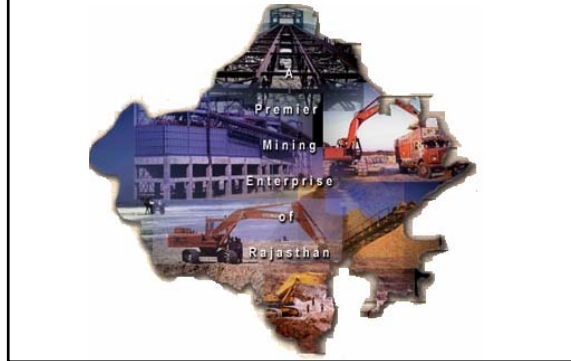


**GYPSUM MINING IN WESTERN RAJASTHAN
BY RSMML : AN EFFORT TO MAKE MINING
COMMUNITY FRIENDLY IN THE THAR
DESERT**

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RAJASTHAN STATE MINES & MINERALS LTD.
(A Govt. of Rajasthan Enterprise)



INTRODUCTION

➤Rajasthan, a state of rich cultural heritage , also enjoys the premier position in the Mineral wealth of our country

➤Deposits of various minerals are scattered all over the state and mining industry plays an important role in the state economy. Rajasthan produces 66 minerals.- Asbestos, Bentonite, Calcite, Copper, Dimensional & Decorative stones, Emerald, Felspar Gypsum, Lead, Limestone (Cement grade and SMS grade), Lignite, Mica, Natural gas, Rock Phosphate, Silica Sand, Soap stone, Talc, Tungsten, Wollastonite and Zinc.

➤In Western Rajasthan, the Thar Desert, People are living a tough life due to scarcity of water and lack of basic infrastructure. But nature has blessed this area with huge reserves of mineral Gypsum and more than 90% of the country's demand of mineral Gypsum is being fulfilled from this region.

➤Rajasthan State Mines & Minerals Ltd, a Govt. of Rajasthan Enterprise, the largest producer of mineral Gypsum of the country has taken initiative to make the Gypsum mining in the Thar Desert, community friendly

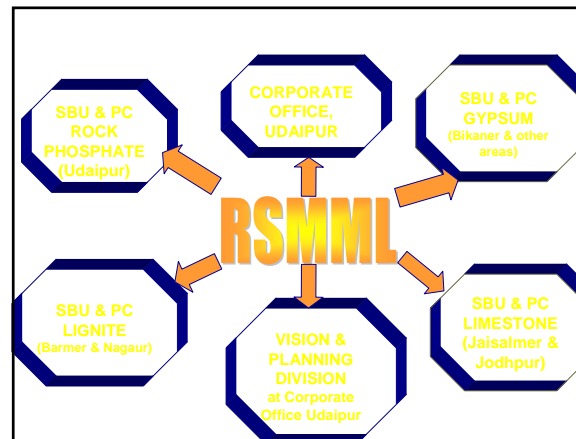
COMPANY PROFILE

➤Rajasthan State Mines & Minerals Ltd. (RSMML) is one of the leading and progressive undertaking of the Rajasthan State Govt. All the performance indices of the company have shown a steady upward trend over the last few years.

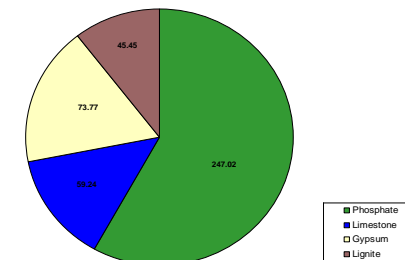
➤RSMML has attained a high rank in the field of mining of non-metallic minerals viz. Gypsum, SMS Grade Lime Stone , Rock Phosphate, Green Marble and it is not only the largest producer of Gypsum, SMS Grade Lime Stone , Rock Phosphate in India but also a global pioneer in technology in open cast mining and mineral beneficiation of carbonate Rock Phosphate.

➤Recently a Wind Power generation plant of 9.8MW capacity has been installed near Jaisalmer reflecting our commitment to develop non-conventional energy resources.

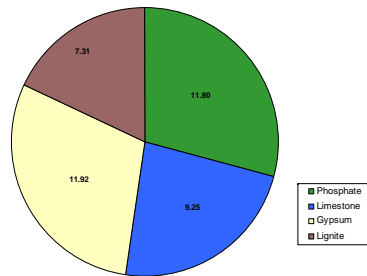
➤Social efforts of RSMML, quietly and and without fan fare, are focused **TO ASSIST THOSE WHO NEED IT THE MOST.**



**Comparative Revenue of Different
SBUs
(Budgeted 2003-04 in Crores Rs.)**

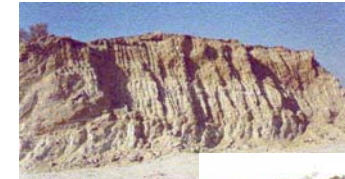


**Comparative Profitability of
Different SBUs
(Budgeted 2003-04)**



MINERAL GYPSUM

- Gypsum is a non-metallic mineral of great economic importance.
- Gypsum is a hydrous sulphate of calcium: $\text{CaSO}_4\cdot\text{H}_2\text{O}$
- Pure Gypsum is colourless to white but owing to admixture with impurity it may grey, brown, red or pink in colour.
- It is soft mineral with hardness 2 (mho's scale)
- Different varieties: Amorphous, Fibrous, Crystalline.
- Crystalline variety of Gypsum, transparent tabular crystals, is called Selenite.
- Average grade:
 - Gypsum : 70% $\text{CaSO}_4\cdot\text{H}_2\text{O}$
 - Selenite : 95% $\text{CaSO}_4\cdot\text{H}_2\text{O}$



GYPSUM BED

USES OF GYPSUM

- In Cement Industry – As a retarding agent 5% by weight mixed with clinker
- Plaster Industry – Plaster of Paris, Surgical grade Plaster is made by high grade Gypsum
- Gypsum Boards – In construction, Gypsum boards are widely used for roofing, wall surface, partition etc.
- As a fertilizer: powder Gypsum is used as soil conditioner for alkaline soils.

OUR CUSTOMERS

GYPSUM

Gujarat Ambuja Cements Ltd.
ACC – Lakheri, Galal,
Maihar, Satna
Vikram Cements, Khor
Aditya Cements, Shambhupura
Shree Cements Beawar
Binani Cement Sirohi
J.K. Cement Nimbahera
Birla Cement Chittorgarh
J.P. Rewa

POWDER GYPSUM

Uttar Pradesh Bhumi Sudhar Nigam
Haryana land Development & Reclamation
Indian Potash Limited
RAJFED
PPCL

SELENITE

Plaster of Paris Industry
Hindustan Sanitary Wares
Madhusudan Ceramics
Birla White Cement
J.K. White Cement

LOCATIONS OF VARIOUS GYPSUM MINES

Gypsum deposits are located in Bikaner, Sri Ganganagar, Hanumangarh, Barmer, Jaisalmer Districts.

District	Mine
Bikaner	1. Ballav Gypsum Mine
	2. Badrasar Gypsum Mine
	3. Lunkaransar Selenite Mine
	4. Kishanpura Gypsum Mine
Sri Ganganagar	1. Deshli Gypsum Mine
	2. Sekhra Gypsum Mine
Hanumangarh	1. Purabsar Gypsum Mine
Jaisalmer	1. Nachna Gypsum Mine
Barmer	1. Thob Selenite Mine

Location of Gypsum deposits & their development



ANNUAL PRODUCTION OF GYPSUM / SELENITE

<u>YEAR</u>	<u>PRODUCTION</u>
2000-2001	10.50 LAC TONNE
2001-2002	14.00 LAC TONNE
2002-2003	12.5 LAC TONNES

GEOLOGY

➤ Gypsum deposits are surficial deposits with thickness of 1.00 M to 5.0 metre and have large lateral extent scattered all over the Western Rajasthan. Some of the places Gypsum out crops and some places it is burried under soil cover.

➤ Gypsum deposited in the form of evaporite in the recent past i.e. quaternary period. The Western Rajasthan, part of Thar Desert, had intensed transgression of sea on the land mass. After regression of sea from the land mass sea water was left behind in small closed basins. Evaporation of water from these closed basins resulted in the formation of Gypsum deposit.

➤ Gypsum deposits are flat, free from any Geological disturbances. Some times a thin clay band can be observed as interburden or earth pockets of considerable volume embedded in the Gypsum mass.

METHOD OF GYPSUM MINING

Land Acquisition: Since most of the gypsum bearing land is owned by private farmers. RSMML temporarily get transfers the surface right of the land with respect to individual farmer on certain terms and conditions.

RSMML pay compensation for land as well as crop to the respective farmer on the basis of quantity of gypsum excavated from his land. Each farmer get around Rs. One lakh per hectare of the mined out land.

RSMML after mining of Gypsum returns this land to the original land owner with backfilling and perfect leveling of the land. It has been confirmed that this results in increase in the crop yield upto 100-150% and thus further strengthening the economic status of farmer.

If part of the land owned by the farmer is not irrigated due to sand dune, these sand dune are further backfilled and leveled in the mined out void hence farmer enjoys the better land use of agriculture.

Major crops of the area are: Wheat, Cotton, Groundnut, Mustard, Gwar, Bajra, Barley.



REMOVAL OF TOP SOIL



DIRECT EXCAVATION OF GYPSUM AND LOADING INTO TRUCKS DEPLOYED BY THE CONSUMER



Backfilling & leveling of mined out area

METHOD OF GYPSUM MINING

Gypsum being a soft mineral is excavated easily by hydraulic excavator without drilling & blasting in a single bench.

Where Gypsum bed is covered by sandy soil, alluvium, this is removed exposing the Gypsum bed. This top soil is simultaneously back filled in the mined out area and levelled to make the land suitable for agriculture. Thus the humous & nutrient top soil is preserved.

For the transportation of Gypsum up to the nearest rail head tippers/trucks of carrying capacity 15-35 tonnes are deployed.

Cement Plants, located in Rajasthan / Himachal Pradesh are deploying trucks to lift Gypsum direct from the mines.

HEMM used in Gypsum Mining

- i) Hydraulic Excavator (BACKHOE – 0.9m³) – 135 HP
- ii) Tippers/Trucks (15-35 Metric Tonne)- 110 HP
- iii) Tractor with Scrapper Blade Attachment / Dozer – 50-75 HP

CONCURRENT RECLAMATION

- The top soil is removed and Gypsum bed is exposed.
- This soil is concurrently backfilled and leveled in the mined out area.
- If the land belongs to private farmer, after mining this leveled land is returned to the original owner for agriculture.
- It has been observed that farmers enjoys an increased crop yield after mining of gypsum.
- More over, the area which was not irrigated (Un Command land) earlier under Indira Gandhi Nahar Project due to sand dune or barren land, after mining as the mined out area is backfilled and leveled perfectly it becomes more amenable to agriculture and irrigation.(Command land)

BARREN LAND: PRE MINING LAND USED

POST MINING LAND USE: AGRICULTURE WITH INCREASED CROP YIELD

POST MINING LAND USE: AGRICULTURE WITH INCREASED CROP YIELD (cont...)



POST MINING LAND USE: AGRICULTURE WITH INCREASED CROP YIELD (cont...)



ENVIRONMENT MANAGEMENT

Environment friendly Gypsum mining is carried out without drilling, blasting and the mined out area is concurrently backfilled and leveled with the top soil and returned to its original land owner for agriculture use.

LAND: Thus barren land or an agriculture land with low crop yield due to presence of Gypsum bed does not allow percolation of water and increases contents of sodium salts. By mining out the Gypsum bed below the soil cover the surface become porous and alkalinity also drains down making the top soil fertile. It results in increase in crop yield.

AIR: Continue sprinkling of water on the haul road reduces the dust generation.

WATER: As water table is below 45 m hence mining of gypsum no way affects the ground water. Rainfall is also very low in the region(250 mm per annum).

NOISE: The noise level increases in the core zone due to operation of HEMM in the core zone that to within the standard noise limit. No significant impact in buffer zone.

SOCIO-ECONOMIC DEVELOPMENT

Gypsum mining in the Thar desert improves socio-economic status of the local people as mining results in generation of direct or indirect employment to them in many ways.

RSMML apart from contributing to the state economy, has also initiated several steps for the upliftment of local community by providing them basic facilities e.g. Road, Water supply, Housing, Education, etc.

RSMML is providing financial assistance – 100% to the local Gram Panchayats of Gypsum Mining area for the construction of School Buildings, Community Hall, Bus stands, Water Reservoirs etc.

YEAR	AMOUNT INCURRED TOWARDS SOCIO-ECONOMIC DEVELOPMENT
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2001-2002	Rs. 15.85 lac
2002-2003	Rs. 25 lac

RSMML has also developed **village co-operative societies** in Gypsum Mining area and providing them direct participation in Gypsum production and ancillary works to **earn as well as learn**.

PROJECT UNDER IMPLEMENTATION

- ❖❖ Lignite Mining Project at Kashnau Matasukh near Nagaur for annual lignite production of 10-12 lac tonnes.
- ❖ ❖ Development of Phosphate rich Organic Manure (PROM), a mixture of high grade Rock Phosphate and waste organic material like farm yard manure, oil cakes & fermi compost, green manure, press mud sugar industries, pomace from juice industries as a substitute of costly chemical fertilizers.



WIND MILLS GENERATING POWER NEAR JAISALMER

CONCLUSION

It is a general perception that mining damages not only the social and cultural heritage of the community living around mineral rich regions but also disturbs, damages the environment.

RSMML has denied this perception with proper planning and development of Gypsum mines taking into account the environmental and socio-economic aspects and the increase in the crop yield of mined out area, upliftment of the socio-economic status reflects our efforts.

THANK YOU..