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URANIUM IN THE PETACA, OJO CALIENTE, AND BROMIDE DISTRICTS, RIO ARRIBA COUNTY, NEW MEXICO*

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Uranium minerals are known in the Petaca, Ojo Caliente, and Bromide districts of Rio Arriba County, New Mexico. They occur as sparsely disseminated crystals in pegmatites and in quartz-fluorite veins. Three small shipments, made specifically for uranium, were of uneconomic grade.

The Petaca district is approximately 3 miles wide and 14 miles long in a north-trending belt west of Petaca, New Mexico. More than 200 pegmatites are known in the district. These Precambrian pegmatites have been an important source of scrap and plate mica. Minor amounts of beryl and tantalum minerals also have been produced.

Uranium in the pegmatites was first reported by Hess and Wells (1930) who identified samarskite, a complex columbate-tantalate that contains calcium, iron, uranium, thorium, and rare-earth elements. Other uranium minerals which since have been identified include uraninite, gummite, and uranophane. Monazite, a thorium mineral which may contain minor amounts of uranium, also has been identified.

In his study of the Petaca pegmatites, Just (1937) noted the occurrence of samarskite in three mica mines. A reconnaissance of the Petaca area in 1943 by geologists of the Union Mines Development Corporation for the Manhattan Engineer District disclosed samarskite at six mines and received reliable reports of its occurrence in seven inaccessible mines. Jahns (1946), during his detailed studies of the mica deposits, noted the presence of samarskite in 40 of the 69 deposits where he observed accessory minerals. Oxidized uranium minerals were noted in 11 of the same 40 deposits, and uraninite was observed in 2 of them. Monazite was observed in 57 of the 69 deposits.

Although samarskite is one of the most common accessory minerals in the pegmatites and is the principal uranium mineral, it is not abundant. It is irregularly distributed in dull black masses, as aggregates of irregular crystals, and as imperfect crystals in quartz and albite-rich pegmatites ranging in size from a pinhead to that of a golf ball. Even larger masses of samarskite were observed by Jahns (1946) in the Kiawa, Fridlund, Lonesome (Beryl), and La Paloma deposits. Samples of samarskite-bearing material analyzed by the AEC contained 0.12 to 4.64 percent U308 depending on how much quartz, feldspar, and other gangue was present in the sample. According to Fronde! and others (1967), the uranium content of pure samarskite ranges from 8.4 to 16.6 percent uranium.

Small black crystals of uraninite occur in albite and quartz at the Fridlund and Pino Verde deposits (Jahns, 1946). It also occurs at the Lonesome (Beryl) deposit (Just, 1937). Brightly colored oxidized uranium minerals commonly surround the uraninite and distinguish it from samarskite.

The small, erratically distributed amounts of uranium-bearing minerals in the pegmatites are too sparse to encourage exploration. Attempts have been made in the past to recover samarskite as a by-product of mica mining, and a few thousand pounds have been marketed for niobium and tantalum; also crystals of samarskite from the Petaca district have been sold to museums. In late 1954, a small trial shipment, made from the La Paloma pegmatite in NE' , NW'/, , sec. 30, T. 26 N., R. 9 E., was uneconomic. Samarskite generally is nonamenable to commercial uranium milling circuits.

Uranium occurs with magnetite in a Precambrian quartzite at the Rancho AAA claim in sec. 10, T. 27 N., R. 8 E. on the southeast flank of Kiawa Mountain in the northern part of the Petaca district.

The Ojo Caliente district, located approximately 8 miles south of the Petaca district, contains more than 20 mica mines and prospects in an area of 4 square miles. Samarskite has been reported by Jahns (1946) in four pegmatites in this district but in smaller amounts than in the Petaca deposits.

The Bromide district, from which copper and gold has been produced in the past, is centered around Tusas Peak, approximately 6 miles northwest of the Petaca district. Uraninite, sabugalite, a hydrogen aluminum uranium phosphate, and metatorbernite, a hydrated copper uranium phosphate, occur in minor amounts at two properties in quartz-fluorite veins cutting Precambrian schists of the Moppin Metavolcanic Series. A similar occurrence is also known in the Precambrian Tres Piedras Granite. Small trial shipments from the JOL property in the SW'/, SW'/ and the Tusas East Slope 5 claim in the NW 1/4, NW 1/4, section 24, T. 28 N., R. 7 E. in early 1956 and late 1954, respectively, were of uneconomic grade.

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