW	2
4	34.5	53	9.8	SW	2
5	35.0	56	9.8	SW	2
6	35.9	43	8.7	SW	2
7	36.6	49	9.4	SW	2
8	37.0	41	8.5	WSW	2
9	37.4	40	9.6	SW	0
10	38.6	41	8.8	WSW	2
11	38.9	42	8.6	WSW	2
12	39.3	40	8.8	SW	2
13	39.9	39	9.3	SW	2
14	38.5	36	8.9	WSW	0
15	38.0	36	9.9	WSW	2
16	37.3	35	10.2	WSW	0
17	37.0	38	9.4	WSW	0
18	36.0	40	8.6	WSW	2
19	36.2	41	10.4	WSW	2
20	35.5	40	9.4	WSW	2
21	34.5	42	9.2	WSW	2
22	33.5	42	9.3	WSW	2
23	32.4	42	9.2	WSW	0

Date:20.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.2	44	6.8	WSW	2
1	32.9	45	6.2	WSW	0
2	33.2	47	5.2	WSW	0
3	33.9	44	4.2	WSW	0
4	34.5	45	6.6	WSW	2
5	34.3	41	5.9	WSW	2
6	36.0	39	5.3	WSW	2
7	36.6	38	4.6	WSW	2
8	36.9	36	4.2	WSW	2
9	37.8	38	6.3	WSW	2
10	37.9	39	6.8	WSW	2
11	38.6	38	7.6	WSW	2
12	39.5	40	7.6	SW	0
13	40.1	41	7.6	SW	2
14	41.5	35	6.2	WSW	4
15	42.6	36	6.6	WSW	2
16	41.2	39	5.2	WSW	2
17	40.8	39	4.7	WSW	0
18	39.6	40	4.2	WSW	2
19	38.4	41	4.6	SW	4
20	37.5	41	5.3	SW	2
21	36.6	42	6.4	SW	0
22	34.6	41	6.1	SW	2
23	33.3	43	7.3	SW	0

Date:21.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.3	45	4.8	SW	2
1	29.0	42	6.2	SW	2
2	30.1	43	5.2	SW	2
3	32.5	46	6.2	SW	2
4	33.3	43	5.6	SW	4
5	34.5	40	5.9	SW	2
6	35.6	39	5.3	SW	2
7	36.2	38	8.6	SW	2
8	36.9	35	6.2	SW	2
9	37.8	32	6.6	WSW	2
10	38.2	31	6.8	SW	2
11	38.8	30	6.6	WSW	2
12	39.0	29	6.6	SW	2
13	38.2	25	7.6	SW	2
14	36.9	28	5.2	WSW	4
15	35.8	29	5.6	WSW	2
16	34.5	31	5.2	WSW	0
17	33.6	32	5.7	WSW	0
18	32.8	35	5.2	WSW	2
19	31.0	36	6.6	SW	2
20	30.0	35	7.3	SW	4
21	29.1	38	8.4	WSW	2
22	29.4	40	7.1	WSW	2
23	28.0	42	6.3	WSW	0

Date:22.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	33.6	47	6.7	WSW	2
1	34.5	50	7.8	WSW	2
2	34.8	51	5.7	WSW	2
3	35.5	51	4.7	WSW	2
4	35.9	52	4.4	SW	2
5	36.8	48	4.7	SW	2
6	37.0	49	5.2	SW	4
7	37.0	48	5.7	WSW	2
8	37.8	50	5.1	WSW	2
9	38.2	51	5.7	SW	4
10	37.2	48	4.2	WSW	2
11	36.1	48	4.7	WSW	0
12	35.4	49	5.1	WSW	4
13	36.4	50	5.4	SW	2
14	37.4	51	6.4	SW	0
15	38.4	50	6.4	SW	2
16	39.4	50	5.7	SW	2
17	41.6	49	6.7	SW	2
18	39.5	48	5.2	SW	2
19	39.5	46	4.5	SW	0
20	39.4	45	6.8	SW	2
21	38.4	48	5.8	SW	2
22	36.6	48	5.7	SW	2
23	34.3	48	5.4	SW	2

Date:23.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	34.0	48	10.4	SW	2
1	34.5	45	10.5	SW	0
2	35.8	46	9.2	SW	0
3	36.5	45	8.2	SW	2
4	36.9	45	9.6	WSW	2
5	37.0	48	7.9	WSW	2
6	37.8	49	8.3	SW	2
7	38.2	49	8.6	SW	2
8	38.9	48	8.2	SW	2
9	38.9	49	8.3	SW	2
10	38.5	39	8.8	SW	2
11	39.4	38	9.5	SW	2
12	40.2	36	9.6	SW	2
13	40.3	39	8.6	SW	2
14	38.6	38	6.2	WSW	0
15	37.1	36	7.6	WSW	2
16	37.5	35	8.2	WSW	2
17	38.5	35	7.7	WSW	2
18	37.5	36	7.2	WSW	2
19	36.4	40	8.6	SW	2
20	35.4	41	8.3	SW	2
21	34.2	42	7.4	SW	0
22	33.1	45	6.1	SW	2
23	32.4	51	5.3	SW	0

Date:24.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	36.2	45	10.8	WSW	2
1	37.2	46	12.2	WSW	2
2	37.9	43	12.2	WSW	2
3	38.5	42	14.2	WSW	2
4	38.9	40	12.6	WSW	2
5	39.0	38	11.9	WSW	4
6	38.1	37	10.3	WSW	4
7	38.9	36	11.6	WSW	2
8	39.0	35	10.2	WSW	2
9	39.5	35	11.3	WSW	4
10	40.3	36	10.8	WSW	2
11	41.1	39	10.6	WSW	0
12	40.3	34	10.6	SW	0
13	40.4	36	10.6	SW	2
14	40.3	31	11.2	WSW	2
15	39.5	33	12.6	WSW	2
16	38.5	35	12.2	WSW	0
17	39.1	39	12.7	WSW	2
18	40.1	40	11.2	WSW	2
19	38.3	40	10.6	SW	2
20	37.3	40	10.3	SW	2
21	36.4	41	11.4	WSW	2
22	36.4	41	10.1	WSW	2
23	37.7	42	10.3	WSW	0

Date:25.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	36.4	45	6.5	WSW	2
1	36.4	46	6.4	WSW	2
2	37.5	45	6.7	WSW	2
3	36.4	42	6.8	WSW	0
4	36.5	47	7.8	SW	2
5	37.4	45	7.8	SW	2
6	38.5	40	7.7	SW	2
7	38.5	39	8.4	SW	2
8	39.5	35	6.5	WSW	2
9	39.7	34	6.6	WSW	2
10	40.8	33	6.8	WSW	2
11	41.7	32	6.6	WSW	2
12	42.3	34	7.6	SW	2
13	41.9	36	7.5	SW	2
14	39.6	34	7.5	WSW	0
15	38.6	35	7.6	WSW	2
16	39.5	36	7.4	WSW	0
17	40.5	34	8.3	WSW	0
18	38.5	33	8.5	WSW	2
19	37.6	32	6.4	SW	0
20	36.7	32	7.4	SW	0
21	34.8	34	7.2	SW	0
22	33.9	37	6.3	SW	2
23	32.4	38	7.2	SW	0

Date:26.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	29.6	50	6.7	WSW	2
1	30.0	51	6.8	WSW	2
2	31.2	49	6.5	WSW	2
3	31.9	45	7.2	WSW	0
4	32.1	44	6.4	WSW	2
5	32.8	45	7.4	WSW	2
6	33.5	50	7.7	WSW	0
7	33.9	49	8.2	WSW	2
8	34.5	45	8.4	WSW	0
9	34.9	42	7.2	WSW	2
10	35.0	41	6.7	WSW	2
11	34.7	40	7.2	WSW	2
12	36.5	39	7.5	SW	0
13	36.6	35	8.6	SW	2
14	38.6	38	6.5	SW	4
15	39.8	36	6.5	SW	2
16	36.8	34	6.5	SW	0
17	35.7	35	6.4	SW	0
18	32.6	38	7.2	WSW	2
19	31.4	39	7.4	SW	4
20	30.5	40	8.4	SW	2
21	29.5	42	7.5	SW	2
22	28.5	44	6.5	SW	2
23	29.4	47	6.3	SW	0

Date:27.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.5	58	9.8	SW	0
1	32.5	55	10.5	SW	2
2	33.6	50	11.7	SW	2
3	34.5	53	11.5	SW	2
4	35.9	55	10.6	SW	2
5	36.8	59	9.5	SW	2
6	37.2	60	8.7	SW	2
7	38.0	59	8.5	SW	2
8	38.5	55	8.5	SW	0
9	39.8	52	7.5	WSW	0
10	40.7	51	7.5	WSW	0
11	40.7	46	7.2	WSW	2
12	40.8	45	7.8	SW	2
13	40.5	42	7.5	SW	2
14	39.4	39	6.5	WSW	2
15	39.5	38	5.5	SW	2
16	38.2	39	8.5	SW	0
17	37.2	42	8.6	SW	0
18	36.5	41	8.5	WSW	2
19	34.5	41	6.1	SW	2
20	33.6	40	9.8	SW	0
21	32.1	39	8.8	WSW	2
22	31.0	40	9.8	WSW	2
23	30.0	42	9.7	SW	0

Date:28.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	29.5	58	8.5	WSW	2
1	29.4	56	9.5	WSW	2
2	30.4	57	7.5	WSW	2
3	28.8	55	8.7	WSW	2
4	29.6	50	8.1	WSW	2
5	30.8	48	7.6	WSW	2
6	31.7	45	6.6	SW	2
7	31.8	46	6.5	SW	2
8	32.8	42	6.8	SW	0
9	32.8	40	7.5	WSW	0
10	33.7	42	7.8	WSW	0
11	34.9	39	7.2	WSW	2
12	35.7	36	8.5	WSW	2
13	35.8	35	6.5	WSW	2
14	38.7	37	6.8	WSW	0
15	38.5	35	6.6	WSW	2
16	36.2	34	6.5	WSW	2
17	35.7	38	6.2	WSW	2
18	34.5	41	7.4	WSW	2
19	32.7	43	6.5	SW	0
20	31.5	46	6.5	SW	0
21	31.2	49	6.5	WSW	0
22	30.8	53	6.2	WSW	0
23	30.2	56	5.2	WSW	0

Date:29.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	33.4	63	4.8	SW	4
1	34.5	65	5.2	WSW	4
2	32.6	62	5.2	SW	4
3	30.4	61	5.2	WSW	4
4	28.5	60	5.6	WSW	4
5	29.6	58	5.9	WSW	4
6	27.6	59	7.3	WSW	4
7	26.5	45	4.6	SW	2
8	25.3	48	4.2	WSW	2
9	26.5	45	2.3	WSW	4
10	27.3	39	2.8	WSW	2
11	28.1	35	2.6	WSW	4
12	29.3	33	5.6	SW	4
13	30.4	33	4.6	SW	2
14	31.3	33	5.2	WSW	4
15	32.5	37	4.6	WSW	2
16	32.5	40	4.2	WSW	4
17	31.2	41	4.7	WSW	4
18	32.9	45	4.2	WSW	2
19	33.8	50	4.6	SW	2
20	34.5	52	4.3	SW	2
21	35.2	56	4.4	SW	2
22	34.5	59	4.1	SW	2
23	33.0	60.32	5.3	SW	4

Date:30.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.5	55	2.5	WSW	4
1	30.4	57	2.4	WSW	4
2	31.4	56	3.7	WSW	2
3	31.5	55	4.8	WSW	2
4	31.2	54	3.8	SW	4
5	32.2	50	3.8	SW	4
6	32.4	49	3.7	SW	4
7	32.1	48	4.4	SW	2
8	33.5	47	2.5	WSW	2
9	33.5	46	2.6	WSW	4
10	34.5	44	2.8	WSW	4
11	35.6	41	2.6	WSW	4
12	37.8	42	2.6	SW	4
13	36.2	39	2.5	SW	2
14	35.6	39	4.5	WSW	4
15	34.2	38	4.6	WSW	2
16	33.5	38	4.4	WSW	4
17	31.2	40	2.3	WSW	4
18	30.5	42	2.5	WSW	2
19	29.2	41	4.4	SW	4
20	29.5	40	4.4	SW	4
21	30.5	41	5.2	SW	4
22	30.2	43	5.3	SW	2
23	31.4	44	5.2	SW	4

Date:31.05.02

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.3	52	2.8	SW	4
1	27.3	48	2.2	SW	2
2	29.3	50	4.2	SW	4
3	30.0	48	4.2	SW	0
4	30.9	50	2.6	SW	2
5	31.2	48	4.9	SW	2
6	33.1	46	2.3	SW	0
7	33.9	45	2.6	SW	0
8	34.5	47	2.2	WSW	0
9	35.6	48	3.3	WSW	2
10	36.5	48	4.8	WSW	2
11	37.6	47	2.6	WSW	2
12	38.2	46	2.6	SW	0
13	36.5	44	4.6	SW	2
14	36.9	43	3.2	WSW	4
15	35.2	40	3.6	WSW	2
16	34.8	39	3.2	WSW	0
17	33.3	36	3.7	WSW	0
18	32.5	39	2.2	WSW	2
19	31.5	41	3.6	SW	4
20	31.0	42	3.3	SW	2
21	30.5	41	2.4	SW	0
22	29.4	43	3.1	SW	2
23	28.0	44	2.3	SW	0

Date:01.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	34.3	36.3	3.6	SW	1
1	33.5	38.2	3.5	SW	2
2	33.4	38.5	4.3	SW	2
3	31.6	37.6	5.5	SW	3
4	30.4	37.4	4.6	SSW	2
5	28.6	35.9	4.4	WSW	2
6	27.5	37.6	5.6	WSW	3
7	27.4	37.5	5.4	WSW	4
8	28.8	36.6	4.5	SSW	5
9	27.6	35.3	5.2	SSW	5
10	27.8	35.1	5.4	WSW	4
11	28.9	31.5	4.3	SW	1
12	30.4	28.6	4.1	SW	2
13	30.5	27.1	4.5	SW	3
14	30.6	27.6	4.2	SW	1
15	31.6	28.3	5.3	WSW	2
16	32.4	29.9	5.4	WSW	3
17	32.5	30.4	4.5	SSW	3
18	33.6	33.6	5.6	WSW	3
19	32.8	36.3	5.4	SSW	2
20	31.6	36.4	4.2	WSW	2
21	30.4	37.9	4.3	WSW	2
22	30.5	38.9	5.4	SSW	4
23	31.6	39.4	5.2	SSW	4

Date:02.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	36.9	32.8	3.3	SW	3
1	34.6	31.4	3.1	SW	3
2	33.5	30.3	2.2	SW	3
3	32.3	32.4	3.6	SW	2
4	35.1	32.6	3.5	SSW	3
5	33.2	33.3	4.4	SSW	2
6	35.3	32.4	3.3	WSW	2
7	35.1	30.6	3.4	WSW	3
8	37.2	31.5	3.9	WSW	3
9	38.3	33.3	4.2	WSW	2
10	35.1	33.4	5.6	W	3
11	34.5	32.9	5.3	W	2
12	32.6	30.5	5.4	W	3
13	30.3	31.3	6.3	W	3
14	34.4	30.4	4.8	WSW	2
15	33.2	31.9	5.3	WSW	1
16	35.3	29.4	6.9	WSW	2
17	34.4	30.6	5.4	WSW	3
18	30.6	32.3	4.9	WSW	5
19	30.1	30.4	6.3	SSW	4
20	29.3	31.3	4.4	SW	4
21	28.5	32.6	4.6	SW	4
22	28.6	31.8	4.4	SW	3
23	29.4	31.6	5.5	SW	3

Date:03.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	38.2	35.6	5.6	SW	3
1	37.2	35.4	5.4	SW	3
2	36.6	35.5	5.5	SW	3
3	34.4	33.6	5.6	SSW	4
4	32.5	34.5	6.4	SSW	4
5	30.6	34.5	4.5	SSW	3
6	29.7	36.6	5.2	SSW	5
7	28.7	36.4	6.3	SSW	4
8	29.8	35.6	4.4	SSW	4
9	29.5	36.5	5.2	WSW	5
10	27.6	36.6	6.5	WSW	3
11	28.5	34.4	6.3	WSW	5
12	29.5	29.6	4.4	SSW	3
13	29.6	28.5	5.2	SSW	5
14	30.5	28.3	6.3	WSW	3
15	31.5	29.4	4.1	WSW	3
16	32.4	29.2	5.2	WSW	3
17	33.8	30.6	6.3	SSW	3
18	31.6	32.4	4.5	WSW	4
19	32.7	34.6	5.3	SSW	2
20	33.6	35.9	5.5	SSW	2
21	31.5	36.4	4.3	SSW	2
22	32.5	38.6	6.6	SSW	2
23	33.3	39.4	6.6	SSW	3

Date:04.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	35.6	51.3	4.6	W	4
1	35.4	50.1	3.5	W	3
2	34.5	51.2	3.3	SW	3
3	33.2	47.5	4.4	SSW	3
4	31.8	48.4	3.9	WSW	3
5	31.4	48.6	3.5	WSW	2
6	30.6	45.2	2.3	WSW	2
7	29.7	42.4	4.4	WSW	4
8	29.9	40.3	5.9	WSW	2
9	28.6	38.4	6.5	WSW	4
10	27.4	38.8	5.3	SSW	4
11	29.5	37.2	2.4	SSW	2
12	30.3	37.1	2.6	SSW	4
13	30.4	39.2	4.2	WSW	4
14	31.9	40.3	4.9	WSW	2
15	31.8	42.4	2.4	SSW	2
16	32.3	42.5	2.2	SSW	4
17	31.4	41.4	1.3	SSW	2
18	32.6	40.5	2.8	WSW	2
19	32.4	41.6	2.3	SSW	4
20	31.9	41.6	4.3	WSW	4
21	31.4	43.4	5.8	WSW	3
22	32.9	41.4	5.5	SW	2
23	32.4	41.5	5.4	SW	4

Date:05.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	29.6	49.6	6.5	SW	4
1	29.4	50.2	5.4	SW	4
2	27.5	50.3	7.6	SW	4
3	28.3	52.4	4.4	SW	5
4	28.4	51.9	6.5	WSW	4
5	29.9	50.3	5.7	SW	5
6	30.4	52.6	5.5	WSW	4
7	30.5	50.4	6.6	WSW	3
8	31.6	50.3	7.4	SSW	4
9	32.3	49.4	4.7	WSW	4
10	33.4	46.2	4.5	SSW	4
11	33.6	48.9	6.5	WSW	5
12	34.6	48.1	6.5	WSW	4
13	34.3	47.6	5.4	WSW	4
14	33.4	46.1	5.4	WSW	4
15	34.9	44.3	4.6	WSW	5
16	35.2	45.5	4.4	WSW	4
17	35.2	49.6	5.5	SSW	5
18	36.1	50.4	5.4	WSW	5
19	35.5	51.5	5.2	SW	4
20	34.1	52.5	5.1	SW	4
21	33.8	52.3	4.1	WSW	5
22	32.1	55.1	6.3	SW	5
23	31.3	50.3	6.2	SW	4

Date:06.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.6	50.9	4.8	WSW	4
1	29.4	49.4	4.6	WSW	6
2	29.5	48.2	4.3	SW	4
3	30.2	46.3	4.6	SW	4
4	29.3	44.1	6.5	SW	2
5	29.5	46.5	5.1	SW	4
6	30.2	43.2	5.6	SW	4
7	30.6	41.6	4.5	SW	4
8	31.1	40.1	5.3	WSW	4
9	31.2	39.8	6.5	WSW	4
10	32.3	38.1	7.5	WSW	6
11	32.8	35.6	7.5	WSW	2
12	32.4	35.1	5.6	SSW	4
13	34.5	38.3	7.3	SSW	4
14	33.3	37.4	8.5	WSW	4
15	33.1	38.9	7.1	WSW	2
16	34.3	39.3	5.2	WSW	4
17	35.1	40.6	6.9	SSW	2
18	35.5	41.1	5.2	WSW	6
19	34.7	41.3	6.2	SW	4
20	33.5	42.1	5.1	SW	4
21	32.4	40.8	5.2	SW	6
22	29.4	39.6	5.2	SW	2
23	28.6	39.1	7.5	SW	4

Date: 07.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.6	45.3	5.3	SW	5
1	30.5	40.5	6.6	SW	5
2	31.4	46.1	6.4	WSW	5
3	30.3	50.2	5.9	SSW	4
4	29.5	56.5	6.4	SSW	4
5	30.9	55.6	8.3	WSW	6
6	30.4	53.4	6.4	W	4
7	31.5	51.9	4.8	W	5
8	30.3	48.4	4.9	W	4
9	30.4	49.3	6.4	WSW	5
10	31.2	45.5	5.5	WSW	5
11	31.5	44.6	5.3	WSW	3
12	31.1	45.4	7.4	SSW	5
13	32.2	46.6	6.5	SSW	5
14	33.3	47.4	5.6	WSW	5
15	32.9	46.6	6.4	WSW	4
16	32.4	45.6	7.2	WSW	4
17	31.2	49.4	7.6	SSW	4
18	30.3	48.2	6.4	WSW	5
19	31.4	50.3	5.3	SSW	5
20	30.3	52.4	6.4	WSW	4
21	31.9	50.9	5.2	WSW	4
22	29.4	52.2	7.1	W	5
23	30.2	53.4	8.9	SW	5

Date:08.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.6	55.6	5.6	SW	3
1	29.5	58.5	4.5	SW	3
2	30.4	61.2	5.9	WSW	3
3	30.5	5.5	5.4	SSW	4
4	31.3	58.2	4.5	SSW	4
5	31.4	54.5	4.3	WSW	5
6	30.2	54.6	6.5	SSW	5
7	30.3	52.5	6.6	WSW	6
8	28.4	55.1	2.4	WSW	5
9	27.2	50.3	5.2	SW	4
10	28.3	51.4	4.3	SW	6
11	28.8	48.1	2.5	SW	2
12	29.4	46.2	3.1	SSW	4
13	30.4	46.3	4.6	SSW	4
14	31.5	45.5	2.1	WSW	2
15	31.1	42.1	3.3	WSW	3
16	32.3	46.0	5.5	WSW	4
17	33.3	45.1	4.3	SSW	2
18	32.2	45.6	2.1	WSW	2
19	31.6	50.5	3.3	SSW	4
20	31.1	52.9	5.4	WSW	4
21	30.5	52.4	4.2	WSW	3
22	30.3	53.9	4.3	WSW	3
23	30.8	54.6	5.4	SW	2

Date: 09.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.5	48.6	4.6	SW	3
1	30.6	52.5	5.3	W	3
2	30.4	54.3	4.5	W	4
3	30.2	53.1	4.6	WSW	4
4	29.3	51.5	6.6	WSW	5
5	29.5	51.6	6.4	WSW	5
6	28.6	50.1	5.5	SSW	6
7	29.4	53.2	4.3	WSW	6
8	29.5	52.3	5.6	WSW	5
9	30.3	52.5	5.2	WSW	3
10	31.5	50.6	6.6	WSW	3
11	32.2	49.1	5.4	WSW	4
12	33.1	49.2	4.6	SSW	3
13	33.3	47.3	4.3	SSW	4
14	34.1	46.1	5.1	WSW	4
15	35.3	45.2	6.3	WSW	5
16	33.2	47.1	6.1	WSW	5
17	31.4	48.8	7.5	SSW	5
18	32.6	46.1	6.1	WSW	5
19	33.3	43.2	4.3	SSW	2
20	32.6	45.8	4.5	SW	2
21	31.4	41.1	5.1	SW	5
22	31.1	42.5	5.3	SW	3
23	32.3	42.4	5.1	SW	4

Date: 10.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.6	47.8	5.6	W	4
1	27.4	46.4	5.5	SW	4
2	27.5	47.3	4.4	WSW	4
3	26.3	47.4	5.2	SSW	4
4	25.4	46.6	5.3	WSW	4
5	25.2	50.5	5.4	WSW	2
6	26.3	50.3	5.5	WSW	4
7	26.1	51.4	5.3	WSW	2
8	27.2	49.5	4.4	WSW	4
9	28.1	49.6	4.6	WSW	2
10	29.2	46.4	7.4	SSW	3
11	29.1	45.5	6.2	SSW	4
12	29.3	42.2	6.5	SSW	4
13	30.3	46.3	5.4	SSW	4
14	30.3	43.4	5.2	SW	2
15	30.1	40.2	5.5	WSW	4
16	31.2	40.4	7.1	SW	4
17	31.3	39.5	6.2	SSW	3
18	30.1	39.9	5.5	WSW	2
19	32.2	38.3	7.2	SSW	4
20	31.3	40.4	6.4	WSW	4
21	31.2	45.3	6.6	WSW	2
22	31.1	46.8	6.4	SW	1
23	30.2	42.5	6.2	SW	2

Date:11.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	26.5	44.6	7.6	WSW	4
1	27.3	42.4	6.5	WSW	4
2	27.5	40.2	2.5	WSW	6
3	26.1	41.2	3.4	WSW	5
4	28.2	43.6	6.2	WSW	3
5	28.3	45.1	5.4	WSW	4
6	30.5	46.3	6.5	SSW	3
7	31.1	45.3	3.3	WSW	5
8	32.5	48.1	4.5	SSW	5
9	32.3	49.5	5.4	WSW	3
10	31.1	48.8	6.2	WSW	2
11	30.5	45.5	6.3	SSW	2
12	31.3	44.4	5.4	WSW	3
13	32.5	42.8	5.5	WSW	4
14	32.1	40.6	5.3	WSW	6
15	31.3	40.4	5.2	SSW	5
16	32.1	38.5	6.5	WSW	4
17	31.3	39.6	5.3	SSW	3
18	30.1	38.4	6.4	WSW	2
19	30.2	39.5	6.5	SSW	3
20	29.2	40.6	5.3	WSW	3
21	28.0	41.8	5.4	SSW	2
22	28.4	45.8	6.3	W	2
23	27.2	42.4	6.3	SW	3

Date:12.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.5	38.8	5.6	SW	2
1	30.4	39.4	5.5	SW	3
2	30.2	43.5	5.4	SW	3
3	31.3	45.4	6.3	SW	2
4	31.6	48.5	5.4	SW	3
5	30.4	46.6	5.5	WSW	4
6	31.5	45.4	6.6	WSW	3
7	31.3	44.2	4.5	WSW	5
8	31.1	43.3	5.2	WSW	4
9	32.5	42.4	6.6	WSW	3
10	33.2	41.5	6.4	WSW	5
11	34.3	45.6	6.5	WSW	4
12	32.4	47.4	5.6	SSW	4
13	31.5	45.2	6.3	SSW	4
14	32.2	43.4	7.4	WSW	4
15	33.5	42.2	6.6	SSW	2
16	34.1	41.3	7.3	WSW	4
17	35.5	40.4	6.4	SSW	6
18	36.1	43.2	5.2	WSW	2
19	34.3	44.2	5.5	SSW	4
20	33.4	44.3	7.1	WSW	4
21	30.2	46.1	6.6	SW	2
22	29.3	46.5	6.3	SW	2
23	29.4	43.1	5.3	SW	4

Date:13.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	31.6	48.5	5.5	S	5
1	30.4	47.4	5.4	S	4
2	31.3	45.2	4.5	SW	3
3	32.2	45.4	4.6	SW	3
4	31.1	40.5	5.7	SW	2
5	30.5	40.1	6.5	SW	2
6	32.3	41.3	6.6	SW	4
7	29.1	43.1	5.3	WSW	3
8	29.3	45.2	5.1	WSW	2
9	28.1	43.3	4.5	WSW	4
10	26.1	41.1	4.3	SSW	2
11	28.2	40.8	5.9	WSW	2
12	29.3	40.4	4.4	WSW	2
13	30.2	45.3	5.2	WSW	3
14	31.1	47.8	5.8	SW	2
15	31.4	45.1	6.4	SW	4
16	32.8	43.3	4.6	SW	3
17	33.9	45.5	5.3	SSW	5
18	32.4	48.1	5.1	WSW	3
19	33.5	49.3	6.3	SSW	2
20	34.4	50.5	6.1	WSW	3
21	33.6	51.3	5.0	SW	3
22	32.5	51.5	5.5	SW	3
23	31.4	52.1	5.8	SW	4

Date:14.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.2	40.1	6.8	SSW	4
1	31.1	45.2	6.8	SSW	2
2	32.1	46.3	5.3	WSW	4
3	31.9	49.6	5.3	SSW	4
4	33.2	50.2	4.6	WSW	5
5	34.2	46.3	5.9	WSW	5
6	34.2	49.2	5.3	SW	2
7	36.6	45.5	4.6	SW	4
8	37.7	48.2	5.2	SW	2
9	39.9	45.8	6.3	SW	4
10	39.0	43.6	5.8	WSW	5
11	40.0	40.0	6.6	SSW	5
12	41.8	39.2	5.6	SSW	2
13	41.8	40.4	6.6	SSW	5
14	40.9	41.6	7.2	SSW	4
15	40.5	42.6	5.6	WSW	4
16	41.4	43.3	5.2	WSW	4
17	41.1	46.2	5.7	SSW	2
18	39.2	45.3	6.2	WSW	2
19	37.5	48.5	6.6	SW	4
20	36.4	47.5	5.3	SW	4
21	35.3	49.8	6.4	SW	5
22	33.2	50.2	6.1	SW	6
23	31.1	51.2	6.3	SW	5

Date:15.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.5	52.6	7.6	SW	4
1	29.1	54.2	5.5	SW	4
2	26.5	50.2	6.4	SW	5
3	24.1	47.1	6.2	SW	4
4	26.6	50.3	6.3	SSW	5
5	27.5	51.4	5.4	SSW	4
6	28.3	50.6	5.4	SSW	4
7	29.1	48.4	5.4	WSW	4
8	30.3	52.3	6.2	WSW	5
9	31.5	51.4	4.3	WSW	3
10	32.4	52.6	4.4	WSW	4
11	33.0	49.4	5.5	WSW	5
12	34.8	48.8	5.3	WSW	3
13	34.3	47.4	4.4	WSW	5
14	39.6	45.7	3.8	WSW	5
15	38.5	43.6	5.6	WSW	4
16	38.5	46.7	6.7	WSW	2
17	37.4	49.9	4.8	SSW	4
18	38.3	48.6	6.6	WSW	2
19	37.2	51.4	5.4	SSW	4
20	36.2	52.3	5.3	WSW	4
21	35.4	50.5	5.5	WSW	3
22	34.3	51.9	5.4	SW	3
23	32.5	50.8	5.6	W	3

Date:16.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	27.9	50.6	6.6	W	3
1	27.4	50.1	5.5	W	4
2	29.8	51.3	5.4	W	2
3	28.2	57.1	5.2	SW	3
4	29.3	55.2	6.6	SW	1
5	27.4	54.5	6.5	SSW	2
6	28.8	52.5	4.3	SSW	3
7	29.4	51.2	6.4	WSW	3
8	30.5	49.3	5.6	WSW	4
9	29.3	51.1	6.4	WSW	5
10	29.4	50.2	6.4	WSW	4
11	30.8	49.3	6.5	WSW	5
12	30.4	48.1	5.7	SSW	4
13	31.5	47.5	6.8	SSW	4
14	32.3	48.2	6.6	WSW	5
15	30.4	47.3	4.4	WSW	6
16	29.2	50.3	6.2	WSW	4
17	29.3	51.3	5.6	SSW	6
18	28.1	52.4	6.4	WSW	6
19	28.5	55.5	6.5	SW	5
20	27.5	54.1	5.3	SW	5
21	27.2	52.2	5.9	SW	5
22	27.6	50.2	6.5	SW	4
23	28.3	47.1	6.6	SW	4

Date:17.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	27.9	56.6	5.6	W	5
1	28.4	55.4	4.4	SW	5
2	28.2	52.2	6.5	SW	4
3	27.1	60.3	4.5	SW	5
4	27.2	61.1	5.5	W	4
5	26.3	60.4	6.3	W	3
6	26.1	58.5	4.5	W	3
7	26.2	59.6	5.5	SW	3
8	28.3	55.1	6.3	SW	2
9	29.1	54.8	6.1	SW	4
10	29.6	50.6	5.2	SW	4
11	30.3	50.3	5.3	WSW	5
12	30.6	49.4	6.4	SW	3
13	31.4	49.2	5.6	SW	3
14	31.6	47.3	6.2	W	3
15	30.3	48.4	6.3	WSW	4
16	29.1	49.5	6.1	WSW	3
17	29.5	50.6	5.3	SSW	3
18	28.6	51.4	6.1	WSW	4
19	28.5	49.2	5.5	SSW	3
20	27.4	48.8	5.1	WSW	4
21	26.3	47.4	6.5	WSW	3
22	25.6	48.6	5.1	SW	4
23	27.1	50.4	5.5	SW	4

Date:18.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	27.6	44.6	8.8	SW	5
1	26.4	41.5	8.6	SSW	5
2	26.5	53.6	7.4	WSW	4
3	26.3	55.6	7.2	SSW	4
4	26.1	61.4	8.3	SSW	4
5	25.5	62.5	6.1	SSW	2
6	26.3	61.6	7.2	SSW	4
7	28.4	62.1	5.3	WSW	4
8	30.6	53.2	6.1	WSW	4
9	30.7	55.3	6.2	WSW	4
10	31.6	59.5	6.3	SSW	6
11	32.4	55.6	7.1	SW	5
12	34.5	53.4	7.5	SSW	4
13	35.6	56.6	6.6	SSW	4
14	36.4	53.3	5.4	WSW	5
15	34.3	52.5	5.3	WSW	2
16	35.1	54.4	5.1	WSW	4
17	33.3	55.3	6.2	WSW	5
18	30.1	55.1	6.3	WSW	4
19	30.2	56.3	5.1	SW	4
20	29.3	61.1	6.2	SW	4
21	28.4	61.6	6.2	SW	5
22	27.8	62.4	6.1	W	4
23	26.4	61.6	6.5	W	5

Date:19.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	25.8	67.8	5.8	SW	2
1	24.4	65.4	5.4	SW	2
2	23.4	62.3	6.6	SW	4
3	24.6	60.4	6.4	SW	2
4	25.4	59.5	6.5	SW	2
5	26.5	56.3	6.3	SW	4
6	30.3	51.4	6.3	WSW	4
7	31.7	53.5	5.4	WSW	6
8	32.5	52.6	5.5	WSW	4
9	32.9	53.4	5.3	WSW	4
10	34.6	51.3	5.4	WSW	6
11	36.4	50.3	5.4	WSW	2
12	35.8	49.1	5.6	SSW	4
13	37.6	45.2	4.6	WSW	4
14	35.4	40.3	4.2	WSW	2
15	38.8	43.1	4.6	WSW	2
16	37.4	46.5	5.2	WSW	4
17	37.8	49.3	5.7	SSW	2
18	39.7	48.1	6.4	WSW	2
19	37.4	46.3	5.5	SSW	4
20	36.2	50.1	4.3	WSW	4
21	35.4	55.5	4.4	WSW	2
22	33.5	57.5	4.1	SW	2
23	31.6	60.3	4.2	SW	4

Date:20.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	26.9	52.8	6.9	W	3
1	26.3	51.4	5.6	SW	5
2	26.8	50.6	4.4	SW	3
3	27.6	52.4	6.6	SW	4
4	27.4	51.8	5.9	W	4
5	28.5	51.6	6.4	SW	4
6	28.6	52.4	5.6	WSW	3
7	29.4	51.9	6.3	WSW	3
8	31.5	50.4	4.4	SSW	3
9	32.9	49.6	4.5	SSW	4
10	32.4	47.4	5.6	SW	4
11	33.5	45.5	4.4	SW	3
12	33.6	47.6	5.9	SW	5
13	34.4	48.4	5.4	WSW	5
14	34.5	46.2	6.6	WSW	5
15	34.6	44.1	6.6	WSW	4
16	35.4	45.5	4.4	WSW	4
17	35.5	50.6	4.5	SSW	4
18	36.6	50.8	4.3	WSW	3
19	36.4	51.9	5.4	SSW	3
20	34.5	51.4	5.5	WSW	3
21	32.4	52.9	5.6	W	3
22	30.5	51.4	4.4	W	3
23	29.4	51.9	4.8	W	4

Date:21.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	25.6	65.6	5.6	SW	4
1	26.4	67.4	5.4	SW	5
2	28.5	69.5	5.6	SW	4
3	29.3	63.4	4.4	SW	6
4	27.4	65.2	4.5	SW	6
5	29.5	68.3	4.3	SW	6
6	29.3	67.4	3.4	SSW	6
7	29.6	68.8	4.2	WSW	5
8	28.4	65.6	4.5	WSW	5
9	29.5	62.4	3.1	SW	5
10	30.3	61.8	4.3	SW	4
11	30.4	60.9	3.5	SW	3
12	31.5	58.4	4.4	SSW	4
13	31.3	57.5	3.2	SSW	3
14	31.4	56.3	4.3	WSW	2
15	32.6	55.4	6.1	WSW	2
16	32.4	58.8	4.2	WSW	2
17	33.2	59.4	2.1	SSW	3
18	34.3	60.5	4.5	SW	3
19	32.4	61.3	2.5	SW	3
20	31.6	62.4	2.1	WSW	4
21	30.4	65.8	4.3	WSW	6
22	29.6	64.8	3.1	SW	2
23	28.4	65.8	4.5	SW	4

Date:22.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.6	59.8	6.9	W	5
1	28.4	59.6	5.6	W	4
2	26.5	56.5	6.5	W	4
3	25.3	56.3	6.6	W	4
4	26.4	56.4	6.4	SW	4
5	28.2	56.8	5.5	SW	5
6	29.3	53.6	6.3	SW	5
7	30.4	51.4	6.5	SW	5
8	31.5	48.5	7.5	WSW	5
9	31.5	49.3	6.1	WSW	5
10	32.5	45.4	6.3	WSW	5
11	32.3	44.5	7.4	WSW	4
12	32.4	45.9	8.5	SSW	5
13	32.2	46.8	8.6	SSW	5
14	33.3	47.6	7.4	WSW	5
15	32.1	46.5	8.6	WSW	5
16	31.5	45.4	7.4	WSW	4
17	31.6	49.4	6.5	SSW	4
18	30.4	48.6	7.3	WSW	5
19	31.5	50.4	8.4	SSW	5
20	30.3	53.5	8.6	SW	4
21	30.1	55.6	6.6	SW	5
22	29.6	55.4	7.4	SW	4
23	29.4	56.6	6.5	SW	5

Date:23.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	24.8	52.7	6.6	SW	4
1	25.4	54.5	5.4	SW	5
2	26.3	55.6	6.5	SW	5
3	28.4	55.4	5.3	SW	5
4	28.5	56.5	6.4	SSW	6
5	27.6	60.6	6.5	WSW	6
6	29.4	59.4	6.5	SSW	5
7	29.5	55.5	6.5	WSW	5
8	28.3	55.3	4.2	WSW	5
9	28.4	50.4	5.8	WSW	5
10	29.5	51.5	5.4	SW	4
11	31.3	49.5	5.5	SW	4
12	32.4	46.5	6.6	SW	5
13	32.5	46.6	5.4	SSW	5
14	31.3	45.4	4.8	WSW	5
15	31.4	43.5	4.4	WSW	5
16	30.8	46.6	6.6	WSW	4
17	30.8	45.4	4.4	SSW	5
18	29.4	49.5	6.8	WSW	6
19	29.3	50.6	6.4	SSW	4
20	28.4	51.4	5.8	WSW	5
21	28.2	52.6	5.4	WSW	5
22	26.2	53.4	5.8	SW	3
23	25.4	55.5	5.3	SW	2

Date:24.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	30.6	48.8	5.5	SW	4
1	29.5	51.4	6.4	SW	4
2	28.5	54.7	6.6	SW	4
3	30.4	53.6	6.4	SW	5
4	31.3	51.4	6.3	SW	5
5	32.4	51.8	5.4	SW	5
6	31.5	52.8	5.3	SW	4
7	32.3	54.6	5.4	WSW	5
8	33.4	50.4	5.6	WSW	2
9	35.5	52.8	6.4	WSW	2
10	35.3	50.6	7.5	SW	4
11	36.4	48.4	5.6	SW	5
12	35.3	49.8	6.1	SW	5
13	33.6	46.6	6.2	SW	4
14	34.4	46.4	6.3	WSW	5
15	34.8	45.3	7.1	WSW	5
16	33.6	46.4	5.2	WSW	5
17	31.4	48.8	6.3	SSW	5
18	32.6	46.9	5.1	WSW	5
19	33.4	43.4	5.5	SSW	5
20	32.6	45.5	6.2	W	4
21	30.4	43.3	7.1	W	3
22	29.6	44.4	7.3	SW	4
23	28.6	45.8	5.1	SW	5

Date:25.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	29.5	52.6	4.9	SW	6
1	29.4	51.5	4.0	SSW	6
2	30.3	54.2	2.9	WSW	6
3	30.4	49.5	4.1	SSW	6
4	30.2	46.3	2.3	WSW	5
5	29.3	48.4	4.8	WSW	6
6	30.4	46.3	6.4	WSW	7
7	31.5	47.4	4.5	WSW	7
8	32.3	50.5	2.6	WSW	7
9	32.4	51.6	4.5	WSW	5
10	32.2	50.4	4.8	SSW	6
11	34.3	45.6	4.6	SSW	6
12	36.1	45.4	4.6	SSW	6
13	37.2	39.2	4.6	SSW	6
14	38.3	35.3	2.2	WSW	7
15	36.4	30.4	4.6	WSW	6
16	34.2	34.5	2.2	WSW	4
17	32.3	36.6	2.7	SSW	7
18	30.1	38.4	4.2	WSW	6
19	29.3	40.2	2.6	SSW	7
20	27.1	40.3	4.5	WSW	5
21	26.3	42.4	2.8	WSW	4
22	27.1	44.2	4.9	SWW	2
23	28.3	45.3	4.3	WSW	4

Date:26.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	28.8	55.6	5.6	WSW	4
1	28.8	53.4	6.5	WSW	4
2	28.6	51.5	4.8	WSW	5
3	27.4	52.3	5.4	SSW	4
4	26.6	50.1	5.3	SSW	3
5	25.6	53.3	4.7	WSW	4
6	27.1	57.1	3.5	SSW	5
7	29.3	54.3	3.6	WSW	5
8	30.4	49.1	4.9	SSW	4
9	32.8	45.3	4.8	WSW	5
10	31.6	49.5	5.7	WSW	4
11	30.4	50.5	6.5	SSW	6
12	31.5	51.3	6.2	SSW	4
13	32.3	48.4	5.1	SSW	5
14	30.4	49.6	6.4	WSW	5
15	31.2	46.3	5.6	SSW	5
16	32.3	45.5	6.8	SW	5
17	31.9	44.5	7.9	SW	5
18	30.3	42.9	6.4	SW	4
19	28.4	40.4	6.7	SW	4
20	27.6	47.6	5.3	WSW	4
21	27.3	51.4	5.9	W	4
22	27.4	53.5	6.6	W	2
23	27.2	54.5	6.5	W	4

Date:27.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	27.4	62.6	6.8	SW	3
1	28.2	62.5	6.8	SW	4
2	27.4	60.3	5.3	SW	4
3	28.5	61.4	6.3	SW	3
4	28.3	59.2	6.6	SW	3
5	27.4	57.3	5.9	WSW	4
6	28.5	55.4	6.3	SSW	4
7	29.3	55.5	4.6	SSW	6
8	29.4	54.3	5.2	SW	4
9	30.5	56.4	6.3	SW	3
10	31.6	54.5	7.8	SW	6
11	31.4	51.3	6.6	WSW	4
12	32.5	51.4	5.6	SSW	4
13	32.3	53.5	7.6	SSW	4
14	33.1	52.3	7.2	WSW	4
15	34.5	55.4	6.6	SSW	2
16	35.3	56.5	7.2	WSW	4
17	33.4	58.6	6.7	SSW	6
18	33.5	60.4	5.2	WSW	2
19	30.6	61.6	5.6	SW	4
20	29.4	62.4	5.3	SW	4
21	28.5	63.3	4.4	SW	2
22	27.6	61.4	6.1	SW	2
23	26.4	60.6	6.3	SW	4

Date:28.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	27.6	61.6	3.6	SW	4
1	27.4	62.4	4.5	SW	4
2	27.2	60.5	3.4	SW	5
3	25.5	61.6	3.3	SW	6
4	25.3	61.1	4.4	SW	5
5	27.4	60.3	4.2	SSW	5
6	28.5	63.1	5.3	SSW	3
7	29.3	60.3	4.4	WSW	3
8	29.4	59.5	5.5	WSW	3
9	30.5	56.6	5.3	SW	2
10	31.6	55.7	6.4	SW	2
11	31.4	57.8	4.5	SW	3
12	32.5	60.5	4.5	W	3
13	34.3	62.7	5.3	W	3
14	35.4	61.5	6.4	SW	2
15	36.8	62.7	4.6	WSW	4
16	35.8	61.5	6.4	WSW	2
17	36.8	63.7	4.2	SSW	4
18	34.4	61.5	5.3	WSW	5
19	33.3	61.5	5.1	SSW	4
20	32.4	62.3	6.3	WSW	4
21	30.3	61.1	5.3	WSW	2
22	29.4	60.2	5.6	SW	2
23	27.9	58.6	5.5	SW	3

Date:29.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	25.5	79.3	5.6	SW	5
1	26.6	81.5	5.4	SW	4
2	27.5	80.6	5.5	SW	2
3	27.4	76.8	6.3	SW	4
4	29.5	77.4	6.4	WSW	5
5	29.5	75.5	6.5	WSW	4
6	30.6	76.6	5.3	WSW	5
7	30.4	75.2	5.4	WSW	4
8	31.6	80.3	5.5	WSW	5
9	30.4	76.1	4.3	SW	5
10	30.2	75.4	5.4	SW	4
11	31.3	70.4	5.5	SW	4
12	31.4	64.5	6.3	SW	4
13	31.5	60.6	6.4	SW	5
14	31.6	61.5	6.5	SSW	4
15	31.4	69.2	4.3	WSW	4
16	32.5	65.6	6.4	WSW	4
17	31.6	60.8	4.5	SSW	2
18	31.4	59.5	4.3	WSW	2
19	32.5	61.9	6.5	SSW	4
20	31.6	64.5	4.3	SW	4
21	30.5	63.8	4.4	SW	5
22	29.4	68.2	5.5	SW	6
23	28.5	72.2	5.3	SW	5

Date:30.06.2002

Hour	Temperature Dry (OC)	Relative Humidity (%)	Wind		Cloud (Octas)
			Speed (kmph)	Direction	
0	20.5	85.8	4.8	W	5
1	22.5	82.6	5.8	W	5
2	23.5	83.4	5.6	SW	6
3	25.6	81.3	5.3	SW	6
4	26.4	82.4	5.4	SW	4
5	26.2	82.2	6.6	WSW	4
6	28.3	83.3	6.4	WSW	5
7	30.4	82.4	5.6	WSW	5
8	30.2	80.5	5.4	SSW	5
9	31.3	80.3	4.3	WSW	4
10	34.4	76.5	4.3	WSW	5
11	33.2	75.4	5.5	SSW	4
12	34.3	76.5	5.6	SSW	4
13	33.6	75.3	5.6	SSW	5
14	32.4	76.4	6.2	SW	4
15	30.6	78.5	4.6	WSW	5
16	29.3	79.4	4.2	WSW	6
17	28.4	73.3	5.7	SSW	6
18	26.7	70.4	4.2	WSW	6
19	27.5	69.2	4.6	SSW	4
20	28.2	68.3	4.3	WSW	4
21	29.6	65.4	4.4	SW	5
22	29.3	66.3	4.1	SW	6
23	30.4	65.2	6.3	SW	5

AMBIENT AIR QUALITY

LOCATION: A1 MINE SITE

(Unit : $\mu\text{g}/\text{m}^3$)

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
01.04.2002	9	18	8	17	14	18	231	42
02.04.2002	11	15	10	14	17	15	216	44
08.04.2002	17	16	16	24	15	24	241	50
09.04.2002	10	20	14	17	14	23	255	45
15.04.2002	16	24	17	21	16	20	218	46
16.04.2002	15	21	13	23	12	22	298	52
22.04.2002	9	23	10	20	9	19	224	53
23.04.2002	12	15	11	22	10	21	237	51
01.05.2002	8	19	9	18	8	19	258	47
02.05.2002	11	21	12	14	11	15	215	41
09.05.2002	13	14	11	15	10	13	267	46
10.05.2002	10	15	8	16	8	14	219	43
16.05.2002	14	17	13	15	12	16	278	48
17.05.2002	9	19	10	18	9	17	284	50
24.05.2002	8	16	9	17	8	16	262	49
25.05.2002	12	15	13	16	12	15	292	42
02.06.2002	11	18	10	19	9	18	244	43
03.06.2002	15	22	14	21	13	22	232	44
10.06.2002	10	23	9	23	10	21	251	51
11.06.2002	12	19	11	20	12	20	223	46
18.06.2002	13	20	12	19	11	17	237	49
19.06.2002	10	23	9	22	9	21	277	43
26.06.2002	11	15	10	16	10	17	233	48
27.06.2002	12	17	13	18	12	19	241	44

AVERAGE SPM – 248.2 $\mu\text{g}/\text{m}^3$
 AVERAGE RPM – 47.6 $\mu\text{g}/\text{m}^3$
 AVERAGE SO₂ – 11.40 $\mu\text{g}/\text{m}^3$
 AVERAGE NO_x – 18.50 $\mu\text{g}/\text{m}^3$

AMBIENT AIR QUALITY

LOCATION: A2 ANDHERI DEVORI

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
03.04.2002	17	19	16	21	14	18	151	45
04.04.2002	15	17	14	18	19	19	149	43
10.04.2002	14	23	13	22	11	21	150	50
11.04.2002	19	26	18	25	17	26	168	54
17.04.2002	16	25	15	24	14	25	147	52
18.04.2002	11	28	19	27	18	16	153	57
24.04.2002	14	24	13	26	12	24	162	47
25.04.2002	15	18	14	19	10	20	159	51
03.05.2002	16	20	15	28	14	27	146	59
04.05.2002	10	22	19	21	13	28	149	57
11.05.2002	12	21	10	20	11	22	155	48
12.05.2002	14	16	13	17	12	18	161	56
18.05.2002	13	17	10	16	17	17	154	53
19.05.2002	16	19	15	20	16	21	156	44
26.05.2002	14	23	13	24	12	23	159	49
27.05.2002	15	25	14	23	13	22	157	54
04.06.2002	10	27	11	26	11	26	160	55
05.06.2002	11	26	12	25	14	24	148	58
12.06.2002	13	18	14	19	13	20	149	46
13.06.2002	18	16	17	17	16	18	157	49
20.06.2002	17	23	18	22	17	21	159	53
21.06.2002	14	25	13	24	12	23	160	57
28.06.2002	12	22	11	21	10	20	154	46
29.06.2002	13	21	12	20	13	21	151	45

AVERAGE SPM – 155.75 µg/m³
 AVERAGE RPM – 52.1 µg/m³
 AVERAGE SO₂ – 13.98 µg/m³
 AVERAGE NO_x – 21.75 µg/m³

AMBIENT AIR QUALITY

LOCATION: A3 SHIVPURA GHATA

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
05.04.2002	14	11	13	17	12	16	137	37
06.04.2002	12	18	11	19	10	18	142	36
12.04.2002	9	10	10	12	9	13	132	41
13.04.2002	15	14	9	10	8	11	149	44
19.04.2002	10	19	15	13	14	14	150	45
20.04.2002	11	12	12	20	13	21	133	34
26.04.2002	13	11	14	19	12	20	135	49
27.04.2002	12	10	11	11	10	12	151	48
05.05.2002	8	22	9	21	15	22	136	46
06.05.2002	10	19	8	18	9	19	139	33
13.05.2002	9	21	10	22	8	21	143	37
14.05.2002	12	17	11	17	12	15	146	34
20.05.2002	11	13	12	14	13	13	150	42
21.05.2002	10	15	9	16	10	15	137	40
28.05.2002	8	17	8	18	9	17	134	32
29.05.2002	9	21	9	22	11	21	137	39
06.06.2002	14	20	15	19	14	18	140	47
07.06.2002	15	14	14	13	15	14	143	35
14.06.2002	10	12	9	12	10	13	146	37
15.06.2002	12	13	11	11	12	15	149	40
22.06.2002	11	9	10	18	9	17	151	44
23.06.2002	13	22	12	22	13	21	138	47
29.06.2002	10	16	9	15	10	16	141	36
30.06.2002	12	17	11	16	12	19	144	39

AVERAGE SPM – 142.71 µg/m³
 AVERAGE RPM – 41.08 µg/m³
 AVERAGE SO₂ – 11.13 µg/m³
 AVERAGE NO_x – 18.05 µg/m³

AMBIENT AIR QUALITY

LOCATION: A4 KHIMPURA

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
01.04.2002	9	15	10	14	8	19	141	50
02.04.2002	10	17	11	16	12	15	145	54
08.04.2002	14	19	16	15	15	13	140	44
09.04.2002	12	14	13	14	14	20	142	43
15.04.2002	16	11	14	12	16	14	144	51
16.04.2002	8	20	9	19	10	18	143	58
22.04.2002	9	12	10	12	7	13	146	57
23.04.2002	11	16	7	20	9	10	145	44
01.05.2002	10	13	11	14	12	13	140	43
02.05.2002	9	14	8	13	9	14	144	41
09.05.2002	7	13	9	15	11	16	146	42
10.05.2002	12	10	13	12	12	13	140	53
16.05.2002	13	11	11	13	13	14	143	55
17.05.2002	8	14	9	10	10	10	142	56
24.05.2002	7	19	8	18	9	19	145	54
25.05.2002	10	17	9	17	8	20	144	43
02.06.2002	15	18	14	19	15	16	142	44
03.06.2002	14	12	13	13	14	14	141	47
10.06.2002	8	14	9	15	10	17	146	49
11.06.2002	10	16	8	17	7	19	143	51
18.06.2002	7	19	10	19	9	16	141	54
19.06.2002	8	17	9	18	8	17	144	56
26.06.2002	10	16	11	15	10	14	145	47
27.06.2002	13	15	12	17	13	15	140	44

AVERAGE SPM – 144.0 $\mu\text{g}/\text{m}^3$
 AVERAGE RPM – 50.1 $\mu\text{g}/\text{m}^3$
 AVERAGE SO₂ – 10.62 $\mu\text{g}/\text{m}^3$
 AVERAGE NO_x – 15.25 $\mu\text{g}/\text{m}^3$

AMBIENT AIR QUALITY

LOCATION: A5 MUNDOTI

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
03.04.2002	9	10	11	11	8	12	136	41
04.04.2002	6	17	7	16	13	10	140	36
10.04.2002	12	14	10	18	5	11	137	39
11.04.2002	7	15	8	17	7	9	139	40
17.04.2002	10	16	9	15	10	18	149	46
18.04.2002	13	12	5	9	6	15	135	43
24.04.2002	8	18	9	17	8	17	138	47
25.04.2002	12	11	11	12	10	14	142	36
03.05.2002	11	10	10	11	11	12	135	38
04.05.2002	6	16	7	15	8	13	147	44
11.05.2002	9	17	8	16	9	15	145	42
12.05.2002	10	9	12	10	11	11	148	35
18.05.2002	5	10	13	9	12	10	137	37
19.05.2002	7	12	6	11	7	12	139	40
26.05.2002	11	14	10	13	9	9	140	39
27.05.2002	12	16	13	15	12	14	142	46
04.06.2002	8	9	10	9	10	10	143	35
05.06.2002	10	10	9	11	8	12	136	40
12.06.2002	12	12	11	13	12	14	139	36
13.06.2002	13	13	12	12	11	11	141	39
20.06.2002	7	15	8	14	9	15	146	37
21.06.2002	6	14	7	13	8	14	147	40
28.06.2002	10	12	9	11	10	10	136	44
29.06.2002	9	13	10	12	11	13	139	45

AVERAGE SPM – 141.6 $\mu\text{g}/\text{m}^3$
 AVERAGE RPM – 41.20 $\mu\text{g}/\text{m}^3$
 AVERAGE SO₂ – 9.34 $\mu\text{g}/\text{m}^3$
 AVERAGE NO_x – 12.86 $\mu\text{g}/\text{m}^3$

AMBIENT AIR QUALITY

LOCATION: A6 RUPAHELI

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
05.04.2002	6	11	6	10	6	12	125	42
06.04.2002	6	11	6	11	6	12	123	40
12.04.2002	7	11	7	12	11	7	120	41
13.04.2002	8	12	7	11	6	12	122	41
19.04.2002	8	12	7	10	6	12	124	41
20.04.2002	6	12	6	10	6	11	124	42
26.04.2002	6	12	6	10	6	11	126	42
27.04.2002	7	12	6	10	8	10	125	43
05.05.2002	7	10	8	12	6	10	120	42
06.05.2002	7	10	6	11	6	12	120	40
13.05.2002	7	10	8	12	6	12	121	41
14.05.2002	6	12	6	12	6	12	122	41
20.05.2002	8	12	7	13	7	11	124	44
21.05.2002	7	10	8	13	8	12	121	44
28.05.2002	8	11	7	12	7	10	125	43
29.05.2002	6	12	6	12	8	12	125	41
06.06.2002	7	11	7	10	6	11	123	40
07.06.2002	6	10	7	11	6	11	120	39
14.06.2002	7	11	8	11	6	10	124	40
15.06.2002	6	11	9	12	7	10	121	41
22.06.2002	6	12	7	11	6	10	123	41
23.06.2002	6	11	6	12	6	10	121	43
29.06.2002	7	12	6	12	7	10	125	40
30.06.2002	7	11	8	10	6	11	122	42

AVERAGE SPM – 119.25 µg/m³
 AVERAGE RPM – 42.41 µg/m³
 AVERAGE SO₂ – 6.75 µg/m³
 AVERAGE NO_x – 11.11 µg/m³

AMBIENT AIR QUALITY

LOCATION: A7 SARKHANA

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
01.04.2002	5	10	5	11	5	12	115	40
02.04.2002	5	10	6	11	5	12	116	40
08.04.2002	6	11	6	12	5	11	119	41
09.04.2002	6	10	6	13	6	12	120	42
15.04.2002	6	11	6	13	7	13	117	44
16.04.2002	6	11	7	12	7	11	117	41
22.04.2002	5	12	6	12	7	11	114	41
23.04.2002	5	10	6	10	7	11	112	40
01.05.2002	4	12	5	10	7	10	115	42
02.05.2002	4	11	5	12	6	10	115	41
09.05.2002	4	12	5	11	6	11	116	41
10.05.2002	5	12	5	11	6	10	112	41
16.05.2002	6	11	5	11	6	10	113	41
17.05.2002	7	12	6	12	5	11	115	43
24.05.2002	7	10	6	12	5	10	114	41
25.05.2002	7	10	6	12	5	12	115	42
02.06.2002	6	11	7	12	5	11	113	40
03.06.2002	6	10	7	12	5	11	112	42
10.06.2002	6	11	7	11	6	12	116	40
11.06.2002	5	12	8	13	7	10	116	41
18.06.2002	5	11	7	13	8	12	113	40
19.06.2002	6	12	7	13	6	11	115	40
26.06.2002	5	12	6	12	7	11	116	41
27.06.2002	5	12	7	12	8	10	115	41

AVERAGE SPM – 116.04 $\mu\text{g}/\text{m}^3$
 AVERAGE RPM – 42.08 $\mu\text{g}/\text{m}^3$
 AVERAGE SO₂ – 5.91 $\mu\text{g}/\text{m}^3$
 AVERAGE NO_x – 11.30 $\mu\text{g}/\text{m}^3$

AMBIENT AIR QUALITY

LOCATION: A8 LASORIYA

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
03.04.2002	6	8	6	9	6	8	135	32
04.04.2002	6	9	5	8	6	8	134	30
10.04.2002	6	8	6	9	7	8	134	30
11.04.2002	7	9	6	10	6	9	136	31
17.04.2002	7	8	7	10	7	9	135	31
18.04.2002	7	9	7	10	7	10	134	30
24.04.2002	8	9	8	10	6	9	133	30
25.04.2002	7	9	7	9	6	8	132	31
03.05.2002	7	9	6	9	6	8	132	30
04.05.2002	7	9	6	10	6	8	131	31
11.05.2002	6	9	6	10	7	8	135	31
12.05.2002	6	10	6	11	7	9	132	31
18.05.2002	6	10	6	9	7	9	135	31
19.05.2002	6	9	7	9	7	8	133	30
26.05.2002	7	9	7	10	7	9	134	30
27.05.2002	7	9	7	10	6	9	134	30
04.06.2002	7	9	6	11	6	9	133	32
05.06.2002	7	8	6	9	6	10	131	32
12.06.2002	6	8	6	9	7	8	132	31
13.06.2002	6	8	6	10	7	8	131	32
20.06.2002	6	8	7	10	7	9	131	31
21.06.2002	6	8	7	10	8	8	131	30
28.06.2002	7	9	7	9	7	8	131	31
29.06.2002	7	8	6	9	7	9	130	32

AVERAGE SPM – 133.87 $\mu\text{g}/\text{m}^3$
 AVERAGE RPM – 31.83 $\mu\text{g}/\text{m}^3$
 AVERAGE SO₂ – 6.54 $\mu\text{g}/\text{m}^3$
 AVERAGE NO_x – 8.95 $\mu\text{g}/\text{m}^3$

AMBIENT AIR QUALITY

LOCATION: A9 GANESHPURA

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
05.04.2002	7	10	7	12	6	10	119	50
06.04.2002	7	11	8	11	6	10	118	51
12.04.2002	6	10	7	11	6	10	116	48
13.04.2002	6	10	7	11	6	10	119	48
19.04.2002	6	11	8	12	7	12	119	48
20.04.2002	7	11	6	11	8	10	113	47
26.04.2002	7	12	6	12	9	11	120	49
27.04.2002	7	12	6	12	8	11	121	50
05.05.2002	7	12	6	11	7	12	120	51
06.05.2002	7	11	6	12	7	11	118	51
13.05.2002	6	11	7	10	8	12	118	52
14.05.2002	7	12	7	11	6	10	115	50
20.05.2002	6	12	8	10	7	10	114	54
21.05.2002	6	12	7	10	8	13	112	57
28.05.2002	7	11	8	12	9	11	114	53
29.05.2002	5	10	8	9	7	10	112	50
06.06.2002	6	10	8	12	6	10	114	51
07.06.2002	7	11	9	10	8	12	110	50
14.06.2002	6	12	7	11	7	11	112	53
15.06.2002	6	10	7	10	8	10	116	51
22.06.2002	7	11	8	9	6	12	113	54
23.06.2002	6	12	7	11	7	12	118	50
29.06.2002	7	12	7	11	7	12	120	50
30.06.2002	6	12	7	11	8	12	120	51

AVERAGE SPM – 117.29 µg/m³
 AVERAGE RPM – 51.79 µg/m³
 AVERAGE SO₂ – 6.93 µg/m³
 AVERAGE NO_x – 12.54 µg/m³

AMBIENT AIR QUALITY

LOCATION: A10 SAHASPURA

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
01.04.2002	6	10	6	11	7	10	120	65
02.04.2002	6	10	6	11	6	10	117	60
08.04.2002	6	12	6	10	7	11	113	63
09.04.2002	7	9	6	10	7	10	116	63
15.04.2002	8	9	6	10	7	10	115	64
16.04.2002	9	7	9	10	7	11	118	64
22.04.2002	9	10	7	10	7	11	120	64
23.04.2002	8	10	7	10	7	11	119	66
01.05.2002	7	10	7	11	6	10	115	66
02.05.2002	7	11	6	10	7	12	117	65
09.05.2002	7	9	6	12	6	10	120	63
10.05.2002	6	9	6	10	6	10	115	61
16.05.2002	6	9	6	12	7	11	114	60
17.05.2002	7	8	5	10	8	12	113	62
24.05.2002	8	10	7	11	9	11	115	61
25.05.2002	6	8	7	10	8	11	116	64
02.06.2002	6	8	6	9	8	12	119	63
03.06.2002	7	9	7	9	6	10	120	61
10.06.2002	6	10	8	9	7	11	121	59
11.06.2002	7	12	7	9	7	10	119	61
18.06.2002	6	10	6	9	6	12	120	63
19.06.2002	6	10	7	10	6	11	115	66
26.06.2002	6	11	7	11	6	10	117	65
27.06.2002	6	10	7	10	6	10	119	64

AVERAGE SPM – 118.20 µg/m³
 AVERAGE RPM – 64.04 µg/m³
 AVERAGE SO₂ – 6.7 µg/m³
 AVERAGE NO_x – 10.1 µg/m³

AMBIENT AIR QUALITY

LOCATION: A11 SUHAWA

Date	Clock hours						24 HOURS SPM	24 HOURS RPM
	08 – 16		16 – 24		00 – 08			
	SO ₂	NO _x	SO ₂	NO _x	SO ₂	NO _x		
03.04.2002	5	10	6	11	5	12	120	64
04.04.2002	5	10	6	11	5	11	117	63
10.04.2002	5	11	6	11	6	11	116	60
11.04.2002	6	11	5	12	5	11	115	60
17.04.2002	6	11	5	12	5	10	117	61
18.04.2002	6	11	5	12	6	10	118	61
24.04.2002	5	11	6	12	6	10	119	62
25.04.2002	5	12	5	12	6	11	118	64
03.05.2002	5	12	5	12	6	11	117	65
04.05.2002	6	12	6	11	6	10	116	63
11.05.2002	6	12	6	11	6	9	116	63
12.05.2002	5	12	6	11	5	10	117	61
18.05.2002	6	12	7	11	5	11	116	61
19.05.2002	6	11	7	10	5	12	116	62
26.05.2002	7	12	7	10	6	12	117	62
27.05.2002	7	11	6	10	6	11	119	60
04.06.2002	6	11	6	11	5	10	119	61
05.06.2002	6	12	6	12	6	11	117	63
12.06.2002	7	12	5	10	7	11	117	63
13.06.2002	7	12	5	11	7	10	117	64
20.06.2002	7	11	5	11	7	10	118	63
21.06.2002	6	12	5	12	7	10	117	61
28.06.2002	7	12	6	10	7	11	117	64
29.06.2002	6	12	6	11	7	10	118	62

AVERAGE SPM – 118.25 µg/m³
 AVERAGE RPM – 63.20 µg/m³
 AVERAGE SO₂ – 5.87 µg/m³
 AVERAGE NO_x – 11.06 µg/m³

ANNEXURE – 1**FAUNA OF 10 KM. STUDY AREA**

JUNGLE BABBLER	–	TURDOIDES STRIATUS
Common babber	–	Turdoides caudatus
Gree lee-eater	–	Merops trientalis
Redvented bulbul	–	Pyenonotus cafer
House crow	–	Corvus splendens
Jungle Crow	–	Corvus maerorhynchos
Indian tree pie	–	Dendrocitta vagabunda
Indian cuckoo	–	Cuculus micropterus
Indian ring dove	–	Streptopelia decaocto
Turtli dove	–	Streptopelia turtur
Senegal dove	–	Streptopelia sevegolensis
Blue role pigon	–	Columba livia
Black drongo	–	Dicurus odrimilis
Pond heran	–	Ardeola grayii
Cattle egret	–	Bubuleus ibis
Sarus crane	–	Grus antigone
House sparrow	–	Passer domesticus
Moopoe	–	Upupa epaps
White breasted kingfishes	–	Haliyon smyrnesis
Comman Myna	–	Acridotheres trists
Black myna	–	Acridotheres ginginianus
Rose ringed parakeet	–	Psittacula krameri
Grey partridge	–	Francolinus pondiceriamus
Indian white buded vulture	–	Gyps bengalensis

FLORA OF 10 KM. STUDY AREA

Heliotropium marifolium Retz. Naharsunda
Indigofera cordifolia Heyne ex Roth Nakali Neel
Indigofera linnaei Ali
Indigofera linifolia Var Campbell Wt. Ex Baker
Tephrosia hamiltonic Drumm Dhamasa
Boerhaavia diffusa Linn (santh) punnava
Crotalaria burnhia Busch-Ham ex Benth Desert grass
Leptadaenia pyrotechnica Kheep
Aerva tomentosa (Burm. F.) Juss. *Aerva* (Desestic)
Citrullus colocynthis (Linn) Schrad (Khurbooj)
Eragrostis pylosa (Linn) P. Beauv (Desert grass)
Zizyphus nummularia (Burm f.) Wt. et Arn.Ber (Jharben)
Chenopodium album Linn Battua
Aregemone mexicana Linn. Fibre plant DC.
Corchorus aestuans Linn. Fibre Plant (tilliaceup)
Aregemone mexicana Linn (Piladhutura) Pilikatel
Acacia nilotica (Linn) Del (Babul)
Prosopis juliflora (Khejari) P Cineraris
Azadirachta indica A. Juss (Nim)
Prosopis cineraria (Linn) Druce Khejri

ANNEXURE-4

DISASTER MANAGEMENT PLAN

1.1 INTRODUCTION

1.1.1 DEFINITION

A major emergency in a works is one, which has the potential to cause serious injury or loss of life. It may cause extensive damage to property and serious disruption both inside and outside the works. It would normally require the assistance of emergency services to handle it effectively.

1.1.2 SCOPE

An important element of mitigation is emergency planning, i.e. recognizing that accidents are possible, assessing the consequences of such accidents and deciding on the emergency procedures, both on site and off site, that would need to be implemented in the event of an emergency.

Emergency planning is just one aspect of safety and cannot be considered in isolation. Sheopura - Kesarpura Limestone Mines of M/s Shree Cement fully endorse this fact and hence before starting to prepare the plan, works management will ensure that the necessary standards, appropriate to their safety legislation, are in place.

1.1.3 OBJECTIVE

The overall objectives of the emergency plan will be:

- (a) To localize the emergency and, if possible eliminate it; and
- (b) To minimize the effects of the accident on people and property.

Elimination will require prompt action by operations and works emergency staff using, for example, fire-fighting equipment, water sprays etc.

Minimizing the effects may include rescue, first aid, evacuation, rehabilitation and giving information promptly to people living nearby.

1.1.4 IDENTIFICATION OF HAZARDS

The following type of Hazards are identified at Sheopura - Kesarpura Limestone Mines.

- a) Fire in HEMM, Electric Panels, Oil room, Diesel storage and magazine.
- b) Inundation in rainy season due to seasonal Nallah.

To deal the above emergencies, the Emergency Plan is prepared.

1.2 ON-SITE EMERGENCY PLANNING

1.2.1 CODE OF PRACTICE IN CASE OF FIRE AT MINES

Objective:-

To deal with Fire efficiently and quickly at different location of Mine including HEMM.

Source of Fire:-

- i) HEMM
- ii) Electrical Sub Station.
- iii) Oil & Lubricant Room.
- iv) Diesel Pump.
- v) Magazine.

Line of Action:-

- i) Any person notices any sign of fire shall immediately take steps to give warning by blowing the siren continuously and take steps to extinguish the fire by using appliances available near the site.
- ii) Duties of Mine Official:- The Mine officials receiving the warning shall forthwith inform on following Phone numbers.
 - a) Fire fighting station
 - b) Security main gate
 - c) Mines Manager
 - d) Mines Agent

After giving information reach the spot, remove Man & Machinery and take steps to tackle the fire in accordance with the fire fighting instructions. Inform Hospital on Phone to get Ambulance if required.

- i) Duties of Fire Fighting Team:- On receiving warning the team shall reach the site of fire and depending on its nature, class and extent shall take steps to extinguish it and rescue persons if involved in fire.
- ii) Duties of Mines Manager:- (a) On receipt of information about fire the Manager shall forthwith rush to the spot and access the extent of fire. He shall supervise the fire fighting operation and make necessary arrangement for medical aid to affected person, if any.
 - (b) Inform to senior officials and statutory bodies.

1.2.2 CODE OF PRACTICE IN CASE INUNDATION

Objective:-

To deal with the incidence efficiently and quickly.

- i) Seasonal Nallahs.

Line of Action:-

- i) Any person notices any rise in water level over danger mark (as marked in field at Nallah or any unsafe seepage or flow of Water over bunds in the working shall immediately take steps to give warning by blowing Siren and at the same time take necessary action for withdrawal of men and machinery.
- ii) Duties of Mine Official:- The Mine officials receiving the warning shall forthwith inform on following Phone numbers.
 - a) Security main gate
 - b) Mines Manager
 - c) Mines Agent

After giving information rush to the spot and take actions for safe removal of men & machinery from the site. Inform Hospital on Phone . for Ambulance, if required.
- iii) Duties of Security personnel:- They shall help in safe removal of men & machinery and rescue the persons, if required.
- iv) Duties of Mines Manager:-
 - (a) On receipt of information about inundation the Manager shall forthwith rush to the spot and supervise safe removal of affected person, if any.
 - (b) Inform to senior officials and statutory bodies.

1.2.3 APPOINTMENT OF PERSONNEL AND DEFINITION OF DUTIES

Effective emergency plans require that, in the event of an accident, nominated individuals be given specific responsibilities, often separate from their day-to-day activities. The two principal people are the site incident controller and the site main controller.

The site incident controller will take control of handling the incident. He or she will often be the person in charge of the plant at the time of the incident and should provide 24-hour cover when shift operation applies. The site incident controller will have to take decisions involving neighboring area perhaps, to be involved in an escalating emergency if it is not shut down.

The responsibilities of the site incident controller include the following:

- (a) To assess the scale of the incident (both for internal and external emergency services);

- (b) To initiate the emergency procedures to secure the safety of employees, minimize damage to plant and property and minimize loss of material;
- (c) To direct rescue and fire-fighting operations until (if necessary) the fire brigade arrives;
- (d) To search for casualties;
- (e) To arrange evacuation of non-essential workers to assembly areas;
- (f) To set up a communications point with the emergency control center;
- (g) To assume the responsibilities of the site main controller pending his or her arrival;
- (h) To provide advice and information as requested to the emergency services.

The site main controller will be chosen from the senior management of the works with general responsibility of directing operations from the emergency control center after relieving the site incident controller of the responsibility for overall control.

The specific responsibilities of the site main controller include;

- (a) To decide (if not decided already) whether a major emergency exists or is likely, requiring the emergency services and the off-site emergency plan;
- (b) To exercise direct operational control of the works outside the affected area;
- (c) Continually to review and assess possible developments to determine the most probable course of events;
- (d) To assess the shutting down of all operation and then evacuation, in consultation with the site incident controller and key personnel;
- (e) To ensure that casualties are receiving adequate attention;
- (f) To liaise with Chief officers of the fire and Police services and with the Mines Directorate and district authorities.
- (g) To control traffic movement within the works;
- (h) To arrange for a log of the emergency to be maintained;
- (i) To issue authorized statements to the new media;
- (j) To control rehabilitation of affected areas after the emergency.

Apart from the two site controllers, other works personnel will have key roles to play in the implementation of the emergency plan. These will include senior management of project not directly involved in the emergency, first aiders, atmospheric monitoring staff, casualty reception staff and public relations staff to liaise with the media. All need to be aware at the emergency pre-planning stage of the precise nature of their roles.

1.2.4 EMERGENCY CONTROL CENTERS

The emergency control center is the place from which the operations to handle the emergency will be directed and coordinated. The site main controller, key personnel and the senior officers of the fire and police services will attend it.

The center will be equipped to receive and transmit information and directions from and to the incident controller and other areas of the works, as well as outside.

Emergency control centers will therefore contain the following:

- (a) An adequate number of external telephones;
- (b) An adequate number of internal telephones;
- (c) A plan of the works, to show:
 - (i) Areas where there are large inventories of hazardous materials, if any;
 - (ii) Sources of safety equipment;
 - (iii) The fire-fighting system and additional
 - (iv) Site entrance and roadways, including up-to-date information on roadwork's;
 - (v) Assembly points;
 - (vi) The location of the works in relation to the surrounding community;
 - (vii) Lorry parks and rail sidings.
- (d) Notepads, pens and pencils;
- (e) A nominal roll of employees;
- (f) A list of key personnel, with addresses, telephone numbers, etc.

The emergency control center should be sited in an area of minimum risk.

1.2.5 ACTION ON SITE

The primary purpose of the on-site emergency plan is to control and contain the incident and so to prevent it from spreading to nearby area. It is not possible to cover every eventuality in the plan and the successful handling of the emergency will depend on appropriate action and decisions being taken on the spot. Other important aspects needing to be considered include the following:

(a) **Evacuation:**

Non-essential personnel will be evacuated from the incident area and also from adjacent area. Evacuation should be to a predetermined assembly point in a safe part of the works.

(b) **Accounting for personnel:**

It is important to be able to account for personnel during an emergency, but it can be particularly difficult because of visitors, contractors, shift changes, holidays and sickness absence, etc. However a rough idea of the number of workers present should always be made available.

(c) **Access to records:**

This will be necessary in order that relatives of any casualties can be quickly informed.

(d) **Public relations:**

Any incident will attract the interest of the media and a major accident is likely to involve widespread radio and television coverage. Unless appropriate arrangements are made, this can divert personnel from the task of handling the emergency. It is essential to make arrangements for the authoritative release of information during any emergency of significant length and a senior manager or member of the staff should be appointed as the sole source of this information. Inquiries made to other employees should be directed to this appointed person.

(e) **Rehabilitation:**

The emergency will continue until all fires have been extinguished with no risk of re-ignition or when the scape has been stopped and / or the gas cloud safely dispersed. Even then, care is required when re-entering the incident area. The local factory inspectorate may wish to initiate an inquiry and should be consulted regarding the collection of evidence before it is disturbed.

1.2.6 REHEARSING EMERGENCY PROCEDURES

To find any lacuna in the training, in workmanship, and in preparing the squad members mentally to face any situation, mock trials should be held at repeated intervals, without any prior intimation to the Disaster Squad.

1.2.7 POST DISASTER ANALYSIS AND EVALUATION

When the emergency is over, the team will carry out a detailed analysis of the causes of the accident, evaluate the influence of various factors and minimize them for future. At the same time, the adequacy of the Disaster Preparedness Plan will be evaluated and shortcomings will be rectified for subsequent improvement of the plan.

1.3 OFF-SITE EMERGENCY PLANNING

1.3.1 INTRODUCTION

The off-site emergency plan is an integral part of any hazard control system. It should be based on those accidents identified by the works management, which could affect people and the environment outside the works. Thus, the off-site plan follows logically from the analysis that took place to provide the basis for the on-site plan and the two plans should therefore complement each other. The key feature of a good off-site emergency plan is flexibility in its application to emergencies other than those specifically included in the formation of the plan. The roles of the various parties that may be involved in the implementation of an off-site plan are described below. The responsibility for the off-site plan will be likely to rest either with the works management or with the local authority.

Either way, the plan must identify an emergency coordinating officer who would take overall command of the off-site activities. As with the on-site plan, an emergency control center will be required within which the emergency coordinating officer can operate. An early decision will be required in many cases on the advice to be given to people living “within range” of the accident – in particular whether they should be evacuated or told to go indoors. Consideration of evacuation may include the following factors:

- a. In the case of a major fire but without explosion risk (e.g. an oil storage tank), or fly rocks due to blasting only houses close to the fire are likely to need evacuation, although a severe smoke hazard may require this to be reviewed periodically.
- b. But if the fire is escalating it might be necessary evacuate people nearby, but only if there is time; if insufficient time exists, people should be advised to stay indoors and shield themselves from the fire.

1.3.2 ASPECTS TO BE INCLUDED IN AN OFF-SITE EMERGENCY PLAN

Some of the aspects to be included in off-site emergency plan are as follows:

1.3.2.1 Organization

Details of command structure, warning systems, implementation procedures, emergency control centers Name and appointments of incident controller, site main controller, their deputies and other key personnel.

1.3.2.2 Communications

Identification of personnel involved, communication center, call signs, network, list of telephone numbers.

1.3.2.3 Special Emergency Equipment

Details of availability and location of heavy lifting gear, bulldozers, specified fire-fighting equipment, fireboats.

1.3.2.4 Voluntary Organizations

Details of organizers, telephone numbers, resources, etc.

1.3.2.5 Chemical information

Details of the hazardous substances, if any, stored or processed on each site and a summary of the risks associated with them.

1.3.2.6 Meteorological information

Arrangements for obtaining details of weather conditions prevailing at the time and weather forecasts.

1.3.2.7 Humanitarian Arrangements

Transport, evacuation centers, emergency feeding, treatment of injured, first aid, ambulances, temporary mortuaries.

1.3.2.8 Public Information

Arrangements for

- (a) Dealing with the media-press office
- (b) Informing relatives, etc.

1.3.2.9 Assessment

Arrangements for

- (a) Collecting information on the causes of the emergency
- (b) Reviewing the efficiency and effectiveness of all aspects of the emergency plan.

1.3.3 ROLE OF THE EMERGENCY COORDINATING OFFICER

The various emergency services will be coordinated by an emergency coordinating officer (ECO) who is likely to be a senior police officer but, depending on the circumstances, could be a senior fire officer. The ECO will liaise closely with the site main controller. Again depending on local arrangements, for very severe incidents with major or prolonged off-site consequences, the external control may pass to a senior local authority administrator or even an administrator appointed by the Central or State Government.

1.3.4 ROLES OF MAJOR HAZARD WORKS MANAGERMENTS

Where the local authority has the organization to formulate the plan, the role of works managements in off-site emergency planning will be to establish liaison with those preparing the plans and to provide information appropriate to such plans. This will include a description of possible on-site accidents with potential for off-site harm, together with their consequences and an indication of the relative likelihood of the accidents.

Advice should be provided by works managements to all the outside organizations which may become involved in handling the emergency off-site and which will need previously to have familiarized themselves with some of the technical aspects of the works activities, e.g. emergency services, medical departments, etc.

1.3.5 ROLE OF THE LOCAL AUTHORITY

In some places the duty to prepare the off-site plan lies with the local authorities. They may have appointed an emergency planning officer (EPO) to carryout all this duty as part of the EPO's roles in preparing for a whole range of different emergencies within the local authority area. The EPO will need to liaise with the works to obtain the information to provide the basis for the plan.

Rehearsals for off-site plans are important for the same reasons as on-site plans and will need to be organized by the EPO.

1.3.6 ROLE OF THE POLICE

The police normally assume the overall control of an emergency, with a senior officer designated as emergency coordinating officer.

Formal duties of the police during an emergency include protecting life and property and controlling traffic movements.

The functions include controlling bystanders, evacuating the public, identifying the dead and dealing with casualties and informing relatives of dead or injured.

1.3.7 ROLE OF THE FIRE AUTHORITIES

The control of a fire is normally the responsibility of the senior fire brigade officer who would take over the handling of the fire from the site incident controller on arrival at the site. The senior fire brigade officer may also have a similar responsibility for other events, such as explosions and toxic releases. Fire authorities having major hazard works in their area should have familiarized themselves with the location on site of all stores of flammable materials, water and foam supply points and fire-fighting equipments.

1.3.8 ROLE OF THE HEALTH AUTHORITIES

Health authorities, including doctors, surgeons, hospitals, ambulances and so on, have a vital part to play following a major accident and they should form an integral part of any emergency plan.

For major fires, injuries will be the result of the effects of thermal radiation to a varying degree and the knowledge and experience to handle this in all, but extreme, cases may be generally available in most hospitals.

1.3.9 ROLES OF THE GOVERNMENT SAFETY AUTHORITY

There will be the factory inspectorate in most places. Inspectors are likely to want to satisfy themselves that the organization responsible for including the off-site plan has made adequate arrangements for handling emergencies of all types including major emergencies.

In the event of an accident, local arrangements regarding the role of the factory inspector will apply. In the aftermath, factory inspectors may wish to ensure that the affected areas are rehabilitated safely.



Annexure-3



A. K. Jadia
आन निर्देशक (उत्तर)
Controller of Mines (North)
भारतीय खान ब्यूरो
Indian Bureau of Mines

अनुमोदित
APPROVED

**MODIFICATION IN THE SCHEME OF MINING
AND
PROGRESSIVE MINE CLOSURE PLAN
OF
SHEOPURA - KESARPURA
LIMESTONE MINES**

(856.8 Hectares Lease Area)
(Period 01.04.2003 to 31.03.2008)

NEAR VILLAGE JHAK, LULWA, & UMA KA BARIA
TEHSIL MASUDA, DISTRICT AJMER (RAJ.)

SUBMITTED ON BEHALF OF
M/s SHREE CEMENT LIMITED,
BANGUR NAGAR, BEAWAR DISTRICT AJMER (RAJ.)

Submitted Under Rule - 10 OF MCDR 1988

VOLUME I (TEXT)

PREPARED BY
ANIL KUMAR JADIA
R.Q.P. /AJM/189/2000/A
VALID UPTO 13.03.2012

पंजीकृत पार्सल ए.डी

भारत सरकार

जोयला एवं खान मंत्रालय

राष्ट्रीय खान ब्यूरो

खान नियंत्रक (उत्तर) का कार्यालय

सं.584(6)(3)(151)/2004-अजमेर

आईबीएम कॉलोनी, आदर्श नगर,
अजमेर - 305008

दिनांक 04-05-2004

सेवा में : मैसर्स श्री सीमेंट लि,
प्लॉ. बान.33, बागड़ नगर,
ब्यावर-305901

विषय : खनिज संरक्षण एवं विकास नियमावली, 1988 के नियम 10 एवं खनिज संरक्षण एवं विकास(संशोधन) नियम, 2003 के नियम 23ख(2) के अंतर्गत आप द्वारा प्रस्तुत जिला-अजमेर, राजस्थान में स्थित श्योपुरा-कंसरपुरा(856.8 हे.) चूना पत्थर खान की अनुमोदित खनन स्कीम में संशोधन एवं खान की उत्तरोत्तर खान बंद करने की योजना का अनुमोदन।

संदर्भ : आपका पत्र दिनांक 23-02-2004, एवं 28.05.2004 इस कार्यालय का पत्र दिनांक 05-04-2004 एवं 23.04.2004

महोदय,

खनिज संरक्षण एवं विकास नियमावली, 1988 के नियम 10 उप नियम 2 एवं खनिज संरक्षण एवं विकास(संशोधन) नियम, 2003 के नियम 23ख(4) के अंतर्गत प्रदत्त अधिकार का प्रयोग करते हुए मैं, एतद्वारा उल्लेखित अनुमोदित खनन स्कीम में संशोधन एवं उत्तरोत्तर खान बंद करने की योजना का अनुमोदन करता हूँ। यह अनुमोदन निम्नलिखित शर्तों के अधीन हुआ है -


1. इस खनन स्कीम में संशोधन एवं उत्तरोत्तर खान बंद करने की योजना का अनुमोदन केन्द्र सरकार अथवा अन्य किसी प्राधिकारी द्वारा खान पर समय-समय पर लागू किए गए कानूनों पर प्रतिकूल प्रभाव डाले बिना किया गया है।
2. यह भी स्पष्ट किया जाता है कि इस खनन स्कीम में संशोधन एवं उत्तरोत्तर खान बंद करने की योजना के अनुमोदन में खान एवं खनिज (विकास और विनियम) अधिनियम, 1957 या खनिज रियायत नियमावली, 1960 या और किसी अन्य कानून जिनमें वन (संरक्षण) अधिनियम, 1980, पर्यावरण संरक्षण अधिनियम, 1986 सहित अन्य किन्हीं कानूनों के किसी अन्य प्रावधान की शर्तों के अनुसार किसी भी प्रकार से सरकार का अनुमोदन समाविष्ट नहीं हुआ है।
3. इस खनन स्कीम में संशोधन एवं उत्तरोत्तर खान बंद करने की योजना का अनुमोदन किसी भी न्यायालय के सक्षम क्षेत्राधिकार के किसी आदेश या निर्देश पर प्रतिकूल प्रभाव डाले बिना किया गया है।
4. "Provisions of the Mines Act, 1952 and Rule and Regulations made there under including submission of notice of opening, appointment of manager and other statutory officials as required by the Mines Act, 1952 shall be complied with".
5. "The execution of mining plan/scheme of mining shall be subject to vacation of prohibitory orders/notices, if any".

(कृ.पृ.उ.)

- 4412/44
8/831(6)
6. "If any thing is found to be concealed as required by the Mines Act in the contents of the mining plan/scheme of mining, and the proposal for rectification has not been made, the approval shall be deemed to have been withdrawn with immediate effect".
 7. The lessee should submit the financial assurance at the earliest.

संलग्न : खनन स्कीम में अनुमोदित संशोधन एवं
उत्तरोत्तर खान बंद करने की योजना की एक प्रति।

भवदीय


(अशोक कुमार)
खान नियंत्रक

प्रतिलिपि : -

1. मुख्य खान नियंत्रक, भारतीय खान ब्यूरो, नागपुर।
2. क्षेत्रीय खान नियंत्रक, भारतीय खान ब्यूरो, अजमेर को खनन स्कीम में अनुमोदित संशोधन एवं उत्तरोत्तर खान बंद करने की योजना की प्रति।
पार्टी द्वारा फाईनल प्रति दिनांक 28.05.2004 को प्रस्तुत की गई।
3. निदेशक, खान एवं भूविज्ञान विभाग, राजस्थान सरकार, शास्त्री सर्किल, उदयपुर को खनन स्कीम में अनुमोदित संशोधन एवं उत्तरोत्तर खान बंद करने की योजना की प्रति पंजीकृत पारसल द्वारा।
4. निदेशक, खान सुरक्षा महानिदेशालय, अनासागर लिंक रोड, अजमेर को खनन स्कीम में अनुमोदित संशोधन एवं उत्तरोत्तर खान बंद करने की योजना की प्रति।
5. श्री अनिल जडिया, 4-के-13, तालवंडी, कोटा-324005(राज.)

संलग्न : यथोपरि।

खान नियंत्रक

CERTIFICATE



- A) Certified that the provision of Mines Act 1952, Mines Rules 1955 and Metaliferrous Mines Regulations 1961, made there under have been observed in the preparation of present Mining Scheme of Sheopura Kesarpura Limestone M/s Shree Cement Ltd. At Beawar, and wherever specified permissions are required the lessee will approach the Director General of Mines Safety.
- B) It is also certified that "The Provisions Of The Mineral Conservation & Development Rules, 1988 have been observed in the preparation of Scheme of Mining of Sheopura- Kesarpura Limestone Mines of M/s. Shree Cement Limited at Beawar, for an area admeasuring of 856.8 Hectares, in Ajmer District of Rajasthan state and wherever specific permissions are required, the lessee will approach the concerned authorities of Indian bureau of Mines."
- C) It is also certified that "The information furnished in the present Mining Scheme are true and correct to the best of my knowledge."

Anil Kumar Jadia
13.05.04

(ANIL KUMAR JADIA)
RPQ/AJM/189 /2000 /A

Date: 13.05. 2004





छान्न योजना तैयार करने हेतु
योग्य व्यक्ति के रूप में
मान्यता का प्रमाणपत्र

अनुमोदित
APPROVED

(छान्न रिजर्वत नियमावली 1960 के नियम 22(सी) के अंतर्गत)

श्री अनिल कुमार जाड़िया

वत्स श्री सत्यवान जाड़िया

निवासी 1-क-13 तलवंडी, कोटा - 324 009

ह्राए अपनी योग्यताओं और अनुभव का संतोषप्रद प्रमाण प्रस्तुत करने के फलस्वरूप
छान्न रिजर्वत नियमावली, 1960 के नियम 22(सी) के अंतर्गत उन्हें एतद्द्वारा छान्न
योजना तैयार करने हेतु योग्य व्यक्ति के रूप में मान्यता प्रदान की जाती है।

उत्पन्न पंजीयन क्रमांक

RGP/AGM/189/2000/A

है।

यह मान्यता दिनांक 13-03-2000 को समाप्त

होने वाली दो वर्षों की अवधि के लिए वैध है।

स्थान : अजमेर

दिनांक : 14 मार्च 2000

क्षेत्रीय मान्यता अधिकारी

राजस्थान राज्य

31.2.00
तयार के लिए नवीनीकृत
दिनांक: 14/03/2000

A. J. J. J.
साहित्य

क्षेत्रीय सहाय निबंधक
Regional Controller of Minc.
भारतीय खाद्य एवं खाद्य सुरक्षा विभाग
Food Bureau of Minc. Office



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APPROVED

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Note:

Permission for preparing plans on scale of 1:5000 has been granted vide letter No. N 11013 / 61 / MP / 89 - CCOM dt. 16.06.1993 from Chief Controller of Mines, Indian Bureau of Mines, Nagpur.



APPROVED

ADDITION

INTRODUCTION TO REVISED SCHEME OF MINING

Shree Cement Limited (SCL) at Beawar in Ajmer District is an over 03.20 million ton cement plant of dry process, which forms an integral part of Bangur Group of Industries commanding brand image in the north Indian Markets. The annual turn over of the company is Rs. 600 Crores.

SCL has an excellent track record of over 20 years in production and Marketing of Cement. The bestowal of various awards in the fields of production, energy conservation, plant & Mines Safety competitions and social work are the provenances of their operating capacity and management.

Justification for Present Modification

The present capacity of the existing units at Shree Cement Limited is 02.40 Million Tonnes per annum; which is being catered from our existing mines of Sheopura - Kesarpura and Nimbeti Limestone Mines, besides, supplemented from outside purchase i.e. Gotan, Bheru ka Badia, Saradhana etc nearing Beawar. The capacities of existing units are not being enhanced. As discussed in the subsequent paragraphs the object of modification of this Mining scheme is arisen, because we wish to reduce the dependency on out side purchase of High grade Limestone and increase feed from our Mines. From this Nimbeti mine the quantity of 1.00 million ton limestone will be dispatched annually to Beawar units.

On account of lower content of $CaCO_3$ i.e. 72.5% in feed from Sheopura - Kesarpura Limestone Mine against the requirement of 76 to 77% of $CaCO_3$ in raw mix, the feed to existing units was dependent on outside High Grade Limestone Purchase. For reducing the outside purchase of High Grade Limestone, feed from existing mines is increased corresponding with supply from our own Nimbeti Limestone Mine.

In this changed scenario of new projects, it was decided to reduce the dependence from out side purchase and gradually increase the ROM from two million tones to 4.0 Million tones from the fifth year from the existing Sheopura Kesarpura Mines in the period of this revised scheme of mining. The present feed of one million tones from Nimbeti to this plant will be continued. Resultantly the schedule of production on which earlier Mining Scheme was approved vide letter No. 584 (6) (3) (129) / 2003 - AJM dt. 26.06.2003 under MCDR, 1988 by the Controller of Mines (North), Indian Bureau of Mines, Ajmer, is required to be changed. Therefore, the present modified Scheme of Mining for Sheopura Kesarpura Limestone Mines, of M/s Shree Cement Ltd., at Beawar is submitted for its approval. The period of modification in the mining scheme is 01.04.2003 to 31.03.2008.



REVISED
MAY 1970

REVIEW OF MINING PLANS
CHAPTER 1

1.1 The purpose of this review is to ensure that the mining plan submitted to the Department of Mines and Technical Surveys meets the requirements of the Mining Act and the Mining Regulations. The review will be conducted by a qualified person appointed by the Department. The review will be completed within a reasonable period of time. The review will be conducted in accordance with the procedures set out in this chapter. The review will be conducted in accordance with the procedures set out in this chapter. The review will be conducted in accordance with the procedures set out in this chapter.

PART I

REVIEW

584 (4) (3) (151) / 2003 - A. S. M.
dt. - 26.06.2003
MCDR, 1988

PART I. REVIEW OF MINING SCHEME
SHEOPURA KESARPURA LIMESTONE MINES
MS SCL, BIKANER (RAI)

[Signature]

शान विभाग (उत्तर)
Controller of Mines (North)
PART I. REVIEW OF MINING SCHEME
Indian Bureau of Mines

REVIEW OF MINING PLAN Chapter-01

1.0 REVIEW OF MINING PLAN

1.1 Name of Mine: Sheopura-Kesarpura Limestone Mines

1.2 Particulars of approval of Mining Plan (under MCR 1960 or MCDR 1988, indicate approval letter no. & date)

- (a) The mining plan was approved under MCR, 1960 vide letter no. 584 (4) (3) (494) /98 - RCM AJMER dt. 15-11-1999. The period of Mining Plan was 28.08.1998 to 31.03.2003)
- (b) The Mining Scheme was approved under MCDR 1988, vide letter no. 584 (6) (3) (129) /2003 - AJM dt. 26.06.2003. The period of Mining Scheme was 01.04.2003 to 31.03.2008)
- (c) The Mining Lease is enforced from 28.08.1998 to 27.08.2018 (further renewable).

1.3 Date of commencement of mining operations: 28-08-1978

1.4(a) Deficiencies, if any, that existed in the approved Mining plan.

The target of production was 21 Lakh Tonnes per annum but the lessee raised 16.93 Lakh tonnes per annum. The development target was 21 lakh tonnes per annum but the lessee raised 17.56 lakh tonnes per annum. (Please refer Annexure-1)

(b) Existing Mining Scheme

The target of production was 24.32 Lakhs Tonnes per annum (Ref. Para 5.3) but the lessee raised 11.95 Lakh tonnes (upto January 2004) @ 15.00 Lakh Tonnes per annum in the preceding period of existing approved Mining Scheme, which is under revision.

The target of removal of overburden / interburden was 7.58 Lakh Tonnes per annum (Ref. Para 5.3) but the lessee removed 5.50 Lakh tonnes @ 6.60 Lakh Tonnes per annum in preceding period of the first year of existing approved Mining Scheme which is under revision.

1.4(b) Review of compliance position of salient features of the mining plan

Exploration: - Deviation not observed (Annexure-I)

Initially detail exploration was carried out which was the basis of mining plan. There was no proposal of further exploration in the mining plan. Hence deviation from the mining plan was not observed.

Mine Development: - The Sheopura-Kesarpura limestone is occurring on the barren surface, and as such there is no topsoil and over burden in rock form. However, limestone deposit is inter bedded with rejects consisting of unusable calc schist and calc gneiss etc. Therefore, the development was initially proposed @ 101 % of actual limestone production and the same were opted to its nearly achieved target. (Annexure I)

Exploitation (Production): - Sheopura-Kesarpura Limestone Mine is a captive limestone mine for cement plant situated near mining lease area and it was proposed that the limestone production 21 Lac Tonnes per annum and the lessee has achieved approximately 82.50% of proposed target, as per raw meal requirement of our Cement Plant (Please see Annexure-I)

In respect of place(s) of excavation, proposed working was as under: -

In Block-I, it was proposed that working will be carried out between section line A-14 to A-20, whereas the lessee has worked during last 5 years from section line A-14 to A-19, hence place of excavation was within the proposed area.

In Block-III, it was proposed that working will be carried out between section line 64 to 69 (old section line B - 26 to B -29), whereas we have worked during last 5 years from section line 64 to 69 (old section line B-26 to B -29), hence, place of excavation was within the proposed area.

In Block-VA, there was no proposal of work during last 5 years in this block. But we have started worked in 5th year from August 2002 between section lines 60 to 63 (old section line A-25 to A-26)

Initially it was not proposed to work in the Block-V as mentioned in the approved mining plan. On account of obstacles created by villagers, which was not envisaged earlier, the immediate change between section line 60 and 63 (old section line A-25 to A-26) had to be made from August 2002. Because of the tense situation, the lessee could not restrict to the earmarked area. The lessee has tried his best and approached post to pillar. Even Government authority could not resolve to it. Hence a slight change in the proposal.

Bench height, bench width and blasting parameters were maintained during last 5 years as follows: -

	Proposed	Implemented
Bench height	9 Mtrs.	9 Mtrs.
Bench Width	More than 9 Mtrs	More than 9 Mtrs
Depth Of Hole	10 Mtrs	9Mtrs
Dia Of Hole	115 mm	115 & 165 mm
Burden	4.0 Mtrs.	4.0 & 4.0 Mtrs
Spacing	4.0 Mtrs	4.0 & 6.0 Mtrs
Powder factor	6.00	6.00

Drill hole diameter proposed in approved mining plan was 115 mm, but the lessee has also used 165 - mm diameter drill hole on the trial basis only. Now it is proposed to have proposed 165-mm diameter hole for next five-year plan. By this change, we found reduction in Air & Noise pollution.

By latest blasting technique using shock tube detonators, down line detonators in combination with noiseless trunk line detonators we saved sub grade drilling. We are drilling 9 Mtrs depth equivalent to bench height and there is no toe problem.

Further we have started mining partly by primary Rock-Breaker (Alternative of drilling and blasting) w.e.f. 8th February 2001. In view of its satisfactory performance, we procured 3 more Primary Rock-Breakers. At present we are using total 4 nos. Primary Rock-Breakers RAMMER G-100 manufactured by M/s. Sandvik Trumrock, Finland, which has been mounted on L & T CK 300, Demag H-40 with backhoe, which is giving average production of 150 M. t. per hour.

Eco friendly mining by Rock- Breaker has eliminated hazards associated with drilling & blasting, transport & use of explosives and blasting such as noise, ground vibration, fly rock and misfire etc.

Shifting of inhabitation under the legal framework could not be implemented even with the interference from the government authority. To reduce the dependence on the process of blasting for trial basis we have partly switched over to use of primary rock breaker. After having successful trial, we have proposed our raisings through these primary rock breakers in the present mining scheme.

Afforestation Programme: - We have planted species within mining lease area and out side mining lease area more than proposed during last 5 years in Approved Mining Plan (Please refer Annexure-I)

Reclamation & Rehabilitation: - There is a continuity of limestone even below 500 mtrs. R.L. therefore reclamation of work out pit was not proposed.

Reclamation of Waste Dump. Except, existing working dump the lessee has done reclamation of waste dump No. 01 & 02 by leveling them, followed by spreading of soil, sprinkling of water & then plantation. The lessee has planted 1477 No. of trees on waste dump yard during last five years.

Other Significant Features

Control of Dust, Noise & Ground Vibration: - Monitoring of Air, Noise, Water and Ground Vibration is done as per proposal given in Approved Mining plan as per circular of M.C.D.R. 1988. Result of monitoring of Air, Noise, Water and Ground Vibration are enclosed at the end of text (Please see Annexure II to XXI)

1.4(c) Review of the compliance positions of conditions and stipulations imposed if any, while approving the mining plan.

NOT APPLICABLE

1.4(d) Review of compliance of violations pointed out after inspection made under MCDR, 1988 during last 5 years.

The first inspection was made under MCDR, 1988 on 24-02-99 by Sh. S. Ray Chaudhuri. The following violations were pointed out by him vide letter no. RAJ/AJM-89/LST-1 dated 31-3-99.

Rule No.	Nature of violation observed in detail
Rule 33 (2):	As per this rule the dumps shall be properly secured to prevent escape of material there from in harmful quantities that may cause degradation of environment and to prevent causation of flood. However in the present case none of the dumps have been properly secured and there is danger of escape of material from dumps in harmful quantities.
Rule 37:	As per this rule air pollution due to fines, dust smoke or gaseous emission shall be controlled and kept within permissible limits but air pollution due to fines and dust are observed to have increased beyond permissible limits.

In compliance of violation pointed out above were rectified and action taken by us in this regard and present status of violations submitted by us vide our letter no. SCL/BWR/Q/S-1/99/2571 dated 07-05-99 i.e. as under: -

Rule 33(2)	We have two waste dumps 80 mtrs. Away from hanging wall in non- mineralized zone. Waste dump site is such that it is dumped between two hillocks so there is no chance of flowing or escape of waste in agriculture fields or harm to inhabitants. A waste dump is done in benches. For stabilization of waste dump dozing is regularly done. In stabilized area, a layer of clay is spread and plantation has been done in such area to further stabilize the waste dump. Thus there is no danger of escape of waste. In few of the area, where is no hillocks, waste dumps is in Shree Cement Ltd, purchased land and there is a check dam at the end of Shree Cement Ltd. land, which is nearly 100 mtrs. Away from existing waste dump. material. The waste dump is also fully stabilized, as per above method. Dump is five to ten years old. It is dead waste dump. In view if above there is no chance of sliding down of any material from dump even during rainy season.
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The third inspection was made under MCDR, 1988 on 14-05-2002 by Sh. R. Parmar, Regional Controller of Mines, IBM Ajmer. The following violations were pointed out by him vide letter no. RAJ/AJM-89/Lst.-1(Vol-II) dated 27-05-2002.

Rule	Nature of violation observed in detail
Rule 13 (1)	There is a major difference between excavation proposed in Para 4 (b) of approved mining plan and actual excavation done (limestone produced and waste rock generated)
Rule 29:	Copies of plans and sections prepared and maintained under rule 28 have not been submitted under this rule.

In compliance of violation pointed out above we have informed in this regard and present status of violations by us vide our letter no. SCL/BWR/Q/S-1/2002/8902 dated 26-06-2002.

Rule 13(1):	<p>During 1st year to 4th year of mining operation 75.4 lac tonnes of Limestone was proposed to produced where as we have achieved 61.93 lac tonnes Limestone production which is 82.15% of the proposed production.</p> <p>Similarly development was proposed 76.74 lac tonnes where as we have achieved 60.6 lac tonnes, which is 78.97% of the proposed development. During 5th year of mine working i.e. April 2002 to March 2003, we are trying to achieve more than proposed in approved mining plan.</p>
Rule 29:	<p>We have submitted copies of plans & sections under rule 29.as under: -</p> <ol style="list-style-type: none"> 1. Surfaces plan DRG No. SCL/Mines/25. 2. Geological Plan Block-I- SCL/Mines/27. 3. Geological Section Block-I- SCL/Mines/28 I. 4. Geological Section Block-I- SCL/Mines/28 II. 5. Geological Plan Block-III SCL/Mines/ 39. 6. Geological Sections Of Block-III SCL/Mines/40. 7. Environment Plans SCL/Mines/35

1.4(e) We wish to draw your kind attention that mining operation carried out during last 5 years was systematic in view of mineral conservation and environment protection including ecology of the area.

1.5 Review of compliance position of salient features of approved mining scheme:

The lessee has not received any violation letter pointed out under the provisions of MCDR 1988 for the existing approved Mining Scheme of which modifications are submitted in the present revised Scheme of Mining.



PART II

अनुसूचित
APPROVED

SCHEME OF MINING

PART II

**REVISED PROPOSAL UNDER
 SCHEME OF MINING FOR THE
 NEXT FIVE YEARS.**

Chapter 02

2.0 REVISED PROPOSAL UNDER SCHEME OF MINING FOR THE NEXT FIVE YEARS.

- | | | |
|------|--------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| 2.1 | Name & address of the Applicant | Shree Cement Limited
P.B. No. 33, Bangur Nagar, BEAWAR. |
| | Name and address of the Nominated Owner | Sh. M. K. Singhi,
Executive Director,
M /s Shree Cement Ltd.,
P.B. No. 33 Bangur Nagar,
BEAWAR- 305901 (Raj.) |
| 2.2 | Name & address, registration number of the recognized person | Anil Kumar Jadia
4-K-13, Talwandi
Kota -324009 (Raj.) |
| 2.3 | Minerals to be mined | RPQ/AJM/189/2000/A
Valid upto 13-03 -2012
LIMESTONE |
| 2.4 | Area & date of expiry of Mining Lease | Area - 856.8 Hectares
Date of expiry of Mining Lease 27-08-2018
There is no forest area within the mining lease Area |
| 2.5a | Date of expiry of 5 years period for which approved on the last occasion | Date of expiry of 5 years period is 31-03-2003 |
| 2.5b | Date of expiry of 5 years period for which approved on the last occasion existing Mining Scheme | Date of expiry of 5 years period is 31-03-2008 |



PART II

RESERVES

Chapter 3

3.0 RESERVES: -

- 3.1 Category wise (proved, probable and possible) reserve estimated in the earlier mining plan with grades:

GEOLOGICAL RESERVE AND GRADE: -

The total mining lease area has been divided into 9 blocks. The formation of different Blocks is based on the period of prospecting.

The details of different blocks are given below: -

Block I: - This block is situated from section line A-12 to A-24 in the Western zone. There are three limestone bands in this block i.e. band A Band B & Band C covering a strike length of 3000 mtrs (3 Km)

Block II: - This block is situated from section line B-14 to B-17 having a strike length of 750 mtrs. in the eastern zone. There are seven limestone bands in this block such as Band I, II, III, IV, V, VI, & VII.

Block III: - This block lies between section line B-24 and B-29 in the eastern zone. covering a length of 1250 mtrs. the block has uneven topography with two nallahs cutting between section line B-26 & B-28.

Block IV: - This block lies between section line A-1 & A-12 in the Western zone. Covering a length of 2750 mtrs there are three limestone bands A, B & C but band B bifurcated into two bands between section line A-1 & A-17. The band A & C are thicker than band B.

Block V: - This block lies between sections line A-24 & A-33 in the Western zone, but recently this block is again divided into two blocks namely VA & VB the block VA is between section line A-24 & A-29 where as the block VB lies between section line A-29 & A-33 in the western zone.

Block VI: - This block lies between sections line B-1 & B-14 in the eastern zone. Covering a strike length of 3250 mtrs prospecting operations were not carried out in this block, as thickly populated village 'Jhak' is located within this block.

Block VII: - This block lies between section line B-17 & B-24 in the eastern zone. Covering a strike length of 1750 mtrs. Prospecting operations were not carried out in this block, as thickly populated village 'Lulwa' is located within this block.

Block VIII: - This block was lying between section line B-29 & B-33 in eastern Zone covering a strike length of 1000 mtrs. At the time of receipt of Mining Lease Area i.e. w.e.f. 28-08-1998, 90 hectares area has been surrendered due to the forest area, which falls in Block V & VIII. After surrendering of this area Block VIII has gone fully in surrendered area and **at present there is no existence of Block VIII in mining lease area.**

Block IX: - this block lies between section A-1 to A-12, near lease boundary in Western Zone

Block No. I, IV, V, & IX falls in western Zone and Block No. II, III, VI, & VII in eastern Zone. Details of prospecting carried out till date in Block I, II, III, V & VIII and proved (measured) reserve estimated. This is a captive limestone mine. The mining operations are being carried out at Blocks I, III & VA.

Block wise Geological & Recoverable Reserves as on 01-04-1998 is as follows: -

Block no.	Geological Reserves (In Mio. Ton)	Recoverable Reserves (In Mio. Ton)		-ROM Grade		Remarks
		Measured	Indicated	CaCO ₃ %	CaO%	
I	26.67	24.00	0.00	74.46	41.70	Upto RL 500
II	2.65	2.39	0.00	73.32	41.06	Upto RL 545
III	21.98	19.78	0.00	74.38	41.65	Upto RL 500
IV	6.23	0.00	5.60	73.07	40.92	Upto RL 527
Va	11.33	10.20	0.00	74.39	41.66	Upto RL 500
TOTAL	68.86	56.37	5.60			

The geological reserves are insitu reserves. These reserves are primarily considered for obtaining the area and for taking decisions for execution of project. These reserves are subject to various factors of mining activity inclusive of raisings, development of pit and other required infrastructures at site. Hence, we have considered Geological and mineable reserves separately.

The ROM grade from our mine is ranging between 73.07% and 74.46 % of CaCO₃ as indicated in the above table, whereas 76% CaCO₃ is maintained in the raw mix in the cement plant by adding sweetener.

The lessee is having another captive Mines named as Nimbeti Limestone Mine near village Ras District Pali (Raj.) from where uptill now, he was getting ROM grade 77.50 % CaCO₃. Recently, a blow bar impactor crusher with screening arrangements is being installed, it is expected to upgrade the quality to 80.00% of CaCO₃.

Other sweetener (Marble & high-grade limestone) is being purchased from outside source. The ratio of different limestones / sweeteners with quality in our Raw Mix is as mentioned herein below.

Source	Average Quality % CaCO ₃	Percentage in Raw Mix
ROM Limestone (Sheopura- Kesarpura Limestone Mines)	72.50	74.00% 74.00% ABOVE
ROM Limestone (Nimbeti Limestone Mines)	80.00	13.00%
Sweetener		
i. Waste Marble Khanda (Makrana)	91.00	01.00%
ii. High Grade Limestone (Gotan, Jaitaran and Borunda)	92.00	12.00%

However this composition of Raw Mix is tentative and may vary depending upon available quality, quantity and landing cost of sweetener procured from outside sources.

3.2 Depletion of reserve.

The mining operations were carried out during last five years mainly in Block I and Block III. Recently in 5th year from August 2002. We have started excavation in block VA (western Zone). The block wise limestone produced and dispatched to cement plant for the period from 01-04-1998 to 28-02-2003 are as follows: -

Block NO.	Production (in Million tones)
	Mining Plan Period
Block-I	1.64
Block-III	6.51
Block-VA	0.32
Total	8.47

3.3 Additional reserves established category wise (with basis and parameters considered).

- No additional reserves have been established.
- As shown in table in para 3.4 there is no workable inferred reserves in ML area, therefore, it was not necessitated to convert them into indicated category.

3.4 Category wise updated reserves with grade (indicate end-use grade with analysis) as well as marginal grades.

We have excavated limestone Block wise during the period from 01-04-1998 to 28-02-2003 as follows: -

Block No.	Quantity (in Million tones)
Block-I	1.64
Block-III	6.51
Block-VA	0.32
Total	8.47

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Hence updated geological reserve and mineable reserve as on date 01-03-2003 is given bellow: -

Block No.	Geological Reserves (Qty. in million tones)			Recoverable Reserves (Qty. in million tones)			ROM Grade		Remarks
	Mea- sured Res- erves	Indi- cated Res- erves	Infe- rred Res- erves	Mea- sured Res- erves	Indi- cated Res- erves	Infe- rred Res- erves	CaCO ₃ %	CaO %	
I	25.03	0.00	0.00	22.36	0.00	0.00	74.46	41.70	Upto RL 500
II	2.65	0.00	0.00	2.39	0.00	0.00	73.32	41.06	Upto RL 545
III	15.47	0.00	0.00	13.27	0.00	0.00	74.38	41.65	Upto RL 500
IV	0.00	6.23	0.00	0.00	5.60	0.00	73.07	40.92	Upto RL 527
VA	11.01	0.00	0.00	9.88	0.00	0.00	74.39	41.66	Upto RL 500
TOTAL	54.16	6.23	0.00	47.90	5.60	0.0			

The position of latest updated reserves as on 01-03-2003 is given in the table in Para 3.4. As desired the depletion of recoverable reserve up to this date is considered in this table. The quantity of reserves depleted from each block is indicated in the table mentioned in the Para 3.2. The original position of reserves as on dated 01-04-1998 is given in the table in Para 3.1, referred from the mining plan.

As mentioned in the table of Para 3.2, the quantity of production is depleted from recoverable reserves. Actual quantity of production has been converted into its entity of geological reserves and the depleted.



PART II

**CONCEPTUAL
MINING PLAN**

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4.0 CONCEPTUAL MINING PLAN

Conceptual mining plan prepared at the scale of 1:5000 Ref. DRG. No. SCL/ Mines/37. The ultimate pit limit is marked. Infrastructures proposed are shown on the plan such as crusher, office, bunker hopper, canteen, workshop, rest shelter, dispensary, ropeway loading station etc.

The proposed site for plantation and proposed site for waste dump are shown in the above plan. The detail description is given below: -

A. Ultimate Pit Limit: -

Ultimate pit limit at the end of the life of mines is shown with pink colour line in above plan. The limestone strata are dipping towards Western direction and it is also proposed to mine up to 500 R.L. hence approximate depth of the pit will be 63 mtrs. So pit limit is marked at a distance of about 75 mtrs. From limestone boundary on western side and at a distance of about 25 mtrs, on eastern side of the limestone boundary.

Mining is not proposed below 500 m R.L.

Justifications: -

- The overall ratio of mineral to overburden is 1:1 (Ref. Prospecting report). It will increase on lowering of BRL, resulting in uneconomic Mining operations in present situations in the span of present Mining scheme.
- The quality of limestone being mined out is substandard and it will further deteriorate on getting down. In present situation it will be difficult to use the same
- As mentioned in the previous paragraphs, the limestone bands being mined are narrow and shall further narrow down at greater depth.
- Considering the pit slope angle, area for transportation, gradient of road and the working area will be of shorter span.
- The matter is kept open for its further review in the scope of next mining scheme.

b. Land Use Pattern: -

in view of the continuing mining operation, the present land use pattern will undergo certain changes at the end of life of mine. The mine working areas and the area for waste dumps shall increase the area under barren land will correspondingly decrease. Besides, extent of the area re-vegetated by M/s. Shree Cement Ltd. will also increase. However no major change is expected in the other categories of land. The respective details of proposed land use pattern given in Table below within 500 mtrs distance from mining lease boundary: -

Land Use Pattern (Proposed)

S. No.	Description	Area (Hectare)	% Of total area
1	Agricultural land	308.20	16.57
2	Residential /dwelling area	48.70	2.62
3	Mine working	225.00	12.10
4	Waste dumps	88.00	4.73
5	Plantation area	70.00	3.76
6	Barren land	1120.10	60.22
	Total	1860.10	100.00

c. Infra Structure: -

There will be no change in the location of infrastructures up to end of life of mine. The location of the infrastructures such as workshop, office building, dispensary, canteen, rest shelter, crusher, bunker hopper, ropeway-loading station are shown in the above plan.

At the end of life of the mine, mines building such as office, workshop, canteen, rest shelter, crusher building etc. will be utilized in the public interest.

d. Proposed plantation: -

The proposed plantation site shown in the conceptual plan Ref. DRG. No. SCL/mines/ 37. The following plant species proposed to be planted: -

S. No.	Botanical name	Plant Type	S. No.	Botanical Name	Plant Type
1	Acacia Nilotica	Desi Babul	7	Azadirachta Indica	Sisam
2	Prosopis juliflora	Angraji	8	Acacia Senegal	Neem
3	Zyzyphus Jujuba	Babul	9	Echinops echinatus	Kumpat
4	Eucalyptus	Bordi	10	Fiscus Religiosa	Kanti
5	Anogeissus	Safeda	11	Holorrhena anticysentrica	Gular
6	Dalbergia Sisoo	Dhokra			Dudheli

S. No.	Botanical name	Plant Type	S. No.	Botanical Name	Plant Type
12	Fiscus Religiosa	Pipal	18	Capparis decidna	Kair
13	Prospis Cimeraria	Khejri	19	Calotropis pocera	Aak
14	Commiphora Mukul	Gugal	20	Pithecolobium	Keekar
15	Saccharum munja	Moonj	21	dulce	Thor
16	Albzzia Lebbek	Siris	22	Euphorbia nivulia	Gulmohar
17	Calligenum polygne	Phog		Delonx z	

e. Waste Dump Management: -

The proposed site for waste dump yard is shown in the above plan. At some places waste dumpsite is near to nallah. Hence preventive measures will be taken for safeguarding to nallah. A garland drain is also proposed on waste dump for controlling the flushing of the waste dump.

There is no subgrade mineral for its separate staking.

Efforts for utilization of Waste Rock: -

We have made all out efforts to utilize maximum waste rock, which contains 60 to 67% CaCO_3 by blending in limestone of 76%. The final ROM quality after blending 40% waste rock comes to 72.50% CaCO_3 .

We are also trying to use this waste rock as aggregate / building stone. For this purpose we are exploring the market.

f. Time frame of completion of mineral exploration

Mineral exploration work has already been completed in block I, II, III & VA. On account of state highway and high tension power line, passing through the block VB (from section line A-28 to boundary line A-33), the exploitation of minerals shall be of great difficult in near future. Keeping in view, the exploration in the said block is deferred sine die.

Block IV, VI & VII are intensely occupied by inhibitions of villages - Jhak Ka Baria, Jhak and Lulwa. The exploration work in these blocks is presently impossible, because of shifting of populations in the Block III is, already in the process which is getting cumbersome, even with the interference of government authority. In such situation, any activity of Mineral Exploration will further inflame the negative impact.

Block IX lies between section A-1 to A-12 near lease boundary in Western Zone. Since the initial results of exploration of geological mapping and surface sampling at an interval of 10 meter are indicative of non availability of workable limestone bands. The mineral exploration is not proposed, as mining is not feasible in this block.

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Reclamation Of Work Out Pit(s)

The reclamation of work out pit(s) by back filling is not proposed in future planning, because mining operation is started from 1st bench i.e. R.L. 572 M and the limestone deposit is still continues. R.L. 500 M. also since the area of low rainfall the excavated pits will be left for storing water, which will help for plantation and up-gradation of ground water table.

Justification for not simultaneously reclamation of pits: -

Since mineral is not completely exhausted, simultaneously these pits can not be reclaimed by back filling, because, it will remote the future chances of mining operation at lower depth than 500 MRL, as discussed in para 4.0(a). However, to improve upon the aesthetic value of the pit and recharging the ground water as well as to solve the acute water shortage for the mankind in the area. These pits are kept open for storage of water.



PART II

MINING

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Chapter 05

5.0 MINING

5.1 Salient description of present mining methods.

- The present mining method is opencast benching method with bench height of 9 mtrs maximum and width 9 mtrs minimum. This is a mechanized mine.
- The general advance takes place towards the strike direction. All the limestone bands are worked in such a way that all quality material is simultaneously exposed for easy blending. Each bench is always kept minimum of 20 mtrs. In advance of their respective bottom bench. The sides of the benches shall be dressed properly.
- Limestone is occurring on the barren surface, and as such there is no topsoil and overburden in rock form. However, limestone deposit is inter bedded with rejects consisting of calc schist and calc gneiss etc.
- In this mine, limestone bands are inter bedded with calc-schist / calc-gneiss etc. having $CaCO_3$ from 55 to 65 %

On an average quality occurring in the limestone bands proposed for mining is varies from 73% to 76% $CaCO_3$. In the interest of mineral conservation and safe guarding environmental parameters the quantity of rejects are also blended with. Resulting the ROM gets infiltrated to 72.5% $CaCO_3$. Ultimately the blended limestone of this mine is again upgraded at cement plant by mixing purchased limestone (sweetener) from outside agencies.

It is proposed to carry out mining operation during next five years in the Block I, Block III and Block VA. The top R.L. of top bench (1st bench) encountered in this working area is 572 mtrs. Hence R.L. of different benches are as given below.



<u>Bench No.</u>	<u>R. L.</u>	<u>Bench No.</u>	<u>R. L.</u>
I	572	VI	527
II	563	VII	518
III	554	VIII	509
IV	545	IX	500
V	536		

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Proposal for mining during next five years is in block I, III, and VA which is having low grade limestone against the requirement of cement plant is 76% CaCO₃.

The entrepreneur is maintaining ROM quality 72.50% CaCO₃ by blending of waste rock. For upgrading the inferior quality the sweetener is being blended at cement plant. For getting required quality of raw mix. Other blocks are also having more or less similar quality of limestone by that same ROM quality can be maintained.

5.2A Yearly Pit Wise Development Plan Proposed For The Next 5 Years In BLOCK-I: -

The development activities will be confined from section line A-17 to A-20. The smoothening of pit slope angle from 65° (tentatively) is considered in the development plan proposed in subsequent paragraphs.

5.2Aa Development during 1st year (01-04-2003 to 31-03-2004)

It is proposed that inter bedded calc schist will be removed during 1st year of mine working will be 5.00 lakh tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lakh tonnes)
A19 - A20	572	I	0.41
A19 - A20	563	II	1.38
A18 - A20	554	III	2.64
A18 - A19	545	IV	0.57
		Total	5.00

The above waste rock is proposed to be stacked at waste dump yard no. 1 as shown in DRG. No. SCL Mines/65.

The approach road will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2A.b. Development during 2nd year (01-04-2004 to 31-03-2005)

It is proposed that inter bedded calc schist will be removed during 2nd year of mine working will be 2.30 lac tones from following benches: -



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Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
A19 -A20	554	III	0.32
A18 -A20	545	IV	1.98
		Total	2.30

The above waste rock is proposed to be stacked at waste dump yard no. 1 as shown in DRG. No. SCL / Mines/66

The approach road will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2A.c Development during 3rd year (01-04-2005 to 31-03-2006)

It is proposed that inter bedded calc schist will be removed during 3rd year of mine working will be 2.62 Lakh tones from following benches: -

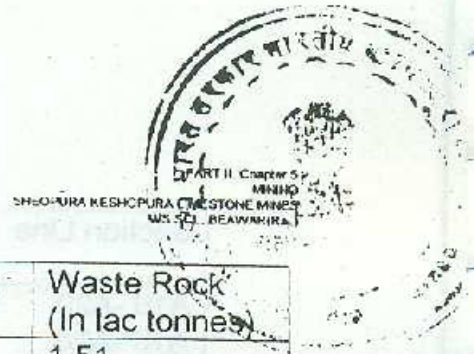
Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
A18 -A20	536	V	1.80
A18 -A20	527	VI	0.82
		Total	2.62

The above waste rock is proposed to be stacked at waste dump yard no. 1 as shown in DRG. No. SCL / Mines/67

The approach road will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2A.d Development during 4th year (01-04-2006 to 31-03-2007)

It is proposed that inter bedded calc schist will be removed during 4th year of mine working will be 3.14 lac tones from following benches: -



Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
A19 -A20	527	VI	1.51
A17 -A20	518	VII	1.63
		Total	3.14

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The above waste rock is proposed to be stacked at waste dump yard no. 2 as shown in DRG. No. SCL / Mines/68

The approach road will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2A.e Development during 5th year (01-04-2007 to 31-03-2008)

It is proposed that inter bedded calc schist will be removed during 5th year of mine working will be 4.18 Lakh tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
A18 - A20	518	VII	0.98
A17 - A20	509	VIII	1.50
A17 - A20	500	IX	1.70
		Total	4.18

The above waste rock is proposed to be stacked at waste dump yard no.2 as shown in DRG. No. SCL / Mines/69

The approach road will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2B Yearly pit wise development plan proposed for the next 5 years in BLOCK-III: -

- The development activities will be confined from section line B-62 M to B-65 (old section line A-24 to A-26)

5.2B.a Development during 1st year (01-04-2003 to 31-03-2004)

It is proposed that inter bedded calc schist will be removed during 1st year of mine working will be 1.20 Lakh tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
B 62 – B65	554	III	0.80
B 63 – B65	545	IV	0.40
	Total		1.20

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The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/60

The approach road will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2B.b Development during 2nd year (01-04-2004 to 31-03-2005)

It is proposed that inter bedded calc schist will be removed during 2nd year of mine working will be 3.45 lakh tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
B 62 - B63	554	III	0.74
B62 – B 64	545	IV	1.29
B 63 – B65	536	V	1.42
	Total		3.45

The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/61

The approach road will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2B.c Development during 3rd year (01-04-2005 to 31-03-2006)

It is proposed that inter bedded calc schist will be removed during 3rd year of mine working will be 3.92 lac tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
B 62 - B64	536	V	1.29
B 63 – B 65	527	VI	2.63
	Total		3.92

The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/62

The approach road will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2B.d Development during 4th year (01-04-2006 to 31-03-2007)

It is proposed that inter bedded calc schist will be removed during 4th year of mine working will be 4.71 lac tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
B 62 - B63	527	VI	0.56
B 62 - B 65	518	VII	2.98
B 64 - B65	509	VIII	1.17
		Total	4.71

The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/63

The approach road will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2B.e Development during 5th year (01-04-2007 to 31-03-2008)

It is proposed that inter bedded calc schist will be removed during 5th year of mine working will be 6.27 lac tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
B 61 - B63	563	II	0.92
B 62 - B 63	554	III	0.52
B 62 - B64	509	VIII	1.69
B 62 - B65	500	IX	3.14
		Total	6.27

The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/64

The approach will be prepared up-to-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2C Yearly pit wise development plan proposed for the next 5 years in BLOCK-VA: -

- The development activities will be confined from section line A-59 to A-63 (old section line A-24 to A-26)

5.2C.a Development during 1st year (01-04-2003 to 31-03-2004)

It is proposed that inter bedded calc schist will be removed during 1st year of mine working will be 0.40 Lac tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In Lac tonnes)
A61-A63	563	II	0.40
		Total	0.40

The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/60

The approach will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2C.b Development during 2nd year (01-04-2004 to 31-03-2005)

It is proposed that inter bedded calc schist will be removed during 2nd year of mine working will be 1.15 lac tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
A58 - A61	563	II	1.15
		Total	1.15

The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/61

The approach will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2C.c Development during 3rd year (01-04-2005 to 31-03-2006)

It is proposed that inter bedded calc schist will be removed during 3rd year of mine working will be 1.31 lac tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
A 57 - A58	563	II	0.24
A 61 - A63	554	III	1.07
		Total	1.31

The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/62

The approach will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2C.d Development during 4th year (01-04-2006 to 31-03-2007)

It is proposed that inter bedded calc schist will be removed during 4th year of mine working will be 1.58 lac tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
A59 - A62	554	III	1.58
		Total	1.58

The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/63

The approach will be prepared upto-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.2C.e Development during 5th year (01-04-2007 to 31-03-2008)

It is proposed that inter bedded calc schist will be removed during 5th year of mine working will be 2.11 lac tones from following benches: -

Section Line	R. L.	Bench No.	Waste Rock (In lac tonnes)
A 57 - A 60	554	III	1.31
A 61 - A 63	545	IV	0.80
		Total	2.11

The above waste rock is proposed to be stacked at waste dump yard no. 3 as shown in DRG. No. SCL / Mines/64

The approach will be prepared up-to-working faces. The waste dump yard will be leveled regularly by dozing systematically.

5.3 YEAR WISE PRODUCTION

It is proposed that year wise mining during next five years will be carried out in **Block I** from section Line A-17 to A-20, in **Block III** from section line B-61 to B-65 (Old section line B-26 to B-27) and in **Block VA** from section line A-57 to A-63 (Old section line A-24 to A-26). The mining activities will be carried out by opencast mechanized mining methods. The mineral deposit is exposed on surface. The parameters of mining activities are given below: -

- Bench height is planned 9 mtrs. To suit the cutting height of the Hydraulic Excavator (bench height will not more than 9 mtrs.)

- The minimum width of the benches will be equal to the height of the bench (i.e. 9 mtrs)
- The working bench will be kept 20 mtrs wide for safe movement of HEMM equipment considering turning radius of dumpers.
- Pit slope is proposed to maintain 60° at hanging wall side and 60° at footwall side.
- The haulage road is planned 1 in 16 gradient and 12 mtrs. Wide.

5.3A Yearly pit wise production plan proposed for the next 5 years in BLOCK-I: -

5.3A.a Production during 1st year (01-04-2003 to 31-03-2004): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A19 – A20	572	I	0.48
A18 – A20	563	II	1.52
A18 – A20	554	III	2.93
A18 – A19	545	IV	0.62
		Total	5.55

Say 5.55 Lakh Tonnes

Less 10% mining losses=0.55 Lakh Tonnes

Recoverable Reserve (Limestone) = 5.00 lakh tones

Hence for raising 5.00 lakhs tones of limestones, 5.00 Lakh tones of waste rock will be removed.

5.3A b Production during 2nd year (01-04-2004 to 31-03-2005): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A19-A20	554	III	1.15
A18-A20	545	IV	6.99
		Total	8.14

Say 8.14 Lakh Tonnes

Less 10% mining losses=0.81 Lakh Tonnes

Recoverable Reserve (Limestone) =7.33 lakh tones

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Hence for raising 7.33 lakh tones of limestone, 2.30 lakh tones of waste rock will be removed.

5.3Ac Production during 3rd year (01-04-2005 to 31-03-2006): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A18-A20	536	V	6.35
A17-A20	527	VI	2.90
		Total	9.25

Say 9.25 Lakh Tonnes

Less 10% mining losses=0.92 Lakh Tonnes

Recoverable Reserve (Limestone) =8.33 lakh tones

Hence for raising 8.33 lakh tones of limestone, 2.62 lakh tones of waste rock will be removed.

5.3Ad Production during 4th year (01-04-2007 to 31-03-2008): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A19 -A20	536	V	0.60
A19 -A20	527	VI	4.80
A17 -A20	518	VII	4.97
A17 -A19	509	VIII	0.74
		Total	11.11

Say 11 11 Lakh Tonnes

Less 10% mining losses=1 11 Lakh Tonnes

Recoverable Reserve (Limestone) = 10 00 lakh tones

Hence for raising 10.00 lakh tones of limestones, 3 14 lakh tones of waste rock will be removed.



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5.3Ae Production during 5th year (01-04-2007 to 31-03-2008): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A19-A20	527	VI	0.75
A19-A20	518	VII	3.24
A17-A20	509	VIII	4.97
A17-A20	500	IX	5.85
		Total	14.81

Say 14.81 Lakh Tonnes

Less 10% mining losses=1.48 Lakh Tonnes

Recoverable Reserve (Limestone) =13.33 lakh tones

Hence for raising 13.33 lakh tones of limestone, 4.18 lakh tones of waste rock will be removed.

5.3B Yearly pit wise production plan proposed for the next 5 years in BLOCK-III: -

5.3B.a Productin during 1st year (01-04-2003 to 31-03-2004): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
B62-B65	554	III	2.77
B63-B65	545	IV	5.56
		Total	8.33

Say 08.33 Lakh Tonnes

Less 10% mining losses=0.83 Lakh Tonnes

Recoverable Reserve (Limestone) =07.50 lakh tones

Hence for raising 07.50 lakh tones of limestone, 1.20 lakh tones of waste rock will be removed.



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5.3Bb Production during 2nd year (01-04-2004 to 31-03-2005): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
B62-B63	554	III	2.60
B62-B64	545	IV	4.59
B63-B65	536	V	5.03
		Total	12.22

Say 12.22 Lakh Tonnes

Less 10% mining losses=1.22 Lakh Tonnes

Recoverable Reserve (Limestone) =11.00 lakh tones

Hence for raising 11.00 lakh tones of limestone, 3.45 lakh tones of waste rock will be removed.

5.3Bc Production during 3rd year (01-04-2005 to 31-03-2006): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
B62-B64	536	V	4.56
B63-B65	527	VI	9.32
		Total	13.88

Say 13.88 Lakh Tonnes

Less 10% mining losses=1.38 Lakh Tonnes

Mineable Reserve (Limestone) =12.50 lakh tones

Hence for raising 12.50 lakh tones of limestone, 3.92 lakh tones of waste rock will be removed.

5.3B d Production during 4th year (01-04-2007 to 31-03-2008): -

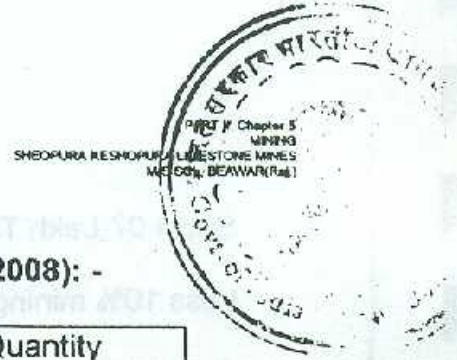
Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
B62-B63	527	VI	1.98
B62- B65	518	VII	10.52
B64- B65	509	VIII	4.16
		Total	16.66

Say 16.66 Lakh Tonnes

Less 10% mining losses=1.66 Lakh Tonnes

Recoverable Reserve (Limestone) =15.00 lakh tones

Hence for raising 15.00 lakh tones of limestones, 4.71 lakh tones of waste rock will be removed.



5.3B e Production during 5th year (01-04-2007 to 31-03-2008): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
B61-B63	563	II	3.28
B62-B63	554	III	1.85
B62-B64	509	VIII	5.99
B62-B65	500	IX	11.10
		Total	22.22

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Say 22.22 Lakh Tonnes

Less 10% mining losses=2.00 Lakh Tonnes

Recoverable Reserve (Limestone) =22.00 lakh tones

Hence for raising 20.00 lakh tones of limestone, 6.27 lakh tones of waste rock will be removed.

5.3C Yearly pit wise production plan proposed for the next 5 years in BLOCK-VA

5.3C.a Production during 1st year (01-04-2003 to 31-03-2004): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A 61 – A 63	563	II	2.77
		Total	2.77

Say 2.77 Lakh Tonnes

Less 10% mining losses=0.27 Lakh Tonnes

Recoverable Reserve (Limestone) =2.50 Lakh tones

Hence for raising 2.50 Lakh tones of limestone, 0.40 Lakh tones of waste rock will be removed

5.3C.b Production during 2nd year (01-04-2004 to 31-03-2005): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A58-A61	563	II	4.07
		Total	4.07

Say 4.07 Lakh Tonnes

Less 10% mining losses=0.40 Lakh Tonnes

Recoverable Reserve (Limestone) =3.67 Lakh tones

Hence for raising 3.67 Lakh tones of limestones, 1.15 Lakh tones of waste rock will be removed.

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5.3C.c Production during 3rd year (01-04-2005 to 31-03-2006): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A 57 – A 58	563	II	0.82
A61 – A 63	554	III	3.81
		Total	4.63

Say 4.63 Lakh Tonnes

Less 10% mining losses=0.46 Lakh Tonnes

Recoverable Reserve (Limestone) = 4.17 Lakh tones

Hence for raising 4.17 Lakh tones of limestone, 1.31 Lakh tones of waste rock will be removed.

5.3C.d Production during 4th year (01-04-2006 to 31-03-2007): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A 59 – A 62	554	III	5.55
		Total	5.55

Say 5.55 Lakh Tonnes

Less 10% mining losses=0.55 Lakh Tonnes

Recoverable Reserve (Limestone) =5.00 lakh tones

Hence for raising 5.00 lakh tones of limestones, 1.53 lakh tones of waste rock will be removed

5.3C.e Production during 5th year (01-04-2007 to 31-03-2008): -

Section Line	R.L.	Bench No.	Limestone Quantity (In Lakh tones)
A 57 – A 60	554	III	4.57
A 61 – A 63	545	IV	2.84
		Total	7.41

Say 7.41 Lakh Tonnes

Less 10% mining losses=0.74 Lakh Tonnes

Recoverable Reserve (Limestone) =6.67 lakh tones

Hence for raising 6.67 lakh tones of limestones, 2.11 lakh tones of waste rock will be removed.

YEARLY BLOCK WISE QUANTITY OF PROPOSED LIMESTONE & DEVELOPMENT IS GIVEN IN TABLE AS BELOW: -

Year	ROM Limestone Production (In Lac Tonnes)				Overburden /interburden (In Lac Tonnes)				Ore to overburden Ratio
	Block-I	Block-III	Block-VA	Total	Block-I	Block-III	Block-VA	Total	
1 st year	5.00	7.50	2.50	15.00	5.00	1.20	0.49	6.60	1.044
2 nd year	7.33	11.00	3.67	22.00	2.30	3.45	1.15	6.90	1.031
3 rd year	8.33	12.50	4.17	25.00	2.62	3.92	1.31	7.85	1.031
4 th year	10.00	15.00	5.00	30.00	3.14	4.71	1.58	9.43	1.031
5 th year	13.33	20.00	6.67	40.00	4.18	5.27	2.11	12.56	1.031
Total	43.99	66.00	22.01	132.00	17.24	19.55	6.55	43.34	1.032

5.4 Proposed method of mining

There is no change in the method of mining, the mining will be carried out by opencast mechanized mining. In Block I, VA and partly in block III we proposed mining by opencast method by using primary rock breaker (Alternate of drilling & blasting) RAMMER G-100 manufactured by m/s Sandvik Tramrock, Finland, which has been fitted on hydraulic excavator with backhoe attachment, which is giving average production of 150 M T per hour.

Eco friendly mining by rock breaker has eliminated hazards associated with drilling, transport & use of explosive & blasting such as noise, ground vibration, fly rocks and mistire etc

In Block III at present the mining operations are involved of primary rock breaker and drilling blasting depending upon the applicability of blasting. During the period of mining scheme the production planning from Rock Breakers will be unaltered and the increased quantity of production will be raised by drilling blasting.



5.4.1 Proposed Deployment of machinery: -
Proposed deployment of machinery in Block -I
Following machinery in different mining operation will be deployed :

S. No.	Name of Machinery	Capacity	No. of Units	Horse Power	Elect. / Non-Elect.
1	Hydraulic. Excavator (Loading equipment)	2.50 M ³	3	240	Non-Electrical
2	Rock Breaker (RAMMER) G-100 with carrier	150 TPH	2	240 / 320	Non-Electrical
3	Front End Loader	1.90 M ³	1	320	Non-Electrical
4	Dozer	-	1	110	Non-Electrical
5	Dumper	35Tonner	5	310	Non-Electrical
6	Tractor With Water tanker	5 KL	1	50	Non-Electrical
7	Jeep (Mahindra & Mahindra)	8 seats	1	35	Non-Electrical
8	Ambulance Van (Maruti Van)		1	800cc	Non-Electrical
9	Mobile Maintenance Van (TATA 407)	3 tonnes	1	60	Non-Electrical
10	Ropeway Bicable (Usha Bracheo)	350 TPh	1	125K W	Electrical
11	L & T make single rotary impact crusher.	350 TPH	1	500 kw	Electrical
12	ELGI Air Compressor at workshop	12 Kg	1	15	Electrical

The above feet of machinery will be sufficient for production and development work up to the period of fifth year of this mining scheme.

Proposed mining
Following machinery in different mining operation will be deployed :

S. No.	Name of Machinery	Capacity	No. of Units	Horse Power	Elect. / Non-Elect.
1	Hydraulic Excavator (Loading equipment)	2.50 M ³	3	240/320	Non-Electrical
2	Rock Breaker (RAMMER) G-100 with carrier	150 TPH	2	240	Non-Electrical



S. No.	Name of Machinery	Capacity	No. of Units	Horse Power	Elect. / Non-Elect.
3	Dumpers	16 Tonnes	6	160	Non-Electrical
3a	Dumpers	35 Tonnes	2	310	APPROVED Electrical
4	Diesel tanker	15 KL	1	100	Non-Electrical
5	Water I tanker	15KL	1	100	Non-Electrical
6	Drill machine (IBH-10)	6" dia	1	450 CFM	Non-Electrical
7	L & T make single rotary impact crusher APPM 1822	800TPH	1	1000 kw	Electrical
8	Cross country conveyor belt	800TPH	1	95	Electrical
9	Jeep (Mahindra & Mahindra)	8 seats	1	35	Electrical

The fleet of above machinery is sufficient for raising production and development upto fourth year. From Fifth year onwards following machinery will be added to above fleet:

S. No.	Name of Machinery	Capacity	No. of Units	Horse Power	Elect. / Non-Elect.
1	Hydraulic Excavator (Loading equipment)	2.50 M ³	1	240	Non-Electrical
2	Dumper	35Tonner	2	310	Non-Electrical

Partly mining will be done by drilling & blasting in Block III, where we have deployed one drill machine, and partly it will be done by rock breaker depending upon applicability of blasting.

Following drilling parameters are proposed:-

Bench height	9 mtrs
Depth of drill hole	9 mtrs
Drill hole dia	165 mm
Burden	4.0 mtrs
Spacing	6.0 mtrs
Inclination with respect to horizontal	Vertical
Sub grade drilling	Not required (by using bottom initiation blasting system)

5.4.2 Blasting:-

Blasting has bearings directly to different mining operations and cost of production. Efficient blasting gives better powder factor and increases the efficiency of mining machineries and crusher as well as it reduces the secondary blasting. Thus the adoption of proper blasting parameters and better techniques leads to higher productivity and overall efficiency, which directly improve the overall economy of mining operation.



Parameters of blasting are as follows: -

a.	Depth of hole	-	9 mtrs.
b.	Diameter of hole	-	165 mm
c.	Burden	-	4.0 mtrs.
d.	Spacing	-	6.0 mtrs.
e.	Sub grade drilling	-	NIL
f.	Charge of explosive per hole	-	90 Kgs.
g.	Powder factor	-	6.0
h.	Type of explosive to be used	-	Slurry explosives (i.e. Toe blast, Powergel etc.) & ANFO
i.	Initiation	-	Bottom initiation by the use of down line detonator in combination of noiseless trunk line detonator on surface.
j.	No.Of holes per round	-	25
k.	Blasting frequency	-	1 to 2 times in a week
l.	Total tonnage per round	-	13500 tonnes (approx.)

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By adopting latest blasting technique, there is no requirement of sub-grade drilling to avoid toe problem.

Latest Blasting Technology: -

We are adopting latest blasting technique using shock tube detonators, down line detonators in combination with Noiseless Trunk Line Detonator. This is the latest blasting technology available in India to reduce Noise, ground vibrations, Air Blast & Fly Rock due to blasting.

The various advantages by this techniques are-

- Better fragmentation
- Lower down stream material handling costs
- Less ground vibrations / noise and no fly rock.
- Better environment management.
- Excellent Toe breakage.
- Easy digging
- Good floor and wall control.
- Longer shovel tooth life.
- Deck charging is not required

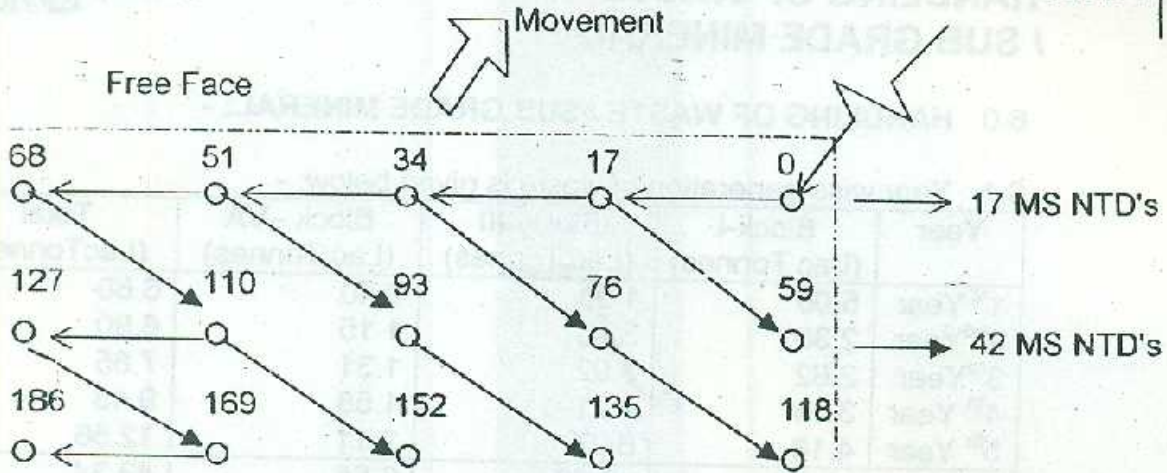
Ground Vibration Studies

As a precautionary measure, the ground vibration studies were conducted on 05.03.2001 by engaging M/s Initiating Explosives Systems India Ltd. Calcutta an independent agency working in this field. The results of these studies are well within the permissible limits and the copy of the same is enclosed as Annexure XXIV.



Figure showing blasting pattern: -

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Note that timing mentioned are surface firing times with each holes initiated with a constant 475 Millie Second DTH unit.

Blasting design :- Five holes in each row is a limitation because the width of limestone bands varies from 15-20 mtrs only in the deposit. Therefore 5 holes per row is proposed.

Storage of explosive: -

There is an explosive magazine for storage & use of explosives near Sheopura Kesarpura Limestone Mine, of M/s. Shree Cement Ltd. The licence capacity of the magazine is given below: -

1.	Nitrate mixture	-	15000 Kg.
2.	Nitro compound	-	3000 Kg.
3.	Safety fuse	-	5000 Mtrs.
4.	Detonators	-	44000 Nos.
5.	Detonating fuse	-	10000 Mtrs.

PART II

**HANDLING OF WASTE
/ SUB GRADE MINERAL**

Chapter 6
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6.0 HANDLING OF WASTE / SUB GRADE MINERAL: -

6.1 Year wise generation of waste is given below: -

Year	Block-I (Lac Tonnes)	Block-III (Lac Tonnes)	Block -VA (Lac Tonnes)	Total (LacTonnes)
1 st Year	5.00	1.20	0.40	6.60
2 nd Year	2.30	3.45	1.15	6.90
3 rd Year	2.62	3.92	1.31	7.85
4 th Year	3.14	4.71	1.58	9.43
5 th Year	4.18	6.27	2.11	12.56
Total	17.24	19.55	6.55	43.34

The above waste material is not suitable to use in any industry. This type of use of waste material is better, because it is proposed that this waste-dumping site will be used for dense plantation and green belt development

The disposal of waste proposed will be on and adjoining the existing dump.

As described on p. 49 of approved Mining Plan the site for existing waste dumps was selected in the area which was out of limestone bearing litho units. Being the area in non-mineralised zone, as well as no other area is feasible for this purpose, the present site for waste dump was chosen.

6.1.1 Build up of dumps and the site of waste dump yard is shown in yearly plan & section. Ref. DRG. No.SCL/Mines/55 to 69 and Surface Geological Plan Drawing No.SCL/Mines/27 I & 42

Details of waste dumps are as under: -

S. No.	Dump Yard	Location	Existing dump size Average (Lxwxht.)
1	Waste Dump yard No.1	Section line A-13 to A17 Western side	750Mx65Mx25M
2	Waste Dump yard No.2	Section line A-17 to A20 Western side	550Mx120MX30M
3	Waste Dump yard No.3	Section line A-26 to A28 Western side	180MX100MX20M

L = Length
W = Width
Ht = Height



- 6.2 There is no generation of sub grade minerals. The nature of waste rock is Calc schist, calc gneiss, mica schist, which is inter bedded between limestone bands and also on hanging wall side and footwall side of the deposit.
- 6.3 There is no sub grade material, hence, it is not applicable.

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PART II

USE OF MINERALS

Chapter ~~07~~ **07**

7.0 USE OF MINERALS

- 7.1 There are no changes in the proposed use of minerals as mentioned in the Approved Mining Plan. The limestone produced from the mines will be for the captive use for cement manufacturing.
- 7.2 No change in the specifications imposed by the user Industries as mentioned in the Approved Mining Plan, because the owner of producer of limestone and user (for manufacturing cement) is same.
- 7.3 Not Applicable

PART II

MINERAL BENEFICIATION

Chapter 08

8.0 MINERAL BENEFICIATION

8.1 **Crusher installed in Block I**

The Capacity of Crusher installed in Block I is 400 metric tonnes per hour. The maximum input size of boulders being put into crusher is one cubic meter and out put size of crushed material is minus ninety millimeters. Since there are no interactions in the limestone, therefore, the screening system is not required.

Crusher installed in Block III & VA

The Capacity of Crusher installed in Block III VA is 800 metric tonnes per hour. The maximum input size of boulders being put into crusher is one and half cubic meter and out put size of crushed material is minus ninety millimeters. Since there are no interactions in the limestone, therefore, the screening system is not required.

8.2 We have not conducted any beneficiation investigations. There is no existing mineral beneficiation plant and tailing disposals.

8.3 We have not done any beneficiation test on sub grade minerals including fines.

The inferiority of quality of limestone is uniform. The formations containing 20-34% CaO in homogeneous form can not be segregated by weight recovery and thus it is unfeasible to upgrade these strata.

PART II

ENVIRONMENT MANAGEMENT
 PLAN

Chapter 09

9.0 ENVIRONMENTAL MANAGEMENT PLAN

1	2	3	4
Particulars	Proposals as per approved mining plan (Date of Approval 08-04-1996 under MCR)	Position at the end of 5 year of mining plan period	Proposal for the next 5 year plan period
Top soil storage, preservation & utilization	Not Applicable	Not Applicable	Not Applicable
Land reclamation & rehabilitation	Not Applicable	Not Applicable	Not Applicable
Waste dump management	We have proposed removal of waste rock 99.85 Lac Tonnes.	We have removed waste rock 87.79 Lac Tonnes during last 5 years.	It is proposed to remove 43.34 Lac Tonnes of waste rock during next 5 years.
Rehabilitation of waste dump	Reclamation of waste dump yard is proposed by leveling it, spreading of soil, sprinkling of water and plantation.	We have rehabilitated of waste dump and 1477 nos. of trees planted on waste dump yard during mining plant period.	Reclamation of waste dump yard is proposed by leveling it, spreading of soil, sprinkling of water and plantation.
Afforestation programme	Refer Para 9.3X It was proposed 3744nos. of plant during last 5 years.	We have planted 39443 nos. of plant during last 5 years.	It is proposed to plant 4474 nos during next 5 years.

1	2	3	4
Particulars	Proposals as per approved mining plan (Date of Approval 08-04-1996 under MCR)	Position at the end of 5 year of mining plan period	Proposal for the next 5 year plan period
Quality of air	Seasonal (quarterly) monitoring as per M. C. D. R. circular.	Seasonal (quarterly) monitoring is done as per M.C.D.R. circular.	Seasonal (quarterly) monitoring is proposed as per M.C.D.R. circular
Quality of water including surface & ground water	It was proposed to take drinking water supplied from plant.	Drinking water supplied from plant.	It is proposed to take drinking water from plant
Noise level	Seasonal (quarterly) monitoring as per M.C.D.R. circular	Seasonal (quarterly) monitoring is done as per M.C.D.R. circular	Seasonal (quarterly) monitoring is proposed as per M.C.D.R. circular for next 5 years
Vibrations	It was proposed to control ground vibrations upto permissible limits	We have achieved ground vibrations upto permissible limits. Refer Para 9.3v	Refer Para 9.3v
Treatment of mine water and effluent / toxic substance before discharge.	Not Proposed	Not Proposed	Treatment of mine water is not proposed because the water entered in the worked out area will be collected at bottom bench and will be used only for water spray on haul road and plantation purpose.
Recirculation of treated water	Not Proposed	Not Proposed	Not Proposed



MANAGEMENT PLAN
SECTION: 11-10000

Air Pollution, Noise Pollution & Ground Vibration Control: -we propose to take following measures to control Air & Noise pollution and ground vibration.

AIR POLLUTION

- a. Drilling machine is equipped with wet drilling system to suppress the dust particles at the source only.
- b. Rock breakers are substituting the drilling & blasting to reduce air pollution.
- c. For effective dust suppression at source, once in a shift, water sprinkling is carried out near working faces and on haul road by two numbers of earmarked water tankers.
- d. On regular basis, sufficient water is continuously sprayed through specifically effective nozzles at various points including of crusher hopper i. e. place of unloading of dumpers, on crusher rotor, ropeway loading point and on transfer point of conveyor belt.

NOISE & GROUND VIBRATION

We are adopting following measures to control Noise & ground vibration

- a. We are categorically, following the scheduled maintenance of HEMM this helps us reducing noise at the time of operations of machines.
- b. The practice of wet drilling is performed through the use of sharp drill bits, which is instrumental in reduction of noise level.
- c. Latest technological up gradation in blasting are introduced for effective control by using shock tube detonator (combination off down line detonators and noise less trunk line detonators.), resulting in reduction of noise and ground vibrations to a greater extent.
- d. Primary rock breakers are substituting the drilling & blasting, which helped in reduction of noise and ground vibrations.
- e. Development of green foliage has also contributed in reduction of noise level.
- f. At the time of procurement of new mining machinery the factor of Noise and vibration is primarily considered for its selection.

In addition to above and for the compliance of provisions of various statutes applicable in the mines, we are providing personal protective equipments- earplug earmuff and respirator to all workmen, working at various places in the mine as preventive measures.



9.1. **Base Line Information's:** -Base line information collected refers Approved Mining Plan

Land Use Pattern: -As on 01-03-2003

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S. No.	Type of Land	Area (Hectares)
1	Non forest agriculture Non irrigated	153.10
2	Non forest Govt. Waste land	589.80
3	Degraded land by PIT	40.90
4	Degraded land by Dump	33.10
5	Degraded land by Road	1.20
8	Degraded land by Plant, building, township etc.	2.10
7	Plantation	36.60
	Total	856.80

9.2. **Environmental Impact Assessment Statement**

9.2a **Impact on Land Environment: -**

- i. **Landscape & Land subsidence:** - The mining activities have changed the topography of the working area.
- ii. **Aesthetic Environment and Tourist spots (if any):** -There will be no impact on aesthetic environment and tourist spots
- iii. **Soil and land use pattern:** -Limestone is exposed, the soil is deposited at some places along nallah and small depressions. This soil will be used for plantation on barren land on waste dump yard

The mining activities have disturbed the land use as follows.

- a. Land has been degraded due to mining & allied activities.
- b. Land has been degraded due to waste dump and construction of office, workshop, rest shelter, ANFO mixing shed and crushers etc.

The land degraded by waste dump yard will be utilized for plantation, hence it is for better use.

IV. **Agriculture:** - There was no impact of mining activities on agriculture during last 5 years.

V. **Forest:** - There is no forest area within Mining Lease Area 90-Hectare area has been surrendered already, which comes under forest area, which is shown on approved mining plan. Wild animals are not seen in the area



- vi. **Vegetation:** - Since the mining operation was carried out within Mining lease Area mainly of barren land and rocky terrain having scanty vegetation, which was affected by mining operation, which is negligible.

There was no change in the vegetation of the surrounding areas.

- vii. **Public Buildings, Places and Monuments including Archeological sites:** There is no important public building, places and monuments including archaeological sites within the mining lease area, core zone and buffer zone, hence there was no impact on above during last five years.

9.2.b. Impact on Water Environment: -

Seasonal nallahs have been observed in the area. Though the existing drainage may be affected by rock excavation and waste disposal etc, the impact is likely to be insignificant, in view of the fact that the area experiences arid climate with very low rainfall. In general, deposition and sedimentation can be caused due to waste disposal. However, in the present case it is expected to be negligible as the waste material consists mainly of lumps of hard rock forming the interburden.

- i. **Surface water:** - The proposed mining operation will not generate any waste water. There are seasonal nallahs in the mining lease area, which are totally dry during summer season and winter season. This area of Rajasthan has scanty rainfall. In the course of mining we have developed a pit with a huge water storage capacity of more than 200000 Cu. M. During monsoon all rainwater will be accumulated in the pit through mine drainage and all around the slope of the hills. This collected water is being used for water spraying for dust suppression on haul road, near working area, at crusher hopper, ropeway loading point, belt transfer point and for plantation purpose.

The existing drainage may be distributed by rock excavation, waste dump yard and erection of civil structure of plant machinery is for better use.

There is no major river or lake and canal in or around the mining lease area. Though the existing drainage may be affected by rock excavation and waste disposal etc, the impact is likely to be insignificant, in view of the fact that the area experiences arid climate with very low rainfall and the nallahs are also of seasonal nature.

In general, deposition and sedimentation may be caused due to waste disposal. However in the present case it is expected to be negligible as the waste material consist mainly of lumps of hard rock forming the interburden. There is hardly any overburden soil and softer clay materials are very less.



Quality of surface water: - The severances emanating out of the used oils and lubricants of the mining machinery will be suitably disposed of i.e. sold to outside parties and therefore will not flow into any nearby water body.

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The quality of surface water may be slightly affected due to spoil and softer clay materials which is very less water may pass through waste dump which may carry with it fine particles. Hence quality of the surface water may be affected that SO_4 content may become high.

ii. **Ground water**

The water table in the wells was generally observed to be below 20 to 45 meters from general ground level. The wells were dug mostly in calc gneisses zones, as the limestone in the area was not found to be a good aquifer. The R.L. of ground level is about 500 m, therefore R.L. of underground water level varies from 470 to 475 m. our future planning of mining of limestone is proposed upto R.L. 500 m. hence there will be no problem in mining due to underground water. The rainfall in the area is erratic and variable during summer, recharge of well very slow and thus the area shows scarcity of water.

The severance emanating out of the used oils and lubricants of the earthmoving machinery is also negligible and does not flow into any water body nearby.

The area covering five km from boundary is having approximately 250 numbers of wells. These wells are having depth of average 17 m. in each of the well generally water table is prevailing to the tune of 10 m. from the ground level in post monsoon period and in pre monsoon period it is 20 to 30 m from the ground level and some wells are dried. Balad lake is another source of water, which is not perennial.

Efforts made & to be continued for water harvesting and recharging of Ground water: -

The idea of ground water recharging is the need of hour, which is being done through rainwater harvesting. The rainwater harvesting, essentially means collecting rainwater in pits at the mines, on the roof of building and storing it under ground for later use. Not only does this recharging, arrest ground water depletion, it also enrich the water table and can help in augmenting of water supply. Following efforts have been made & being made for:-

Rainwater harvesting:-

Construction of earthen dam/ check dam:-

We have constructed six nos. of earthen / check dam across the seasonal Nallah at Plant. Mines and colony area, originating in between the valley of the hills to check the run off water, which has resulted in recharging of sub surface water. Total capacity of the earthen/check dam is 100000 Cu. M.

Utilization of Mining Pit at SCL:-

In the course of mining for the last about eighteen years, we have developed a pit with a huge water storage capacity of more than 2,00,000 Cu. M. during monsoon all rain water gets accumulated in the pit through drains and all around the slope of the hills. This phenomenon recharges the ground water in the area.

Roof water Harvesting:-

We have adopted roof water harvesting technique to store rainwater from roof of houses for new C super quarters & D super quarters. The schematic diagram of roof water harvesting is enclosed as Annexure - XXVI. The rainwater from the roofs of the quarters will be collected in a tank and will be used.

Drip irrigation:-

Drip irrigation system has been adopted for plantation in Shri HANUMAN TEMPLE and other areas, which helps a lot in conservation of water.

Sewage treatment plant (S.T.P.): -

The sewage treatment plant of 400 KL per day capacity has been commissioned at shree cement ltd. Bangur Nagar in November 2002. Discharged water of colony sewage is being treated in this plant and after treatment this water is reused except for drinking purpose. The chemical analysis report of discharge water from Sewage Treatment Plant is being enclosed as Annexure - XXVII.

Efforts for awareness:-

Water Policy:- The Company has formed a water policy and efforts have been done for wide circulation of the same. Management gives a top priority to water conservation as our plant is established in highly water scarcity area. All efforts are done to educate people for water conservation by external & internal training sessions. We have celebrated August 2002 as WATER CONSERVATION MONTH and various activities were held to pass on message to all employees and best contribution by way of posters, slogans drawing, essays, proposal were suitably awarded.

Souvenir on water conservation: -

A special issue of 'SOUVENEIR' on Water Conservation' has been published by Shree Cement Ltd. The souvenir has been distributed to all our employees and among the public for wide publicity.

iii. Ground water quality

Baseline ground water quality is meeting the drinking water quality standards: ground water has more TDS, and more hardness. Due to the mining operations no negative impact on ground water is anticipated as there will be no wastewater generation and the mine drainage will be used for green belt development.

There is no impact on quality of ground water. Outside the proposed mining operation area. Further as there will be no regular discharge from the mines, the water quality of the surrounding wells is not likely to be affected and water is potable. However the quality of quarry water collected at bottom R.L. of the quarry is slightly affected that SO_4 content is high. Hence the sump water will be only used for dust suppression in the quarry and on haul road and not domestic consumption.

9.2c Impact on air Environment: -

i. Air: - The general air pollutants in case of mining operation will include dust, smoke, organic gases, oxides of carbon, sulfur, nitrogen etc. these can have adverse effects on the human health conditions, depending upon the concentration, particle size and duration of the above pollutants.

The result of the air quality survey & parameters tested proves that during mining operation the SPM concentration have become high close to the source, but beyond this the concentration is well within the permissible limit.

Gaseous emissions due to blasting and exhaust from diesel engines of the machinery deployed also pollute the atmosphere marginally.

ii. Impact of noise and ground vibration: -

Increased vehicular movements, during mining operation may result in adverse effect on noise level. The noise level may be high close to the working place of heavy earth moving machineries, which are in use for drilling, loading & transportation etc. also there is a slight change in the ground vibrations but will be controlled by adopting proper mitigation measures.

Noise impact due to mining operation may sometimes be significant for the workers working in certain area i. e. during drilling blasting etc

- iv. Climate conditions: - There will be no impact on climatic condition due to mining operations like drilling, blasting, excavation, dumping of over burden crushing etc. the use heavy earth moving machineries leads to increase CO₂ and hydrocarbon and due to mining operations some area will be heavy mechanized. These may make some impact on climate condition, but after the dispersion of CO₂ and Hydrocarbons will give negligible impact on climate.

9.2d. Socio Economic Environment: -

- i. Social and Demographic Profile: - The impact of the mining would be positive on the socio-economic environment within the 5 Kms. Radius. The positive impacts on the different components is given below: -

Positive Impacts: - The mining operations would definitely increase job opportunities as more and more manpower by way of semi skilled & skilled labour, personnel and office staff. The additional facilities such as medical, educational and transport will be provide to nearby villagers.

Along with general development in the area business opportunities would improve leading to enhanced economic status.

Negative Impact: -increasing population in the local area by way of the people coming to work at the site would put strain on the basic amenities in the area.

The air pollution which is likely to occur if mining operations is not properly maintained, would lead to loss of agriculture products as well as health of the people.

- ii. Occupational Health and Safety: - The limestone mining will not release very much fine particle or dust particle, which can cause respiratory disease. However fine particle will move away with wind directions.

- iii. Human Settlement - The mining lease and the surrounding 5-Km. Area shown in the Key Plan. The study reveals that there are 71 villages in the area with a total population on 44769 according to the 1981 census. (data provided by sponsor) the average population of a village is 630

As the area is largely of hilly terrain and due to the paucity of irrigation facilities, the agriculture output is low. The inhabitants mainly depend on the employed in defense and civil services. Most of the people from RAWAT and MEHRAT communities and belong to the backward classes. Nearly 20% of the population is from the middle class category while the rest appear to live below the poverty line.

Since the area is rocky in nature, the inhabitants live in clusters and a group of 10 to 15 houses is locally called "BARIA". The nearest town "BEAWAR" is about 9.50 Km., and the district head quarter "AJMER" is about 54 Km. From Beawer.

Local economy thus improves. The mining operation will also create better facilities for transportation, education medical etc. thus there will be a great deal of development of this region.

9.3 Environment Management Plan: -

The management of Shree Cement Limited with a view to minimize the impact of the mining operation on the environment and to maintain the air, noise and water quality within stipulated limits propose a comprehensive environmental plan.

The Environmental Management Plan (EMP) will include all measures and safety precautions necessary for safe mining of the required limestone for cement manufacturing.

9.3i Storage & preservation of topsoil: -

The limestone is exposed on the surface, hence there is no topsoil. Alluvium occurs at some places along valley and at some places small depression have been filled up from interstitial soil, which occur along fracture and joint plane, and accumulated at some depressions, through rainy water. We are utilizing this soil for plantation purpose.

9.3ii Proposal for Reclamation of Land Affected by Mining operations: -

We are not reclaiming the land affected by mining operations, because there is continuity of limestone below the 500m R.L. at the end of life of the mine, the worked out area will be converted in to pond, which will be utilized for plantation and plant process and also help for recharging of ground water.

9.3iii In case of Forest- Programme of phased Compensatory Afforestation:-

There is no forestland within the mining lease area. Therefore no question of disturbance of forestland by the mining operations, so there will be no compensatory afforestation will be required. Although we are proposing for a five-year afforestation programme as given below:-

S.NO	Year	No. of trees proposed for plantation	Expected Survival rate	Final Nos. of Plants	Cumulative nos. of plants
1	1 st	800	95%	760	760
2	2 nd	840	95%	798	1558
3	3 rd	863	95%	820	2378
4	4 th	971	95%	922	3300
5	5 th	1000	95%	950	4250
	Total	4474	95%	4250	

The type of the plant proposed to be planted is given below:-

S. No	Botanical name	Plant Type	S. No.	Botanical Name	Plant Type
1	Acacia Nirotica	Desi Babul	12	Ficus Religiosa	Pipal
2	Prosopis juliflora	Angraji Babul	13	Prosopis Cimeraria	Khejri
3	Zyzyphus Jujuba	Bardi	14	Commiphora Mukul	Gugal
4	Eucalyptus	Safeda	15	Saccharum munjo	Moonj
5	Anogeissus	Dhokra	16	Albizia Lebbak	Siris
6	Dalbergia Sisoo	Sisam	17	Calligenum polygae	Phng
7	Azadirachta Indica	Neen	18	Capparis decidua	Kair
8	Acacia Senegal	Kumpal	19	Calotropis pocera	Ank
9	Echinops echinatus	Karb	20	Pithecolobium dulce	Keekar
10	Ficus Religiosa	Cular	21	Euphorbia nivulia	Thor
11	Holanlrena anticysentrica	Dudheli	22	Delonx regia	Guanohar

FRUIT TREES

S. No.	Botanical Name	Common Name
1	Pardium Cattleianum	Guava
2	Citrus species	Lemon
3	Punica grantum	Pomogranate
4	Carica papaya	Papaya
5	Musa sapientum	Banana
6	Ziziphus jiyabo	Berry
7	Mangifera indica	Mango, Aam
8	Citrus nobiliers	Orange
9	Phyllanthus emblica	Ariwala



Precaution proposed for survival and protection of plantation: -

We have employed two horticulturists, five nos. of gardeners and 10 nos. helpers for look after, maintenance and watering of plants. If any plant is dead due to some reason it is replaced by new plant. So that density of plantation does not decrease. The horticulturists are responsible for proper maintenance of nursery where different types of sapling are prepared. We have two nurseries, one at plant and other at mines (near canteen). For watering to plants. We have constructed water hose at different plantation site and along road so that watering of plants is easy. The survival and protection of plantation will be looked after by the horticulturists, gardeners and helpers.

9.3iv. Measures for dust Suppression: -

During mining operation, we have conducted air survey during every season regularly and data recorded in register.

The proposed survey station for air monitoring is given below: -

1. Waste Dump Yard No. 2
2. Quarry Edge
3. Close To Loading Point.
4. Drilling Site
5. Near Mines Haul Road.
6. Crusher
7. Near Ropeway Loading Station
8. Colony No 2

The water spray will be done on haulage road by water tanker for dust suppression. The frequency of water spraying on haul road will be once in every working shift.

Regular water spraying at crusher hopper is being done by specially designed nozzles, while unloading of Dumpers. Regular water spray is being done on crusher rotor, ropeway-loading station and at transfer point.

Drilling is done with IBH-10 drill machine which is provided with wet drilling arrangement. So that dust is suppressed immediately.

9.3V Measures to Minimise Vibrations due To Blasting and Check Noise Pollution: -

It is proposed that during mining operation the noise level of machinery will be maintained within permissible limits. Monitoring of noise level is also proposed to carry out in every season.



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The proposed noise level monitoring places is given below:-

- Hydraulic Excavator L&T CK 300 No. 1
- Hydraulic Excavator L&T CK 300 No. 3
- Hydraulic Excavator L&T CK 300 No. 4 with Rock- Breaker
- Hydraulic Excavator Demag H-55 No. 3
- Front end wheel loader
- Dozer BD155
- Dumper HM-1035
- Drill Machine CM-15 IR
- Crusher
- Ropeway

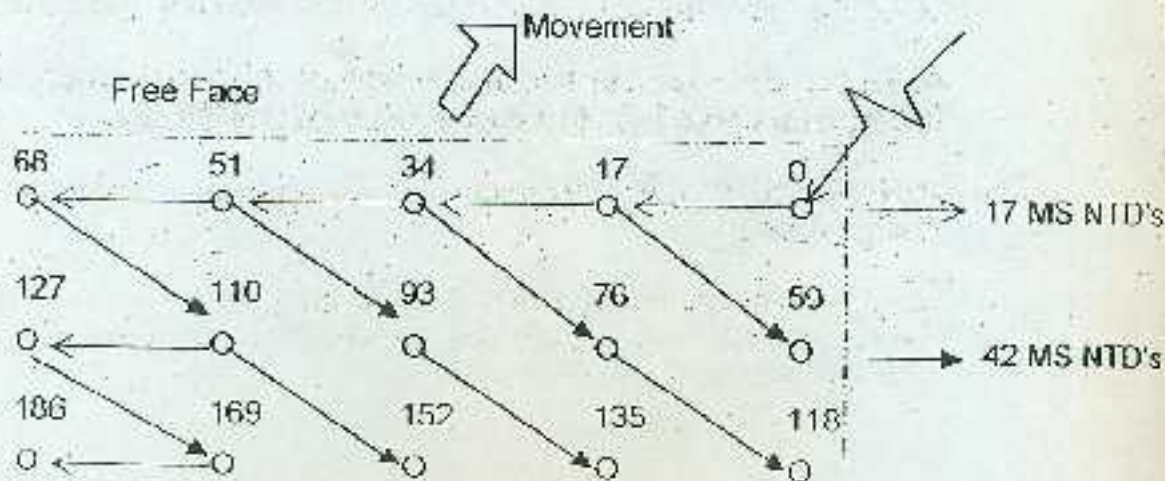
Ground Vibrations, Air Blasts and Fly Rocks: -

We are adopting latest blasting technique using shock tube detonators, Down line detonators in combination with Noiseless Trunk Line Detonator. This is the latest blasting technology available in India to reduce Noise, ground vibration, Air Blast & Fly Rock due to blasting.

The various advantages by this techniques are-

- Better fragmentation
- Lower down stream material handling costs.
- Less ground vibration/noise and no fly rock.
- Better environment management.
- Excellent Toe breakage.
- Easily digging
- Good floor and wall control.
- Longer shovel tooth life.
- Deck charging is not required

Figure showing blasting pattern. -





Note that timing mentioned are surface firing times with each holes initiated with a constant 475 MS DTH unit.

Further to reduce ground vibration, we have started mining by Primary Rock Breaker (Alternate of Drilling & Blasting)

Eco friendly mining by primary Rock Breaker has eliminated hazards associated with drilling, blasting, transport & use of explosive, noise, ground vibration, fly rock and misfire etc.

9.3.vi. Stabilization of dumps: -

- a. The dump yard will be leveled by dozer / loader.
- b. The slope of waste dump will be equal to angle of repose of waste material dumped.
- c. Strong parapet wall will be made at the edge of top of dump yard so that water will not flow out side through the slope of dump. It will prevent the soil erosion and rainy water accumulated on it will be utilized for plantation. After completion of waste dump yard, we will level it and make suitable for plantation by using topsoil.

9.3.vii. Treatment and Disposal of Water from Mine and Beneficiation Plant: -

As already stated, in this region rainfall is scanty, no beneficiation is proposed and there is no change of ground water quality during last five years.

The proposed mine working are located above and upto the general ground level and the water table is varying between 20-45 M below the ground level. Therefore the water seepage is not anticipated in the mining area. The runoff water during the monsoon period will flow through natural watercourses into nallahs. The rainwater is accumulated on bottom bench within working area & worked out area and used for dust suppression & plantation purpose; hence there is no need of water from mine.

The operation of various equipments like excavators, dumpers, loaders etc. result in generation of liquid waste in form of used oil. This oil will be filled in cut barrels and will be sold to outside parties to be further used for greasing of tractors etc.

9.3.viii. Measures for Minimising Adverse effects on Water Regime: -

The mine drainage will not contain any toxic material and therefore it will not be harmful to biotic life.

It is proposed to construct check dam by using big boulder across the nallah at different places to arrest soil erosion and to prevent water pollution. The proper drainage system will be developed within the mine working area and along the road so that non polluted rainy water will be accumulated at existing ponds which may be utilized for plantation, irrigation and drinking purpose for cattle.



9.3IX. Afforestation of Tailing Ponds: -

The beneficiation is not proposed, because the limestone in M.L. area is cement grade. the tailing ponds will not be formed hence afforestation is not required.

9.3x. Preparation of dumping ground for stacking toxic Mineral substance: -

There is no toxic mineral substance in the M.L. area. There is no proposal for stacking sub grade mineral; whatever the limestone produced from the mine will be dispatched to Plant.

9.3xi. The 77.30 hectares of land has been degraded out of 856.80 hectares of mining lease area till to - date. The mining operation is carried out above the general ground level and there is continuity of limestone below the mine working area. There is no feasibility of measures to be taken for restoration.

Mining lease area is	856.80 Hectares
The land degraded by pit is	40.90 Hectares
The land degraded by dump is	33.10 Hectares
The land degraded by road is	1.20 Hectares
The land degraded by plant, building & township etc. is	2.10 Hectares

77.30

9.3xii The wasteland /barren land will be utilized for dense plantation after completion of waste dumps. Therefore there will be no land disturbed by waste dumping.



PART II

OTHER ASPECTS

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Para 10.0 Any other aspects

(A) Expenditure incurred so far upto 31-03-2003 for socio economic development is as follows: -

S. No.	Parameters.	Particulars of work done	Expenditure Incurred 2002-03 (in Lac Rs.)	Total Expenditure As on 31-03-2003 (in Lac Rs.)	No. of beneficiaries
1	Housing	Housing colony for workmen.	150	350	98
2	Water supply	a. Water hut & water Facility for cattle's	85	0.55	19 Points
		b. Distribution of drinking water in draught affected village of Masuda sub-division.	6.03	10.53	20 Village
3	Sanitation	-	-	-	-
4	Health, safety and medical facilities	Eye camp	0.30	1.80	990 Nos
		Physical handicaps Camp	-	0.15	22 Nos
		Medical treatment at company's hospital.	1.90	16.90	11000 Y
		Polio vaccination camp	-	-	830 Nos
		Donation of generator set to A.K. hospital Bewar.	-	3.00	General Public
		Donation of children ward to A.K. hospital Bewar	-	5.00	General Public

PART III

PROGRESSIVE
MINE
CLOSURE
PLAN

CHAPTER 11

INTRODUCTION

11.0 GENERAL

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The mines of Shree Cement Ltd. located near village Sheopura — Kesarpura owned by the Bangur flagship company is catering the 3.20 million-ton capacity cement manufacture plant with latest modern technologies. At the instance of general awareness prevailing in the company with the attitude of modern management the company is bestowed with the several honoris causa of prestigious awards in the fields of Eco friendly operations of mines and plants besides the energy conservation.

In the wake of recent circular promulgated in the MCDR 1988 in the rule 23 for Mine Closure plan the company has reviewed its activities and in the compliance of aforesaid amendment the present document is submitted in the prescribed format provided by the Indian Bureau of Mines vide dated 11.08.2003. In the subsequent paragraphs different aspects of progressive mine closure plan are summarised.

In this direction an attempt has been made in this chapter to envisage post-mining scenario based on relevant environment aspects in the area. It is a visualization of the post mining activities. The main object of this progressive mine closure plan to turn the landscaping from the degradation to conducive for the environment. For this prima facie the weightage is given to utilization of mined out area as water reservoir that will add not only the enrichment and longevity of water table but also will create aesthetic beauty and will be boon in disguise for the welfare of the mankind inhabiting the area.

The aforesaid object shall be implemented within the framework of the MCDR 1988. Therefore, it is quite necessary that we follow the path in environmentally compatible manner considering waste management, reclamation of mined out area, community development and social upliftment etc.

As per guide lines provided by the Indian Bureau of Mines the progressive Mine Closure Plan is described as herein below.



Name & Location of the Mine: Sheopura-Kesarapura Limestone Mines, Near villages Sheopura - Kesarapura, Jhalana Ka Baria & Lutwa, Tehsil Masera District (Ajmer) (Raj.)

Name & Address of the nominated owner: Shri M. K. Singhi, Executive Director, M/s. SHREE CEMENT LTD., P.B. No. 33, Bangar Nagar, RFAWAR-3C5901 (Raj.)

Mining Lease No.: 24 / 97 (R)

Mineral: LIMESTONE

Mining Lease Area: 856.80 Hectares

Mining Lease Period (Valid Up to): 28-08-1998 to 27-08-2018 (Further renewable)

Type of lease area: There is no forestland included in the mining lease area. An area admeasuring 90 hectares categorized as forestland has been surrendered in the year 1998, at the time of renewal of the Mining Lease. A safety margin of 25 mtrs width has been kept at ML Border.

11.A LAND USE PATTERN

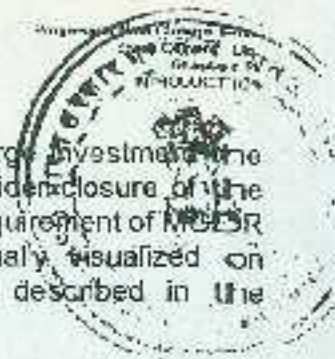
Position at the end of Fifth Year of Proposed Mining Scheme

S. No	Type of Land	Area (Hect.)
1	Forest Land	NIL
2	Non Forest Land	715.80
	a. Non forest agriculture Non irrigated	153.10
	b. Non forest Govt. Waste land	562.70
3	Private Irrigated Land	NIL
4	Private Non irrigated Land	Covered in item 2a
5	Land covered by PIT	62.00
6	Land covered by Dump	33.10
7	Land covered by Road	1.20
8	Land covered by Plant, Building, Township etc.	2.10
9	Plantation	42.80
Total		856.80
Total Land covered by Pit, Dump, Road, Plant & Building etc.		98.40

Details of land as mentioned above, are shown in Surface Plan (SCL / Mines / 25)

11.1 Reason of closure

In the light of present day development and the large investment the organisation has incurred, there is no question to consider closure of the mine at this juncture. However, keeping in view of the requirement of MCLSR 1988 the closure of the mine can only be conceptually visualized on exhaustion of the mineral potentiality that is being described in the subsequent paragraph.



11.2 Statutory Obligations

There is no legal obligation as such provided in the Mining Lease deed. Lessee is not bound with any special conditions mentioned in the grant order or in mining leases agreement and also in approved mining plan. There is no special directives from the Indian Bureau of Mines, Ministry of Environment and Forest, state and central Pollution Control Board and any other government agencies. All the relevant statutory provisions are strictly complied with.

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11.3 Closure Plan Preparation

- a. Name of Applicant : Sheopura - Kesarpura Limestone mine
- b. Address of applicant : Shree Cement Limited
Post Box no 33
Bangur nagar
BEAWAR (Raj.) 305901
- c. Name of RQP : Anil Kumar Jadia
- d. Registration Number : RQP/AJM/189/2000/A
- e. Address of RQP : 4-K-13 Talwandi
KOTA (Raj.) 324009
- f. Name of Executing Agency : Shri S C Suthar, Agent,
Sheopura - Kesarpura Limestone Mines,
Shree Cement Limited
Post Box no 33, Bangur Nagar
BEAWAR (Raj.) 305901

The present document is a Progressive Mine Closure Plan as described above, at present it is not warranted for the final closure, therefore, the resolution of the board is not required.



Part III CHAPTER 12

MINE DESCRIPTION

12.1 Geology

12.1.1 Regional Geology

As described in the Indian Geological literature, the rock formations occurring in the area belong to super group of Delhi systems. The general trend of the rocks of Ajabgarh Group is NE-SW with moderate to steep ridges and hillocks. These rocks comprise of limestone, calc and mica schist, amphibolites, calc gneisses and pegmatite.

12.1.2 Topography

The terrain is rugged occupied by the exposures of litho limits as described above. The two parallel ridges of limestone are base of the topography which is traversed by small rivulets. The overall look of the area is in undulating shape.

12.1.3 Local Geology

The rock type occurring in the mining lease area belongs to Ajabgarh group of Delhi super group consisting of Calc schist, Calc gneiss, and Limestone. Different litho units are described as hereunder

Rock Type: Limestone

Physical Characteristics: It is dark gray in colour and medium to coarse grained. Metamorphosed showing recrystallisation of carbonate minerals.

Chemical Characteristics: Calcium Carbonate

Rock Type: Calc Schist

Physical Characteristics: Calc schist is product of regional metamorphism of Calcite and Quartz matrix. It is greyish black in colour and medium to fine grains.

Chemical Characteristics: Calcium Silicates

Rock Type: Calc Gneisses

Physical Characteristics: It is compact, thinly laminated occurring in black colour and having medium to fine grains. Showing presence of micaceous minerals.

Chemical Characteristics: Calcium Silicates

Structurally the area represents a tight isoclinal synclorium where Limestone constitutes two limbs of fold, which are separated by a shallow valley.



12.2 Reserves

Updated geological reserves as envisaged in mining scheme (as on 01/03/2003) are given below:

Block No	Geological Reserve (Qty. in million tonnes)			Recoverable Reserve (Qty. in million tonnes)			ROM Grade % CaCO3	Remarks
	Measured Reserve	Indicated Reserve	Inferred Reserve	Measured Reserve	Indicated Reserve	Inferred Reserve		
I	25.03	0.00	0.00	22.36	0.00	0.00	74.46	Upto RL 500
II	2.65	0.00	0.00	2.39	0.00	0.00	73.32	Upto RL 545
III	15.47	0.00	0.00	13.27	0.00	0.00	74.38	Upto RL 500
IV	0.00	6.23	0.00	0.00	5.60	0.00	73.07	Upto RL 527
VA	11.01	0.00	0.00	9.88	0.00	0.00	74.39	Upto RL 500
TOTAL	54.16	6.23	0.00	47.90	5.60	0.00		

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12.3 Mining method

Limestone is occurring on the barren surface, and as such there is no topsoil and over burden in rock form. However, limestone deposit is interbedded with rejects consisting of unusable calc schist and calc gneiss etc. having CaCO3 from 55 to 65%. Keeping in view the salient features of methodology adapted in the Sheopura – Kesarpura Limestone Mine are described as herein below:

At present mining method adapted is opencast working by means of complete mechanization. The slicing pattern of mining in proper benching and flooring is designed. The keeping in view of Mines Safety Provisions of MMR 1961 the maximum bench height kept is 9M and the sufficient span of mine floor kept to the tune of minimum is 9 m. Separate working permission encovering mechanization is already obtained by the lessee.



The general advance takes place towards the strike direction. All the limestone bands are worked in such a way that all quality material is simultaneously exposed for easy blending. Each bench is always kept minimum 20 meters in advance of their respective bottom bench. The sides of the benches are dressed properly.

Before initiating the mining operation the area is dressed and graded for smoothness by dozing operations. For safe and eco friendly mining the rock breakers are used. We are doing excavation by Primary Rock Breaker (G100 Make: - Rammer) as alternative to Drilling and Blasting, which has been fitted on Hydraulic Excavator having backhoe attachment. Utilisation of rock breakers the hazards of blasting is completely eliminated as well as ground vibrations are nil. The shape and size of benches and floors are regular. For steady and stable transportation the haul road well within the permissible limits of slopes and curves are provided in the mine lay outs. This feature is shown in the surface plan drawing No. SCL/MINES/25. These haulage roads are connected with the crushers.

Thus we can express the views that this is the only place where environmental parameters are considered primarily by taking up Eco friendly mining performed by Rock Breaker, that has eliminated hazards associated with drilling, transport & use of explosives and blasting such as noise, ground vibrations, fly rocks & misfire etc.

The waste generated during mining has been dumped in waste dump yard in systematic manner and on earmarked area as per approved mining plan. The waste dump is on non-mineralized area. 90% of dead waste dumps have been stabilized and plantation has been done over them by spreading clay on the stones.



12.3.1 **Extent of Mechanisation**
 Deployment of Machinery
 Block - I

S. No.	Name of Machinery	Capacity	No. of Units	Horse Power	Elect / Non-Elect.
1	Hydraulic Excavator (Loading equipment)	2.50 M ³	3	240	Non-Electrical
2	Rock Breaker (RAMMER) G-100 with carrier	150 TPH	2	240 / 320	Non-Electrical
3	Front End Loader	1.90 M ³	1	320	Non-Electrical
4	Dozer	-	1	110	Non-Electrical
5	Dumper	35 Tonner	5	310	Non-Electrical
6	Tractor With Water tanker	5 K L	1	50	Non-Electrical
7	Jeep (Mahindra & Mahindra)	8 seats	1	35	Non-Electrical
8	Ambulance Van (Maruti Van)		1	800cc	Non-Electrical
9	Mobile Maintenance Van (TATA 407)	3 tonnes	1	60	Non-Electrical
10	Ropeway Bicable (Usha Bracheo)	350 TPh	1	125K W	Electrical
11	L & T make single rotary impact crusher	350 TPH	1	500 k w	Electrical
12	ELGI Air Compressor at workshop	12 Kg	1	15	Electrical

Block - III & VA
Deployment of Machinery

S. No	Name of Machinery	Capacity	No. of Units	Horse Power	Elect. / Non-Elect.
1	Hydraulic Excavator (Loading equipment)	2.50 / 3.75 M ³	3	240/320	Non-Electrical
2	Rock Breaker (RAMMER) G-100 with carrier	150 TPH	4	240	Non-Electrical
3	Dumper	16 / 35 Tonnes		160/310	Non-Electrical
4	Diesel tanker	15 KL		100	Non-Electrical
5	Water tanker	15KL		100	Non-Electrical
6	Drill machine (IBH-10)	6" dia		450 CFM	Non-Electrical
7	L & T make single rotary impact crusher APPM 1822.	800TPH		1000 k w	Electrical
8	Cross country conveyor belt	800TPH		95	Electrical
9	Jeep (Mahindra & Mahindra)	8 seats		35	Electrical

The fleet of above machinery is sufficient for raising production and development upto fourth year. From Fifth year onwards following machinery will be added to above fleet

S. No.	Name of Machinery	Capacity	No. of Units	Horse Power	Elect. / Non-Elect.
1	Hydraulic Excavator (Loading equipment)	2.50 M ³	1	240	Non-Electrical
2	Dumper	35Tonner	2	310	Non-Electrical

Part III
CHAPTER 13
REVIEW



13.0 REVIEW OF IMPLEMENTATION OF MINING PLAN / SCHEME OF MINING INCLUDING PROGRESSIVE MINE CLOSURE PLAN

13.1 Review Of Implementation Of Progressive Mine Closure Plan

After enforcement of the provisions, the present document submitted for the first time, as progressive mine closure plan document (progressive closure plan) for review is yet to be created. The review of the present Progressive Mine Closure Plan will be covered at time of next documentation.

13.2 Review of Implementation Of Mining Scheme

The target of production was 24.32 Lakh tonnes per annum (Ref. para 5.30) but the lessee raised 11.95 Lakh tonnes @ of 15 Lakh tonnes per annum in the preceding period of existing mining scheme, which is under revision.

The target of removal of overburden / interburden was 7.58 Lakh tonnes per annum (Ref. para 5.3) but the lessee removed 5.50 Lakh Tonnes @ 6.6 Lakh tonnes per annum in the preceding period of existing Mining Scheme which is under revision.

We wish to draw your kind attention that the mining operations carried out during this period were systematic in view of mineral conservation and environment protection including ecology of the area. MCDR 1988 was adhered to the maximum possible and as such there is no violation in this regard.

13.3 Review of Proposals

Sr. No.	Particulars	During the Five year Plan	During the Conceptual Mining Plan Period
1	Area to be excavated	21.10 Ha	225.00 Ha
2	Storage for Top Soil (Direct Exposures in working area, there is no spreading of Top Soil)	Not Applicable	Not Applicable
3	Waste Dump	00.00	88.00 Ha
4	Mineral Storage (It is in direct process, stock is not required)	Not Applicable	Not Applicable
5	Infrastructure (Workshop, Building, etc)	0.00	2.50 Ha
6	Roads	0.00	2.00 Ha
7	Railways	Not Applicable	Not Applicable
8	Green Belt	06.00	70.00 Ha
9	Tailing Pond	Not Applicable	Not Applicable
10	Effluent Treatment Plant	Not Applicable	Not Applicable
11	Mineral Separation Plant	Not Applicable	Not Applicable
12	Town Ship Area	Not Applicable	Not Applicable
13	Others	Not Applicable	Not Applicable

CHAPTER 14

CLOSURE PLAN



14.1 MINED OUT LAND

The Mining Pits as discussed in preceding paragraphs are having area of 44.70 hectares. When we initially started our activities the area was in rugged form occupied by barren land. If we have made sea changes in improving environmental parameters. The scenario is quite changed. Now the mined out and being mined area is conducive to environment.

The bottom ultimate pit limit of 500 M RL was decided on the following facts of justifications:

- The overall ratio of Mineral to overburden is 1:1 (Ref. Prospecting Report). It will increase on lowering of bottom bench RL, resulting in uneconomic Mining operations in present situation in the span of current Mining Scheme.
- The quality of limestone being mined out is substandard and it will further deteriorate on getting down. In present situation it will be difficult to use the same.
- The limestone bands being mined are narrow and shall further narrow down on greater depth.
- Considering the pit slope angle, area for transportation, gradient of road and the working area will be of shorter span.

During the tenure of current mining scheme the bottom limit will be 509 BRL, whereas the ultimate pit limit has been considered upto 500 BRL. As such in conceptualization no part of the area will be touched to its final limit of threshold line where reclamation work can be taken up.

In such situation we can not plan for back filling the land affected by mining operations for its reclamation. The area mined out is now itself utilised for recharging the water and for reservoir purpose in postmonsoon period. Since the limestone is extended beyond the ultimate pit limit of 500 m R. L. This limit is fixed in present day scenario. In future in case scarcity warrants the pit limit may be changed on its economic value. Meanwhile the temporarily mined out area will be utilised as "POND" to collect rainwater, which will be utilized for plantation, irrigation and also help for recharging of ground water.

To avoid inrushment of water in the working pit, the inflow of water is connected to seasonal nullas in adjacent area. In future, when we required implementing the measures of progressive mine closure plan, the same can be reconnected to abandoned pit. This arrangement will enrich the reservoir to the maximum extent.

In order to safeguarding parameters of environment, vis a vis for mitigating the measure for Noise and vibrations limits the programme of afforestation is taken up which will ultimately bring the scenic beauty to the area. Plantation foliage is selected in the area, which will not be used for mining. The above mentioned water pond with plantation around them will help in attracting the birds and animals to the site. This will turn the area as sight seeing/ picnic spot.

Table Showing Strategy for Winning Mineral Simultaneously with Reclamation / Restoration Work

Sr. No.	Particulars	At the Start of Mining Scheme	At the End of Mining Scheme
Winning Mineral			
1.	Excavated Area	40.90	62.00
2.	Waste Dump Area	33.10	33.10
3.	Road	1.20	1.20
4.	Plant, Building etc	2.10	2.10
Reclamation / Restoration Work			
1.	Plantation (Within ML Area)	36.60	42.60
2.	Plantation (Adjacent to ML Area)	12.50	12.50
3.	Construction of Check Dams	Four	Four

A. The expenditure incurred upto the date of Starting of Mining Scheme is Rs. 82,50,000/-

B. For plantation the estimated expenditure to be incurred during the period of Scheme of Mining is tentatively Rs. 15,00,000/- excluding the cost of maintenance

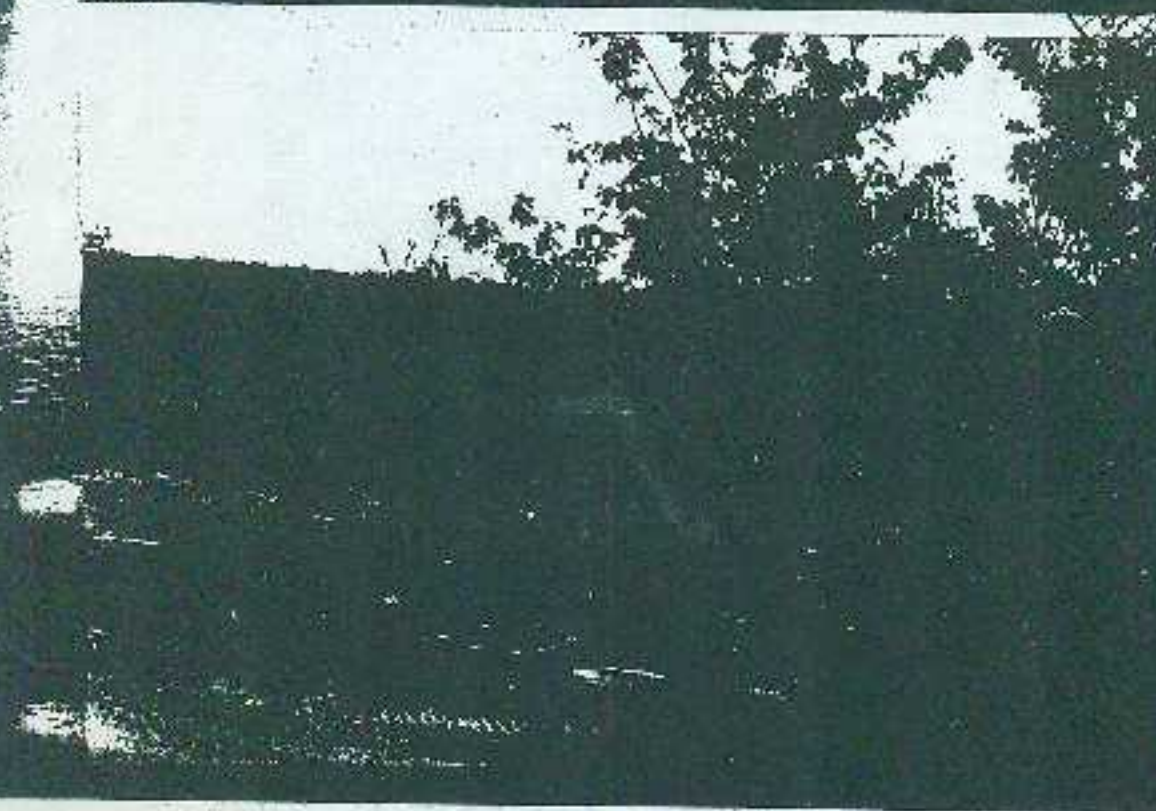
The detail of plantation in Mining Lease Area done up to year 2002-03 is provided in Annexure XXII

The detail of plantation adjacent to the Mining Lease Area done up to year 2002-03 is provided in Annexure XXII.

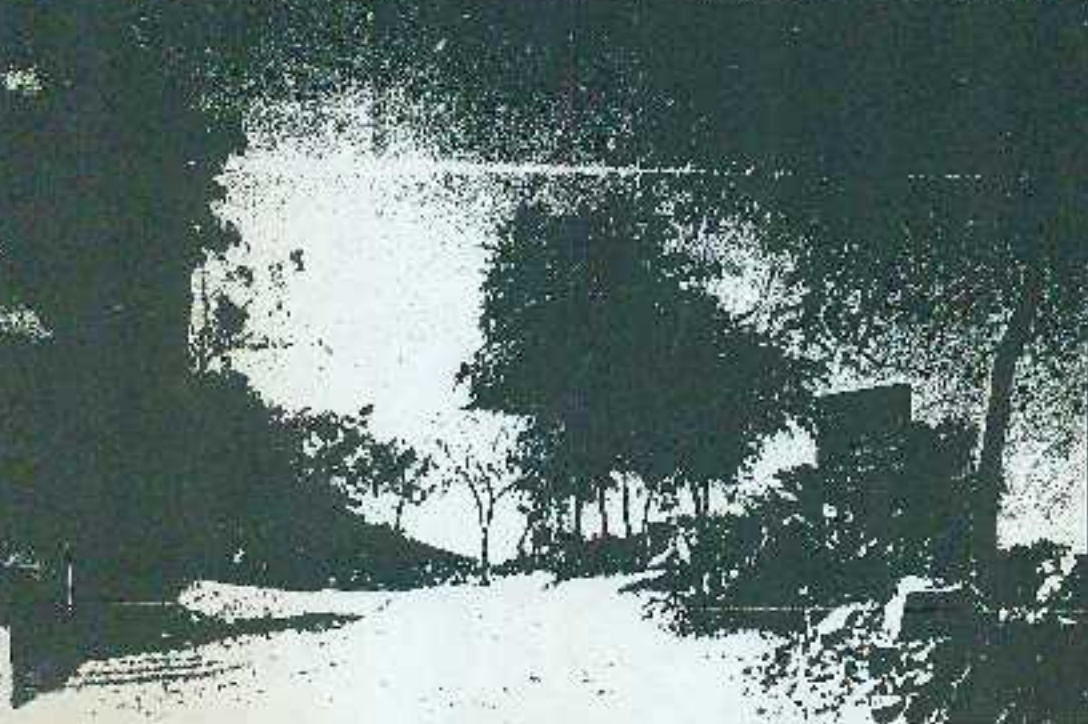
The proposed programme of plantation for next five years as given in the Mining Scheme is mentioned as herein below -



SREE CEMENT LTD.
SHEOPURA-KESARPURA MINES
PLANTATION AT WASTE DUMP YARD



SREE CEMENT LTD.
SHEOPURA-KESARPURA MINES





S.NO.	Year	No of trees proposed for plantation	Expected Survival rate	Final Nos. of Plants	Cumulative nos. of plants.
1	1 st	800	95%	760	760
2	2 nd	840	95%	798	1558
3	3 rd	863	95%	820	2378
4	4 th	971	95%	922	3300
5	5 th	1000	95%	950	4250
	Total	4474	95%	4250	

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Details of Plantation

The type of the plant proposed to be planted is given below: -

S. No.	Botanical Name	Local Name	S. No.	Botanical Name	Local Name
1	Acacia Nilotica	Desi Babul	12	Ficus Religiosa	Pipal
2	Prosopis Juliflora	Angraji Babul	13	Prosopis Cimeraria	Khejri
3	Zyzyphus Jujuba	Bordi	14	Commiphora Mukul	Gugal
4	Eucalyptus	Safeda	15	Saccharum munja	Moonj
5	Anogeissus	Dhokra	16	Albizzia Lebbek	Siris
6	Dalbergia Sisoo	Sisam	17	Calligenum polygne	Phog
7	Azadirachia Indica	Neem	18	Capparis decidua	Kair
8	Acacia Senegal	Kumpta	19	Calotropis pocera	Aak
9	Echinops actinatus	Kanti	20	Pithecolobium dulce	Keekar
10	Ficus Religiosa	Gular	21	Euphorbia nivulia	Atthar
11	Holopterna anticyseritica	Dudhali	22	Delonx regia	Gulmdhar

FRUIT TREES		
S. No.	Botanical Name	Local Name
1	Psidium cattleianum	Guava
2	Citrus species	Lemon
3	Punica granatum	Pomegranate
4	Carica papaya	Papaya
5	Musa sapientum	Banana
6	Ziziphus jujuba	Berry
7	Mangifera indica	Mango
8	Citrus nobilis	Orange
9	Phyllanthus emblica	Airwala

Measures for Survival and Protection of Plantation

Measures for Survival and Protection are implemented at both the nurseries one at plant and another at Mines besides the Plantation foliage. Measures considered for plantation are summarized as herein below.

Upkeep and Maintenance

Both the nurseries are looked after by two qualified and experienced horticulturists leading a team of five nos. of gardeners and 10 nos. helpers to assist them. This team regularly controlling the survival and protections measures

Watering

Watering arrangements are made in plantation foliage and in both the nurseries. Plants are grown in rows and columns connected through drainage for watering purpose. These rows and columns as well zones are further grouped with large tanks at ground level for constant supply of water. For nursery regular water is catered by mechanical means by the team engaged for the purpose.

Removal of extra vegetation

For faster and uninterrupted growth of the plantation, the grass and other types of harm full shrubs and vegetation are regularly cleaned.

Pasting

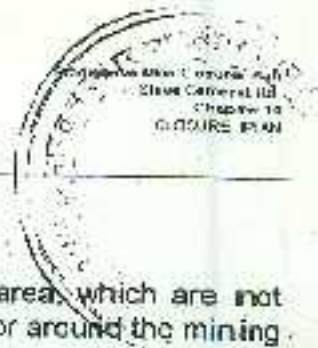
For prevention of various diseases the regular pasting is done in the directions of the horticulturists.

Safety

For keeping safe the plantation zone is barricaded by coniferous plants fencing walls.

Survival

Regular record of plantation is kept. Provisions are made to replace the plantation in case any plant is damaged on account of unforeseen circumstances.



14.2 WATER QUALITY MANAGEMENT

Surface Water

There are seasonal nallas in the mining lease area, which are not perennial. There is no major river or lake and canal in or around the mining lease area.

At the time of development of pit, having huge capacity of water storage. Due care has been taken to avoid the unwarranted interruptions to flow of these nallas. Basically, these nallas are formed out of ground slopes of the ridges in the lower level zone whereas the mining is continued in high SRL area. Hence no nalla or surface ground water is affected. These mining pits are proving instrumental in storage of water and recharging the area. As such in no case, surface water regime will be adversely affected.

In the process of mining and crushing there is no effluent of water. Hence the quality of surface water will not be disturbed

Quality of Surface Water

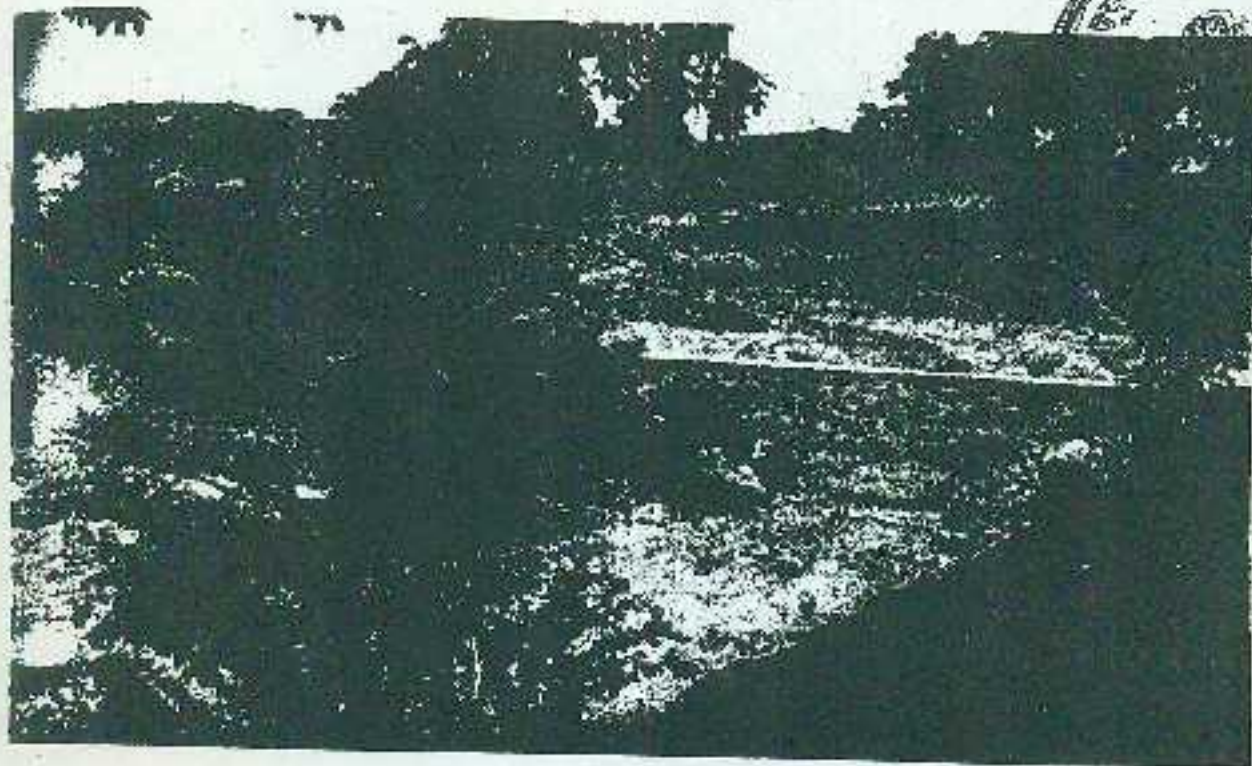
As described above net work of nallas as well as flow of surface water is separate with the extensions of mining pits. As such there is no effluent therefore, quality of surface water will be uninterrupted.

Ground Water

The water table in the wells was generally observed to be below 20 to 45 meters from general ground level. The wells were dug mostly in calc-gneiss zones, as the limestone in the area was not found to be a good aquifer. The R. L. of ground level is about 500 m; therefore R. L. of underground water level varies from 470 to 475 m. Our future planning of mining of limestone is proposed up to R. L. 500 m. Hence we will not cross the water table during course of mining. The rainfall in the area is erratic and variable during summer, recharge of well very slow and thus the area shows scarcity of water.

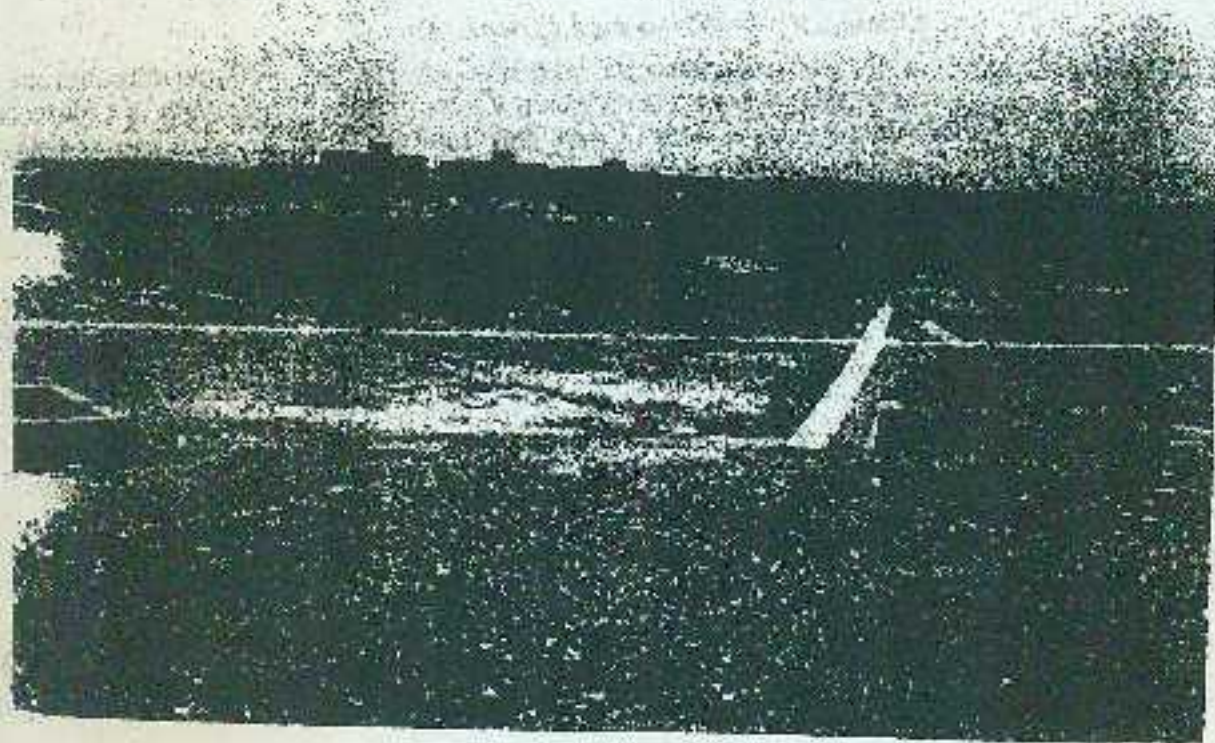
Baseline ground water quality is meeting the drinking water quality standards; ground water has more TDS and more hardness. Due to the mining operation no negative impacts on ground water are anticipated as there will be no wastewater generation and the mine drainage will be used for green belt development.

WATER HARVESTING PROGRAMME BY SHREE CEMENT LTD.



SHREE CEMENT INITIATED FOR WATER HARVESTING
IN THE REGION

WATER HARVESTING PROGRAMME BY SHREE CEMENT LTD.



SHREE CEMENT INITIATED FOR WATER HARVESTING

There is no impact on quality of ground water outside the proposed mining operation area. Further as there will be no regular discharge from the mines, the water quality of the surrounding wells is not likely to be affected and water is potable

Efforts to be continued for Water quality management

The mine drainage does not contain any toxic material and therefore it will not be harmful to biotic fauna. In view of this an analysis of sample from water stored in the Mines is enclosed as Annexure - XXI

It is proposed to construct more check dams by using big boulders across the nallahs at different places to arrest soil erosion and to prevent water pollution.

The sewage water from toilet and urinal in mines office is discharged into a soaking pit through septic tank.

The proper drainage system will be developed within the mine working area and along the road so that non polluted rainy water will be accumulated at existing ponds which may be utilized for plantation, irrigation and drinking purpose for cattles.

The idea of ground water recharging is the need of hour, which is being done through rainwater harvesting. The rainwater harvesting essentially means collecting rainwater in pits at the mines, on the roof of building and storing it under ground for later use. Not only does this recharging, arrest ground water depletion, it also raises the water table and can help in augmenting of water supply. Following efforts have been made & some are being made for: -

Rainwater harvesting: -

Construction of earthen dam / check dam: -

We have constructed six nos. of earthen / check dam across the seasonal Nallah at Plant, Mines & colony area, originating in between the valley of the hills to check the run off water, which has resulted in recharging of sub surface water. Total capacity of the earthen / check dam is 100000 CU. M



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Utilization of Mining Pit at SCL: -

In the course of mining for the last about eighteen years, we have developed a pit with a huge water storage capacity. During monsoon all rainwater gets accumulated in the pit through drains and all around slope of the hills. This phenomenon recharges the ground water in the

Roof Water Harvesting: -

We have adopted roof water harvesting technique to store rainwater from roof of houses for new C super quarters & D super quarters. The schematic diagram of roof water harvesting is enclosed as Annexure XXVI. The rainwater from the roofs of the quarters will be collected in a tank and will be used.

Drip Irrigation: -

Drip irrigation system has been adopted for plantation in Shri HANUMAN TEMPLE and other areas, which helps a lot in conservation of water.

Sewage Treatment Plant (S.T.P.): -

The sewage treatment plant of 400 KL per day capacity has been commissioned at shree cement ltd, Bangur Nagar in November 2002. Discharged water of colony sewage is being treated in this plant and after treatment this water is reused except for drinking purpose. The chemical analysis report of discharge water from Sewage Treatment Plant is being enclosed as Annexure - XXVII.

Efforts for Awareness: -

Water Policy: - The Company has formed a Water Policy and efforts have been made for its wide circulation. As a policy matter, Management gives top priority to water conservation as our Plant is established in highly water devoid area. Awareness is generated amongst people for water conservation by external & internal training programs. Company has celebrated "AUGUST" as "WATER CONSERVATION MONTH" and various activities were held to pass on message to all employees. Intense publicity and propoganda has been spread over by way of posters, slogans, drawing, essays, and proposals.

Souvenir on Water Conservation: -

A special issue of "SOUVENIR" on "Water Conservation" has been published by Shree Cement Ltd. The Souvenir has been distributed to all of our employees and among the public for its wide publicity.



Water Consumption:

The water stored in our pits is only source of catering our requirement of water. The daily consumption of water is -

150 Kiloliter per day for water spraying at Haul Road, Crusher, various transfer points

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- 50 Kiloliter per day for plantation and Office utility

We are not discharging any water from our pit. The stored water is used for our own consumption and it helps for ground water recharging. The ground water table is below our bottom most part of working.

Acid Mine Drainage:

The mineral being worked is limestone which is alkaline in nature and it does not create any acidic effect in the water.

14.3 AIR QUALITY MANAGEMENT:-

There is no generation of fine during the course of mining with rock breakers, therefore the lode on the Air Pollution will be as normal as it is prevailing elsewhere.

Measures taken to control Air pollution: -

We are using Primary Rock breakers instead of drilling & blasting, which help us in reduction of air pollution to a greater extent.

For effective dust suppression at source, once in a shift, water spraying is carried out near working faces and for dust suppression on haul road, by two water tankers are earmarked.

On regular basis, sufficient water is continuously sprayed through specifically effective nozzles at various points including of crusher hopper i.e. place of unloading of dumpers, on crusher rotor, ropeway loading point and on transfer point of conveyor belt.

Development of green foliage has also contributed in reduction of air pollution.

Protective Measures: -

In addition to above and for the compliance of provisions of various statutes applicable in the mines, we are providing personal protective equipments like dust masks to all workmen, working at various places in the mine as preventive measures.

14.4 WASTE MANAGEMENT:-

We have calc schist and calc gneiss as waste material with limestone. These minerals are solid and mined out as lumps/boulders. Year-wise generation of waste is given below:-

Year	Block-I (Lac Tonnes)	Block-III (Lac Tonnes)	Block-V A (Lac Tonnes)	Total (Lac Tonnes)
2003-2004	5.00	1.20	0.40	6.60
2004-2005	2.30	3.45	1.15	6.90
2005-2006	2.62	3.92	1.31	7.85
2006-2007	3.14	4.71	1.58	9.43
2007-2008	4.18	6.27	2.11	12.56
Total	17.24	19.55	6.55	43.34

Stacking Pattern:-

The waste generated during mining operation is loaded by hydraulic excavators and transported by dumpers to waste yard.

The dump area is selected in non-mineralized zone. The site of waste dump yard is shown in surface Geological Plan

Details of waste dumps are as under:-

S. No.	Dump Yard	Location	Existing dump size Average (L X W X Ht.)
1.	Waste Dump yard No. 1	Section line A-13 to A-17 Western side	750 M X 65 M X 25 M
2.	Waste Dump yard No. 2	Section line A-17 to A-20 Western side	550 M X 120 M X 30 M
3.	Waste Dump yard No. 3	Section line A-26.5 to A-27.5 Western side	180 M X 100 M X 20 M

L = Length / W = Width / Ht = Height

The above mentioned dumps are active dumps. As such there is no inactive waste dump. As described in preceding para 13.3 there are direct rock exposures. Top Soil spreading is not available in the working area. These rock exposures are barren without any soil. Therefore, the soil dump was not created.

Stabilization of Dumps: -

The maintenance of dump yard is performed by mechanical means. Smooth surface is maintained by dozing operations. Ramps are well dressed and safe.

Strong parapet wall has been made at the edge of top of dump yard, so that water will not flow out side through the slope of dump. It will prevent the soil erosion and rainy water accumulated on it will be utilized for plantation. After completion of waste dump yard, we level it and make suitable for plantation by using topsoil. This type of use of waste material is better, because the waste dumping site will be used for dense plantation and green belt development.

There is no toxic and hazardous waste material dumped.

Plantation on Waste Dump Area: -

When particular area of dump is completely filled with waste material, it is perfectly leveled up with dozer and terrace formed at edges. Then small pits for plantation are dug out. The topsoil / subsoil is filled in these pits and plants of various varieties are planted in them.

The present status of biological reclamation of the dump yards is as stated below -

Waste dump yard no.	Area planted	No. of plants	Plants survived	Survival percentage
1	3.10 Ha	3135	3081	97.64
2	2.50 Ha	2569	2490	96.92

During the period of Scheme of Mining itself, the biological reclamation of these waste dumps will be following the active zone.

14.5 TOP SOIL MANAGEMENT:-

The limestone is exposed on the surface, hence there is no topsoil. Alluvium occurs at some places along valley and at some places small depression has filled up from interstitial soil, which occurs along fracture and joint plan and accumulated at small depression through rainy water. We are utilizing this soil for plantation purpose.

14.6 TAILING DAM MANAGEMENT:-

We are not having any beneficiation and no tailing is generated, hence we are not having any tailing dam.

14.7 INFRASTRUCTURE:-

There will be no change in the location of infrastructures up to end of life of mine. The location of the infrastructures such as workshop, office building, dispensary, canteen, rest shelter, crusher, bunker hopper, ropeway loading station is shown in the above plan.

At the end of life of the mine, mines building such as office, workshop, canteen, rest shelter, crusher building etc. will be utilized in the public interest.

14.8 DISPOSAL OF MINING MACHINERY:-

We are not having plan for final closure hence there is no planning for disposal of mining machineries. At the time of closure of mines if another mine of company operates, and then these machineries will be shifted to that site.

If any machinery crosses its economical life it is disposed off in following manner:

- All serviceable parts and assemblies are taken out for use in other machineries.
- All unserviceable parts are sold to open market in order to recycle the metal.

14.9 SAFETY & SECURITY:-

At present and during next five years no portion of mine working area will be abandoned. In case of abandonment for safety purpose fencing will be provided as required under Reg. 115 of MMR1961.

14.10 DISASTER MANAGEMENT & RISK ASSESSMENT:-

There are no such areas having high risk of accidents like land slide, inundation, seismic activity, or tailing dam failure except fire in HEMM, Oil room or Diesel pump, Electrical sub station, Magazine.

We are maintaining overall pit slope of about 60-70 Deg. We are having benches in limestone, calc schist, and calc gneiss. These materials are having good strength and slope angle avoids any chances of failure.

The area is being hilly terrain and there is no major river in the area. Only seasonal nullah are there. Hence there is no risk of inundation.

We are not having any tailing dam.

During present working fire hazard in HEMM, Oil room, Diesel pump, Electrical sub station, Magazine, can be there but in case of final closure there will not be any such hazard.

14.10.1 Proposal for Handling any Minor / Major Accident

First Aid station is located in the Mine and Ambulance Van is readily available. First Aid trained persons are available at mine during work.

14.10.2 Distance of Near By Dispensary / Hospital / Primary Health Center

Dispensary :	Bangur Nagar	04 Kms
Hospital :	Beawar	12 Kms

14.10.3 Mode of Transport Available

Ambulance Van and Jeep are readily available.

14.10.4 Communication Facility at Mines Site

For easy and prompt communication, a number of internal, land line and Mobile Telephones are available in the Mines.

14.10.5 Nearest Police Station : Beawar : distance of 12 Kms

Nearest Fire Brigade : Bangur Nagar : distance of 4 kms .



ii. Duties of fire fighting crew:

On receiving warning team should reach to site of fire and depending upon nature, class, and extent of fire shall take necessary steps to extinguish it and rescue the persons if involved in fire.

iv. Duties of Mines manager:

- a) On receipt of information about fire the manager will forth with rush to site and assess the extent of fire. He shall supervise the fire fighting operation and make necessary arrangements for medical aid to affected persons if any.
- b) Inform to senior officials and statutory bodies.

Action on site:

The primary purpose of on site emergency plan is to control and contain the incident. The important aspects needing to be considered include the following:

a) Evacuation:

Non essential people will be evacuated from incident area to a pre determined assembly point.

b) Accounting for persons:

It is important to account for persons during an emergency however rough idea of number of persons present should be always made available.

c) Access to records:

This will be necessary in order to inform to relatives of persons injured.

d) Public relations:

It is essential to make arrangement for authoritative release of information and a senior member of staff should be appointed as sole source of information.

e) Rehabilitation

The emergency will continue until all fires have been extinguished with no risk of re-ignition. Even then care is required when re-entering the incident area.

Post disaster analysis and evaluation:

When emergency is over, the team will carry out a detailed investigation into cause of accident; evaluate them and how to minimize in future.

14.11.1981
Mines Department
Central Office
New Delhi
CLASSIFIED
SECRET PLAN

14.11 CARE AND MAINTENANCE DURING TEMPORARY DISCONTINUANCE:-

14.11.1 Notice

Notice in Form D-1 under Rule 24 of MCDR 1958 will be submitted to Controller General and Regional Controller of Mines Indian Bureau of Mines within stipulated time limit provided under Rule 24.

14.11.2 Measures

Prohibitive Measures

Access of unauthorized entry will be restricted by providing fencing as required under Regulation 115 of MMR 1961.

Protective Measures

Potential endangering sources of electrical and mechanical installations, the mine openings or workings and all other structures will be provided with the protective measures as per provisions of applicable statute.

Monitoring Programmes

All physical, chemical and biological monitoring programmes will be continued during the period of temporary discontinuance.

Regular Inspections

All the waste dumps, and working pits will be regularly checked by competent persons for stable and safe conditions and whenever required necessary corrective actions will be taken during the period of temporary discontinuance.

14.11.3 General Arrangements

At present the activities of Sheopura Kesarapura Mines are run in coordination with Workshop, competent persons, Mining Officials and connected departments of Shree Cement Limited at Bangur Nagar. In situation of temporary discontinuance, the maintenance work of machinery, building, plantation and road will be taken up. Under Regulations 116/108 of MMR 1961, the working area will be regularly inspected by competent persons. Vocational training Courses will be arranged. Safety measures and welfare amenities like fencing, Road Signals, Rest Shelter, Canteen etc will be maintained. We shall try to utilize manpower in extra and routine work of Plant.

Part III

**ECONOMIC REPERCUSSION OF
CLOSURE OF MINE AND
MANPOWER RETRENCHMENT**

Chapter 15

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15 ECONOMIC REPERCUSSION OF CLOSURE OF MINE AND MANPOWER RETRENCHMENT :

Looking to the present successful way of working of our company, we can not visualise any closure at this juncture. However during the tenure of full utilization of mineral potentiality the individual cases of retirement on attaining the age of 58 years will be dealt as per company's rules and provisions made in the statutes applicable to our organization.

15.1 Present Employment

The present employment as on 01.04.2004 is 196 persons. All persons are directly employed and covered under the PF Act. The details of type of workmen employed in mines is given here in below:

Sr. No	Category	No. of Persons
01	Skilled	122
02	Semi Skilled	74
	Total	196



Part III

**TIME SCHEDULING FOR
ABANDONMENT**

Chapter 16

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16 TIME SCHEDULING FOR ABANDONMENT:

This is Progressive mine closure plan only, therefore this clause is not applicable.

Part III

ABANDONMENT COST

Chapter 17

17 ABANDONMENT COST:

This is Progressive mine closure plan only, therefore this clause is not applicable.

Part III

FINANCIAL ASSURANCE

Chapter 18

18 FINANCIAL ASSURANCE:

The overall area covered by pit, dump, road, plant & building etc. at the end of fifth year of this Scheme of Mining will be 98.40 Hectares. As per the clause 1 of rule 23F of MCDR 1988, the rate of assurance applicable in our case is Rupees 25,000/- per hectare. The Total amount becomes Rupees 24,60,000/-.

This provision of financial assurance came into enforcement from 10.04 2003, whereas, we have been voluntarily doing such reclamation and rehabilitation work right from beginning of our mine. A sizeable amount as described in subsequent paragraph has already been spent against the amount required under the new rules of MCDR 1988. Since, our programme of reclamation and rehabilitation is an ongoing practice, these measures will be continued. The quantum of work of further reclamation and rehabilitation measures are already taken up, on which amount is regularly spent, therefore, the provisions of Rule 23F are applicable which is reproduced as herein below:


"Provided further that where a leaseholder undertakes reclamation and rehabilitation measures as part of the progressive closure of mine, the amount so spent shall be reckoned as sum of the financial provisions already spent by leaseholder and the total amount of financial assurance to be furnished by the lessee, shall be reduced, to that extent."

As mentioned in our Mining Scheme, we have developed plantation in 36.00 Hectares in Mining Lease Area and 16.00 Hectares adjacent to the Mining Lease Area. So far we have spent Rupees 01,70,000/- on this plantation programme. We have also constructed four nos. of check dams at seasonal nullas. The amount spent on construction of these check dams is Rupees 80,000/-. Thus we have spent a sum of Rs. 82,50,000/- in this head. Hence, as per clause No. 23F of MCDR 1988 for provisions of Progressive Mine Closure Plan, we propose to reckon the amount already spent by leaseholder while assessing the financial assurance.

CERTIFICATE

- A) Certified that the provision of Mines Act, Rules and Regulation made here under have been observed in the preparation of Progressive Mine Closure Plan and wherever specified permissions are required the applicant will approach the Director General of Mines Safety.
- B) It is also certified that "The provisions of Mineral Conservation & Development Rules, 1988 have been observed in the preparation of Progressive Mine Closure Plan of Sheopura-Kesarpura Limestone Mines for an area of 856.80 Hectares in Ajmer district of Rajasthan State of M/s. Shree Cement Limited and wherever specific permissions are required, the applicant will approach the concerned authorities of Indian bureau of Mines."
- C) It is also certified that "The information furnished in the above Progressive Mine Closure Plan are true and correct to the best of my knowledge."

Date: 13.05.2004


13.05.04
(ANIL KUMAR JADIA)
RQP / AJM / 189 / 2000 / A

DECLARATION

The Progressive Mine Closure Plan of Sheopura Kesarpura Limestone Mines, has been prepared in full consultation with me and I understand its contents and agree to implement the same in accordance with Law.

For SHREE CEMENT LIMITED,

(M. K. SINGHI)
EXECUTIVE DIRECTOR

Date: 13.05.2004

-BR:

This scheme of mining has been approved
vide letter : 586/(X)2(L/S)/2004-Adn
dt. 04-06-2004, under MCR, 1986

श्रीमति (बलर)
Controller of Mines (North)
भारत सरकार
Indian Bureau of Mines



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20 PLANS & SECTIONS:

Following Plans & Sections are annexed herewith as a part of Progressive Mine Closure Plan.

S. No.	Name of Plan / Section	Scale	DRG No.
1	Location Plan	1: 250000	SCL/MINES/21
2	Key Plan	1: 50000	SCL/MINES/23 & 24
3	Environmental Plan	1: 5000	SCL/MINES/35
4	Surface Plan	1: 5000	SCL/MINES/25
5	Surface Geological Plan	1: 5000	SCL/MINES/26
6	Geological Section Block - I	1: 500	SCL/MINES/28 I
7	Geological Section Block - II	1: 500	SCL/MINES/28 II
8	Geological Section Block - III	1: 500	SCL/MINES/40
9	Geological Section Block - VA	1: 500	SCL/MINES/41
10	Conceptual Mining Plan	1: 5000	SCL/MINES/37
✓ 11	Pit Position at the End of 5 th Year of Block - I	1: 1000	SCL/MINES/69
✓ 12	Pit Position at the End of 5 th Year of Block - III	1: 2000	SCL/MINES/59
✓ 13	Pit Position at the End of 5 th Year of Block - VA	1: 2000	SCL/MINES/64
14	Composite Plan	1: 5000	SCL/MINES/72

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SHEOPURA - KESARPURA LIMESTONE MINE
STATEMENT SHOWING DEVIATION IN MINING PLAN DURING
26-06-1998 TO 31-03-2003

S.No	Particulars	Proposed	Achieved
1	Exploration a) Topographical Survey b) Geological Mapping c) Borehole drilling	Not proposed Not proposed Not proposed	NIL NIL NIL
2	Development (Qty. in Lac Tonnes) 1st year 28-06-1998 to 31-03-1999 2nd year 01-04-1999 to 31-03-2000 3rd year 01-04-2000 to 31-03-2001 4th year 01-04-2001 to 31-03-2002 5th year 01-04-2002 to 31-03-2003	(Lac Tonnes) 12.69 21.31 20.98 21.78 22.15	(Lac Tonnes) 21.20 18.23 18.30 15.98 14.08
	Total	98.89	87.79
3	Production (Qty. in Lac Tonnes) 1st year 28-06-1998 to 31-03-1999 2nd year 01-04-1999 to 31-03-2000 3rd year 01-04-2000 to 31-03-2001 4th year 01-04-2001 to 31-03-2002 5th year 01-04-2002 to 31-03-2003	(Lac Tonnes) 12.72 20.37 21.06 21.24 23.24	(Lac Tonnes) 16.19 17.77 18.87 16.33 15.51
4	Total	98.63	84.67
	(1st year 2nd year 3rd year 4th year 5th year)	748 736 718 770 772	1850 in M.L. and 3100 outside M.L. 330 in M.L. and 4240 outside M.L. 1351 in M.L. and 10240 outside M.L. 1000 in M.L. and 1084 outside M.L. 1233 in M.L. and 5015 outside M.L.
5	Monitoring of Air, Noise & Water etc.	Seasonal (quarterly) monitoring as per MCDR circular.	Seasonal (quarterly) monitoring as per MCDR circular.
	Total	3724	38173

25/4/03
APPROVED

SHREE CEMENT LIMITED
SHEOPURA - KESARPURA LIMESTONE MINE
STATEMENT SHOWING DEVIATION IN MINING SCHEME DURING
01-04-2003 TO 31-03-2004

Annexure **II**

S.No.	Particulars	Proposed	Ach. ved
1	Explorator d) Topographical Survey e) Geological Mapping f) Borehole drilling	Not proposed Not proposed Not proposed	NIL NIL NIL
2	Development (Qty. in Lac Tonnes) 1st year: 01-04-2003 to 31-03-2004	7.59 (Lakh Tonnes)	(Lakh Tonnes) 5.50 Upto January 2004
3	Production (Qty. in Lac Tonnes) 1st year: 01-04-2003 to 31-03-2004	24.32 (Lac Tonnes)	(Lac Tonnes) 11.95 Upto January 2004 1st year 01-04-2003 to 31-03-2004
4	Planets: (Nos.)	1st year 800 Nos. Total	1362 in M.L.
5	Monitoring of Air, Noise & Water etc.	Seasonal (quarterly) monitoring as per MCCR circular.	Seasonal (quarterly) monitoring as per MCCR circular.

22/01/04
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SHREE CEMENT LIMITED

SHEOPURA-KESARPURA LIMESTONE MINES

MONITORING OF AIR QUALITY WITHIN CORE ZONE

Period		02-06-1998 to 15-06-1998										02-05-1998 to 15-09-1998										05-12-1998 to 15-12-1998										107-03-1999 to 22-03-1999									
Sl. No.	LOCATION	Sart. No.	Average Temp. °C	SPM ug/m ³	SO ₂ ug/m ³	NO _x ug/m ³	CO ug/m ³	Average Temp. °C	SPM ug/m ³	SO ₂ ug/m ³	NO _x ug/m ³	CO ug/m ³	Average Temp. °C	SPM ug/m ³	SO ₂ ug/m ³	NO _x ug/m ³	CO ug/m ³	Average Temp. °C	SPM ug/m ³	SO ₂ ug/m ³	NO _x ug/m ³	CO ug/m ³	Average Temp. °C	SPM ug/m ³	SO ₂ ug/m ³	NO _x ug/m ³	CO ug/m ³														
																												SPM ug/m ³	SO ₂ ug/m ³	NO _x ug/m ³	CO ug/m ³	SPM ug/m ³	SO ₂ ug/m ³	NO _x ug/m ³	CO ug/m ³	SPM ug/m ³	SO ₂ ug/m ³	NO _x ug/m ³	CO ug/m ³		
NASS DUTT																																									
-BOND No 2																																									
1		400	375	15.30	11.10	0.00	25.5	372	14.80	10.80	0.00	20.8	370	7.40	7.60	0.00	25.0	370	8.90	6.90	0.00	0.00	25.0	370	8.90	6.90	0.00	0.00													
2		380	382	15.70	10.80	0.00	26.0	380	14.80	10.80	0.00	21.2	374	7.50	7.50	0.00	26.0	364	7.20	6.40	0.00	0.00	25.5	368	7.20	6.40	0.00	0.00													
3		410	404	14.90	11.40	0.00	26.2	386	14.20	10.90	0.00	21.4	378	7.60	4.80	0.00	25.5	368	7.20	6.40	0.00	0.00	25.5	368	7.20	6.40	0.00	0.00													
4		430	373	14.70	11.50	0.00	26.5	385	14.10	10.70	0.00	20.9	373	7.80	7.00	0.00	15.0	355	1.80	0.70	0.00	0.00	25.5	368	7.20	6.40	0.00	0.00													
-BOND No 1																																									
1		410	294	15.10	12.20	0.00	25.3	310	16.30	11.30	0.00	20.4	312	3.40	3.80	0.00	26.3	368	7.20	6.40	0.00	0.00	25.5	368	7.20	6.40	0.00	0.00													
2		400	201	15.50	11.60	0.00	26.8	315	16.50	11.40	0.00	20.8	318	3.80	3.20	0.00	26.7	368	7.20	6.40	0.00	0.00	25.5	368	7.20	6.40	0.00	0.00													
3		390	285	15.70	11.70	0.00	26.1	345	16.80	11.30	0.00	21.3	325	2.90	3.90	0.00	27.1	375	3.30	6.90	0.00	0.00	25.5	368	7.20	6.40	0.00	0.00													
4		430	245	15.70	12.10	0.00	25.7	318	15.90	11.40	0.00	21.4	332	3.70	3.30	0.00	26.8	330	3.50	7.20	0.00	0.00	25.5	368	7.20	6.40	0.00	0.00													
-BOND No 2																																									
1		420	158	14.30	9.97	0.00	25.4	150	11.20	10.10	0.00	20.8	160	3.50	2.70	0.00	26.4	150	3.50	3.10	0.00	0.00	25.5	150	3.50	3.10	0.00	0.00													
2		420	157	12.80	10.10	0.00	25.3	162	10.80	10.90	0.00	21.2	167	4.00	3.80	0.00	26.5	157	3.80	3.90	0.00	0.00	25.5	150	3.50	3.10	0.00	0.00													
3		410	163	14.20	10.30	0.00	24.8	160	11.30	10.20	0.00	21.4	166	3.80	3.50	0.00	26.4	155	3.10	3.80	0.00	0.00	25.5	150	3.50	3.10	0.00	0.00													
4		390	105	13.50	9.84	0.00	24.7	148	11.50	9.90	0.00	20.8	160	3.10	3.20	0.00	27.2	147	3.20	3.20	0.00	0.00	25.5	150	3.50	3.10	0.00	0.00													
-BOND No 1																																									
1		410	428	16.30	1.20	0.00	25.2	425	12.30	10.90	0.00	20.8	430	3.70	0.40	0.00	26.6	422	3.60	3.50	0.00	0.00	25.5	422	3.60	3.50	0.00	0.00													
2		408	425	14.80	0.90	0.00	25.3	430	12.40	10.80	0.00	20.6	422	3.30	10.10	0.00	27.1	426	3.40	3.90	0.00	0.00	25.5	422	3.60	3.50	0.00	0.00													
3		424	424	15.90	10.50	0.00	24.8	405	12.10	10.70	0.00	21.2	426	2.40	10.40	0.00	26.7	388	2.80	4.10	0.00	0.00	25.5	422	3.60	3.50	0.00	0.00													
4		424	418	15.80	10.30	0.00	24.7	355	11.90	10.80	0.00	21.3	426	2.60	10.20	0.00	26.8	355	2.80	2.60	0.00	0.00	25.5	422	3.60	3.50	0.00	0.00													
-BOND No 2																																									
1		422	406	15.40	10.70	0.00	24.8	338	12.50	11.10	0.00	20.8	398	11.70	8.20	0.00	27.3	363	8.60	7.50	0.00	0.00	25.5	363	8.60	7.50	0.00	0.00													
2		418	412	16.50	10.50	0.00	24.9	430	12.80	11.30	0.00	20.4	402	11.60	7.60	0.00	27.3	387	8.50	7.50	0.00	0.00	25.5	363	8.60	7.50	0.00	0.00													
3		407	416	15.40	11.30	0.00	25.3	438	12.70	11.20	0.00	20.7	408	12.10	7.80	0.00	27.7	378	8.10	7.60	0.00	0.00	25.5	363	8.60	7.50	0.00	0.00													
4		405	407	17.10	11.00	0.00	25.6	440	12.50	11.10	0.00	20.8	404	11.30	8.30	0.00	27.4	368	7.90	7.30	0.00	0.00	25.5	363	8.60	7.50	0.00	0.00													
-BOND No 1																																									
1		393	488	16.80	11.40	0.00	25.8	435	15.30	10.70	0.00	20.6	426	15.30	10.40	0.00	26.8	432	8.50	9.30	0.00	0.00	25.5	432	8.50	9.30	0.00	0.00													
2		403	472	16.30	10.70	0.00	24.8	428	15.50	10.60	0.00	20.7	425	15.40	10.30	0.00	25.4	428	8.90	9.40	0.00	0.00	25.5	432	8.50	9.30	0.00	0.00													
3		417	437	17.10	10.40	0.00	25.2	424	15.40	10.90	0.00	21.2	426	15.20	10.10	0.00	25.6	430	8.80	8.90	0.00	0.00	25.5	432	8.50	9.30	0.00	0.00													
4		404	412	14.50	0.90	0.00	25.2	409	14.40	10.40	0.00	20.3	408	14.20	10.10	0.00	25.2	375	9.30	8.40	0.00	0.00	25.5	432	8.50	9.30	0.00	0.00													
-BOND No 2																																									
1		414	395	14.50	0.60	0.00	26.1	401	14.30	10.50	0.00	20.8	406	14.40	9.80	0.00	26.8	355	8.70	6.70	0.00	0.00	25.5	355	8.70	6.70	0.00	0.00													
2		389	380	14.30	1.10	0.00	24.7	365	14.10	10.40	0.00	19.7	408	14.50	10.20	0.00	25.0	328	9.10	6.30	0.00	0.00	25.5	355	8.70	6.70	0.00	0.00													

SHREE CEMENT LIMITED
SHEOPURA-KESARPURA LIMESTONE MINES
MONITORING OF AIR QUALITY WITHIN CORE ZONE

STATION	DATE	10-05-1992 to 15-06-1992										10-06-1996 to 18-09-1999										12-12-1996 to 27-12-1998										14-08-2000 to 25-03-2001									
		SO ₂	SPM	NO _x	CO	SO ₂	SPM	NO _x	CO	SO ₂	SPM	NO _x	CO	SO ₂	SPM	NO _x	CO	SO ₂	SPM	NO _x	CO	SO ₂	SPM	NO _x	CO																
Waste Dump Yard No. 2	1	380	380	0.50	1.25	0.20	378	10.40	10.80	0.00	368	10.20	9.90	0.00	389	9.40	8.70	0.00	372	6.40	8.90	2.80	6.40	8.90	2.80																
	2	390	410	0.90	10.80	0.00	406	9.80	9.70	0.00	389	9.40	8.70	0.00	386	7.40	9.20	0.00	386	7.40	9.20	0.00	386	7.40	9.20																
	3	430	329	1.20	11.40	0.00	385	11.30	13.40	0.00	375	11.10	8.20	0.00	291	7.20	6.70	0.00	284	7.30	9.60	0.00	284	7.30	9.60																
	4	405	375	2.50	11.80	0.00	372	11.80	10.60	0.00	364	10.80	9.30	0.00	268	7.30	9.60	0.00	270	11.50	11.40	0.00	270	11.50	11.40																
Waste Crusher Mound	1	395	300	12.20	12.30	0.00	290	12.10	11.80	0.00	275	11.80	11.80	0.00	275	11.80	11.80	0.00	270	11.50	11.40	0.00	270	11.50	11.40																
	2	410	230	11.00	11.80	0.00	290	11.70	12.10	0.00	285	11.60	10.70	0.00	284	11.70	10.90	0.00	284	11.70	10.90	0.00	284	11.70	10.90																
	3	405	285	9.50	11.50	0.00	270	10.90	11.40	0.00	277	10.80	10.80	0.00	282	11.50	11.20	0.00	287	10.90	10.70	0.00	287	10.90	10.70																
	4	388	250	13.30	12.60	0.00	273	11.40	12.20	0.00	282	11.50	11.20	0.00	275	10.90	11.10	0.00	275	10.90	11.10	0.00	275	10.90	11.10																
Corey No. 2	1	398	138	11.20	10.20	0.00	102	10.40	8.80	0.00	93	9.50	8.90	0.00	101	9.80	7.20	0.00	96	8.80	6.70	0.00	96	8.80	6.70																
	2	400	135	11.10	10.20	0.00	102	10.40	8.40	0.00	97	9.70	7.20	0.00	101	9.80	7.20	0.00	104	8.60	7.10	0.00	104	8.60	7.10																
	3	110	142	10.50	9.80	0.00	92	11.20	5.90	0.00	108	9.70	6.50	0.00	104	9.30	6.40	0.00	104	9.30	6.40	0.00	104	9.30	6.40																
	4	402	137	9.80	9.60	0.00	102	10.80	7.10	0.00	108	9.70	6.50	0.00	108	9.80	6.20	0.00	314	9.30	6.40	0.00	314	9.30	6.40																
Quarry Edge	1	402	112	9.10	6.30	0.00	115	9.80	6.40	0.00	108	9.80	6.20	0.00	318	9.60	6.80	0.00	318	9.60	6.80	0.00	318	9.60	6.80																
	2	395	115	10.10	5.40	0.00	120	10.30	6.80	0.00	122	9.60	6.50	0.00	318	9.60	6.80	0.00	318	9.60	6.80	0.00	318	9.60	6.80																
	3	406	120	10.20	7.10	0.00	135	10.50	7.30	0.00	131	10.10	6.90	0.00	331	8.80	7.20	0.00	329	8.40	6.80	0.00	329	8.40	6.80																
	4	410	127	10.00	7.30	0.00	132	9.70	7.20	0.00	138	9.50	7.10	0.00	329	8.40	6.80	0.00	329	8.40	6.80	0.00	329	8.40	6.80																
Waste Dump Cont.	1	400	130	10.20	6.90	0.00	120	10.40	6.80	0.00	128	10.10	6.60	0.00	148	9.70	6.50	0.00	148	9.70	6.50	0.00	148	9.70	6.50																
	2	397	111	9.70	6.70	0.00	138	10.30	7.30	0.00	132	10.50	7.20	0.00	148	10.90	6.30	0.00	148	10.90	6.30	0.00	148	10.90	6.30																
	3	395	110	9.50	7.10	0.00	132	11.20	8.20	0.00	134	11.10	8.10	0.00	148	10.90	6.30	0.00	148	10.90	6.30	0.00	148	10.90	6.30																
	4	400	108	7.10	7.00	0.00	120	8.60	7.80	0.00	138	9.70	6.20	0.00	154	9.50	8.10	0.00	154	9.50	8.10	0.00	154	9.50	8.10																
Drying Site	1	412	356	11.20	10.80	0.00	340	11.50	10.50	0.00	345	11.20	10.40	0.00	415	11.30	11.40	0.00	422	10.80	9.70	0.00	422	10.80	9.70																
	2	407	395	10.50	10.50	0.00	340	10.90	10.90	0.00	347	10.60	10.10	0.00	428	10.60	10.80	0.00	428	10.60	10.80	0.00	428	10.60	10.80																
	3	406	380	11.30	11.20	0.00	335	11.40	11.10	0.00	352	10.80	10.30	0.00	396	11.70	10.80	0.00	402	10.60	10.80	0.00	402	10.60	10.80																
	4	393	405	11.70	10.60	0.00	345	11.80	10.90	0.00	378	10.90	10.50	0.00	402	10.60	10.80	0.00	402	10.60	10.80	0.00	402	10.60	10.80																
Near to Mine Waste Road	1	407	415	11.20	10.20	0.00	405	11.20	9.80	0.00	403	10.80	11.10	0.00	371	10.70	10.90	0.00	384	11.40	10.70	0.00	384	11.40	10.70																
	2	403	435	11.70	10.30	0.00	415	11.30	8.70	0.00	412	11.30	10.80	0.00	384	11.40	10.70	0.00	384	11.40	10.70	0.00	384	11.40	10.70																
	3	405	418	10.80	10.40	0.00	420	10.90	10.20	0.00	422	10.80	9.70	0.00	381	10.80	9.60	0.00	381	10.80	9.60	0.00	381	10.80	9.60																
	4	402	410	10.90	10.80	0.00	410	11.50	9.30	0.00	413	11.50	10.80	0.00	384	11.90	10.60	0.00	384	11.90	10.60	0.00	384	11.90	10.60																
Near to Quarry Waste Dump	1	113	12.30	6.80	0.00	108	9.60	6.70	0.00	113	9.80	6.80	0.00	113	9.80	6.80	0.00	113	9.80	6.80	0.00	113	9.80	6.80																	
	2	117	13.70	7.20	0.00	112	8.90	6.40	0.00	112	8.90	6.40	0.00	112	8.90	6.40	0.00	112	8.90	6.40	0.00	112	8.90	6.40																	

SHREE CEMENT LIMITED
SHEOPURA-KESARPURA LIMESTONE MINES
MONITORING OF AIR QUALITY WITHIN CORE ZONE

S	LOCATION	Sample No.	Period																											
			15-06-2020 to 30-06-2020	01-07-2020 to 15-07-2020	16-07-2020 to 31-07-2020	01-08-2020 to 15-08-2020	16-08-2020 to 31-08-2020	01-09-2020 to 15-09-2020	16-09-2020 to 30-09-2020	01-10-2020 to 15-10-2020	16-10-2020 to 31-10-2020	01-11-2020 to 15-11-2020																		
			SPM	SO ₂	Vox	CO	SPM	SO ₂	Vox	CO	SPM	SO ₂	Vox	CO	SPM	SO ₂	Vox	CO	SPM	SO ₂	Vox	CO	SPM	SO ₂	Vox	CO	SPM	SO ₂	Vox	CO
1	Waste Dump	182	7.80	0.20	0.00	0.00	385	7.60	0.00	0.00	302	7.40	0.00	0.00	360	7.40	0.00	0.00	360	7.40	0.00	0.00	360	7.40	0.00	0.00	360	7.40	0.00	0.00
2	Waste Dump	356	7.80	0.00	0.00	0.00	383	7.80	0.00	0.00	380	7.60	0.00	0.00	380	7.60	0.00	0.00	380	7.60	0.00	0.00	380	7.60	0.00	0.00	380	7.60	0.00	0.00
3	Waste Dump	315	7.40	0.10	0.00	0.00	387	7.80	0.00	0.00	372	7.50	0.00	0.00	372	7.50	0.00	0.00	372	7.50	0.00	0.00	372	7.50	0.00	0.00	372	7.50	0.00	0.00
4	Waste Dump	358	8.00	0.50	0.00	0.00	380	8.40	0.00	0.00	370	7.90	0.00	0.00	370	7.90	0.00	0.00	370	7.90	0.00	0.00	370	7.90	0.00	0.00	370	7.90	0.00	0.00
5	Waste Dump	314	9.40	10.10	0.00	0.00	314	9.30	0.70	0.00	312	9.10	0.60	0.00	312	9.10	0.60	0.00	312	9.10	0.60	0.00	312	9.10	0.60	0.00	312	9.10	0.60	0.00
6	Waste Dump	322	8.60	9.80	0.00	0.00	318	8.50	8.80	0.00	314	8.90	8.80	0.00	314	8.90	8.80	0.00	314	8.90	8.80	0.00	314	8.90	8.80	0.00	314	8.90	8.80	0.00
7	Waste Dump	324	8.40	9.70	0.00	0.00	321	9.20	9.50	0.00	310	8.80	9.30	0.00	310	8.80	9.30	0.00	310	8.80	9.30	0.00	310	8.80	9.30	0.00	310	8.80	9.30	0.00
8	Waste Dump	318	9.80	9.90	2.00	0.00	312	9.70	9.80	0.00	316	9.40	9.50	0.00	316	9.40	9.50	0.00	316	9.40	9.50	0.00	316	9.40	9.50	0.00	316	9.40	9.50	0.00
9	Waste Dump	298	9.70	10.20	0.00	0.00	288	9.30	9.80	0.00	304	9.20	9.10	0.00	304	9.20	9.10	0.00	304	9.20	9.10	0.00	304	9.20	9.10	0.00	304	9.20	9.10	0.00
10	Waste Dump	316	6.40	10.30	0.00	0.00	280	9.80	8.70	0.00	308	9.80	8.80	0.00	308	9.80	8.80	0.00	308	9.80	8.80	0.00	308	9.80	8.80	0.00	308	9.80	8.80	0.00
11	Waste Dump	323	9.20	10.80	0.00	0.00	285	9.20	10.10	0.00	298	9.10	9.40	0.00	298	9.10	9.40	0.00	298	9.10	9.40	0.00	298	9.10	9.40	0.00	298	9.10	9.40	0.00
12	Waste Dump	306	10.70	9.30	0.00	0.00	265	10.60	8.90	0.00	368	10.10	8.40	0.00	368	10.10	8.40	0.00	368	10.10	8.40	0.00	368	10.10	8.40	0.00	368	10.10	8.40	0.00
13	Waste Dump	348	8.70	9.80	0.00	0.00	348	9.60	9.30	0.00	292	8.80	9.10	0.00	292	8.80	9.10	0.00	292	8.80	9.10	0.00	292	8.80	9.10	0.00	292	8.80	9.10	0.00
14	Waste Dump	355	9.60	8.70	0.00	0.00	342	10.20	9.50	0.00	370	10.30	9.90	0.00	370	10.30	9.90	0.00	370	10.30	9.90	0.00	370	10.30	9.90	0.00	370	10.30	9.90	0.00
15	Waste Dump	360	9.60	8.80	0.00	0.00	365	9.70	8.80	0.00	365	8.90	9.60	0.00	365	8.90	9.60	0.00	365	8.90	9.60	0.00	365	8.90	9.60	0.00	365	8.90	9.60	0.00
16	Waste Dump	405	8.10	9.80	0.00	0.00	397	7.80	9.40	0.00	362	7.90	9.20	0.00	362	7.90	9.20	0.00	362	7.90	9.20	0.00	362	7.90	9.20	0.00	362	7.90	9.20	0.00
17	Waste Dump	398	7.90	9.70	0.00	0.00	385	8.20	9.30	0.00	348	7.70	9.00	0.00	348	7.70	9.00	0.00	348	7.70	9.00	0.00	348	7.70	9.00	0.00	348	7.70	9.00	0.00
18	Waste Dump	365	0.20	3.80	0.00	0.00	348	8.10	8.80	0.00	358	8.10	9.90	0.00	358	8.10	9.90	0.00	358	8.10	9.90	0.00	358	8.10	9.90	0.00	358	8.10	9.90	0.00
19	Waste Dump	378	7.00	8.70	0.00	0.00	376	7.90	9.60	0.00	340	7.50	8.10	0.00	340	7.50	8.10	0.00	340	7.50	8.10	0.00	340	7.50	8.10	0.00	340	7.50	8.10	0.00
20	Waste Dump	340	6.20	7.80	0.00	0.00	339	7.50	8.20	0.00	324	7.30	8.10	0.00	324	7.30	8.10	0.00	324	7.30	8.10	0.00	324	7.30	8.10	0.00	324	7.30	8.10	0.00
21	Waste Dump	312	7.90	0.10	0.00	0.00	340	7.90	8.80	0.00	330	7.30	8.40	0.00	330	7.30	8.40	0.00	330	7.30	8.40	0.00	330	7.30	8.40	0.00	330	7.30	8.40	0.00
22	Waste Dump	336	7.70	8.90	0.00	0.00	336	7.90	8.50	0.00	326	7.90	8.00	0.00	326	7.90	8.00	0.00	326	7.90	8.00	0.00	326	7.90	8.00	0.00	326	7.90	8.00	0.00
23	Waste Dump	316	7.50	7.80	0.00	0.00	340	7.70	8.30	0.00	338	7.60	7.80	0.00	338	7.60	7.80	0.00	338	7.60	7.80	0.00	338	7.60	7.80	0.00	338	7.60	7.80	0.00
24	Waste Dump	280	7.9	7.8	0.00	0.00	260	8.80	0.80	0.00	254	6.80	6.00	0.00	254	6.80	6.00	0.00	254	6.80	6.00	0.00	254	6.80	6.00	0.00	254	6.80	6.00	0.00
25	Waste Dump	291	8.1	7.9	0.00	0.00	240	7.0	6.50	0.00	260	6.40	5.80	0.00	260	6.40	5.80	0.00	260	6.40	5.80	0.00	260	6.40	5.80	0.00	260	6.40	5.80	0.00
26	Waste Dump	288	6.2	8.1	0.00	0.00	268	7.00	6.70	0.00	202	7.00	6.40	0.00	202	7.00	6.40	0.00	202	7.00	6.40	0.00	202	7.00	6.40	0.00	202	7.00	6.40	0.00
27	Waste Dump	290	8.0	6.2	0.00	0.00	252	9.60	8.40	0.00	248	9.90	6.20	0.00	248	9.90	6.20	0.00	248	9.90	6.20	0.00	248	9.90	6.20	0.00	248	9.90	6.20	0.00

APPROVER

SHREE CEMENT LIMITED
SHEOPURA KESARPURA LIMESTONE MINES
MONITORING OF AIR QUALITY WITHIN CORE ZONE

Station	Sample No.	Period																																			
		13-05-2001 to 16-05-2001	16-05-2001 to 18-05-2001	18-05-2001 to 20-05-2001	20-05-2001 to 22-05-2001	22-05-2001 to 24-05-2001	24-05-2001 to 26-05-2001	26-05-2001 to 28-05-2001	28-05-2001 to 30-05-2001	30-05-2001 to 31-05-2001	31-05-2001 to 01-06-2002																										
		SPM	SO ₂	NO _x	CO	SPM	SO ₂	NO _x	CO	SPM	SO ₂	NO _x	CO	SPM	SO ₂	NO _x	CO	SPM	SO ₂	NO _x	CO	SPM	SO ₂	NO _x	CO	SPM	SO ₂	NO _x	CO	SPM	SO ₂	NO _x	CO				
1. Quarry Edge	1	320	1.40	8.10	0.00	385	7.90	9.10	0.00	370	8.00	8.50	0.00	380	7.70	9.10	0.00	368	8.10	5.50	0.00	352	7.50	8.20	0.00	367	8.40	5.20	0.00	352	7.50	8.20	0.00				
	2	312	1.20	7.80	0.00	378	8.10	8.60	0.00	335	7.80	5.20	0.00	352	7.50	8.20	0.00	367	8.40	5.20	0.00	352	7.50	8.20	0.00	367	8.40	5.20	0.00	352	7.50	8.20	0.00	352	7.50	8.20	0.00
	3	360	1.90	0.00	0.00	307	0.30	9.50	0.00	393	8.10	5.30	0.00	367	8.40	5.20	0.00	367	8.40	5.20	0.00	352	7.50	8.20	0.00	367	8.40	5.20	0.00	352	7.50	8.20	0.00	352	7.50	8.20	0.00
	4	340	0.00	0.20	0.00	392	0.20	9.10	0.00	395	8.10	5.40	0.00	395	8.10	5.40	0.00	395	8.10	5.40	0.00	405	9.30	5.80	0.00	405	9.30	5.80	0.00	405	9.30	5.80	0.00	405	9.30	5.80	0.00
2. Waste to Landfill	1	365	0.20	0.00	0.00	389	8.60	9.40	0.00	405	9.30	5.80	0.00	405	9.30	5.80	0.00	405	9.30	5.80	0.00	405	9.30	5.80	0.00	405	9.30	5.80	0.00	405	9.30	5.80	0.00	405	9.30	5.80	0.00
	2	393	0.80	0.00	0.00	358	9.30	8.80	0.00	401	8.70	4.70	0.00	414	7.30	4.90	0.00	391	8.10	4.70	0.00	391	8.10	4.70	0.00	391	8.10	4.70	0.00	391	8.10	4.70	0.00	391	8.10	4.70	0.00
	3	300	0.50	0.00	0.00	384	8.40	8.00	0.00	410	8.20	4.90	0.00	391	8.10	4.70	0.00	391	8.10	4.70	0.00	391	8.10	4.70	0.00	391	8.10	4.70	0.00	391	8.10	4.70	0.00	391	8.10	4.70	0.00
	4	287	0.30	0.40	0.00	402	8.40	8.30	0.00	375	8.50	7.30	0.00	352	7.50	7.20	0.00	352	7.50	7.20	0.00	384	8.10	7.00	0.00	384	8.10	7.00	0.00	384	8.10	7.00	0.00	384	8.10	7.00	0.00
3. Near Mine Haulage road	1	325	0.80	0.00	0.00	388	8.80	8.20	0.00	390	7.30	6.90	0.00	387	7.60	6.90	0.00	387	7.60	6.90	0.00	387	7.60	6.90	0.00	387	7.60	6.90	0.00	387	7.60	6.90	0.00	387	7.60	6.90	0.00
	2	365	0.20	0.00	0.00	388	8.80	8.20	0.00	385	7.70	7.50	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00
	3	365	0.20	0.00	0.00	388	8.80	8.20	0.00	385	7.70	7.50	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00
	4	365	0.20	0.00	0.00	388	8.80	8.20	0.00	385	7.70	7.50	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00	337	8.20	7.20	0.00
4. Near Cluster Office	1	370	7.80	8.90	0.00	361	8.00	8.10	0.00	376	7.80	8.70	0.00	356	8.20	7.80	0.00	356	8.20	7.80	0.00	356	8.20	7.80	0.00	356	8.20	7.80	0.00	356	8.20	7.80	0.00	356	8.20	7.80	0.00
	2	345	7.20	8.40	0.00	346	7.80	8.80	0.00	326	7.80	7.20	0.00	370	7.90	7.40	0.00	370	7.90	7.40	0.00	370	7.90	7.40	0.00	370	7.90	7.40	0.00	370	7.90	7.40	0.00	370	7.90	7.40	0.00
	3	360	7.10	8.00	0.00	349	7.90	8.30	0.00	295	7.60	8.70	0.00	298	7.30	8.30	0.00	298	7.30	8.30	0.00	298	7.30	8.30	0.00	298	7.30	8.30	0.00	298	7.30	8.30	0.00	298	7.30	8.30	0.00
	4	355	7.20	8.20	0.00	336	7.40	7.80	0.00	301	7.60	7.10	0.00	286	7.50	7.20	0.00	286	7.50	7.20	0.00	286	7.50	7.20	0.00	286	7.50	7.20	0.00	286	7.50	7.20	0.00	286	7.50	7.20	0.00
5. Near Power at Loading Station	1	340	7.30	8.30	0.00	338	7.80	7.80	0.00	289	6.00	6.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00
	2	340	7.30	8.30	0.00	338	7.80	7.80	0.00	289	6.00	6.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00
	3	340	7.30	8.30	0.00	338	7.80	7.80	0.00	289	6.00	6.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00
	4	340	7.30	8.30	0.00	338	7.80	7.80	0.00	289	6.00	6.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00	285	7.50	7.90	0.00
6. Quarry No. 2 Area of Wind	1	280	6.00	5.70	0.00	252	6.80	6.20	0.00	240	7.50	6.90	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00
	2	255	6.20	6.60	0.00	282	7.20	5.80	0.00	245	6.80	7.20	0.00	238	6.50	6.90	0.00	238	6.50	6.90	0.00	238	6.50	6.90	0.00	238	6.50	6.90	0.00	238	6.50	6.90	0.00	238	6.50	6.90	0.00
	3	280	6.00	5.70	0.00	252	6.80	6.20	0.00	240	7.50	6.90	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00
	4	280	6.00	5.70	0.00	252	6.80	6.20	0.00	240	7.50	6.90	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00	241	7.40	6.40	0.00

BY
APPROVER

SHREE CEMENT LIMITED

SHEOPURA-KESARPURA LIMESTONE MINES

MONITORING OF AIR QUALITY WITHIN CORE ZONE

Period

12-05-2002 to 28-06-2002 (23-09-2002 to 27-08-2002) (19-12-2002 to 23-12-2002) (03-03-2003 to 06-03-2003)

LOCATION	Sample No	SPM		SO ₂		NO _x		CO		SPM		SO ₂		NO _x		CO		SPM		SO ₂		NO _x		CO			
		ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³	ug/m ³		
Waste Dump Road	1	342	8.80	8.40	0.30	362	7.20	6.90	0.00	364	8.00	7.00	7.00	0.00	352	9.00	7.00	0.00	352	9.00	7.00	7.00	0.00	352	9.00	7.00	0.00
	2	376	8.10	5.90	0.00	352	7.30	7.00	0.00	380	9.00	7.00	0.00	358	8.00	7.00	0.00	358	8.00	7.00	7.00	0.00	362	9.30	7.00	0.00	
	3	407	7.30	8.30	0.00	365	7.00	7.30	0.00	365	9.30	7.00	0.00	362	9.30	7.00	0.00	362	9.30	7.00	7.00	0.00	366	9.30	7.00	0.00	
	4	388	7.80	5.80	0.00	348	7.10	6.80	0.80	362	8.30	7.30	0.00	348	8.30	7.00	0.00	348	8.30	7.00	7.00	0.00	348	8.30	7.00	0.00	
Quarry Edge	1	386	8.40	6.20	0.00	346	7.00	6.40	0.00	360	8.68	7.00	0.00	348	8.68	7.00	0.00	348	8.68	7.00	7.00	0.00	350	8.00	7.30	0.00	
	2	356	7.80	6.10	0.00	351	7.10	6.60	0.00	362	8.68	7.00	0.00	352	9.68	7.00	0.00	352	9.68	7.00	7.00	0.00	355	8.88	7.30	0.00	
	3	365	8.20	6.40	0.00	364	7.40	6.30	0.00	348	8.30	9.86	0.00	355	9.86	7.00	0.00	350	8.68	7.30	7.30	0.00	350	8.68	7.30	0.00	
	4	376	7.70	6.50	0.00	345	7.20	6.80	0.00	354	8.50	7.00	0.00	354	8.50	7.00	0.00	376	8.68	7.30	7.30	0.00	376	8.68	7.30	0.00	
Close to Loading Point	1	380	7.70	6.60	0.00	385	7.80	6.10	0.00	379	10.00	7.30	0.00	376	8.68	7.00	0.00	376	8.68	7.00	7.30	0.00	376	8.68	7.30	0.00	
	2	401	8.20	6.80	0.00	380	7.50	6.20	0.00	397	8.50	7.00	0.00	370	8.50	7.00	0.00	370	8.50	7.00	7.00	0.00	374	9.30	7.00	0.00	
	3	412	8.70	4.80	0.00	401	7.70	6.00	0.00	370	10.00	7.30	0.00	374	9.30	7.00	0.00	374	9.30	7.00	7.00	0.00	388	9.30	7.00	0.00	
	4	397	8.40	4.80	0.00	385	7.30	6.40	0.00	388	9.30	7.00	0.00	388	9.30	7.00	0.00	388	9.30	7.00	7.00	0.00	388	9.30	7.00	0.00	
Near Wire Haulage Road	1	362	7.80	7.40	0.00	378	7.40	7.60	0.00	372	8.30	7.30	0.00	386	8.30	7.00	0.00	386	8.30	7.00	7.00	0.00	386	8.30	7.00	0.00	
	2	380	7.60	7.10	0.00	382	7.50	7.80	0.00	388	8.00	7.30	0.00	364	8.30	7.30	0.00	364	8.30	7.30	7.30	0.00	364	8.30	7.30	0.00	
	3	370	6.10	6.80	0.00	388	7.40	7.60	0.00	365	8.30	7.30	0.00	365	8.30	7.30	0.00	365	8.30	7.30	7.30	0.00	365	8.30	7.30	0.00	
	4	386	8.40	7.30	0.00	370	7.30	7.90	0.00	370	8.30	7.65	0.00	350	9.30	7.30	0.00	350	9.30	7.30	7.30	0.00	372	9.30	7.30	0.00	
Near Cluster Haulage	1	380	8.60	7.30	0.00	352	8.40	8.90	0.00	374	8.30	7.30	0.00	372	9.30	7.30	0.00	372	9.30	7.30	7.30	0.00	372	9.30	7.30	0.00	
	2	390	8.40	7.40	0.00	360	8.20	6.70	0.00	352	8.00	7.00	0.00	364	8.30	7.30	0.00	364	8.30	7.30	7.30	0.00	364	8.30	7.30	0.00	
	3	385	6.20	7.90	0.00	359	6.80	8.50	0.00	370	10.00	7.30	0.00	370	9.00	7.00	0.00	370	9.00	7.00	7.00	0.00	370	9.00	7.00	0.00	
	4	388	9.30	7.10	0.00	348	8.10	8.40	0.00	373	10.00	7.30	0.00	372	9.00	7.00	0.00	372	9.00	7.00	7.00	0.00	372	9.00	7.00	0.00	
Near ropeway Loading Station	1	304	7.60	6.80	0.00	310	7.20	7.40	0.00	390	7.30	6.50	0.00	310	7.30	6.50	0.00	310	7.30	6.50	7.30	0.00	310	7.30	6.50	0.00	
	2	258	7.50	6.40	0.00	318	7.10	7.00	0.00	315	8.20	6.30	0.00	305	7.30	6.30	0.00	305	7.30	6.30	7.30	0.00	305	7.30	6.30	0.00	
	3	285	7.20	6.50	0.00	305	7.00	6.00	0.00	305	7.30	6.30	0.00	310	7.30	6.30	0.00	310	7.30	6.30	7.30	0.00	310	7.30	6.30	0.00	
	4	288	7.70	6.30	0.00	322	7.30	6.80	0.00	315	7.30	6.00	0.00	300	7.00	6.50	0.00	300	7.00	6.50	7.00	0.00	300	7.00	6.50	0.00	
Company No. 2 Arand Mohar	1	240	7.80	6.80	0.00	220	7.00	6.10	0.00	250	7.00	6.30	0.00	240	6.30	6.50	0.00	240	6.30	6.50	7.00	0.00	240	6.30	6.50	0.00	
	2	248	8.10	6.70	0.00	216	8.00	6.30	0.00	245	7.00	6.30	0.00	216	6.66	6.30	0.00	216	6.66	6.30	7.00	0.00	216	6.66	6.30	0.00	
	3	248	6.80	7.10	0.00	225	6.60	6.80	0.00	252	7.00	6.00	0.00	248	6.66	6.50	0.00	248	6.66	6.50	7.00	0.00	248	6.66	6.50	0.00	
	4	282	6.40	6.30	0.00	208	6.40	5.70	0.00	230	7.00	6.00	0.00	234	6.66	6.30	0.00	234	6.66	6.30	7.00	0.00	234	6.66	6.30	0.00	

APPROVAL

SHREE CEMENT LIMITED
SHEOPURA-KESARPURA LIMESTONE MINES
MONITORING OF AIR QUALITY WITHIN CORE ZONE

Annexure - VIII

S. No.	LOCATION	Sample No.	05-06-2003 to 07-06-2003							03-09-2003 to 04-09-2003							02-12-2003 to 06-12-2003						
			SPM ug/m ³	RPM ug/m ³	SO ₂ ug/m ³	NOx ug/m ³	CO ug/m ³	SPM ug/m ³	RPM ug/m ³	SO ₂ ug/m ³	NOx ug/m ³	CO ug/m ³	SPM ug/m ³	RPM ug/m ³	SO ₂ ug/m ³	NOx ug/m ³	CO ug/m ³						
1	Waste Dump Yard	1	360	152	9.00	7.00	0.00	300	149	7.66	7.00	0.00	334	135	7.74	7.14	0.00						
		2	354	150	9.00	7.00	0.00	306	145	7.66	7.00	0.00	330	133	7.71	7.18	0.00						
		3	362	150	9.33	7.33	0.00	308	142	7.66	7.00	0.00	318	133	7.68	7.10	0.00						
		4	356	152	9.00	7.00	0.00	298	138	7.88	7.00	0.00	325	134	7.75	7.15	0.00						
2	Quarry Edge	1	344	148	8.33	7.00	0.00	290	140	7.33	7.00	0.00	306	141	7.48	7.05	0.00						
		2	348	148	8.33	7.33	0.00	294	140	7.33	7.00	0.00	314	140	7.44	7.10	0.00						
		3	344	146	8.33	7.00	0.00	288	138	7.00	8.00	0.00	303	146	7.46	7.08	0.00						
		4	340	144	8.33	7.00	0.00	288	138	7.00	8.00	0.00	306	142	7.48	7.03	0.00						
3	Close in Working Area	1	380	158	9.66	7.66	0.00	314	148	9.66	8.00	0.00	355	146	9.14	7.94	0.00						
		2	376	158	9.33	7.33	0.00	340	148	9.66	8.00	0.00	350	143	9.08	7.98	0.00						
		3	384	159	9.33	7.33	0.00	346	146	9.66	8.00	0.00	361	145	9.21	7.97	0.00						
		4	376	156	9.33	7.33	0.00	344	146	9.66	8.00	0.00	363	146	9.14	7.86	0.00						
5	Near Mine Haulage road	1	372	148	8.33	7.00	0.00	324	142	7.33	8.33	0.00	358	141	8.14	7.98	0.00						
		2	358	146	8.00	7.00	0.00	322	148	7.33	9.33	0.00	364	143	8.10	7.92	0.00						
		3	366	150	8.00	7.33	0.00	320	140	7.00	8.00	0.00	353	140	8.20	7.94	0.00						
		4	370	148	8.33	7.33	0.00	326	144	7.00	8.00	0.00	386	142	8.28	7.96	0.00						
6	Near Crusher Hopper	1	374	146	8.00	7.00	0.00	310	140	7.00	8.33	0.00	361	135	7.84	8.18	0.00						
		2	370	148	8.00	7.00	0.00	308	140	7.00	8.33	0.00	364	136	7.88	8.20	0.00						
		3	368	145	8.00	7.00	0.00	308	142	7.33	8.33	0.00	357	134	7.80	8.10	0.00						
		4	372	146	8.33	7.33	0.00	312	144	7.00	9.00	0.00	368	138	7.8	8.13	0.00						
7	Near roadway Loading Station	1	310	138	7.00	6.00	0.00	312	142	6.66	8.00	0.00	306	131	7.04	6.58	0.00						
		2	312	140	7.00	6.00	0.00	310	142	6.66	8.00	0.00	310	132	7.08	6.54	0.00						
		3	306	138	7.00	6.00	0.00	310	140	7.00	8.33	0.00	313	133	7.16	6.53	0.00						
		4	304	138	7.00	6.00	0.00	308	138	7.00	8.33	0.00	304	129	7.01	6.49	0.00						
8	Colony No 2 Anand Vihar	1	224	102	6.33	6.00	0.00	182	96	5.33	5.66	0.00	218	84	5.46	5.96	0.00						
		2	228	102	6.33	6.00	0.00	184	96	5.33	5.66	0.00	218	84	5.48	5.81	0.00						
		3	220	102	6.33	6.00	0.00	178	84	5.33	5.85	0.00	208	83	5.61	5.86	0.00						
		4	228	102	6.33	6.00	0.00	180	96	5.33	5.66	0.00	198	82	5.55	5.84	0.00						

SHREE CEMENT LIMITED, BEAWAR
SHECPURA-KESARPURA LIMESTONE MINES
NOISE LEVEL SURVEY

ANNEXURE - X

S. No	Name of Machine	Measuring Place	DATE OF SURVEY				
			05-04-98 to 15-04-98	09-07-98 to 13-07-98	10-10-98 to 15-10-98	24-11-98 to 09-11-99	
			Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)	
1	L & T Pooler 71	Operator's cabin 10 M. away	70-72 83-88	71-73 81-85	73-75 82-84	73-74 82-85	
2	L & T Pooler III	Operator's cabin 10 M. away	69-72 84-85	67-70 83-85	68-70 79-82	67-69 79-84	
3	Hydraulic Excavator Demag H 55 No. 3	Operator's cabin 10 M. away	70-74 84-88	69-72 81-85	70-73 74-78	70-72 75-80	
4	Front end Loader at operator's cabin	Loading Idling	80-92 70-74	89-92 71-74	87-90 70-73	86-90 71-73	
5	Dozer BD-145 at operator's cabin	Idling	80-94 72-76	91-94 72-75	82-83 72-74	81-83 72-75	
6	Dumper HM-1025 at operator's cabin	Running Idling	85-90 72-75	83-85 71-74	85-87 71-73	88-90 75-80	
7	Compressor	2 M. away Operator's position	82-85 82-86	90-93 81-85	87-88 80-83	85-89 81-85	
8	Drill Machine G.M-15 R	Hopper 15 M. away Operator's Cabin	76-80 82-88	72-76 80-83	73-74 82-85	71-75 80-85	
9	Crusher	Hopper	76-82	76-79	80-82	80-83	
10	Ropeway	Control Room Loading Point	72-76 80-85	71-74 76-82	68-70 71-73	70-73 77-80	

ANNEXURE - X
SHECPURA-KESARPURA LIMESTONE MINES

SHREE CEMENT LIMITED, BEAWAR
 SHEOPURA-KESARPURA LIMESTONE MINES
 NOISE LEVEL SURVEY

ANNEXURE - X

No	Name of Machine	Measuring Place	DATE OF SURVEY			
			03-04-98 to 04-04-99	02-07-98 to 03-07-99	05-10-99 to 05-10-99	12-01-2000 to 13-01-2000
			Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)
1	L & T Poulah 1	Operator's cabin	70-72	69-71	69-70	72-74
		10 M. away	80-81	78-80	81-83	80-82
2	L & T Poulah 11	Operator's cabin	85-87	86-70	72-74	77-79
		10 M. away	78-82	77-80	78-80	77-79
		Operator's cabin	68-70	66-68	74-76	76-78
3	Hydraulic Excavator Demag H-55 No. 3	Operator's cabin	72-78	74-76	83-85	84-86
		10 M. away	85-88	82-85	84-85	82-85
4	Front end Loader	Operator's cabin	70-72	71-73	81-82	75-82
		10 M. away	80-82	88-90	84-85	83-85
5	Dumper BD155	Operator's cabin	70-72	70-72	80-81	79-81
		10 M. away	85-86	83-85	81-82	80-82
		Idling	71-73	69-70	67-68	66-68
6	Compressor	Operator's position	80-82	78-80	85-86	84-86
		10 M. away	71-75	68-70	75-76	77-79
		Operator's Cabin	78-80	76-78	81-82	80-82
7	Crusher	Hopper	77-78	77-79	78-79	76-78
		Control Room	70-74	68-70	70-72	71-73
8	Ropeway	Loading Point	78-80	74-76	72-74	70-72

SHREE CEMENT LIMITED, BEAWAR
SHEOPURA-KESARPURA LIMESTONE MINES
NOISE LEVEL SURVEY

ANNEXURE-VI

Sl. No	Name of Machine	Measuring Place	DATE OF SURVEY			
			10-04-00 to 11-04-00	13-07-00 to 15-07-00	18-10-00 to 20-10-00	22-01-01 to 24-01-01
			Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)
1	L & T Pochan 1	Operator's cabin	84.85	85.87	83.85	80.82
		10 M. away	75.78	76.78	70.72	71.75
2	L & T Pochan 1	Operator's cabin	80.82	82.84	81.83	80.82
		10 M. away	77.79	78.80	73.75	75.77
3	Hydraulic Excavator Demag. 4-55 No. 5	Operator's cabin	85.88	88.88	80.82	81.83
		10 M. away	83.84	84.88	82.84	82.84
4	Front end Loader at operator's cabin	Idling	85.88	85.87	83.85	80.82
		Dozing	81.82	80.81	71.73	86.87
5	Dozer BD-55 at operator's cabin	Idling	81.82	80.81	71.73	81.83
		Running	81.82	82.84	84.86	82.84
6	Dumper HM-1035 at operator's cabin	Idling	87.88	76.78	79.81	79.81
		2 M. away	85.80	88.88	87.88	86.87
7	Compressor	Operator's position	80.81	80.82	83.85	82.84
		Helper 4.5 M. away	78.79	78.79	80.81	80.82
8	Drill Machine - CM-7149	Operator's Cabin	84.86	86.88	84.86	84.86
9	Crusher	Hopper	79.81	79.81	80.82	80.82
		Control Room	72.75	74.76	82.84	81.83
10	Roadway	Loading Point	75.77	78.78	81.83	82.84



**SHREE CEMENT LIMITED BEAWAR
SHEOPURA-KESARPURA LIMESTONE MINES
NOISE LEVEL SURVEY**

ANNEXURE-XII

S. No	Name of Machine	Measuring Place	15-06-2001		10-08-01 to 19-08-01		11-12-01 to 12-12-01		25-03-02 to 26-03-02	
			Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)		
1	L & T Excavator	Operator's cabin	76	71-72	72-74	71-73	71-73			
		10 M. away	88	82-84	82-84	81-82	81-82			
2	L & T Excavator III	Operator's cabin	75	71-73	71-73	71-73	71-73			
		10 M. away	85	80-81	85-87	85-87	85-87			
3	Hydraulic Excavator Demag H-55 No. 3	Operator's cabin	76	70-72	67-69	67-69	67-69			
		10 M. away	88	79-81	83-85	83-85	81-83			
4	Front end Loader	Loading	85	79-81	81-83	81-83	80-82			
		Idling	80	74-76	72-74	71-73	71-73			
5	Coker BO-55	Dozing	88	80-81	82-83	81-83	81-83			
		Idling	82	73-75	71-73	70-72	70-72			
6	Dumper HM-1035	Running	88	81-83	78-90	77-80	77-80			
		Idling	80	70-72	68-70	67-70	67-70			
7	Compressor	2 M. away	89	83-85	83-85	84-85	84-85			
		Operator's position	88	80-81	78-80	77-80	77-80			
8	Drill Machine CM-15 R	Helper 15 M. away	79	75-78	68-70	67-69	67-69			
		Operator's Cabin	81	80-83	74-75	73-75	73-75			
9	Crusher	Hopper	73	71-73	73-80	73-80	73-80			
		Control Room	82	76-77	73-80	73-80	73-80			
10	Ropeway	Loading Point	80	78-80	80-81	75-80	75-80			



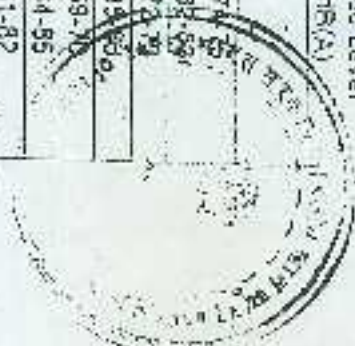
APPROVED
25/03/02

SHREE CEMENT LIMITED, BEAWAR
SHEOPURA-KESARPURA LIMESTONE MINES
NOISE LEVEL SURVEY

ANNEXURE-XIII

Sl. No.	Name of Machine	Measuring Place	DATE OF SURVEY				
			20-06-02 to 21-06-02	09-09-02 to 10-09-02	06-12-02 to 07-12-02	10-03-03 to 11-03-03	
			Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)	
1	L & T Pochin I	Operator's cabin 10 M. away	74 82	72-74 82-83			
2	L & T Pochin II	Operator's cabin 10 M. away	72 83		73-74 81-82	74-75 81-82	
3	Rock Breaker & T Pochin IV	Operator's cabin 10 M. away		71-72	70-71	70-71	
4	Hydraulic Excavator Demag H-55 No. 3	Operator's cabin 10 M. away	70 60	68-69 84-85	67-68 86-86	69-70 84-85	
5	Front end loader at operator's cabin	Loading Idling	81-82 72	83-84 70-71	83-84 73-74	81-82 89-70	
6	Dozer BD155 at operator's cabin	Idling	81	81-82	81-83	81-82	
7	Dumper HM-1035 at operator's cabin	Running Idling	78 70	72-73 69-70	71-72 7-72	71-72 70-7	
8	Compressor	2 M. away	83				
9	Drill Machine CW-15 IR	Operator's position Helper 15 M. away	87	82-83 80-70	86-70 00-82	66-70 81-82	
10	Crusher	Operator's Cabin Hopper	73 78	72 75	72 75	71 75	
11	Runway	Control Room Loading Point	72 78	73 80	72 79	73 73	

OVER



SHREE CEMENT LTD. BFAWAR
SHEOPURA KESARPURA LIMESTONE MINE
NOISE SURVEY



DATE OF SURVEY		14-06-03 to 14-06-03	08-09-03 to 09-09-03	08-12-03 to 09-12-03	
S. No.	Name of Machine	Measuring Place	Noise Level dB(A)	Noise Level dB(A)	Noise Level dB(A)
1	Hydraulic Excavator	Operator's cabin 10 M. away	70-72 76-78	71-72 78-79	70-73 75-80
2	Rock Breaker(G-100) with carrier	Operator's cabin 10 M. away	70-71 84-85	70-71 82-83	71-74 78-82
3	Loader	At Operator's cabin			
		Idle	70-72	70-72	71-73
		Loading	84-85	82-83	77-80
4	Dozer	At Operator's cabin			
		Idle	72-74	70-71	70-74
		Dozing	83-84	80-81	79-81
5	Dumper	At Operator's cabin			
		Idle	70-71	68-70	69-72
		Running	80-82	80-81	76-78
6	Drill Machine	Operator's position	70-72	70-71	
		Helper 15 M. away	83-84	82-83	
7	Crusher	Operator's Cabin	70	68	70
		Hopper	74	72	73
8	Ropeway	Control Room	71	72	70
		Loading Point	78	74	75

SHREE CEMENT LIMITED
SHEDFURA-KESARPURA LIMESTONE MINES
WATER ANALYSIS REPORT

Location	Water supplied from Plant.		Water from Well		Water from Plant		Water from Well		
	Date	No. 1	No. 2	No. 1	No. 2	No. 1	No. 2	No. 2	
A PHYSICAL	Appearance	Clear	Clear	Clear	Clear	Clear	Clear	Clear	
	Colour	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	Colourless	
B CHEMICAL (mg/lit)	Calcium	7.5	7.2	7.1	7.2	7.3	7.2	7.3	
	Fe	483	465	462	487	480	487	480	
C CHEMICAL (mg/lit)	Total dissolved solids at 105°C	105	210	190	205	165	205	182	
	Chlorides as Cl	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
	Alkalinity as CaCO ₃	170	172	175	173	173	171	174	
	Total Alkalinity	181	190	183	182	182	181	182	
	Total Hardness	38	70	71	60	60	72	71	
	Calcium Hardness	29	25	28	27	27	28	28	
	Magnesium Hardness	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
	Permanent Hardness	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
	Temporary Hardness	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
	Dissolved Solids as SiO ₂	0.13	0.10	0.12	0.12	0.12	0.11	0.11	
	Dissolved Iron as Fe	142.0	144.0	145.0	143.0	143.0	142.0	143.0	
	Total Sulphate	540.0	542.0	540.0	543.0	545.0	543.0	542.0	
	Total Solids								

SHREE CEMENT LIMITED
SHEOPURA-KESARPURA LIMESTONE MINES
WATER ANALYSIS REPORT

Location Date	Water supplied from Plant to Mirus for drinking purpose.		
	04-05-1998	03-08-1999	05-11-1999
A PHYSICAL			
Appearance	Clear	Clear	Clear
Colour	Colourless	Colourless	Colourless
Odour	Odourless	Odourless	Odourless
Ph	7.2	7.4	7.4
Total dissolved solids at 105°C mg / Ltr.	482	480	489
B CHEMICAL (mg / Ltr)			
Chlorides as Cl	195	181	193
Alkalinity as CaCO ₃	NIL	NIL	NIL
Total Alkalinity	173	171	173
Total Hardness	182	181	179
Calcium Hardness	60	70	72
Magnesium Hardness	27	28	30
Permanent Hardness	NIL	NIL	NIL
Temporary Hardness	NIL	NIL	NIL
Dissolved Solid as SiO ₂	NIL	NIL	NIL
Dissolved Iron as Fe	0.11	0.12	0.13
Total Sulphate	143.0	138.0	141.0
Total Solids	544.0	480.0	504.0

SHREE CEMENT LIMITED
SHEOPURA-KESARPURA LIMESTONE MINES
WATER ANALYSIS REPORT

Location Date	Water supplied from Plant to Mines for drinking purpose.			
	14-05-2000	12-08-2000	15-11-2000	20-02-2001
A PHYSICAL				
Appearance	Clear	Clear	Clear	Clear
Colour	Colourless	Colourless	Colourless	Colourless
Odour	Odourless	Odourless	Odourless	Odourless
pH	7.6	7.2	7.1	7.8
Total dissolved solids at 105°C mg/L	483	482	480	479
B CHEMICAL (mg/L)				
Chlorides as Cl	189	183	180	183
Alkalinity as CaCO ₃	NIL	NIL	NIL	NIL
Total Alkalinity	178	175	175	179
Total Hardness	179	178	181	182
Calcium Hardness	89	74	80	75
Magnesium Hardness	32	35	32	36
Permanent Hardness	NIL	NIL	NIL	NIL
Temporary Hardness	NIL	NIL	NIL	NIL
Dissolved Solids as CaCO ₃	NIL	NIL	NIL	NIL
Dissolved Iron as Fe	0.14	0.16	0.15	0.17
Total Sulphate	138.0	146.0	143.0	148.0
Total Solids	484.0	509.0	497.0	503.0

SHREE CEMENT LIMITED
SHEEPURAKESARPURA LIMESTONE MINES
WATER ANALYSIS REPORT

A	PHYSICAL	Water supplied from Plant to Mines for drinking purpose			
		Date			
	Appearance	18-05-2001	22-06-2001	26-11-2001	05-02-2002
	Colour	Clear	Clear	Clear	Clear
	Odour	Odourless	Colourless Odourless	Colourless Odourless	Colourless Odourless
	PH	7.8	7.8	7.4	7.5
	Total dissolved solids at 105°C	485	468	468	459
	TDS (mg/l)				
B	CHEMICAL	181	179	178	174
	Chlorides as Cl	NIL	NIL	NIL	NIL
	Alkalinity as CaCO ₃	181	174	172	170
	Total Alkalinity	176	176	172	173
	Total Hardness	75	71	70	68
	Calcium Hardness	39	35	33	38
	Magnesium Hardness	NIL	NIL	NIL	NIL
	Permanent Hardness	NIL	NIL	NIL	NIL
	Temporary Hardness	NIL	NIL	NIL	NIL
	Dissolved Solid as Silica	NIL	NIL	NIL	NIL
	Lime/Silica as Fe	0.18	0.15	0.16	0.14
	Total Sulphate	146.0	143.0	146.0	142.0
	Total Solids	489.0	471.0	472.0	442.0

SHREE CEMENT LIMITED
SHEEPURA-KESARPURA LIMESTONE MINES
WATER ANALYSIS REPORT

A	Location -	Water supplied from Plant to Mines for drinking purpose.		
	Date	19-05-2003	16-08-2003	11-11-2003
PHYSICAL				
Appearance	Clear	Clear	Clear	
Colour	Colourless	Colourless	Colourless	Colourless
Odour	Odourless	Odourless	Odourless	Odourless
T ₁₀	7.2	7.1	7.2	7.2
Total dissolved solids at 105°C (mg/lit)	469	445	442	442
B				
CHEMICAL (mg/lit)				
Chlorides as Cl	174	168	168	168
Alkalinity as CaCO ₃	NIL	NIL	NIL	NIL
Total Alkalinity	168	160	158	158
Total Hardness	168	168	162	162
Calcium Hardness	66	64	32	32
Magnesium Hardness	39	35	34	34
Permanent Hardness	NIL	NIL	NIL	NIL
Temporary Hardness	NIL	NIL	NIL	NIL
Dissolved Solid as SiO ₂	NIL	NIL	NIL	NIL
Dissolved Iron as Fe	0.14	0.13	0.12	0.12
Total Sulphate	144	140	140	140
Total Solids	472	445	445	445



S. Srinivas
Analyst

SHREE CEMENT LIMITED
ANALYSIS REPORT OF WATER STORED IN MINING PIT

Annexure XXI

A	PHYSICAL	Clear	Unit
	Appearance	Colourless	
	Colour	Odorless	
	Odor	7.9	
	pH	650	Mg/litre
	TDS at 105°C		
B	CHEMICAL		
	Chlorides as Cl	200	Mg/litre
	Alkalinity as CaCO ₃	NIL	Mg/litre
	Total Alkalinity	190	Mg/litre
	Total Hardness	175	Mg/litre
	Calcium Hardness	80	Mg/litre
	Magnesium Hardness	36	Mg/litre
	Permanent Hardness	NIL	Mg/litre
	Temporary Hardness	NIL	Mg/litre
	Dissolved Solids as SiO ₂	NIL	Mg/litre
	Dissolved Solids as Fe	0.18	Mg/litre
	Total Sulphates	160	Mg/litre
	Total Solids	630	Mg/litre



APPROVED

SHREE CEMENT LIMITED, BEAWAR
SHEDPURAKESARPURA LIMESTONE MINES
PLANTATION WITHIN MINING LEASE AREA UPTO MARCH 2003


S. No.	Location	Last year of Plantation	Area (In Hect)	Nos. of Plants	Survival of plants (Nos.)	% of Survival	Fruit Trees including total trees planted
1	Garden No. 1 (Near Well No. 1)	1998-97	7.00	3275	3200	97.71	274
2	Garden No. 2 (Near Well No. 2)	1998-97	14.00	9067	8883	97.97	5
3	Waste Dump Yard No. 1	2002-03	3.10	3135	3091	97.64	374
4	Waste Dump Yard No. 2	2000-01	2.50	2569	2480	96.92	275
5	Lin Between Mines Office & Ropeway	2001-02	4.50	9658	3656	97.21	131
6	Along road side from Mines office to Waste Dump Yard	2001-02	1.50	2317	2228	96.18	178
7	Mursan	1998-97	0.50	185	191	97.84	0
8	Near Water Tank in front of Crusher (Milllock)	2000-01	1.00	1775	1736	97.80	190
9	Behind Workshop	2002-03	0.50	221	211	95.48	0
10	Footwa side of Mines Road	2002-03	0.50	600	500	83.33	0
11	Pl. No. 2 Block VA Office & Workshop	2002-03	1.50	1885	1799	96.46	12
	Total		36.60	28567	27845	97.47	1378

Mines Office
 SHEDPURAKESARPURA

SHREE CEMENT LIMITED, BEAWAR
SHEOPURA-KESARPURA LIMESTONE MINES

PLANTATION ADJACENT TO MINING LEASE AREA UPTO MARCH 2003

S. No.	Location	Last year of Plantation	Area (in Hect)	Nos. of Plants	Survival of plants (Nos.)	% of Survival	Fruit Trees including trees planted
1	Mezzaire & surrounding Area	2002-03	5.50	3881	3824	88.53	0
2	Along road side from Arand Vihar to Mines office.	2001-02	1.00	170	168	99.82	0
3	Colony No. 2 Arand Vihar, garden and near S. T. P. Plant	2002-03	5.50	9926	9817	99.89	0
	Total		15.00	13977	13609	97.37	0


 SHREE CEMENT LIMITED
 BEAWAR
 APPROVED

Run Time: Tran at 13:37:08 March 5, 2007
 Trigger Source: Geo: 2.00 mm/s
 Range: Geo: 254 mm/s
 Record Time: 20 sec at 1024 sps
 Job Number: 7

Serial Number: BE6515 V 3.74-3.74 MiniMate Plus
 Battery Level: 6.3 Volts
 Calibration: April 21, 1999 by InstanTel Inc.
 File Name: 4515RFVX.T110
 Scaled Distance: 32.3 (250.0 m, 60.0 kg)

Notes

Client Name: Shree Cements Limited
 Name of Mine: Kasarpura Limestone Mines
 Location: A Band, Sector 14, 518/0 FL

Post Event Notes:
 Vibration levels are way below prescribed limits of DGMS.
 At a distance of 400m-500m (distance of closest village)
 (above mentioned levels of charge per delay are maintained)
 no problem is suspected w.r.t. damage due to blast vibrations

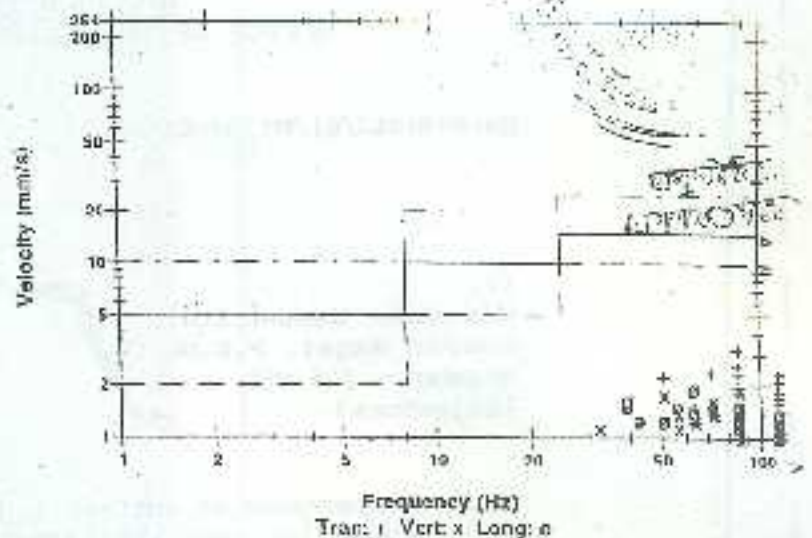
Microphone: Linear Weighting
 FSPL: ≈ 1 SCN pa () at -0.245 sec
 DC Freq: N/A
 Channel Test: Check (Freq = 0.0 Hz Amp = 0 mV)

	Trans	Vert	Long	
V	3.30	1.90	1.90	mm/s
DC Freq	85	85	64	Hz
Time (Rel. to Trig)	0.128	0.029	0.029	sec
Peak Acceleration	0.159	0.0928	0.106	g
Peak Displacement	0.00802	0.00465	0.00485	mm
Sensorcheck™	Passed	Passed	Passed	

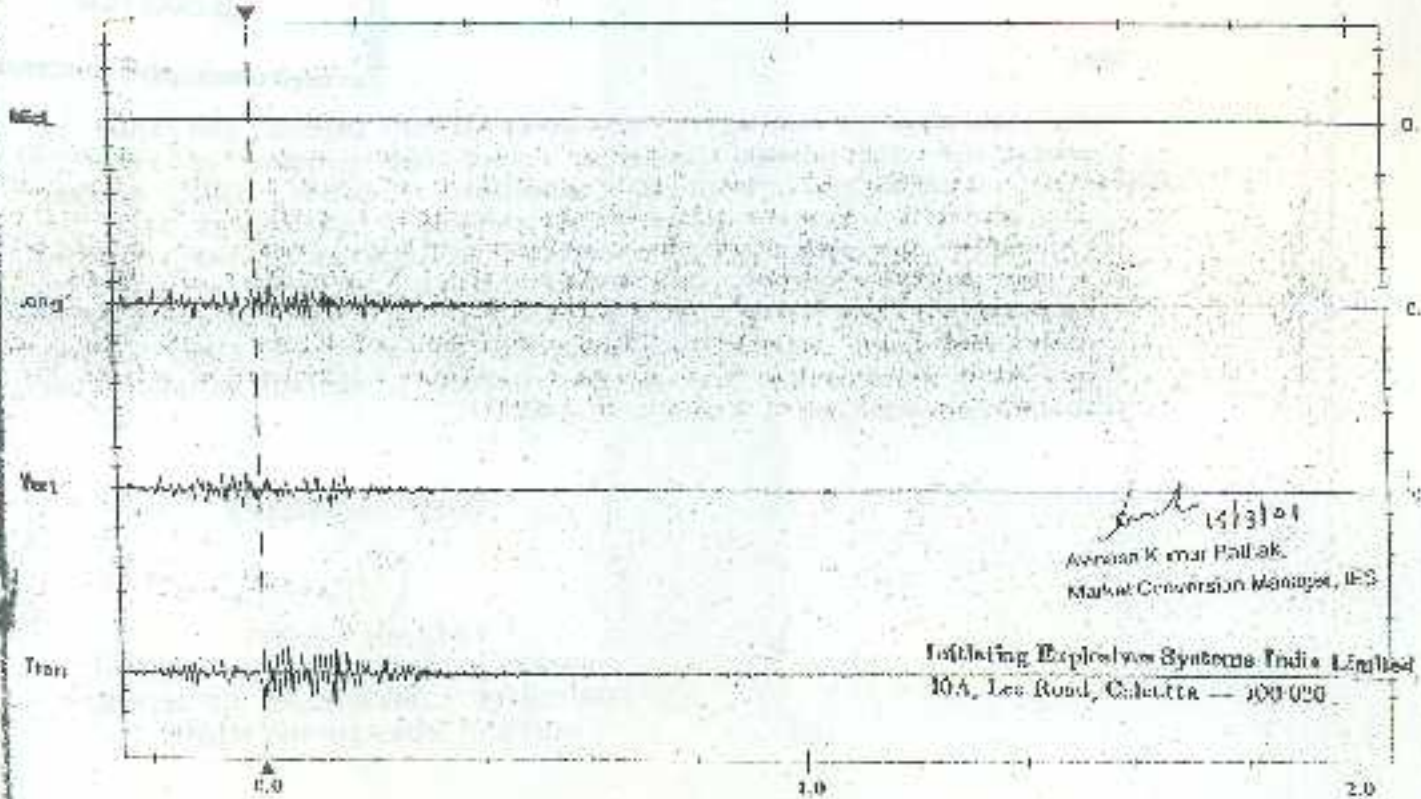
Peak Vector Sum: 3.68 mm/s at 0.128 sec

N/A: Not Applicable

DGMS India (A)
 Permissible Ground Vibration



- a) Industrial Buildings
- b) Domestic houses/structures
- c) Historic objects, sensitive structures

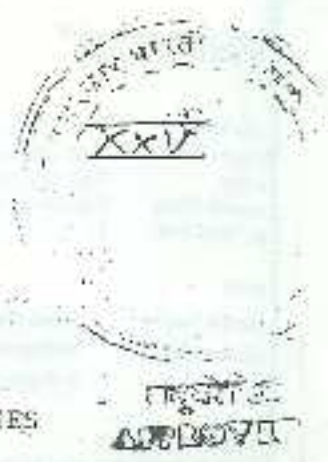


[Signature] 15/3/07
 Avinash Kumar Pillai
 Market Conversion Manager, IES

Installing Explosives Systems India Limited
 10A, Lee Road, Calcutta - 700 020

Time Scale: 0.20 sec/div Amplitude Scale: Geo: 2.00 mm/s/div Mic: 10.00 pa./div
 Trigger: \blacktriangleright \blacktriangleleft

GOVERNMENT OF INDIA
MINISTRY OF MINES
INDIAN BUREAU OF MINES
OFFICE OF THE CHIEF CONTROLLER OF MINES



No. N-11013/61/MP/89-CCOM

2nd Floor, 'A' Block,
Indira Bhavan, Civil lines,
Nagpur - 440 001.

16-6-93

To,
M/s. Shree Cement Ltd.,
Bangur Nagar, P.B.NO.33,
Dewar - 306 901
(Rajasthan).

Sub: Preparation of surface & geological plan on a scale of 1:5000 for your sheopura-Kesargura Limestone lease in Dewar Tahsil, Ajmer district.

Ref: Your letter no. SCL/BWR/U/S-1/93/187/9 dt. 9.1.93.

Shree Cement Ltd.

23 JUN 1993

Received

Sir,

With reference to above, I am directed to inform you that in exercise of the powers conferred under the proviso of rule 27 1)(d) of MCDR '88, the Chief Controller of Mines, IBM, Nagpur has permitted you to prepare the surface & geological plan for the entire area of your above referred mining lease, as required to be prepared under rules 28 (1)(a) & 20(1)(b) of MCDR '88 respectively, on a scale of 1:5000 instead of 1:2000 as prescribed under the rules. Further, Chief Controller of Mines, IBM, Nagpur has also permitted you to prepare surface & geological plans for the working mine on a scale of 1:1000.

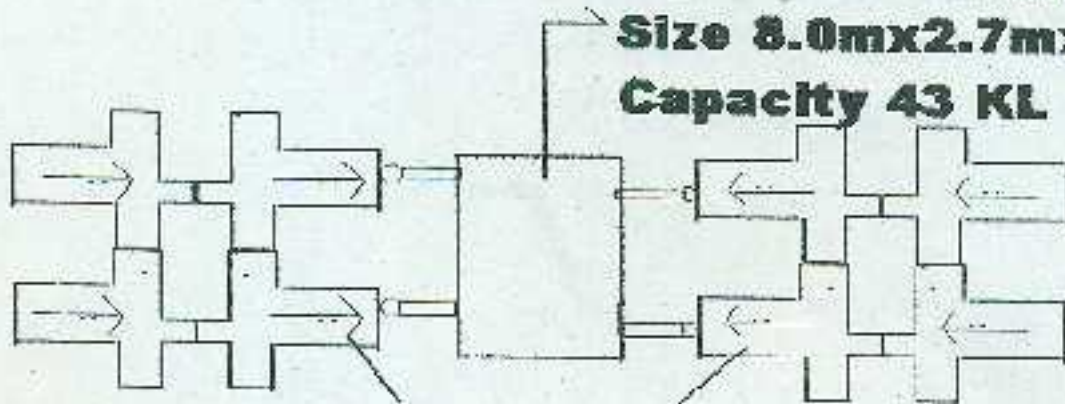
Yours faithfully,

(RANJAN SAHAI)
DEPUTY CONTROLLER OF MINES
FOR CHIEF CONTROLLER OF MINES
INDIAN BUREAU OF MINES

SHREE CEMENT LIMITED

Schematic Diagram of Roof Top Water Harvesting

Water Harvesting Tank
Size 8.0mx2.7mx2.0m
Capacity 43 KL



C Super quarters

SHREE CEMENT LIMITED
WATER ANALYSIS REPORT
OF SEWAGE TREATMENT PLANT

Annexure XXV/I

S. No.	Particulars	Inout Water	Output Water
01	pH Value	7.29	7.25
02	BOD	180 mg/litre	9.5 mg/litre
03	COD	250 mg/litre	45.5 mg/litre
04	TSS	180 mg/litre	9.5 mg/litre

SHREE CEMENT LIMITED