

EXAMINATION OF BERYL PRODUCTION POSSIBILITIES

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Introduction

The pegmatites of the Kings Mountain area contain the largest known domestic reserves of beryl and spodumene. Reserve estimates indicate the existence of approximately 90 million tons of pegmatite containing 0.4 to 0.5 percent beryl. In other words, there are 240,000 tons of beryl containing 34,000 tons of BeO.*

In the late fifties and sixties, work was done by the U. S. Bureau of Mines to recover beryl from the tailings of a spodumene operation at Kings Mountain. However, all of the beryl mined with spodumene is still discarded. Since this time, plant practices have changed, prices of beryl concentrates have changed and new technology has come to light. With all these facts in mind, a fresh look at the beryllium picture was warranted. With two plants now producing spodumene, the chances for beryl recovery appeared twice as good as before.

Sample Identification

Representative samples of plant streams were supplied by the two companies in operation in the tin-spodumene belt. They were labeled and identified as follows:

*J. S. Browning, AIME Transactions Vol. 220, 1962, p. 420.

#3489 A - Plant feed	Lithium Corp. of America
B - Clawson Underflow	" " " "
D - Heavy media tailings	" " " "
#3500 - Spodumene concentrate	" " " "
#3490 A - Plant feed	Foote Mineral Co.
B - Rougher tails	" " "
C - Spodumene concentrate	" " "
D - Iron scavenger	" " "

Procedure

Since the quickest and most widely used method for determination of BeO content is by neutron emission, arrangements were made with Boulder Scientific for analysis by this method.

Neutron emission is a non-destructive method of analysis, therefore, it was requested that the samples be returned to us after analysis. These could be used as standards in the future.

Results

The results of the analyses are shown below:

<u>Product</u>	<u>% BeO</u>
<u>Lithium Corporation of America -</u>	
Plant feed	0.051
Heavy media tailings	0.063
Clawson underflow	0.066
Spodumene concentrate	0.038

<u>Product</u>	<u>% BeO</u>
<u>Footo Mineral Company -</u>	
Plant feed	0.061
Rougher tails	0.059
Iron scavenger	0.461
Spodumene concentrate	0.063

Remarks

One of the great uncertainties in beryl production and sales is the fact that there are fewer consumers of cobbled beryl ore in the world, than any other mineral. Of the four consumers, the United States is home for two, The Brush Beryllium Corporation and Kaweck-Berylco Industries, Inc. The other two companies are in Europe and Japan. The transactions of the European and Japanese companies are rarely a factor in future demand.

In 1969, the price of \$40 - \$45 per short ton unit BeO, FOB, was typical. However, when Brush Beryllium completes its \$10 million plant at Delta, Utah and Anaconda Company completes its plant a little later, beryl requirements are expected to be reduced by more than two-thirds. Both plants will process ores from the Spor Mountain area for bertrandite ($4 \text{ BeO} \cdot \text{SiO}_2 \cdot \text{H}_2\text{O}$, BeO = 42%).

According to Industrial Minerals, August 1969, p. 36, "By 1971 the USA might well be self-sufficient in beryllium raw materials, with almost no prospect of the displaced beryl tonnage being absorbed elsewhere."

The idea that an oversupply of beryl will lower the cost of beryllium and thereby create more uses and in turn more demand, does not seem to apply here. The major cost of beryllium is not due to cost of raw materials, but is due to the cost of processing raw materials into finished beryllium metal and alloys. A drop in cost of raw materials could only affect the price of beryllium metal very slightly.

It should be stressed that the plant stream samples were from current spodumene operations, and were not made in an effort to isolate and separate beryl.

Conclusion

In light of recent developments, and press releases, the picture for domestic beryl is gloomy. If either, or both, of the bertrandite operations fail to economically come on stream, the picture would improve.

Therefore, the best policy to observe at this time is to wait and see. By this time next year the direction of the beryllium industry should be firmly established.

Special appreciation is given to both Lithium Corporation of America, and Foote Mineral Company for permission to publish analyses of material from their plants.