Mineral Resources of Bhilwara

1. Introduction

It is not recorded as to how the name of Bhilwara was ascribed to the area, which now forms the district. Tradition has it that it came to be known as Bhilwara because it was mostly inhabited by Bhils, in old days. Then these Bhils were eventually driven away towards the hill tracts.

The District Bhilwara is situated between latitude 25[°] 1' and 25[°] 58' and longitude 74[°] 1' and 75[°] 28' east of Greenwich. It is bounded in the north by Ajmer district; in the northwest and southwest by Udaipur district and south and southeast by Chittorgarh district and in the east and northeast by Bundi and Tonk district. It occupies an area of 10458 sq kms and the district head quarter Bhilwara is well connected by rail on Ajmer-Ratlam Section of western railway and by road on state highway No. 4 passing through district and connecting it with other important places.

As regards mineral potential, this district has attained national importance after the discovery of a rich Zinc-Lead deposit near village Rampura-Agucha by the State Department of Mines & Geology, Rajasthan. Discovery of this deposit has significantly augmented the reserve position of lead and zinc ore in the country. The deposit has a reserve of about 61 million tones of lead and zinc ore having metal content of about 13.48% zinc and 1.93% lead. This deposit is proposed to be developed for a production of 2500 TPD of zinc and lead ore to provide a reliable and economic source of zinc and lead connect rates for the new zinc-lead smelter having a capacity of 70,000 TPA zinc and 3500 TPA lead proposed to be established by M/s Hindustan Zinc Ltd. at Chanderi in Chittorgarh district. The other minerals, which are being produced in the district, are mica, soapstone, marble, garnet, clays, asestors, beryl, felspar, dolomite, building stones, etc. The production of various minerals and their status in comparison to Rajasthan's total production is tabulated in Annexure-I.

Review of Annexure-I reveals that during the year 1985 Major Mineral Commodity produced from this district is Mica which is about 98% of the total production of mica in Rajasthan. Other minerals produced in bulk quantity are soapstone, china clay, sandstone, masonary stone, etc.

During the year 1987-88 this district contributed Rs. 2.32 crore in terms of royalty, which is 4% of total revenue collected from minerals in the state. The revenue figures of Bhilwara district from 1972-73 to 1987-88 are tabulated in Annexure-II.

At present there are 222 mining leases for major minerals, 238 mining for minor minerals, 3785 R.C.R.L. in the district. Mining activity in the district has generated employment avenues for nearly 12,000 persons. About 40 mineral based industries are under operation, the details of which are tabulated in Annexure-III.

II. Physical Features

The area has a rugged topography formed by hills and valleys. The topographic variations are mostly due to the lithological difference in the constituents of rocks. The gneisses, phyllites and schist generally formed soft crumbling outcrop, scarcely rising above the ground level. Dolomite, quartzite, granites forms high hills with steep, narrow and parallel ridges. The general slope of the district is from west to east. The district has a hot dry summer and a bracing cold season. Average minimum temperature is 15° C and maximum 30° C in summer. The maximum temperature reaches up to 45° C in May and June. In winter around December and January temperature goes down to 4⁰ C. The average rainfall of the area is 75 cm. The relative humidity is as low as 20% during summer months, while it increases up to 60% during monsoon months. The general wind directions are from west to southwest during monsoon season, in post-monsoon and winter seasons the winds are from west to south, while during the summer the winds are from northwest to southwest. Vegetation in the area is generally poor. Although small patches of wooded area exist in the hilly portion. The common trees found are Babool, Mahuva, Nim, Mango, Dhak, Bar, Kher, Tendu.

Various types of thorny bushes grow in the hill slopes. The general ground level of the district is 380 meters above MSL. The highest hill is 581 mts. Daragarh hill near village Banera. The principal rivers flowing through this district are Banas and its tributaries namely Berach, the Kothari, the Khari. Other small rivers are Mansi, Menali, Chandra Bhage. Wheat, gram, maize, cotton, opium are main crops produced in the area.

III. Geological Setup

The important rock types of this district are Pre-Aravalli metamorphites and gneisses, which were intruded by basic and acidic rocks. Later the rocks of Vindhyan age comprising sandstone, shale and limestone were deposited between 600 and 1000 million years age (this were assigned by Dr. Heron). In recent years Pre-Aravallies have been redesigned as Bhilwara Super Group following the code of stratigraphic nomenclature of India (After Krishna Swamy 1981). Bhilwara Super Group comprises of complex assemblage of meta semipelite, quartzite, conglomerate, metagraywacks, metaprotoquartzite, marble, dolomite, calc schist, calc-gneisses, para-amphibolite, synsedimentitional basic meta volcanics, migmatite, composite gneiss, granite, granite-gneiss, granulitic rocks, granodiorite, charnokite, norite and ultramafics. The boundaries of Bhilwara super group are defined by erosional unconformities. This is ever lain by the Aravalli Super Group in west and southwest, Delhi Super Group in the northwest, Vindhyan sediments in the east and Deccan Traps in southeast. The base of the Bhilwara Super Group is not exposed but it concealed under the Vindhyans.

The general stratigraphic succession given by Geological Survey of India is as under:-

General Strateg	raphic Succession of Bh	iilwara Super Group Uncl	assified Granites
C	and Ba	asic Rock	
BARISADRI	RANTHAMBHOR	MANDALGARH	FORMATION
FORMATION	GROUP		
	HORA		
	FORMATION		
	BERACH GRANITE A	AND GNEISS (2585 M.Y.)	
Jahazpur Group	Rajpura-Dariba Group	Pur-Banera Group	Sawar Group
Chuleshwarji	Satdudhia Formation	Samodi Formation	Morhi Formation
Formation			
Jhikri Formation	Sindesar Formation	Tiranga Formation	Ghatiali Formation
			Giyangarh
Umar Formation	Dariba Formation	Rewara Formation	Asind
	Malikhera Formation	Pur Formation	Acidic
			Rock
Instrusives	Untala Gingal Granities (2950 🗕 150 M.Y.) Raipur Jalayan Ultra		
		Mafic	Rock
		Mafic	Rock
Hindoli Group	Mangalwar Complex		
Nangauli Formation	Potla Formation	Rajmahal Formation	
Sujanpura			
Formation			
Bhadesar Formation		Suwana Formation	Sandmata Complex
Lasaria Formation	Kekri Formation	Sarada Formation	Berach Formation
		Samplessante Eannastis	Daonor Formation
		Samonugarn Formation	

IV. Mineral Resources:

A- Metallic Minerals

1. Rampura-Agucha Zinc-Lead Deposit

The Rampura-Agucha prospect is connected by 15 kms. fair weather road from Gulabpura. Gulabpura Ryl. Station is 60 Kms. from Bhilwara. In the year 1978-79 Department of Mines & Geology, Rajasthan discovered this largest deposit of zinc and lead in the country near village Rampura-Agucha. After preliminary prospecting this deposit was leased out to M/s Hindustan Zinc Ltd. and the intensive exploration work is being done by this organization. In this area seen in a strike length of 1.5 kms. The rock type comprises quartz-biotite-schist, fels pathic quartzite, amphibolites, calcilicate rocks and granite gneisses. As a result of exploration, mineralisation has been proved in strike length of 1 kms. and ore reserves of the order of 61 million tones of zinc and lead ore having metal content of about 13.48% zinc and 1.93% lead have been proved. The ore can be produced by open cast mining. The mineral station is mainly associated with quartz-biotite schist, which is persisting beyond 100 mts. vertical depth. The discovery of this deposit in a new geological environment which was hitherto not considered conducive to basemetal mineralisation has thrown open new possibilities of finding additional reserves of zinc and lead. This deposit is proposed to be developed to a possible production capacity of 2500 TPD zinc and lead ore to provide a reliable and economic source of concentrate for the proposed zinc and lead smelter with capacities of 70,000 TPA zinc and 35,00 TPA lead.

2. Pur-Banera magnetite Deposit

During the year 1969-70 Geological Survey of India had prospected this deposit along with exploration for basemetals. The banded magnetite-quartzite and ferruginous carbonate rocks inter layered with mica schist occurs as persistent horizon and are exposed along a series of discontinous ridges in Pur-Banera in Bhilwara district over a strike length of 29 kms. The possible reserves of magnetite quartzites and the associated ferruginous carbonate rock are estimated to be about 45 million tones up to general ground level and 522 million tones to a depth of 50 mts. below the ground level. These are expected to contain 16 MT and 172 MT of magnetite averaging 33% iron and 2.48% SiO2. The deposit is of low grade but is amenable to benefication by magnetic process. It can be mined independently or along with the basemetals, the economic aspect of which is required to be considered.

3. Pur-Banera Lead-Zinc-Copper Deposit

Deposits of lead, copper and zinc have been located in the Pur-Banera belt in Pre-Aravalli rock extending over a length of 30 kms and in a width of 5 kms. The Pur-Banera block contains indicated reserves of 1.65 million tones of ore with 1.05% copper. Further Samodi, Dewas and Devpura blocks carry reserves of the order of 14.13 million tones of low-grade ore containing 1.5% to 2% zinc and 1.2% lead.

B. Non-Metallic Minerals

1. Soapstone

In Bhilwara district, the soapstone belt extends from Ghevaria to Bhani-Khera and Cahinpura. There are five working deposits in this belt of which largest is near Ghevaria. The soapstone occurs in three parallel zones striking NE-SW, the middle zone is prominent. This middle zone is exposed over a length of about 1 kms. The talc occurs as-lenses and lenticular pockets of varying thickness form few meters to 30 meters. The talc is confined to dolomitic limestone. The present excavated depth is about 25 meters and soapstone seems to be persisting at more depth. Talc is generally of snow-white colour, occasionally pale green and gray varieties are also seen. Talc is foliated, compact and massive variety occurs in small portion is confined to deeper sections of talc bodies. At Ghaveria mine talc is of high grade. A total reserve of 2.5 million tones of soapstone has been assessed by I.B.M. During the year 1986 the total production of soapstone was 47899.15 tones, which was 15% of Rajasthan's total production (313002.52 tones). 29 mining leases of soapstone are existing at present and there are six grinding and pulverizing units under operation. About 950 persons are employed in soapstone mining in the district.

2. Mica and Felspar

The Bhilwara district is prominent through out the country as a mica-mining centre in Rajasthan. About 98% of total production of mica in Rajasthan during the year 1986-87 was shared by this district alone. It is one of the important major mineral of district from the point of view of production, value and the royalty. Mica is mined at over 20 localities. Important centers are Bhunas, Danta, Tunka and Pratapura. Bhilwara mica belt extend from E to W covering Bhilwara Deoli, Tonk which is one of the three parallel mica belts of Rajasthan. Another belt runs from Konaria-Gangapur of Mandal and third from Kankroli to Kishagarh. The total production of mica during 1986 was 683.29 tones from Bhileara district. At present 114 mining leases for mica exist. Three mica powder manufacturing units, 4 mica cutting and processing units and 8 mica insulators and brick-making units are operating presently in the district. Felspar is obtained along with mica near Damartia. During the year 1986, 14406.0 tones of felspar was produced from this district. There is only one independent mining leases executed for felspar.

3. Garnet

Bhilwara district occupies an important position in the production of garnet (abrasive and gem variety). About 84% of the total Rajasthan's production of crude garnet and 35% of total Rajasthan's production of gem and semi gem garnet is shared by this district. Important occurrences are found at Kadnabpura, Rupaheli, Agucha, Koduta, Deori and Samodi. Presently 16 mining leases are granted for garnet. There is scope for the establishment of garnet processing units and garnet coated abrasives paper industry in Bhilwara.

4. Limestone

Extensive deposits of cement grade limestone of vindhyan formation occur in mandalgarh-Ladpura are near Bhargi Ka Khera and Ratiya-Khera in Bhilwara district. The limestone belt extends for a strike length of 28 kms with varying width from 200 mts to 2 mts. On the basis of extent of limestone deposit lying in this belt over Shamgarh, Ladpura and Daulji Ka Khera, a reserve of about 100 million tones of cement grade limestone have been inferred which is sufficient to support a cement plant of about 5 lakh tones annual capacity. The investigations carried out by the department in Shampura limestone belt, indicated CaO content varying from 42% to 47%, silica and acid insoluble vary from 10% to 16% and MgO content from 1% to 4%. This limestone can also made suitable for cement making by adding appropriate sweetener.

5. Clay

A-Man group Clay Deposit

The clay deposit is located near village Mangroup in Bhilwara district. It is situated at about 30 km. south of Bhilwara town. The nearest railway station is Hamirgarh. The clay is grayish white in colour and is soapy in touch. The thickness of clay horizon is 1 meter to 1.3 meter. About 0.90 million tones reserve of clay have been assessed. The chemical analysis of a few samples have shown 33.63%

AI2 O3 1.17% Fe2 Oc, 43.80% combined silica 3.37% free silica, 2.50% TiO2, 0.92%, MgO, 0.12% CaO, 0.06% K2 0.25% Na2 O and 10% LOI. Few tests conducted by national level laboratory indicate that this clay is suitable for ceramic industry.

The deposit is located 3 kms. SW of Bhadupur village, which is 66 kms. NE of Bhilwara town. The clay is grayish-white in colour. The overburden is about 1.6 mts. This seems to be a very small deposit of clay.

6. Asbestos

Asbestos occurs in ultrabasic rocks near Barana-Sulwara in Asind tehsil. A reserve of 10,000 tones of asbestos has been estimated. During the year 1984, 14 tones of asbestos were produced from the district and state has earned revenue of Rs. 10,600 from this mineral. At present four mining leases of asbestos are esixting in the district.

7. Beryl

Rajasthan is the principal beryl producing State in India. Beryl occurs in mica pegmatities in Ajmer, Udaipur and Bhilwara districts. In Bhilwara district occurrences have been recorded at Triohli, Bhunas, Jampura and Deora. It is an important radioactive mineral and also used in chemical industry.

8. Building stone

Among the building stone, this district is producing sandstone, masonary stone, limestone and bajri in bulk quantities. There are about 238 mining leases of minor minerals and 3785 R.C.R.L. Bijolia is the main center for producing sandstone was produced in the district fetching the revenue of Rs. 126.68 lakhs during the year 1986-87. Importance boundaries of sandstone are located near village Jhaleri, Bania Ka Talab, Kasia, Aroli, Kesharpura, Nala Ka Mataji, Shambhupura, etc. Departmental core drilling operations are being conducted in this area to acertain the depth persistence of splitable sandstone horizon.

Marble occurs near Manohargarh in Jahajpur tehsil of the district. It is fine grained and brownish in colour. There are 16 mining leases of marble in the district. During 1986-87, 1990 tones of marble was produced and a revenue of Rs. 88,400 was earned.

About 1 lakh persons are being employed annually in building stone mines and state has earned a revenue of Rs. 138.58 lakhs from minor minerals during 1986-87.

9. Other Minerals

Occurrences of barites have been located near Barliyas and 1600 tones reserve have been indicated containing 80-90% BaSO4. Minor occurrences of fluorite have been reported near Asind Pyrophyllite occurs near Kachola tehsil Mandalgarh. Deposits of dolomite occurs near Mandoal, Geol, Semer, Kosithal, etc. There is a one mining lease of dolomite near Koshithal. Silica sand occurs near village Baval and one mining lease exist in the district.