PRE – FEASIBILITY REPORT

For

SANU-I LIMESTONE MINES

(ML No. 27/96, ML Area-1000.00 Ha.)

Enhancement in Production Capacity of Steel Grade Limestone from 1.25 MTPA to 1.50 MTPA

Village -Joga ,Tehsil & District -Jaisalmer (Rajasthan)

RAJASTHAN STATE MINES & MNERALS LTD.

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CONTENT

PRE-FEASIBILITY REPORT

1.0 EXECUTIVE SUMMARY

M/s. Rajasthan State Mines & Minerals Ltd. intends to enhance the production capacity of Steel grade Limestone from 1.25 MTPA to 1.50 MTPA of its SANU-I Limestone Mine (ML No 27/95, ML Area 1000 ha) at Village- Joga, Tehsil & District- Jaisalmer (Rajasthan).

i) SALIENT FEATURES OF THE PROJECT

Name of the Project	:	SANU-I Limestone Mine
Location of the Project	:	Village-Joga, Tehsil-Jaisalmer, Sub-Tehsil-Ramgarh, District-Jaisalmer, Rajasthan
Geographical Location	:	Latitude : $27^0$16'43" to $27^0$19'40" – N Longitude : $70^0$33'52" to $70^0$35'00" – E Toposheet no. 40 I/11
Minerals to be Mined	:	SMS Grade Limestone Low Silica High Grade Limestone
Nearest Airport	:	Commercial:- Jodhpur (350 Km) Jaisalmer-Air Strip (About 55 km from the mines)
Nearest Railway Station	:	Jaisalmer (about 60 km from the mines)
Mining Lease Area	:	1000.00 Hectare
Proposed Expansion in Limestone	:	From 1.250 MTPA to 1.50 MTPA
Main fuel	:	HSD Oil
Anticipated life of the mines	:	7 years
Environmental Protection Cost	:	Rs. 10.00 lakh per year
End user	:	Steel Plant
Cost Details	:	
o Total Project Cost	:	Rs. 12 Crores/-
o Cost for Environment Protection Measures	:	Capital Cost : Rs. 0.25 Crores/-Recurring Cost :Rs. 10 Lacs /Annum
Man Power Requirement	:	65 person

ii) ENVIRONMENTAL MANAGEMENT PLAN

A. Air Quality Management

Drilling

Wet drilling and dust collection system during drilling to suppress dust generation at source.

Blasting

Controlled Blasting is adopted with the optimum use of explosive energy which helps in reducing air pollution. Rock breaker for breaking

over sized boulders, which eliminates the generation of dust. No secondary blasting is carried out. Hydraulic breakers are deployed in place of secondary blasting.

Crushing and Screening

Water sprinkling at Crusher Hopper Bag Filters in Crusher & Screening plant Water sprinkling over conveyor belt Transportation Regular water spraying on the haul roads is being done. Regular maintenance of HEMMs & transportation vehicles. Overloading of material during transportation is avoided. Personal protective equipment is being provided to the workers. Greenbelt Development & Plantation Greenbelt/plantation will be developed along 7.5m width of ML periphery of the project site, along the haul roads, mine office, workshop etc. Periodic air quality monitoring is carried out. All the above mentioned practices/activities will be adopted in the proposed production expansion project.

B. Water Quality Management

No waste water will be generated during mining operation Septic tanks and soak pits will be provided for the disposal of domestic effluents generated from mine office. Garland drains will be provided to prevent the entry of rainwater into the mining pit. Regular monitoring of ground water quality will be carried out.

C. Noise Level Management

Adequate silencers with AC cabins will be provided in Heavy Earth Moving Machines. Proper maintenance, oiling and greasing of machines at regular intervals will be done to reduce generation of noise. Earmuffs/earplugs will be provided to all operators and employees working near the machinery. Green Belt will be developed around the lease boundary and haul roads. Plantation will be done on undisturbed area, reclaimed area, nearby workshop & mine office etc to minimize the propagation of noise. Periodical monitoring of ambient noise quality will be done and corrective measures will be taken to meet the norms (if required).

D. Greenbelt/ Plantation

Plantation has been developed over an area of 3.30 ha. in the Mining Lease area. Native plant species like Neem, Amaltash, Ashoka, Nimbuetc have been planted. The same will be maintained and enhanced in future. Plantation will be carried out along the periphery of the lease boundary, over the waste dump , dump slope, haul roads, nearby workshop & mine office etc. Local species will be planted after consultation with local forest officer and as per CPCB/RPCB guidelines.

iii) PROPOSED PLANNING

- Mining Method: Opencast, single Bench, Mechanized Method with deep hole blasting
- Project Cost: Rs. 10.00 Crore (Existing) + 2.00 Cr. (For expansion) = Total 12.00 Cr.
- Production: 1.50 MTPA

2.0 INTRODUCTION OF THE PROJECT/ BACKGROUND INFORMATION

i) IDENTIFICATION OF PROJECT AND PROJECT PROPONENT

- IDENTIFICATION OF PROJECT

The present proposal is for proposed expansion in Limestone Production capacity from 1.25 Million TPA to 1.50 Million TPA from Sanu-I limestone mine. The Sanu-I mine came in operation in the year 1988. The basic input like power, water, offices etc. are already exists at the site. The mining lease area is mostly Govt. wasteland. Considering the annual proposed production capacity of SMS grade limestone @ 1.50 million MT (maximum) average rock handling 3.50 million MT per annum, the anticipated life of the mine is around 7 years (up to year 2025). The Sanu-I, limestone mine was under RSMDC and which merged with RSMML on 20th February 2003.

- IDENTIFICATION OF PROJECT PROPONENT

Considering the mineral reserve potential in the state of Rajasthan, Rajasthan State Mines and Minerals Ltd. (RSMML) came into existence in the year of 1974, profit making Rajasthan State Government undertaking. The company is engaged in diverse activities, which includes Mining, Beneficiation, Consultancy, Research and Development, Power Generation etc. As its name depicts that it is mining and marketing mineral rock phosphate, limestone, lignite, gypsum, and Selenite and wind & Solar power generation in every corner of Rajasthan. The company is the major producer of minerals like gypsum/selenite, rock-phosphate, SMS grade limestone, Lignite in the country. It was further strengthened by merging Rajasthan State Mineral Development Corporation on 20th February 2003, another leading giant in mineral sector, by an extraordinary Gazette Notification of Ministry of Company Affair, Govt. of India.

To further strengthen the growth and increase the production of SMS grade limestone and to meet the market demand, RSMML proposes to enhance the production capacity of the limestone mines Sanu-I near village Joga in Jaisalmer district of Rajasthan.

ii) JUSTIFICATION

High quality hard and compact limestone is a technological necessity for steel plants with the basic oxygen furnaces technology where it is used as a flux. After the closure of limestone quarries at Dehradun by the historic judgment of the Hon'ble Supreme Court, the limestone from Jaisalmer found enormous importance for the steel industries. It was the recommendation of the technical team constituted by Govt. of India in the year1986 after assessing the various limestone deposits available in the country that the low silica limestone available from Jaisalmer is the best suited for use in the steel industries. The limestone deposits of Jaisalmer district are very important and unique in the mineral map of Rajasthan because of its rare occurrences and potential in steel industries. Based on the recommendation, mining of limestone was commenced by erstwhile RSMDC since 1988 for supply to different steel plants from their mines near Sanu and later by RSMML.

The demand of limestone for different steel products in different steel plants is increasing along with the exports to China and Japan. All the steel plants are gearing up to meet the increasing demand which has resulted into sudden increase for the demand of limestone from Jaisalmer. As per the projections given, the demand for low silica limestone in coming years by SAIL and TISCO plants is expected to be approximately 30-32 lakh MT per annum. There are sufficient reserves of high quality limestone in Jaisalmer district and it may continue to cater the future requirement of steel plant for so many years.

The present proposal is for Sanu Limestone Mine-I located in sub-tehsil Ramgarh of Jaisalmer district, Rajasthan. The present production capacity is not sufficient to meet the market demand. Thus, to meet the increasing demand of limestone and also to keep the wheel of progress moving in industrial sector, it is proposed to expand the production capacity of Sanu Mine-I @ 1.50 mill TPA. Hence, the expansion proposal of Sanu- I Limestone Mine is justified.

iii) MINING LEASE STATUS

M/s Rajasthan State Mineral Development Corporation Ltd., a Govt of Rajasthan Undertaking, was appointed as an agent of the State Government for exploitation of steel grade limestone from 10 Sq.Km area near Village Sanu, Distt : Jaisalmer vide order no.F.4 (270) Khan/Gr.II/88 dated 24th Feb, 1988 , Department of Mines, Group-II, Government of Rajasthan. The mining operations were commenced by erstwhile M/s RSMDC in year 1987-88 for supply to different Steel Plants from their mines at Sanu. The agency status of area continued upto 31st March 1997. Thereafter, pending the mining lease application, state government granted working permission for the period till the grant of regular mining lease.

The mines which were held by M/s. RSMDC came under the control of M/s RSMML on amalgamation of M/s. RSMDC in M/s Rajasthan State Mines & Minerals Limited (RSMML) w.e.f. 20.02.2003 by an extra ordinary notification no. S.O.207 (E) dated 19.02.2003 from Ministry of Finance & Company Affaire, GOI, New Delhi.

Later, state government vide Order No. P.4 (270)Khan/Gr. 2/83 dated 27th January 2010 granted mining lease in favour of M/s RSMML over the same area of 10 Sq.Km (1,000 hectare) for mineral SMS /Steel-grade limestone (LD Grade) near village Sanu, Tehsil & District Jaisalmer (ML No.-JSM/major/ 27/96) for a period of 30 years w.e.f. 01.04.1997. The lease deed agreement was executed on 22.07.2010 & registered on 30.07.2010 in the office of sub-registrar, Jaisalmer. With the amendment in section 8A (6) vide Mines & Mineral development & regulations Amendment Act 2015, state government has extended the lease period upto 31.03.2047.

iv) EXISTING CLEARANCES & CONSENTS

The Environmental Clearance was granted by the Ministry, vide letter EC No. 11015/42/2006-IA.II (M) dated 3rd Aug 2007 for mining of steel grade limestone with production capacity 12, 50,000 TPA in mine lease area of 1000.00 ha in the name of M/s Rajasthan State Mines & Minerals Ltd. Copy of same is enclosed as Annexure.

Consent to Operate (CTO) under section 21(4) Air (Prevention & Control of Pollution) Act, 1981 and under section 25/26 of Water (Prevention & Control of Pollution) Act, 1974 was obtained from Rajasthan State Pollution Control Board (RSPCB) vide their letter no. F(Mines)/Jaisalmer(Jaisalmer)/1958(1)/2016-2017/9866-9870 dated 31.03.2017 valid upto 31.07.2019. Regular Compliance reports of EC/Consents conditions are being submitted to the concern authorities on regular basis. Screening category of Project As per EIA Notification dated 14th September, 2006 as amended from time to time, the project falls under Category “A”, Project or Activity 1(a)–3.

v) NEED FOR THE PROJECT & ITS IMPORTANCE TO THE COUNTRY AND OR REGION

High quality hard & compact limestone is a technological necessity for Steel Plants with the basic oxygen furnace technology where it is used as a flux. After the closure of limestone quarries at Dehradun by the historic judgment of the Hon’ble Supreme Court, the limestone from Jaisalmer found enormous importance in the Steel Industry. It was the recommendation of the technical team constituted by Govt. of India in the year 1986 after assessing the various limestone deposits available in the country that the low silica limestone available from Jaisalmer is the best suited for use in the Steel Industry. Based on the recommendation mining of Limestone was commenced by erstwhile

RSMDC since 1988 for supply to different Steel Plants from their mines at Sanu.

The demand for different steel products from different Steel Plants is increasing along with the exports to China and Japan. All the steel plants are gearing to meet the increasing demand which is resulting into sudden increase for the demand of limestone from Jaisalmer. As per the projections given, the demand for low silica limestone in coming years by SAIL plants & TISCO is expected to be approximately 27-28 lakhs MT per annum. There are sufficient reserves of this high quality limestone in district Jaisalmer & it may continue to cater the future requirement of steel plant for so many years.

The present proposal is made for Sanu limestone mine - I located in Ramgarh sub-tehsil of Jaisalmer district Rajasthan. The present production capacity of the mine is not sufficient to meet the market demand. Thus, to meet the increasing demand of limestone and also to keep the wheel of progress moving in industrial sector, it is proposed to expand the production capacity of the mine @ 15.00 lac MT per annum.

The annual steel production in India is around 75 Million MT and SMS Grade limestone requirement is@ 80 KG per metric tonne of steel (8%). The total annual consumption of SMS Grade limestone is 6 million MT and out of that only 2.5 Million MT is being supplied from Jaisalmer and remaining is being met through import. Thus, its expansion will reduce the dependability over imported limestone, particularly by SAIL & Tata Steel Ltd. And in turn increase the revenue to state exchequer by way of royalty, taxes etc and partial enhancement of direct indirect employment.

vi) DEMAND – SUPPLY GAP

After proposed enhancement of the production capacity of the steel plants of SAIL & Tata Steel Ltd, it is expected to increase in demand of limestone from Sanu Mines. SAIL has already indicated in their long term MoU with RSMML.

vii) IMPORTS *VS*. INDIGENOUS PRODUCTION

Higher landed cost restricts the steel plants to procure Jaisalmer limestone, as the imported limestone from Dubai, Oman, Thailand etc is cheaper though their physical quality is inferior to the Jaisalmer Limestone. Around 25-30 % demand of ingenious limestone is met from Sanu Mines Jaisalmer. A few from captive mines of the steel plants but major share is imported from these countries, due to logistic component

viii) EXPORT POSSIBILITY

Not applicable, it is low cost mineral & Jaisalmer is far off from the sea port. The transportation of this mineral makes it unviable to user industries.

ix) DOMESTIC/EXPORT MARKETS

Limestone produced from Sanu Limestone Mine is being / will be utilized by steel plants mainly of SAIL, Tatat Steel etc.

x) EMPLOYMENT GENERATION (DIRECT AND INDIRECT) DUE TO THE PROJECT

Direct and indirect employment will be generated due to the expansion in project. Unskilled /semi skilled manpower can be sourced from the local area and skilled manpower will be sourced from outside. At present about 65 persons are engaged at Sanu-I mine as direct employment and post expansion of limestone production around 10 manpower will be engaged in mining activities from raising to transportation viz. technical, supervisory staff, wage board employees including tipper operators & its sizing by crushing plant. But their shall be substantial increase upto 15% in share of indirect employment in transportation activities.

3.0 PROJECT DESCRIPTION

i) TYPE OF PROJECT INCLUDING INTERLINKED AND INDEPENDENT PROJECTS, IF ANY:

Mining project is independent unit for supply of steel grade limestone to steel plants in open market sale. The environment clearance has already been obtained from MoEFCC vide letter No. J-11015/42/2006-IA.II (M) dated 3rd Aug 2007 for mining of steel grade limestone with production capacity 12, 50,000 T PA (1.25 MTPA) in mine lease area of 1000.00 Ha.

ii) LOCATION (MAP SHOWING GENERAL LOCATION, SPECIFIC LOCATION, AND PROJECT BOUNDARY & PROJECT SITE LAYOUT) WITH COORDINATES.

Total lease area	:	1000.00 Hectrs
District & State	:	Jaisalmer, Rajasthan
Taluka	:	Jaisalmer
Village	:	Joga
Whether the area falls under Coastal Regulation Zone (CRZ)? If yes, Details thereof.	:	No, Part of Thar desert.
Existence of public road/railway line if any nearby and approximate	:	GREF Road (connecting Jaisalmer to Ramgarh) passing through lease

distance area.

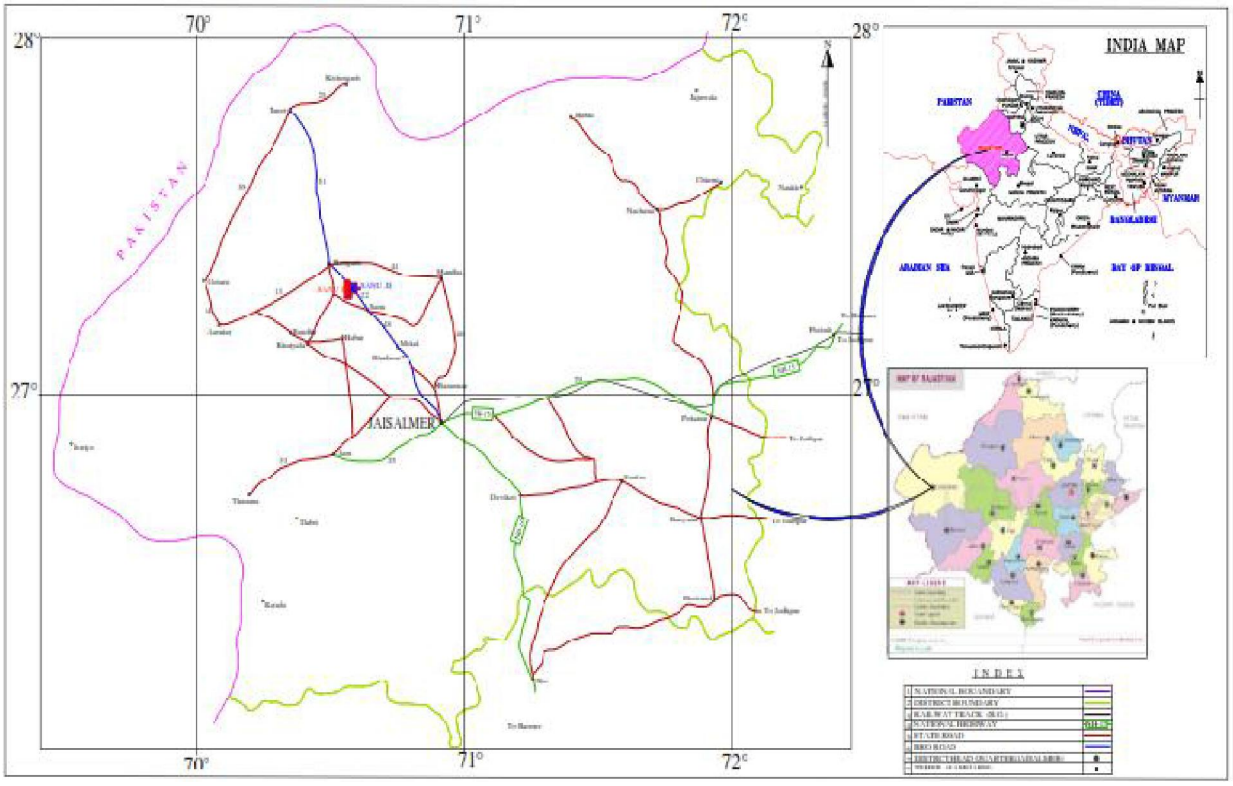
Nearest Railway station is Jaisalmer & around 60 KM from lease are.

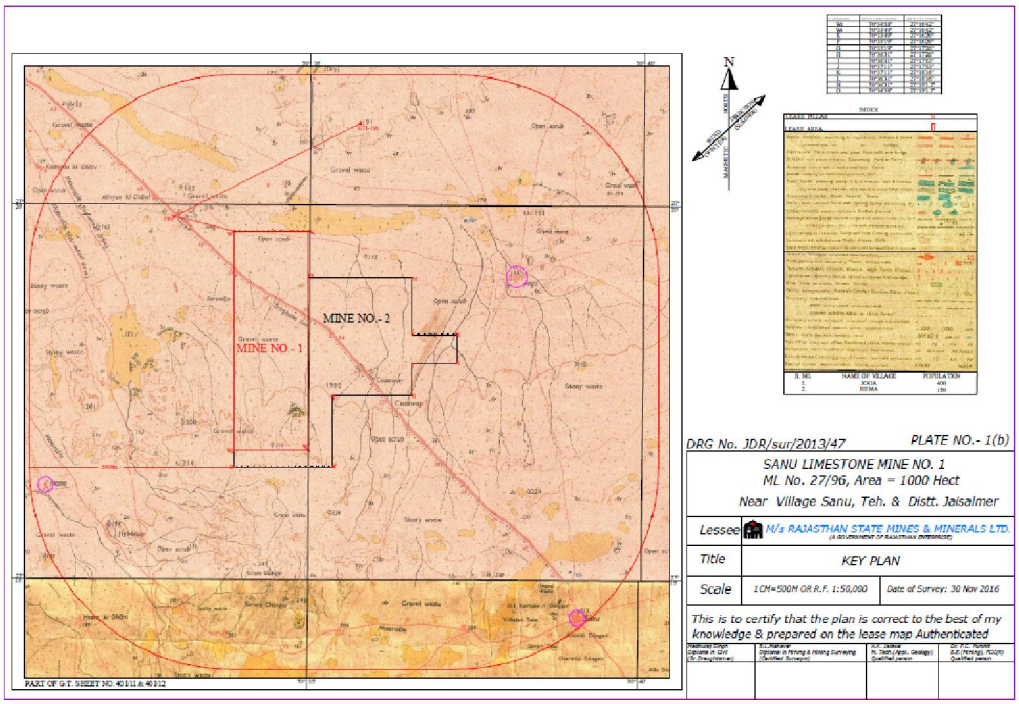
Toposheet No. : 40I/11

PIILAR WISE COORDINATE OF THE LEASE AREA

COORDINATE	**PILLAR NO.W**	**PILLAR NO.W-1**	**PILLAR NO.W-2**	**PILLAR NO.W-3**
Latitude	$27^0$16’43” N	$27^0$16’43” N	$27^0$19’40” N	$27^0$19’40” N
Longitude	$70^0$33’52” E	$70^0$35’00” E	$70^0$35’00” E	$70^0$33’52” E

Figure 1: Location Map showing general location, specific location, project boundary & project





iii) DETAILS OF ALTERNATE SITES CONSIDERED

No alternative site has been taken into consideration as the mineral (Limestone) has been proved with adequate reliability at this site. Also, this is an existing project & all required infrastructure is already available at the site.

iv) SIZE OR MAGNITUDE OF OPERATION

Expansion in steel grade limestone Production Capacity is proposed from 1.25 Million TPA to 1.50 Million TPA within existing Mining Lease Area of 1000 ha. To win about 1.50 Million TPA limestone about 3.50 Million TPA ROM is to be mine and about 54-55 % waste is expected to be generated in form of Inter burden & fines produce after sizing & screening of ROM limestone to get steel grade limestone.

v) PROJECT DESCRIPTION WITH PROCESS DETAIL

A. <u>Geology</u>

Geologically the area forms a part of Jaisalmer basin of Tertiary and Eocene age rocks formations located in the western part of Rajasthan, a part of great Indian Thar Desert. The limestone deposit is of the younger Khuiyala formation of Jaisalmer basin. Its surface extension is about 100 km in length & around 5 Km in width.

The deposit is simple bedded type with rolling dip near to horizontal. No structural disturbance observed in the area. The Stratigraphic sequence of the area explored by drilling can be summarized as under:

Stratigraphic sequence of the area

Cenozoic	Eocene	Bandah formation	Gypseous shale
		Khuyala formation	➢ Te-taker limestone (Bouldery & hard compact limestone) ➢ Chalky limestone ➢ Fragmental limestone ➢ Shaly limestone ➢ Foraminiferal (Assilina) bed ➢ Gypseous clay /fuller's earth/shale
	Palaeocene		Sanu sandstone(ferruginous sandstone)

----------major unconformity----------

Hard, Compact, Bouldery limestone: (HCB Limestone)

The limestone is low silica limestone fine grained hard, compact, bouldery, fragmental to nodular in nature and massive & compact at depth.

Top bouldery layer-

- Quality wise is better than lower massive bed, have silica contents <1.0%, hard & compact in nature.
- Can be excavated easily without use of drilling & blasting.
- The product recovery (sized limestone) is less i.e. up to 40% by weight as it contains up to 45% by weight argillaceous soil & calcareous pebbles.

Bottom massive layer-

- It contains silica 1.0-1.50 %, moderately hard & compact in nature.
- It required drilling & blasting.
- The product recovery (sized limestone) is better i.e. up to 60%.

B. Mineral Reserves

The mineral resources may be estimated purely based on level of exploration, with reference to the threshold value of minerals declared by IBM:-

Updated Reserves as on 01.04.2018 as per UNFC code

Classification	UNFC code	Quantity	Grade
Total Mineral Resources (A+B)		25.591 mt	Steel grade
(A) Mineral Reserve			
(1) Proved Mineral Reserve.	111	20.010 mt	Steel grade
		3.115 mt	Chem.grade
(2) Probable Mineral Reserve	121 and 122	41.772 mt	Chem.grade
	121 and 122	331.190 mt	Cement grade

(B) Additional or Remaining Resources (1) Feasibility Mineral Resources (2) Prefeasibility Mineral Resource (3) Measured Mineral Resource (4) Indicated Mineral Resource **(5) Inferred Mineral Resource** (6) Reconnaissance Mineral Resource	211 221 and 222 **331** 332 333 334	**5.581 mt**	Steel grade

The brief up date status, as on 01.04.2018, about mining & exploration activities is detailed hereunder-

Total Lease area	:	1000.000	Hectrs
Area covered by detailed exploration	:	1000.000	Hectrs
Unexplored area	:	0.000	Hectrs
Mineralised Zone(Chemical Grade)	:	105.875	Hectrs
Total Potential Mineralised Zone(SMS Grade)	:	894.225	Hectrs
SMS reserves area under Non Mining Zone	:	65.600	Hectrs
Area already exhausted till 31.03.2018	:	525.00	Hectrs
Remaining area for Mining(for SMS grade) as on 01.04.2018	:	303.60	Hectrs

Mineable Reserves of SMS grade limestone

S.No.	Category	Reserves (In million tonne)
1	Balance Insitu geological reserves under proved category as on 01.04.2018	25.591
2	Reserves under non-mining zone (Like safety zone along common lease boundary/along road side/under the public road etc)	5.581
3	Balance Mineable reserves as on **01.04.2018**	**20.010**

C. Details of Mining

Considering the nature of deposit & negligible overburden, opencast single benched mechanized mining method is ideally suited for exploitation of steel grade limestone. Here, the mining techniques are well established to win out the ore for production of steel grade limestone & it is proposed to adopt the same philosophy.

Mining operation is being/ will be carried out by opencast mining method, utilizing Heavy Earth Moving Machines (HEMM) in conjunction with drilling & blasting. Loading is being/will be done by Hydraulic Shovels and transport of blasted limestone is being/ will be done by Dumpers to the crusher located at Sanu-I Mine having

sizing and screening arrangements for screening of fines and other associated impurities and then sized limestone will be transported through tippers to the railway siding.

SEQUENCE OF MINING

- The area is devoid of any significant topsoil.
- Drilling & blasting for limestone using HEMM.
- Loading of ROM Limestone by shovel – Dumpers combination.
- Transportation of ROM Limestone to Crusher.
- Transportation of crushed Limestone from Mines to railway siding by Tippers.

PRESENT METHOD OF MINING

a) Drilling

- Exploitation of limestone will be by conventional method of drilling and blasting technique.
- Drilling will be carried out by deploying 115 mm diameter drill equipped with in-built arrangement of water sprinkling for dust suppression and separate dust extraction system.

b) Blasting Specifications

- pattern of 100 mm φ holes (Burden X Spacing X Depth):-

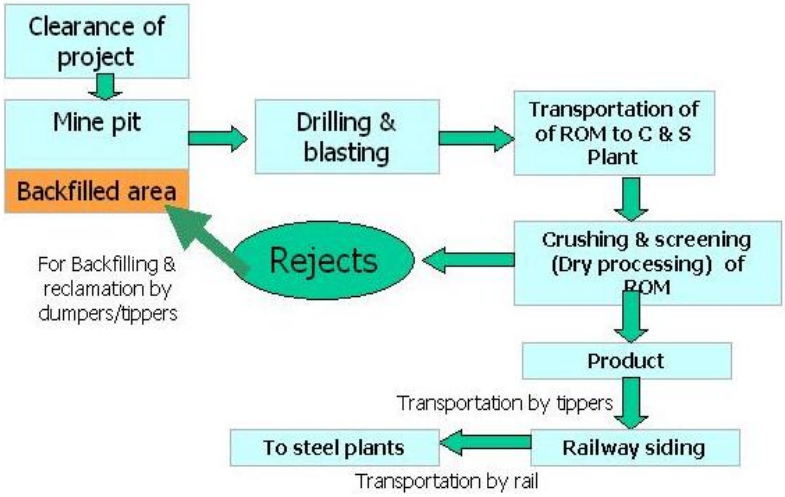
  2.5m X 3.5m X 4.0m and 3.0m X 4.0m X 4.0m depending upon strata (with additional centre holes of depth 2.5 m to 3.5 m to restrict generation of big boulders)

- Charging pattern (Burden X Spacing X Depth):-
  - Primer Charge: Cap Sensitive Slurry/Emulsion explosives
  - Column Charge: ANFO Explosives (mixture of PAN & GAN in ratio of 1:1 to 1:2 depending upon strata)
  - Deck Charge: Depending upon strata as shown in the section of hole below-
- Charge per hole
  - Main holes:-
    - Cap Sensitive explosives : - 2.78 to 4 .0 Kg
    - ANFO explosives : - 5.00 to 6 .5 Kg
  - Additional centre holes:-
    - Cap Sensitive explosives : - 2.00 to 2.78 Kg
    - ANFO explosives :- 3.00 to 4 .5 Kg
- Firing sequence: -

  Inst. Electric detonator is being used in the first row, thereafter delay of 25ms to 50 ms is provided by connecting Cord Relays

(i.e. Non electric delay detonators) between two consecutive rows. In this system, on the surface of the hole, the delay between different holes is provided by non electric connectors ensuring correct firing as per the blast design. The process reduces the maximum instantaneous charge per delay which finally reduces the ground vibration levels. Ground vibrations are regularly monitored with Minimate (Seismograph) through study of the peak particle velocity at different distances. The boulders are broken using hydraulic rock breaker.

The process flow diagram given below depicts the mining process:-



D. Year Wise Production Details

The details of year wise production for five years of proposed Modified Mining Plan period are given below:-

Year	Area to be mined	thickness of limestone	Volume	Sp. Gr.	ROM Production	Saleable Finished Product (30-80 mm) with recovery @ 45-46%
	(lakh Sqm)	(mtrs)	(lakh cum)	(t/cum)	(lakh Te)	(lakh Te)
2018-19	3.67	4.50	16.5	2.00	33.00	15.00
2019-20	3.88	4.25	16.5	2.00	33.00	15.00
2020-21	3.59	4.60	16.5	2.00	33.00	15.00
2021-22	3.88	4.25	16.5	2.00	33.00	15.00
2022-23	4.23	3.90	16.5	2.00	33.00	15.00
2018-23	**19.25**	**4.29**	**82.50**	**2.00**	**165.00**	**75.00**

There is no change in lease area. Expansion in production is envisaged through deploying efficient and high yield production machineries, increased drilling and blasting and capacity of sizing & screening plant.

Production Record

The production record during the last years since 1982 is as given below:-

Year	Production (30-80mm)	Year	Production (30-80mm)
2007-08	**7.79**	**2013-14**	**8.60**
2008-09	**8.81**	**2014-15**	**8.26**
2009-10	**8.13**	**2015-16**	**10.03**
2010-11	**7.46**	**2016-17**	**10.93**
2011-12	**11.76**	**2017-18**	**12.30**
2012-13	**8.60**		

Fig in Lac MT

E. Conceptual Mining Plan

On the basis of updated reserves of SMS grade limestone , nature of deposition of mineral limestone, structural; feature, topography, pit design etc ultimate pit limit have been delineated after detailed exploration data & continuity of limestone with available grade for steel plants within lease area.

Life of Mines

Considering to the future upcoming market demand; the proposed rate of excavation of ROM under expansion @ 33.00 Lac Te/annum (in-situ) has been consider to get optimum 15.00 lac Tonne/year production of SMS grade limestone (with recovery 44-46%) & based on this rated capacity, the anticipated life of mine w.e.f. April' 2018 works out to around 8.0 years or up to year 2025 taking into consideration of the available mineral reserves. Details of production/saleable mineral & sub grade mineral till the end of life of the mineral in lease area is given below. The mineral at rated capacity is estimated to exhaust before the expiry of the lease period i.e. before 31.03.2047.

Year (Period)	Av. Height of bench	Area	Volume	Sp.gr.	ROM Production
	(m)	(Sqm)	(cum)	t/cum	(Tonne)
2018-23	4.29	1925000	8250000	2	16500000
2023-25	2-3	1119824	1755000	2	3510000
Total		**3044824**	**10005000**		**20010000**

Year (Period)	ROM feed to crusher	Saleable Finished Product	High grade fines / by-product	Low grade fines Generated to be backfilled
	(lakh Te)	(lakh Te)	(LacTe)	(LacTe)
2018-23	165.00	75.00	19.80	70.20
2023-25	35.10	16.50	5.16	17.70
Total	**200.19**	**91.50**	**24.16**	**87.90**

Ultimate Pit Limit

The area is devoid of overburden. The hard compact limestone, which is SMS grade limestone is exposed from the top of the surface & shall be mined in complete single layer. For optimum exploitation SMS grade limestone, the total bed of SMS grade limestone (maximum upto 5.5 m only) shall be excavated and the mining shall be continued by single bench open pit mining, hence the limit of excavation shall be the ultimate pit limit upto the lease boundary (SMS grade limestone). The ultimate pit slop angle shall be maintained to 60^0 on all sides of mined out area. Total lease area is 1000 hectares & during the lease period, only SMS grade limestone is intent to mine. Further, the area is devoid of OB & SMS grade limestone is directly exposed to the surface. Thus, the ultimate pit boundary shall be SMS area exposed on the surface. However, the non-mining zone like safety zone along common lease boundary, public tar road etc which is around 65.600 hectare shall not be mined, though it is having 5.581 million tonnes SMS grade limestone. The non SMS grade limestone i.e chemical grade limestone directly exposed to the surface is covering 105.225 hectrs area. Thus, the total area intend to mine within the ultimate pit boundary shall be 828.625 hectrs.

vi) RAW MATERIAL REQUIRED ALONG WITH ESTIMATED QUANTITY, LIKELY SOURCE, MARKETING AREA OF FINAL PRODUCTS, MODE OF TRANSPORT OF RAW MATERIAL AND FINISHED PRODUCT

This is a Limestone mining project hence no as such additional raw material will be required. ROM Limestone will be transported to sizing & screening plants within ML area for production of sized steel grade limestone. Finished product (Limestone gitty) will be transported from mine to the crusher and to railway siding by Tippers for onward dispatches to steel plants by rail.

vii) RESOURCES OPTIMIZATION/ RECYCLING AND REUSE ENVISAGED IN THE PROJECT, IF ANY, SHOULD BE BRIEFLY OUTLINED.

No waste water is being/ will be discharged outside the Mining Lease Area. Rainwater harvesting will be done using excavated pit void. Water conservation will thereby increase in water table of groundwater. The area is devoid of topsoil hence no top soil shall be generated and reused.

viii) AVAILABILITY OF WATER, ITS SOURCE, ENERGY /POWER REQUIREMENT AND SOURCE

A. Water Requirement

The estimated industrial water & domestic water requirement for the project is 35 KLD & 20 KLD respectively. Total water requirement for mining expansion project will be 55 KLD. Water requirement for the above purpose would be sourced from IGNP Canal Water from Ramgarh (10 km from Project) or from PHED t/w supply from Sanu Village (10 KM from project).

Water Requirement

S. No.	Water Requirement	Total Requirement (KLD)
1	Dust suppression	35
2	Greenbelt	15
3	Drinking & Sanitation	5
	Total	**55**

B. Power Requirement

Power requirement for proposed expansion of lime stone mining project will be about 1.25 MW, which will be sourced from JVVNL(***Jodhpur Vidyut Vitran Nigam)*** and DG set will be kept standby for power requirement at site (2 DG sets of 750 kVA for standby arrangement).

ix) QUANTITY OF WASTE TO BE GENERATED (LIQUID AND SOLID) AND SCHEME FOR THEIR MANAGEMENT/DISPOSAL

A. Liquid

As the mining operation is dry no water pollution is envisaged. The domestic effluent, if any, would be treated in a cesspool and disposed off into soak pits. Hence the question of contamination of either surface water or ground water does not arise. Any adverse impact on the surface water/ground water regime is not expected from the domestic effluent.

B. Solid

The rejects in the form of inter bedded material is sub grade mineral, which is collected in rejection hopper during course of crushing and screening, will be transported back to pit by the dumper/tipper during return trips for back filling into worked out pits. Different sub-grade mineral is stacked separately, in view of its possible future use. These back filled area shall be levelled and compacted by the dozer/loader to restore the original topography of the ground.

From the experience of working it has been found that recovery of finished/saleable material around 44-46% and considering swell factor as 1.6 (maximum), ample space would always be available there in the pits to accommodate all the rejects/sub grade minerals up to the level of original ground without any difficulty.

The details of year wise rejects or sub-grade mineral shall be generated during production of steel grade limestone for five years of proposed Modified Mining Plan period are given below:-

Year	ROM feed	High grade fines / by-product		Low grade fines	Backfilling by Low grade fines
	(lakh Te)	(lakh Te)	(lakh Te)	(lakh Te)	(lakh Sqm)
(Period)		(-10mm)	(10-30mm)	(-10mm)	(-10mm)
2018-19	33.00	1.65	2.31	14.04	3.34
2019-20	33.00	1.65	2.31	14.04	3.34
2020-21	33.00	1.65	2.31	14.04	3.34
2021-22	33.00	1.65	2.31	14.04	3.34
2022-23	33.00	1.65	2.31	14.04	3.34
2018-23	**165.00**	**8.25**	**11.55**	**70.20**	**16.70**

4.0 SITE ANALYSIS

i) CONNECTIVITY

Mine site is situated at a distance of 55km from Jaisalmer town on Jaisalmer-Ramgarh Road maintained by Border Road Organisation (BRO. The existing Sanu-I mine site can be is well connected by road & approachable by jeep, bus, trailer and truck. Nearest railway station is Jaisalmer (North Western Railway) at a distance of about 60km in SEE direction from mine site. The limestone is being transported from the mine site to Jaisalmer railway station by road for onward dispatch by rail. Jaisalmer is connected to Jodhpur by a single track Broad-Gauge railway line. The nearest airport is at Jodhpur which is at an aerial distance of 300 km in SEE direction from Jaisalmer

ii) LAND FORM, LAND USE AND LAND OWNERSHIP

The total Mining lease area is 1000 ha out of which 956.75 ha area is Govt waste land and 43.25 ha area is others (Pvt Land/public road).There is no forest or pasture land in the lease area.

iii) TOPOGRAPHY & DRAINAGE

The Sanu-I Limestone Block is falling under the part of Great Thar desert & located in western part of Rajasthan. This region is characterized by flat topography with ground undulations restricted within 24 m (between 163 to 211 m above mean sea level). The flat

surface of the area is partly covered with thin discontinuous Aeolian sands with intermittent area marked by bouldery limestone outcrops.

On account of the low precipitation the water table in the area varying from 70-120 mtrs below the surface & the quality of water is saline. There is no surface water body in the area. There is no prominent nallah (drain) or stream exists in the lease area. The area is devoid of prominent vegetation except few shrubs and grasses in low lying areas. Practically the area is devoid of any drainage pattern.

The area is devoid of any type of forest land, most of the area is Government waste land, marked with studded boulders of limestone embedded in clayey soil.

iv) EXISTING LAND USE PATTERN

{AGRICULTURE, NON-AGRICULTURE, FOREST, WATER BODIES (INCLUDING AREA UNDER CRZ)}, SHORTEST DISTANCES FROM THE PERIPHERY OF THE PROJECT (up to 10 km) 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.

Total mining lease area is 1000 ha. There is no National Park, Wild Life Sanctuaries, Biosphere Reserves, Tiger Reserves, and Wildlife Corridors etc. within 10 km radius of the mining lease area. Details of Environmental settings around the mine site are given in the table below:

S. No.	Areas	Name	Aerial distance from (in km.) Core * Zone Buffer* Zone
1.	National Park, Wild Life Sanctuaries, Biosphere Reserves, Tiger Reserves, Wildlife Corridors	Nil	There is no National Park, Wild Life Sanctuaries, Biosphere Reserves, Tiger Reserves, and Wildlife Corridors etc. within 10 km radius of the mining lease area.
2.	Forest (RF / PF / unclassified)	Nil	
3.	Water bodies	IGNP Canal	About 10 km in NWW direction. There is no perennial water body flowing through ML Area.
4.	Habitat for migratory birds	Nil	

5.	Archaeological sites * Notified/ * Others	Nil	
6.	Defence Installation	Ramgarh	>10 km
7.	Industries / Thermal Power Plants	Ramgarh Gas Tapiye Vidyut Nigam	About 10 km
8.	Other Mines	Sanu-II (LSU)	Adjacent to lease boundary
9.	Airport	Jaisalmer/jodhpur	About 55 km/355 km
10.	Railway Lines	Jaisalmer	About 60 km
11.	National / State Highways	NH-15 passes through the district	>60 km
12.	Seismic Zone	Zone – III as per IS: 1893 (Part-I) : 2002	

v) EXISTING INFRASTRUCTURE

The site is well connected to SH-68 (~60 km in SEE direction) & NH-11 (~60 km in SEE direction). Nearest town is Ramgarh (~10 km in NWW direction). Nearest District Headquarter to the mine site is Jaisalmer (~60 km in SEE direction). Nearest Railway Station is Jaisalmer (~60 km in SEE direction). Nearest Airport is Jodhpur Airport (~355 km in SEE direction). Post and Telegraph, Hospital, Bank, Education and all market facilities are available at Ramgarh at 10 KM & Jaisalmer at 55 KM. Electricity is available at site through Jodhpur Vidhyut Vitran Nigam Ltd.

vi) SOIL CLASSIFICATION

As such mining lease area is devoid of top soil. However, at some places limestone is covered by thin layer of Aeolian soil. The surface soil is brown in colour with medium grain size.

vii) CLIMATIC DATA FROM SECONDARY SOURCES

The climate of the area is typically sub-tropical, dry and windy. It is characterized by large extremes of temperature and erratic rainfall. The hot weather is very prolonged and the heat during summer, which extends till the end of June is intense. During 1986, the mercury rose to 460C, while the minimum was as low as 2^0C. The mean temperature generally works out to be 24^0C while the average humidity was recorded as 65.7%. The average annual rainfall is restricted from 200-250 mm as last 20 years IMD data. Sand storms with speeds ranging from 20-60 Km/hr in summer & 6-20 Km/hr in winter are prominent for maximum part of the year. The winter months are quieter. In summer the sand raising high speed wind carry huge amount of sand & block the roads/tracks within few hours, which affect the road traffic & transport system. Due to adverse climatic conditions, the entire region is suffering a severe setback on agricultural & industrial front.

Temperature, relative humidity, wind and rainfall pattern are components of regional behavior and are not likely to be affected by the proposed limestone mining operations since it is confined to a localized area.

viii) SOCIAL INFRASTRUCTURE AVAILABLE

Nearest Town is Ramgarh ~ 10 km in NNW direction from the mine site. The site is well connected with social infrastructure facilities like medical, post office, schools, police stations etc. and as such no constraints are envisaged in this aspect.

5.0 PLANNING BRIEF

i) LAND USE PLANNING

Land area indicating the area likely to be degraded due to quarrying, dumping, roads, workshop, processing plant, tailing pond/dam, township etc: Since it is running projects, the land other than mining pit is already in use & no new land is required for any activity other than mining.

The entire mineralized area shall be put to use up to the entire life (ultimate pit) of the mine. The mined out area is concurrently backfilled & levelled by low grade rejects (fines), which is around 50 % by volume. But its swelling characteristics results backfilling covered area arrives to around 75%. Remaining mined out area shall be converted into water reservoir and voids once entire mineral is removed from the pit.

At the end of mine life, part of the mined out lease area shall be Greenbelt/plantation with 35% approx area (including area on backfilled area, along road side & along periphery of the mine site and haul roads, mine office, workshop etc) using local species in consultation of state forest department. Post mining, part area will remain undisturbed.

ii) ASSESSMENT OF INFRASTRUCTURE DEMAND (PHYSICAL & SOCIAL)

RSMML has already assessed the demand of infrastructure (Physical & Social) in nearby area of the mine site and same is being developed under corporate social responsibilities programmes. This is an existing Mine. There will be negligible additional impact as the existing infrastructure will be sufficient for the expansion project.

iii) AMENITIES/FACILITIES

RSMML is already supporting in creating additional facilities under CSR activities in the villages of buffer zone of mines & also in the distruict headquarter. RSMML is working in & around the vicinity of the company

area. RSMML is engaged in various activities viz, water resource management, Education, Health care, sanitation etc and contributing significant role for development of amenities in the society.

6.0 PROPOSED INFRASTRUCTURE

i) INDUSTRIAL AREA (PROCESSING AREA)

Proposed limestone mining lease area is 1000 ha. Expansion in limestone production capacity has been planned from 1.25 Million TPA to 1.50 Million TPA and all the required infrastructure like Mine office, VT centre, canteen etc are already available in the existing mining lease area. The crusher and screening plants & its ancillary structure are already developed at the mine site. The proposed expansion capacity can easily be accommodated with the existing infrastructure with marginal changes within the flow sheet. Capacity of Crusher & Screening plants are:

Crusher No. 1 : 2000 TPD finished product 30 mm to 80 mm

Crusher No. 2 : 3000 TPD finished product 30 mm to 80 mm

Primary/secondary crushers are toothed roll/impact crusher with different stages of screening attached with conveying system to store & load of mineral through bins into tippers.

ii) RESIDENTIAL AREA (NON- PROCESSING AREA)

No Residential area is planned near mines. The employees will stay at existing Township in Jaisalmer or will come from nearby villages.

iii) GREEN BELT DEVELOPMENT

Plantation has been developed in the Mining Lease area. The plants planted in the area are Neem, Shisham, Kikar Khejari, Rohida, Babool,Jal, Sares, Kumbat, Juli flora etc. The plantation has been carried out around office complex, around crushing plant, along haul road/tar road, in backfilled area etc. Total 135.92 Hectares area is covered under plantation work as on March 2017.

The same will be maintained and enhanced in future. By the end of lease life, Greenbelt/plantation will be covered up to 35% of total lease hold area (including backfilled area & lease periphery of the mine site, along the roads, mine office etc). Local species will be planted after consultation with local forest officer and as per CPCB/RPCB guidelines.

iv) SOCIAL INFRASTRUCTURE

Proposed expansion project will result in growth of the surrounding areas by increased indirect employment opportunities in the region

including ancillary development and supporting infrastructure. The project has also/ will also have its entire established social infrastructure for its employees as well as for the local community.

v) CONNECTIVITY

The site is already well connected by road to state & national highway at the distance of around 60 KM. Its district head quarter has all the infrastructure facilities like BG rail link, state & National Highways, air connectivity etc. The mine is well accessible by public transportation system. Its connecting road is well maintained by BRO. Post and Telegraph, Hospital, Bank, Education and all market facilities are available at nearby town i.e. Ramgarh a sub-tehsil (10 KM from Mines).

vi) DRINKING WATER MANAGEMENT (SOURCE & SUPPLY OF WATER)

Total water requirement for this expansion project will be 50 KLD which will be sourced from IGNP canal located 10 KM from Mines near Ramgarh and also from Sanu PHED t/ws. The water shall be transported by water tanker & stored at mines in water reservoirs for further use.

vii) SEWERAGE SYSTEM

The domestic waste water generated from mine office is being/ will be disposed off in soak pits via septic tanks.

viii) INDUSTRIAL WASTE MANAGEMENT

The mining process is totally dry, no liquid effluent will be generated hence no adverse impact on surface water is anticipated. Hence there will not be any adverse impact either on the quality or quantity of ground water.

ix) SOLID WASTE MANAGEMENT

Since the area is devoid of overburden, the mineral rejects is absent. The sub grade mineral is generated during dry processing of ROM from sizing & screening plant. Part of this is being dispatches to steel plants for sintering purpose & also in thermal power plant in de-sulphurisation process. The low grade fine is concurrently backfilled in the mined out pit & levelled. This backfilled area will have plantation activities using woody plants.

x) POWER REQUIREMENT & SUPPLY/SOURCE

Total Power requirement for limestone mine will be 2.5 MW which will be sourced from Rajasthan State Electricity Board.

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 laborers (brief outline to be given)

The total Mining lease area is 1000 ha. Mining is restricted to government waste land. Proposed expansion will take place within the existing ML Area. Since, it is an existing mine and there is no habitation in the lease area, therefore rehabilitation & resettlement plan is not required/ applicable.

8.0 PROJECT SCHEDULE & COST ESTIMATES

i) Likely date of start of construction and likely date of completion

This is an existing mining project & expansion in production capacity will be done after obtaining all statutory clearances & consents from the concerned regulatory authorities.

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

The existing cost is 10.00 Crore and project cost for expansion will be Rs. 2.00 Crore. Total cost after expansion will be 12.00 Crores.

- Estimated Capital Cost of the Project : Rs 12 Crores
- Cost of Production : Rs. 620 / tonne
- Sale Price : Rs. 750 / tonne

The demand supply relation is adequate for supply. The expansion project is economically viable based on preliminary study of cash flow forecast. The mine shall be contributing every year to the State and Central Govt. exchequer by way of mining revenue (Royalty, DMF & NMET) , GST etc after the expansion project.

Expenditure Proposed for Environmental Protection Activities (Water Sprinkling, green belt development, Environment monitoring & management, land levelling):

- Capital cost - Rs. 0.25 Crores/-
- Recurring cost - Rs. 10 lacs /annum

9.0 ANALYSIS OF PROPOSAL

Expansion in Limestone production capacity will result in growth of the surrounding areas by increased indirect employment in the region including ancillary development and supporting infrastructure.

Development of social amenities is being/ will be done in the form of medical facilities, education to underprivileged children in village areas and better sanitation facilities. No major adverse effect on environment is envisaged as the required mitigation measures are inbuilt in the project. Expansion project will create direct & indirect employment opportunities which shall be extended to the local people of the area.

There would be many indirect employment opportunities from the expansion project in the form of contractual jobs/works, service facilities, horticulture, housekeeping, building maintenance, rental vehicles and utility stores etc. Moreover, employment opportunities shall also be created due to transport of mineral etc.

However, in last few years, Company has undertaken various development activities under CSR/ESC for social benefits of the locals such as construction of village roads, Financial aid for tube well drilling and submersible pump, construction of classrooms and distributions of free stationeries & furniture to village school, skill development by imparting training to the students for computer operations, construction of toilets, organization of free medical camps, aid to the primary/district Health centre for facility expansion, distribution of sports material etc.

Based on the Need based Assessment, skill development program shall be taken up for the betterment of the locals.

10.0 CONCLUSION

It is predicted that socio-economic impact due to this project will positively increase the chance of more employment opportunities for local inhabitants. There are no Resettlement and Rehabilitation issues involved in this project. The project infrastructures will be of use to people of the area. The revenue of the State Govt. will be definitely increasing due to the proposed activity. The entire project area is devoid of any endangered flora and fauna. At the end of life of the mine, part of the area would be backfilled by concurrent backfilling process & levelled followed by plantation activities and remaining mined out area is proposed to convert mined out pit into water reservoir and develop green belt around the mined out pit. Thus, the proposed project is not likely to affect the environment or adjacent ecosystem adversely.