CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
520-770-3500
http://www.azgs.az.gov
inquiries@azgs.az.gov

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ASARCO

Southwestern Exploration Division

JHC

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J. H. C.

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FILE MEMORANDUM

Beryllium

The recognition of anomalous beryllium in the spectrographic analysis of samples collected from a greisen zone in the Fresnal Wash area of southern Pima County precipitated a brief study and review of beryllium, its use, consumption, price and future demand.

Beryllium is a specialty metal that has been used in minor amounts as an alloy of copper for the past several decades. Today, it is used in the aerospace industry for structures of supersonic aircraft and satellites, in disc brakes for aircraft, for marine turbine props, in anti-magnetic spark proof tools, special springs, rings, bearings and castings, and also as repeaters in submarine communication cables and throughout the electronics and nuclear energy industries. With such wide application, one would think the market should be strong and growing, but that is not the case. Beryllium is a difficult metal to produce and work due to the extremely high toxicity of the metal itself, and its resulting compounds. Because of the high toxicity, OSHA standards for worker exposure are stringent, creating ever-increasing production costs.

Beryllium sources are two: hand-sorted beryl, and low grade bertrandite ores from Brush Beryllium Company's mines near Spor and Topaz Mountains in Utah. Brush's extraction plants represent 90% of the Free World's extraction capacity.

World production of beryllium from 1970-1975 -- the latest year for which production data could be found, is as follows: 1970 -- 6,857 short tons; 1971 -- 5,791 short tons; 1972 -- 4,330 short tons; 1973 -- 3,963 short tons; 1974 -- 3,977 short tons; and, 1975 -- 3,558 short tons. The figures do not include USA production, the figures for which are not available. However, USA production, almost entirely from bertrandite, is estimated to be about the same as world production based on USA consumption which was: 1970 -- 9,496 short tons; 1971 -- 10,372 short tons; 1972 -- 7,781 short tons; 1973 -- 8,695 short tons; 1974 -- 9,279 short tons; and, 1975 -- 4,850 short tons. The 50% decline in consumption between 1974 - 1975 reflected the 1975 recession and the phase-out of the Poseidon missile, which used considerable beryllium-copper metal.

It should be noted that though the USA recovers beryllium from bertrandite, the remainder of the Free World's production comes from hand-sorted beryl, mined from pegmatites. That production, which is largely from Brazil, South Africa, India, and Argentina, will probably decrease as labor costs increase. Beryl mining and concentration is labor intensive as no mechanical methods of concentration have been developed. However, the Brush Beryllium mines and plant in Utah should be able to replace any loss in supply created by the stoppage of any beryl mining outside the USA.

Beryl and beryllium hydroxide from bertrandite ores are marketed in short ton units of 11% BeO. The price has remained relatively stable through-

out the 1970's, varying from a low of $30.00/stu during 1972-1975, to the current high of $40.00/stu in August 1978.

Demand for beryllium over the long term is considered as weak and in the short term, poor. Any large increase in demand is dependent upon the governments decisions regarding the construction of new missile systems and to a small degree, with the continuation of the space shuttle and other NASA programs. Industrial consumption of beryllium-copper alloys should follow general business conditions, but if stringent OSHA safety regulations create higher prices, the beryllium-copper alloys may lose a portion of their markets to manganese-nickel-copper and aluminum-nickel-bronze alloys.

It does not appear that a beryllium deposit, other than a high-grade beryl deposit worked by a few individuals, would be economic in the near or medium term future. However, beryllium is one of the metals that has application in the space, electronics and nuclear energy fields, and therefore its use and demand could change at any time, due to new technological developments.

Burton Devere Jr.

Burton J. Devere, Jr.

BJD:jlh
c.c. W.L.Kurtz
F.T.Graybeal
J.H.Courtright