

POSITION AND PROSPECTS FOR DEVELOPMENT OF THE PRODUCTION OF INDUSTRIAL MINERALS IN BULGARIA

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ABSTRACT: The paper reviews the resources of industrial minerals in Bulgaria by types of reserves, specifies the deposits, the amounts of payable reserves and their most common qualitative characteristic. A brief analysis is made of the major types of production of primary industrial minerals. The main strategic aims and priorities in the technological and product renovation for the next few years are pointed out. The productions of export industrial minerals are presented as well as the countries where they are exported. In conclusion some important generalisations are made about these productions on the background of market demands

1. INTRODUCTION

Bulgaria is a country rich in industrial minerals. As of January 1, 1997 deposits of 54 industrial minerals were studied and recorded. They have been explored and utilised to a different extent. For the last 5-6 years 31 types of deposits have been exploited and during the period 1995-1996 23 industrial minerals were mined. The most important of these minerals as regards their demand at the domestic and foreign markets as well as the possibility for technological and product renovation of the productions according to modern requirements are as follows: kaolin stock, bentonite clays, perlite stock, clinoptilolite zeolites, barite stock, quartz and quartz-feldspar sands, dolomites for xylolite production, fluonte stock, fire clays, rock salt, gypsum stock, limestones for the chemical and fodder industry, etc.

The industrial mineral deposits have exotic and endogenic origin. They are located mainly in the following regions: Kurdjali (bentonite, perlite, zeolite), Razgrad (kaolin, quartz sands), Pleven (fire clays, limestones), Sofia (fire clays, fluonte, pegmatite, barite, dolomite, etc.), Vidin (quartz sands, limestones, rock salt, etc.) The location of the deposits in definite geostuctural zones and geologic formations depends largely on their origin,

2. QUANTITATIVE AND QUALITATIVE CHARACTERISATION OF MINERAL RESERVES

The analysis of the amounts of mineral reserves in the deposits of basic industrial minerals points to the following

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(bentonite, limestones for the chemical industry, zeolite, barite, etc.)

2. Part of the industrial minerals being mined and their products are well-known at the foreign markets (kaolin, bentonite, perlite, quartz sands, etc.) and the reserves of these minerals create real opportunities for profitable export without disturbing the balance of domestic demand.

3. The implementation of new techniques for processing part of the industrial minerals (vermiculite, diatomites, zeolites, etc.) can expand their structure of consumption in the country and improve prospects for their demand abroad.

The analysis of the assay values in the industrial reserves of various minerals showed that for most of them no reassessment for output is necessary under the market economy conditions. The raw materials and their *products correspond to the* Bulgarian state standards and international requirements, which determine their division into kinds, types and categories depending on their applicability in various productions. The qualities of Bulgarian industrial minerals show that for the majority of these minerals it is possible to achieve such a technological and economically efficient treatment which will lead to the product renovation required by the market

The basic industrial minerals which represent this industry in the country and its perspectives for the next 15-20 years are bentonite, perlite, zeolite, kaolin, barite, fluonte, limestones, quartz sands and some others whose productions will start or will be increased considerably over the next few years. (Table I)

Table 1

No	Type of industrial mineral	Pay reserves as of 1 Jan 1997/1000 t
	Bante stock	219850
2	Bentonite clays for foundry, drilling, etc	42180
3	Bentonite clays for wine production	1520
4	Limestones for chemical industry	1046150
5	Limestones for flux	166400
6	Limestones for fodder industry	51200
7	Vermiculite	4140
8	Vitrophyr for glass industry	1740
9	Gypsum	89530
10	Fire clays	8650
11	Diatomite	20000
12	Dolomites for refractory	60150
13	Dolomites for xylohte production	15260
14	Rock salt	4358000
15	Kaolin stock	161220
16	Quartz sands in kaolm stock	82600
17	Quartz-feldspar sands	22800
18	Quartz sands for glass industry and foundry practice	27280
19	Quartzites for silica refractory	5140
20	Clmoptilolite zeolittites	722670
21	Perlite stock	2570
22	Fluorite stock	710

3 BRIEF ANALYSIS OF MAIN PRODUCTIONS

Russia, Greece, Israel, Libya Romania Egypt Italy,
Austria and Holland

1 Bentonite

Over the last 6-7 years about 120-125 thousand t/y on average of the following types of bentonite products were produced and marketed activated, drilling, wine, granulated fractionated and cat's bed bentonite. The major amounts of four of these types were activated drilling granulated and fractionated. These are exported to foreign contractor countries.

The quality indices of the bentonite products meet the standard requirements and needs of consumers, including the foreign markets*. This is particularly valid for activated bentonite for the foundry practice.

Because of the limited space it is not possible to present all the data characterising of each industrial mineral. These data can be provided with [MH.II d » 1](#)

which in terms of quality ranks among the first in Europe

2 Perlite

Bulgaria produces 60-90 thousand t/y of the following types of industrial mineral products obtained after processing the perlite stock: fractionated perlite, expanded perlite, agropperlite, perphyl, perlite for special insulation, ceramoperlite and some other varieties in more limited amounts. For the domestic market four varieties are produced: expanded perlite, fractionated perlite, ceramoperlite and perphyl, while for the foreign market only perphyl for the time being. In quality, the perlite products meet the standard requirements and needs of consumers.

3 Zeolite

Despite the practically unlimited reserves and their good quality, the multiple possibilities to use zeolite, especially in agriculture, as well as its demand on the European and world markets, the production of fractionated zeolite in Bulgaria is quite limited - up to 2-3 thousand t/y, one tenth of which is for export.

The only producer of bentonite, perlite and zeolite in Bulgaria is Bentonite Co, which, on the basis of marketing research, will increase over the next few years the production of activated, fractionated and drilled bentonite, granulated activated bentonite and cat's bed bentonite. Investigations are planned and if they lead to positive results, the production of new products will start on the perlite stock base, which are in demand on the international market.

4 Kaolin

Over the last 6-7 years Bulgaria has produced and realised about 100-150 thousand t/y on average of the following industrial mineral products obtained after processing kaolin sands: enriched china clay (different brands), enriched kaolin for the rubber and chemical industries, kaolin for filler in paper industry, kaolin for coating in paper industry, kaolin chamol (or refractory ground kaolin, bleached kaolin and finely dispersed kaolin). About 50% of the output is exported to 12 countries: Greece, Italy, Romania, Hungary, Turkey, Yugoslavia, Macedonia, Germany, France, Ukraine, England and Saudi Arabia.

The quality of Bulgarian kaolin products (the producer is Kaolin Co) meets the Bulgarian state standards and internationally accepted quality requirements, which is why they are in great demand not only in Bulgaria but also abroad.

During the next several years the kaolin production will undergo substantial positive changes. In the production of bleached kaolin elements from the technology used in Britain, USA and Spain will be introduced so as to increase the whiteness of our bleached kaolins to a degree corresponding to the requirements of paper and paint producers in the EU countries. The production of finely dispersed kaolin (for paper coating) will be modernized on the basis of the results obtained from the kaolin production in the former English China Clay Plants. A production line will be introduced for china clay with higher strength indices (1.5-2.5 MPa), as well as for high strength kaolin-plasticizer (with strength of over 50 MPa).

5 Bante

The bante concentrate, the only primary product produced in Bulgaria from bante stock, varies over the last 10 years in quantity between 25 and 270 thousand t/y depending on the market demand. The structure of consumption shows that 2-3% of the output is spared to meet domestic needs and the remaining 97-98% is exported. The export structure is as follows:

- First quality bante concentrate (over 97% BaSO_4) - 75%
- Second quality (over 95% BaSO_4) - 15%
- Third quality (over 90% BaSO_4) - 10%

Out of the whole quantity of export concentrate, 82% is exported in bulk and 18% after drying and packing.

The export is realised mainly in the Middle East countries, the Commonwealth of Independent States (ex-Soviet republics), Italy and Germany.

The strategic aims for the production of primary barium products from the bante stock of Kiemikovtzi Co (the producer company in Bulgaria) envisage the transition in the near future to the production of barium salts (barium carbonate, barium chloride, chemically pure barium sulphate and barium hydroxide), bleached bante concentrate and micronized bante concentrate.

6 Fluorite

Bulgaria is among the few countries in Europe which has fluorite stock reserves. Until 1985-1986 the annual output of fluorite concentrate was 14 thousand t, of which about 10000 t for exporting, mainly to the former Soviet countries and former Czechoslovakia. During the following 10 years the output decreased and towards 1995-1996 it reached

about 3000 t/y, mainly due to the market situation and depletion of reserves in the mined deposits. Nevertheless, new capacities are planned to be introduced for fluonite production from a new deposit (Loukna Padina) and the country will have the potential to produce 50000 t/y, out of which about 13500 t/y of only metallurgical concentrate meeting all consumer requirements or 5500 t/y of metallurgical grade plus 10500 t/y of acidic grade. The metallurgical grade of fluonite concentrate will be pelletized in accordance with the standard requirements.

4 CONCLUSIONS

In the strategy for the development of minerals production in Bulgaria for the next 20 years there is a tendency for a gradual transfer of the centre of gravity from the metallic minerals to the industrial minerals due to changes in the market and product structures, as well as the mineral reserves. The natural properties of Bulgarian industrial minerals and pay reserves proven so far are optimistic with respect to the above-mentioned tendency having in mind the ever increasing demand of such minerals on a European and world scale. It is also necessary to take into account the strategic aim and priorities in the various productions, as well as the research, exploration, marketing and development work which has been and is being done in the production companies. There is a lot of optimism in the proposals already made by leading world companies producing industrial minerals for setting up joint ventures on a mutually profitable base. Our door is open to any proposals and offers which can ensure the technological and product renovation in the production of primary industrial minerals on the basis of efficient marketing research.