

## 5. World Deposits and Reserves

### 5.1 WORLD DEPOSITS

The mineral barytes has a fairly abundance distribution in the commonwealth countries often in association with metallic compound. It is reported to be associated with copper and silver-lead minerals. Pure barytes with over 92 percent of  $BaSO_4$  is found in lodes at Running Creek and elsewhere around Kilkivan. Most of the deposits are among middle and older palaeozoic rocks and commonly found associated with galena, pyrite and limonite. Lenses and small veins of barytes are found in Devonian rocks in the vicinity of lava, east of Mudgene. They are apparently in part fissure lodes and in part replacements of shales and sandstones and they may be related to an adjacent intrusion of quartz porphyry<sup>(1)</sup>.

Near Kitzbuhel(Tyrol) widespread barytes was mined for some time and the barytes, which occurs in Devonian dolomite, is linked to the 'Spielberg Dolomite'(Devonian), mostly assumed to be a primary sedimentary deposit with subsequent concentration by lateral secretion in Late Hercynian (upper carboniferous permian). There are many localities of large crystals of barytes. Most of the fine crystals of baryte occur in metal sulphide veins of Kurko type deposits. Wide varieties of crystal habits have been reported. Commonly observed habits are platy, rhombus, six-sided or eight sided forms depending on the combination of faces.

#### (1) China

China is the largest producer of barytes with an output of about 1.81 million tonnes in 1992 and is undoubtedly the number one exporter<sup>(9)</sup>. The deposits are seemingly high quality easy to work, with large reserves. Some mines are located at Tangsham in Acbaci province, Hwastan in Shandong, Hsulgen in Kwangsi and Linchuan in Klangsi<sup>(10)</sup>.

#### (2) United States of America

In USA barytes is mined in Nevada, Missouri, Arkansas, Alaska, Georgia, Idaho, Illinois, Montana and Tennessee. The Baroid division of N L Industries Dresser Industries Inc., Nilchem Inc., and IMCO services are involved in exploration for new resources in Nevada, Missouri, Arkansas and other states.

The Baroid division of NL Industries Inc. produces barytes from domestic resources of Magnet core, Arkansas, the Dunphy mine of Battle mountain, the Fountain Farm mine at Potosi, Missouri and at Sweetwater, Tennessee. Dresser minerals, the mining subsidiary of Dresser Industries Inc. has two principal operations in the USA. The extensive Milchem county deposits have been known for more than a decade, although their exploitation suffered a long delay due to the remoteness of the reserves. Milchem has also continued exploration of the Paney Hill barytes deposit in Montgomery county, Arkansas.

New Riverside Ochre Company barytes mines near the city of cartersville in Georgia, process the crude ore to chemical grade specifications. Thompson Weinman and Company a subsidiary of Cyprus Mine Corporation also mine barytes in the same region near Carterville. Chemical treatment of the ore is carried out at the company's nearby plant to produce pigment and filler grades for the paint, plastics, rubber and paper industries. Barytes is also produced in the Illinois, Kentucky fluorspar district by Allied Chemical Corporation through its Minerva Mines Division. Barytes concentrate is produced as a by-product of fluorspar, lead and zinc flotation at Cavein Rock, Illinois.

### (3) Commonwealth of Independent States (CIS)

According to available data Kazakhstan, Bulgaria and Romania were the principal producers with Georgia, Slovakia and Poland contributing sizeable amounts whilst smaller quantities came from Albania, Armenia, Bosnia and Croatia. Russia was planning to solicit foreign investment for development of the Khoilinskoye barytes deposit with reserves estimated at 10.0 million tonnes with over 84 percent barytes content. Barytes production at Khoilenskoye was projected to reach 1.6 million tonnes per annum (tpa) by 1999. The feasibility study envisaged exporting about 55 percent of the barytes output.

### (4) Morocco

In Morocco, Company, barytes is mined from two established underground mines at Chemaia in Safi and Benitadjite in Errachidia. Morocco minerals started exploiting a new deposit in 1991 in the Midelt region. S.A. Cherifiene d' Etudes Mineres (Sacem) has a large barytes deposit at Taza with reserves in excess of 1 million tonnes<sup>17</sup>. The most important individual producer in Morocco is the state owned concern Cie Marocaine des barytes - 'COMABAR', an active mine at Djobel near the port of Safi where both underground and opencast mining techniques are followed.

Other important barytes mines are situated at Jbel Ighoud, Zelmon muai, Tazarine near Ourzazate and Loukaïmeden near Marrakech, Tinejdade near Errachide and Imaulasse near Agadir, Asni at Mata and the Jguit at Lalla Aziza. These mines are located close Marrakech in southern Morocco, Imine, Khenifra and Tarza. The baryte here is associated with galena and copper oxides but becomes more homogeneous at depth. In the Imini area barytes bearing veins are worked close to the famous manganese mine<sup>(15)</sup>.

### (5) Thailand

The principal commercial deposits are located in the west of the country among the highly faulted carboniferous and triassic granite terrains in the central and northern regions of the country. The majority of Thailand output originates in the province of Nakhon si Thammar in the south, chaïang Mai in the North, and Loei in the North East. Australian Company Thai Tin Ltd., prominent amongst the country's leading producers are mining in the southern provinces of Nakhon si Thammar, Surat Thani and Satun. The largest known reserves of barytes in the north of Thailand are located at Phu Mai Tong, where 6 million tonnes of ore have been delineated<sup>(10)</sup>.

### (6) Mexico

Barytes occur in several Mexican states but production is centralised in areas like Sonora, Colima and Michoacan, Nuevo Leon, and Coahuila. Other significant deposits are found in the Galeana region, near Julimes and Allende in Chihuahua, Coalcoman, Apatzingan in Michoacan and the Teca region in Jalisco<sup>(9)</sup>.

### (7) Turkey

Baryte Maden Turk as through the recent acquisition of Matosan's will try its complete grinding plants for barytes with installed capacity of 260,000 tpa, at the Bahce about 90 km from the port of Iskenderun on the Turkish Mediterranean coast. Initially, the company will produce mainly ground barytes required for oil well drilling. Barytes ore for the plant will be produced mainly from mines in Marash, Adana, Sivas and Kayseri districts<sup>(23)</sup>.

### (8) Algeria

Sonarem - Ste Nationale de Recherche et d' Exploitations Minieres was the first Algerian company to be involved in the domestic barytes industry when it took over the management of the Keddara deposits from French interest in 1967.

### (9) France

A new joint company Societe Garrot, Chaillac, has been formed by Societe des Mines de Garrot the Bureau de Recherches Geologiques et Miniers

(BRGM), Societe des Tales de Luzenac and the BANEXI to work a barytes deposit in France. The barytes deposit located about 50 km SSW and called the Rossigal deposit, is a sub-horizontal stratiform type within a triassic detrital sedimentary formation which overlies the gneissic basement of the massif central. The deposit extends over an area of about 190,000 sq.m. and has an average thickness of 12 m to 13 m. Reserves are estimated to be 8.48 million tonnes.

#### (10) Italy

The growth of the Italian barytes industry is largely attributed to the development of resources on the island of Sardinia in the Mediterranean. Deposits are widespread throughout the island, and reserves have been estimated to be 6 million tonnes. The public owned concern Ente Minerario Sardo (EM sa), mines barytes at two localities in Sardinia at Barega, and Mont Ega, in the SULES is region in the Southwest of the island. The Barega operation is based on reserves estimated at 1.6 million tonnes with an average 30 percent BaSO<sub>4</sub>.

The operations of Baraid International SP -A subsidiary of Nh Industries are based near the village of Barbusi in the corona Sa Craba concession in the Suleis region.

In island of Sardinia baryte occurs in two major forms. One is related to the remobilization in the cambrian carbonate rocks of Sule Iglesias in the south west of the island and the other, to Hercynian magmatism as veins containing fluor spar, galena, silver minerals. Baryte in the area is found in Paleozoic rocks. The numerous lead, zinc and baryte deposits in the Sule is and Iglesias mining district occur at several stratigraphic levels between the lower cambrian and Permo triassic. The variation of size appearance and setting (including massive vein type, karst filling and strata bound) and has led to the conclusion that these deposits represent the products of more than one genetic process.<sup>(15)</sup>

#### (11) Brazil

Barytes is being mined at Camamu in Bahia states & also of Vila Itapura in the Misel Calmon area of Bahia states.

#### (12) Germany

Formerly, Europe's largest producer. Historically over 70 percent of production of barytes has gone into lithophone and barium chemical manufacture, 25 percent in various filler applications and only a minor proportion (5 percent) of output has been consumed in barytes major market oil well drilling. Sachtleben Berghau GmbH a wholly owned subsidiary of Metal Gessel Shaft AG, operates the underground Meggen mine near the River Lenne in the North Rhine Westphalia region. The ore body at Meggen has been principally a source of pyrites, sphalerite and galena. The company also mines barytes at two other places viz. Wolfach and Bad Lauterberg.

#### (13) Ireland

Numerous base metal deposits such as Gortdrum, Silver mines and north of Tipperary; Navan north of Dublin; and Arcoa to the south were discovered in the Lower carboniferous limestone of Ireland's central Plains. Since baryte is present in these deposits exploration enabled the Irish Republic to become a major baryte supplier. In Silver mines silurian sediments at the base are overlain with unconformity by Devonian old Red sandstone, which merges conformably into the lower most carboniferous rocks. The rocks of carboniferous period brought into contact of with silurian rocks by ENE - WSW silvermines fault. This hosts the sulphide and baryte mineralization.

Milchem Inc. the major US mud supply company and mineral producer is operating barytes mine near Clonakilty.

### 5.2 WORLD RESERVES OF BARYTES

Barytes is widely distributed mineral found in most countries of the world and commercially produced by about 40 different countries. Reserves of barytes throughout the world are estimated to be about 2000 million tonnes. Out of which only about 500 million tonnes are from identified

resources. However, its supply position is considered adequate to meet world demand.<sup>(31)</sup> The

world Reserves data as per USGS Mineral Resources of US is given in Table 5.1.

TABLE 5.1 WORLD RESERVES OF BARYTES<sup>(42)</sup>  
(By Principal countries)

(In thousand tonnes)

World Ranking	Country	Reserves	Reserve Base
1.	China	40,000	150,000
2.	United States	30,000	60,000
3.	India	30,000	32,000
4.	USSR	10,000	75,000
5.	Morocco	10,000	11,000
6.	Thailand	9,000	15,000
7.	Mexico	7,000	8,500
8.	Turkey	4,000	20,000
9.	Algeria	2,000	8,000
10.	France	2,000	2,500
11.	Italy	2,000	2,000
12.	Brazil	1,000	2,000
13.	Fed.Rep. of Germany	1,000	1,500
14.	Ireland	1,000	1,500
15.	Other countries	21,000	111,000

Source : Latest Mineral Commodity Summaries, 1992. United States Department of Interior, Bureau of Mines.

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