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OSBORNE DISTRICT

Location:

The Osborne mining district covers the southern and central portions of the Belmont Mountains south of the Vulture mine on the southern margin of the Hassayampa Plain.

Geology and History:

Precambrian schists, gneisses and granites make up most of the little studied Osborne district. The schists are believed to be part of the Pinal series and thus are probably composed of mainly sedimentary and volcaniclastic protoliths. Mid-Tertiary volcanic rocks cover older rocks on the northern and western portions of the district. Numerous subvolcanic plugs and northwest-trending dike swarms cut the older rocks and probably served as feeders to now eroded portions of a once more extensive volcanic field. The subvolcanic plugs form a crude east-west belt across the southern portion of the Belmont Mountains. At least some of these intrusions are andesite and latite porphyries in composition and host significant mineralization.

The largest and most productive mine in the district, the Tonopah-Belmont, was discovered in 1904. The ores of the district are generally base-metal dominant (Pb-Cu) but contain considerable precious metals. Between 1927 and 1928 the Tonopah-Belmont produced some 23,420 tons of ore (ADMR files). The 1927 production amounted to 2,326 tons which averaged 0.39 opt Au, 3.2 opt Ag, 5.3% Pb, and 0.7% Cu. Between 1927 and 1930, production from the mine amounted to \$610,000; of this total, gold and silver production amounted to \$210,000 and \$120,000, respectively. Keith and others (1983a) list recorded district production between 1916-57 as amounting to 86,000 tons from which were recovered 13,000 oz Au; 195,000 oz Ag; 1,369,000 lbs Cu; 7,701,000 lbs Pb; and 500 lbs Zn.

Although remote, the district has received some recent renewed exploration interest. B.T. Gold Explorations of Havelock, Ontario has been conducting exploration near the Tonopah-Belmont mine since 1982 (Northern Miner, July 5, 1984). This company is proposing to seek financing for exploration in four areas of anomalous surface geochemistry that are at least 35 ft across with values in excess of 0.45 opt Ag. A B.T. Gold Explorations assessment work report indicates that the anomalies are associated with a contact area between andesite and shales (schist?). Gold and copper values reportedly increase near the contact and are associated with areas of silicification, sericitization, alunization, and porphyritization. The Northern Miner story indicated that sampled zones of alteration assayed 0.075 opt Au over 45 ft. A large tonnage, low grade target is being sought. Likewise, the nearby Morningstar property was also reportedly being sampled by a small company in 1983.

With such little geologic information known about the district, a thorough surface reconnaissance with geochemical sampling seems in order. The Tertiary subvolcanic plugs appear to warrant special interest, especially near their contacts with the Precambrian rocks.

Mines of Interest:

Tonopah-Belmont (Belmont McNeil) Mine: (W $\frac{1}{2}$ Sec. 36, T4N, R7W) Pb-Cu-Au-Ag mineralization occurs in fractured zones and brecciated margin of an andesite plug that displays considerable relief above the low hills in the immediate vicinity. The plug intrudes Precambrian schist and is but one of many similar bodies that occur in the southern part of the Belmont Mountains. The plug is roughly prismatic and approximately 1,000 ft on a side. Its walls are fluted and nearly vertical and indicate that it was probably some sort of volcanic neck. The hosting Precambrian rocks are highly fractured and dikes in a semi-radial pattern surround the plug. ADMR file data indicate that brecciated fracture zones extend away from the plug toward the west for at least one mile and similar fractures also extend toward the southeast. The outer fringes of the fractures are filled by latite porphyry. It is believed that the mineralizing fluids came up the fractures and breccia zones of the plug to form the open fillings and replacement type ores that have been exploited to date. Veins that fill the fractures in the plug itself are typically about 300 ft long and average about 4 ft thick. There has apparently been an intersection of three such veins with the margin of the plug, where the ores reportedly become 30 ft wide over varying length and are described as becoming "ore pipes."

The property was most extensively worked in the periods 1926-30, 1940-41, and 1944-46. During the latter period the mine was said to have had much damage to its workings due to pillar robbing, etc. The mine reportedly has a 450 ft shaft with over 12,000 ft of lateral workings. The ore shoots were reportedly mined from the surface to the 400 ft level below the adit (about 600 vertical feet).

The property was examined in 1961-62 by the Milca (Onego Corp.) Mining Co. of Pittsburg, Pennsylvania, who repaired the shaft and drilled a 1,043 ft diamond drill hole, which apparently yielded rather unencouraging results. A report in the ADMR by a J. E. Wilson, E.M., who apparently worked about 4 months on the property for Milca, states the following:

"The veins filling the fractures are 400' plus long and 4' wide until the intersection of veins #2, #3 and #4 are reached at which place they attain a width of up to 40'. The dip of the NE vein is 78 degrees S and the rake is eastward. The SE vein has almost a vertical dip and rakes N. These ore shoots were mined thru to the surface from the 400' level below the adit level. The adit level is 200' plus and minus (allowing for contour) below the surface.

The rake of the vein after intersection plunges sharply to the East and because of this deviation the shaft penetrated the end of the ore shoot. An X-cut was driven South from the bottom of the shaft to allow for the dip of the vein and then a drift tunnel was driven E to pick up the vein at the point where the vein raked into it. The vein at this point is

eight feet wide and was drifted on for a distance of about 400'. The ore was stoped upward for about 15' and the vein is strong and consistent the full length of the drift from the point where the vein raked into the drift.

Two winzes were sunk to a depth of 20' on the level and both are damp from about 10' down and water about two feet deep is standing in the bottoms of each. They both contain sulphides and indicate that water level has been attained. There is no diminuation of the vein at the bottom of the winzes and it is my conviction that the vein will continue downward to a great depth. I cut chip samples from the faces at the bottom of the winzes and the assays revealed 12.2% copper, .43 oz gold, 3.6 oz silver and .82% lead."

The B. T. Gold Explorations of Ontario reported in 1984 that surface trenching revealed a zone 50 ft wide that averaged 0.07 opt Au. They were apparently going to promote a stock issue in an effort to raise drilling money.

The property sounds interesting and should be examined as a joint venture or buy out exploration possibility.

Morningstar (Belmont Eastern) Mine: (Sec. 6, T3N, R6W) The property was first worked in 1928, but was then left idle until 1937 when three cars of ore were shipped. In 1940 the property was leased and small production accompanied exploration and development work until 1946 when the mine was again idle. Mineralization is described as 3 veins averaging about 2.5 ft thick; two strike northerly and one trends EW. The veins are hosted by andesite near a contact with rhyolite. They seem to dip toward the rhyolite contact and enclose the rhyolite on 3 sides; west, south and east. The rhyolite is reportedly considerably altered as is the andesite adjoining it. The ore consists mainly of chalcocite and copper carbonates, thought to have formed by oxidation of primary chalcopyrite. Development consists of a 24° inclined shaft 425 ft in length; a 30 ft vertical shaft with a 35 ft drift from the bottom reportedly all in ore; one 102 ft tunnel probably all in ore and several surface cuts and trenches. In 1937, the ore reportedly averaged 9.15% Cu, 2.30 opt Ag, 0.01 opt Au. While the gold values are very low, one wonders if this ore was mined from oxidized surface ores for its copper content and that the gold values might be somewhat leached. The nearby Tonopah-Belmont mine which might have similar character ores, displayed comparable copper and silver values, but had much higher gold.

Moon Anchor Mine: (Sec. 31, T4N, R7W) No description is available. CRIB files indicate that it was a vein deposit in andesite that has had some production. Major commodities were Pb, Ag, Au (apparently in order of importance). Mine production amounted to 25 tons/day in December, 1942.

Scott Lead Mine: (Sec. 21, T4N, R7W) Two intersecting veins; one strikes N15°E, the other N15°W. Veins carry argentiferous galena in quartz gangue. Some 22 tons of ore shipped around 1945 than ran 12% Pb and 26 opt Ag. Ore carries about 0.03 opt Au. The deposit is probably small.

Divide Iron Cap: (Sec. 10, T4N, R7W) The host rocks are volcanics underlain by rhyolite and andesite. Two veins about 400 ft apart reportedly are traceable on the surface for 3,000 ft. The Divide vein occurs at a lithologic contact and is reportedly 6 to 8 ft wide. The Iron Cap vein is from 3 to 6 ft wide. The two veins trend northwest. Development consists of shallow workings. Values in the Divide vein occur in hematite and average about 0.12 opt Au and 1.5 opt Ag. Iron Camp vein has values of about 0.10 opt Au, 1 opt Ag, and 2.5% Pb according to a 1939 report.

References:

Arizona Dept. Mineral Resources, file data; Keith and others, 1983a.

