from NBMG OFR 83-9
See also 83-10 for geochemical results.

108
Item 5

0750 0005

BUCKHORN DISTRICT

The Buckhorn district is situated on the lower east flank of the southern Cortez Mountains about 5 miles east of the Cortez Gold mine. Mines, prospects and drill holes are scattered throughout the canyons and low ridges occupying the northwest quarter of the Horse Creek Valley 15' quadrangle, but the extensive underground workings and glory holes which comprise the central district are located in section 31, T27N, R49E. The entire property consists of 7,700 acres of patented and unpatented lode claims (Minesearch Report, 1983). The central district is currently held by Cominco American Exploration Co.

The early history of mining activity is well documented by Vanderberg (1938). The district was first discovered in 1908-1909 and by 1913 the Buckhorn Mines Co. had "done considerable development work and blocked out a body of low-grade gold-silver ore"(Vanderberg, 1938). Between 1914 and 1916, ore was mined from a glory hole and milled on site. The mill was powered by electricity derived from a 700-horse power steam plant located at Beowawe. The next surge of activity at the mine was during the 1930's and since that time there has been sporadic mining of the deposit and some reworking of dump material. The total known production for the deposit through 1950 is 39, 024 oz. Au, 311,278 oz. Ag and minor copper (Roberts, R.J., et al, 1967). Most of the ore produced was derived from the north and south glory holes which together comprise the Buckhorn mine.

In recent years, Bethex Corp., in joint venture with several other companies, drilled 246 exploration holes totaling 40,865' in 3 or 4 separate zones in the district (E and MJ, 1981). Cominco later acquired Bethexs' claims and continued with exploration work during the summers of 1982 and 1983. At the time of our examination of the district in July, 1982 their work included geologic mapping of the claim area, geochemical sampling and core drilling within and near the existing glory holes. A 1982 estimate on the potential ore reserves is 2.5 million

tons at 0.082 oz Au/ton and 1.05 oz. Ag/ton (Bonham, 1982). However, Comincos' recent exploration work on the deposit indicates considerably different reserves (Oral comm., Scott Monroe).

According to Wells and Elliott (1969) the geology of the Buckhorn area is as follows:

"Rocks in the Buckhorn area consist of a series of Pliocene basaltic andesite flows that overlie Tertiary sedimentary rocks. The mineralized area is along three faults that trend N. 10° W. The Tertiary sedimentary rocks are exposed along a horst that is cut by a medial fault. They consist, in decending order, of laminated bedded chert, tuffaceous sandstone (possibly interbedded with the chert), sandstone, and conglomerate. The sandstone and conglomerate are tightly cemented by silica. These rocks dip 10°-35° E., are locally deformed, and are intruded by vesicular basalt that is altered and silicified. Some of the basalt near the medial fault zone has been altered to pure white kaolin. The altered rock grades from kaolin through white swelling clay, brown swelling clay (montmorillonite), and partially altered basalt to fresh basalt."

Resistivity surveys by the USGS indicate the basalts in the Buckhorn area are about 350-400' thick (Wells and Elliott, 1969).

The volcanic rocks at Buckhorn are part of a sequence of basaltic andesite flows which cover the east flank of this part of the Cortez Mountains. This sequence is shown on the eastern margin of the Cortez 15' geology map (Gilluly and Masursky, 1965). At Buckhorn and Cortez, the basalts directly overlie Tertiary gravels and less commonly, Paleozoic rocks. The basalts are known to be correlative with similar rocks exposed in the Shoshone Range (Wells, et al,1971). K-Ar age determinations on basaltic andesites collected southeast of Horse Ranch and on the east flank of the northern Shoshone Range yielded identical ages of 16.3 my(Wells,et al,1971 and McKee and Silberman, 1970).

These identical data support correlations of the volcanic stratigraphy between the two ranges and indicate that the host basalts at Buckhorn are late Miocene in age. Furthermore, it has been sugested that the mineralization at Buckhorn is associated with intrusive rhyolites of Miocene age which outcrop about 3 miles southwest in Horse Canyon (Wells, et al, 1971). This suggestion seems plausible since adularia from a "chalcedony-adularia vein" near the Buckhorn mine yielded a 14.6 my age date which,"within the limits of analytical uncertainty" is essentially the same as the Horse Canyon rhyolite dated at 15.3 my. (Wells and Silberman, 1973).

The mineralization at the Buckhorn mine occurs within a highly altered, chaotic breccia zone. The deposit is centered along a vertical or steeply east-dipping, north to north-west striking reverse fault which lies along the central axis of a north trending structual block shown as a horst by Wells and Elliott, 1969. Recent mapping in the area by Cominco geologists indicates that the faulted block may actually be a graben (oral comm., Scott Monroe).

The breccia zone is well exposed in the north end of the south glory hole. The zone is completely oxidized by supergene processes. Boulder to pebble size fragments of altered amygdaloidal basalt are cemented and veined by a mixture of grey chalcedonic silica,clay, iron oxides and iron sulfates (jarosite). The matrix contains abundant limonite in addition to goethite and hematite. The breccia fragments are altered to an argillic assemblage of kaolinite and montmorillonite. Unusual green and yellow coatings on the fragments are probably arsenic or sulfur minerals. Some microfossils were identified in pulverized rock from the zone indicating that sediments also comprise a portion of the host rocks. At the south end of the pit, bedded siltstones faulted against the basalts along a steeply east-dipping structure.

Free gold at Buckhorn occurs with limonite along fine fractures and veinlets

within the breccia zone. The oxide zone extends for about 100' below the surface. Below this depth, the zone contains abundant pyrite and marcasite. Sample 1514 was taken from the dump of underground workings located just east of the Buckhorn glory holes. The dumps contain ore from the unoxidized zone consisting of silicified sedimentary breccias with abundant unoxidized pyrite in fragments, veinlets and within the siliceous cement. The gold content in the ore zone reportedly decreases with depth while the silver content generally increases. Results of geochemical sampling within and near the ore zone reveal some high gold values (several in the range between 1-10p pm Au) and anomalous amounts of Hg, As and Ag (Wells and Elliott, 1969).

Approximately 1 mile northeast of the Buckhorn mine there are beds of opalite which lie directly on basalts. The opalite beds strike northwest and contain fossil reed and snail impressions. According to Cominco, the opalite contains anomalous quantities of Au, Ag and Hg. Hydrothermal explosion breccias, sinter deposits and opalized conglomerate outcrop elsewhere in the district. The presence of these rocks types in the mine are evidence for the existence of a shallow, hot-springs environment during the time of mineralization at Buckhorn.

Several shallow workings and drill holes are located in a north-south drainage about 4 miles east of the main district. Exposures are poor, but in general the workings explore fault zones in quartzites, cherts and shales of the Penn-Permian Brook Canyon Formation or the Ordovician Vinini Formation. Sulfides were noted in some drill cuttings and in silicified breccia found on the dumps. The canyon follows the trace of a northwest-striking, high-angle fault. Several intrusive bodies are located just north of the mines and may be related to the mineralization (Roberts, et al, 1967).

Selected References:

Bonham, H. F. Jr. (1982) Reserves, host rocks and ages of bulk-minable precious metal deposits in Nevada: NBMG OFR 82-9.

Elliott, J.E. and Wells, J. D. (1969) Variation of mineralization with geologic factors in the Cortez - Buckhorn area, Nevada (Abs): GSA Abs. 1969, pt. 5, Rocky M section, p. 22.

Engineering and Mining Journal, March (1981) section: Exploration Round up,p. 31.

Gilluly, J. and Masursky , H. (1965) Geology of the Cortez quadrangle, Nevada: USGS Bull. 1175, 117p.

McKee, E. H. and Silberman, M. L., Aug.(1970) Geochronology of Tertiary igneous rocks in central Nevada: GSA Bull., v. 81, p. 2317-2328.

Minesearch Report, Feb. (1983) Guide to new mine development : United States, v.1, no.1.

Roberts, R.J. (1967) Geology and mineral resources of Eureka County, Nevada: NBM Bull. 64, p. 68.

Roberts, R. J., et al (1971) Gold bearing deposits in north-central Nevada and southwestern Idaho: Econ. Geology, v. 66, p. 14-33.

Vanderberg, W. O. (1938) Reconnaissance of mining district in Eureka County, Nevada: USBM Inf. Circ. 7022, 66p.

Wells, J.D. and Elliott, J.E. (1969) Preliminary geologic and geochemical maps of the Buckhorn mine area, Eureka County, Nevada: USGS OFR 69-315, 5p.

Wells, J. D., et al (1971) Age of the igneous rocks associated with ore deposits, Cortez-Buckhorn area, Nevada: USGS P.P. 750-C, p. C 127-C135.

Wells, J. D. and Silberman, M. L. (Dec. 1973) K-Ar age of mineralization at Buckhorn, Eureka County, Nevada: Isochron/West, no. 8, p. 37.