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NBMG OFR 83-11

See also 8312 for  
geochemical results

BUNKERVILLE DISTRICT

(23)

Item 7

The Bunkerville (Key West, Copper King) mining district is located about 10 miles south of Mesquite in the northern Virgin Mountains in northeastern Clark County, Nevada, in T15S, R70, 71E. The district is bounded by the approximate latitudes  $36^{\circ}35'$  and  $36^{\circ}45'$ , and longitudes  $114^{\circ}00'$  and  $114^{\circ}15'$ . The western portion of the district is easily accessible by way of the Gold Butte Road south from Interstate 15 along good to fair dirt roads; however, the eastern side of the district is accessible only from the north by a fairly long and steep hike along a washed out jeep trail.

The first reported activity in the district resulted from copper-nickel ore being discovered in the eastern part of the district in the 1890's. From 1900 to 1903 the Nevada Copper and Nickel Co. explored the district, primarily for additional copper-nickel deposits and it was during this investigation that platinum's association with the copper-nickel ore was discovered. Minor ore was produced in 1908 and 1916 from the Key West Mine, after which the mine shut down. Attempts to mine in 1929 resulted in 2,000 tons of copper-nickel ore being mined and milled, but poor mill recovery prompted another shutdown. Attempts were made again to mine the copper-nickel deposits in 1936, 1952 and 1953, but all were unsuccessful. Since then other companies and individuals have explored the area, but with little or no results. The tungsten-beryl-mica deposits are located in the rough terrain of the eastern part of the district, east of the Key west area. Development work was done in the early 1950's and between 1953 and 1956 the Tri-State Metals, Inc. produced approximately 150 units of tungsten ore. There were shorts periods of activity in 1971 and 1980. Scrap mica was reported to have been mined in the 1890's and sheet mica was mined in 1920 by Daniel Bonnelly, who was one of the earlier settlers and explorers of the region.



Beryl was noted in the district in the 1930's (Holmes, 1964) and several attempts were made to mine the deposits prior to 1960. Transportation costs have proven to be prohibitive, thus preventing economical production of the tungsten-beryl-mica deposits. The total production for the district has been less than \$30,000 in gold, silver, platinum, palladium, copper, lead, nickel, tungsten, and cobalt. Both areas of the district have been subject to U.S. Bureau of Mines investigations (Heedham, et al, 1950; Holmes, 1964).

The northern Virgin Mountains are a northeast trending, structurally complex range consisting primarily of Precambrian metamorphic rocks flanked by Paleozoic and Cenozoic formations. The Precambrian rocks are highly deformed and locally range from moderately to highly metamorphosed from both contact and regional metamorphism. Middle Precambrian granitic, pegmatitic, and mafic dikes and plutons invade the older metamorphic rocks. Paleozoic carbonate and clastic sedimentary rocks, ranging in age from Cambrian to Permian, flank the Precambrian core. A narrow, irregular belt of Mesozoic rocks border the Paleozoic rocks on the northern edge of the district. Longwell (1928) and Beal (1965) suggest that structurally, the Virgin Mountains are a broad, northeasterly trending, asymmetrical anticline with the north flank complicated by extensive faulting. The northern Paleozoic and Mesozoic formations appear to be tilted, massive fault blocks in thrust fault contact with lower thrust plates of Precambrian rocks. Throughout their history, the Virgin Mountains have experienced several episodes of thrust faulting, chiefly during the Late Cretaceous and early Cenozoic. This thrust faulting is possibly related to the Mesozoic Overthrust belt, which at the present time is considered a prime collection site for oil reserves. These thrust faults are complicated by local normal, reverse, and strike-slip faulting. The Bunkerville district is divided into 5 general structural blocks, bound by reverse and thrust faults (Beal, 1965).



The Precambrian rocks generally consist of garnet-sillimanite-biotite schist, granite and granodiorite gneisses, and pegmatite dikes, with the schistosity of the rocks trending northeast and almost vertical. Most of the narrow pegmatites dikes are simple or barren; however the complex variety (those which have been enriched by hydrothermal solutions) are abundant throughout the district. These pegmatites follow the northeast trend of the district and show substantial amounts of beryl and chrysoberyl along with minute quantities of cesium and lithium (Holmes, 1964). Massive and tabular pegmatites, up to 75 feet wide also cut the Precambrian metamorphics and carry minor beryllium. The Precambrian pegmatites have been dated by K-Ar method at  $1.37 \pm 0.14 \times 10^9$  years (Anderson, 1951). Dark grey mafic dikes and sills cut the Precambrian rocks in the southwest block and smaller hornblendite dikes occur throughout the district.

All mineral deposits are related to or occur in the Precambrian rocks with the mineralized zones divided into two main groups: The tungsten-beryllium-mica belt in the eastern part of the district which extends from the Arizona border southwest for approximately 1.5 miles; and the northeasterly trending copper-nickel-platinum deposits in the western part of the district. The tungsten-beryl-mica workings are along and adjacent to prominent reverse faults in garnet-mica schist with concordant hornblendite sills and dikes, pegmatites, and scheelite-bearing quartz veins. These intrusives follow the general northeast structural and foliation trend. Chrysoberyl and beryl occurs as disseminated grains and local concentrations in the pegmatites. Scrap mica is a constituent of the garnet-mica schist and sheet mica occurs sporadically in zones throughout the pegmatites (Holmes, 1964).

The copper-nickel deposits are generally fissure type veins with partial replacement and disseminations. Beal (1965) suggests that the deposits resulted from hydrothermal activity along north-northeasterly trending faults. The two



main deposits (the Key West Mine and the Great Eastern Nickel deposit) are located in Precambrian granodiorite gneiss which grades laterally into granite gneiss and later was intruded by hornblendite and pegmatite dikes. Most of the nickel-bearing sulfides (pyrite, pyrrhotite, and chalcopyrite) are confined to the hornblendite dikes, where they mainly occur in tiny veinlets and discrete grains. Chrome has also been noted in the hornblendite dikes along with traces of platinum (Lindgren, Davy, 1924).

At the Key West mine the hornblendite body occurs as a domelike structure approximately 150 feet wide and 200 feet long with mineralization, metamorphism, and alterations occurring in varying degrees. The mineralization appears to be confined to the areas where pre- and post-mineralization faulting is most prominent. The ore minerals are not confined to any one given rock type, but the main ore body occurs in the large hornblendite lenticular mass. The ore consists of oxidized and sulfide minerals containing copper, nickel, and platinum, along with minor amounts of gold. Magnetite is uniformly distributed throughout gangue and ore. (Needham, Davy, 1924). The sulfides at depth also include sphalerite and molybdenite and are concentrated in the hornblendite dike and other hosts, including quartz veins. Outcrops at the mine are intensely weathered and hydrothermally altered to spectacular colors.

At the time the district near visited no activity was observed at either the tungsten-beryl-mica area in the east or the nickel-copper deposits in the west. However, surface exploration had been conducted in the area surrounding the Key West Mine within the last 5 years.



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