POTOSI MINING DISTRICT

LOCATION

The Potosi, or Getchell, mining district is located in the northern Osgood Range, Humboldt County. Most of the mines of the district are on the eastern flank of the range, about 30 miles northeast of the town of Winnemucca. The Pinson gold mine is on the southeast side of the district, near the mouth of Granite Creek. The Getchell gold deposit is about 8 miles to the north. Several tungsten deposits were mined at locations along the east flank of the range and at locations along the crest of the range.

HISTORY

The northern Osgood Range was first prospected in the late 1800's for precious metals. The recorded discovery was in 1874 when deposits of silver, lead, and antimony were found on the Louisa claim on the northwest side of the range. The district was first named Crystal in reference to plentiful, large quartz crystals found at the original discovery site. This same area later became the Richmond tungsten property, and crystals may still be found there in cavities in a massive garnet tactite.

By 1878, the district name had been changed to Potosi but there was little recorded activity until 1899 when a copper strike on Granite Creek in the southern part of the range received attention. The copper occurrences, never important, were in a granite contact zone later mined for tungsten as the Granite Creek Mine and are just north of the present Pinson open pit gold mine. In 1915, molybdenum was discovered in the district with ore containing "18% moly" being reported from the Jacks Mine. No molybdenum production was recorded, the occurrence was probably at the location of the Moly-Tonopah tungsten mine.

Tungsten was discovered in the Osgood Range in 1916, the first claims were recorded at Granite Creek and the district was actively prospected through about 1919. No tungsten production was recorded from the district, however, until 1942 when wartime demand improved the tungsten price. The major periods of tungsten production were from 1942-1945, and from 1950-1957. Production of tungsten totaled about 2 million units of WO3 and Getchell ranks third in tungsten production for Nevada.

The Getchell gold deposit was discovered in 1933 and began production in 1938, one of the three earliest disseminated gold deposits to be exploited in Nevada. Although plagued with metallurgical difficulties almost from the beginning, Getchell produced over $25 million in gold up to 1967 when the mine closed. The Pinson gold deposit was discovered in the southern part of the district in the early 1970's and is now in production. Exploration continues in the district for gold and other similar gold deposits are likely to be found within the Potosi district.

GEOLOGIC SETTING

The heart of the Osgood Range is mainly composed of sedimentary rocks of the Cambrian Preble Formation which have been intruded by the Osgood granodiorite stock. In outcrop pattern, the granodiorite forms an hour-glass configuration along the eastern slope of the range crest, while the sedimentary units form the actual range crest and wrap around the steeper portions of the north, east, and south flanks of the range.

In this area, the Preble formation is composed of a lower, phyllitic shale section, a middle limestone-rich section, and an upper carbonaceous shale and quartzite section. These rocks have been folded into a series of tight isoclinal folds, overturned to the west, whose axes now strike generally north-northeast and dip steeply to the east. The structure of the Preble Formation in the Osgood Range is very complex, and it is not known exactly where within the Preble section these rocks can be placed. The presence of numerous sections of limestone along the eastern margin of the range suggest that these rocks correlate with the middle Preble unit, and the thick shale (now hornfels) section exposed on the north, west, and southern portions of the range may correlate with the lower, shaly portion of the Preble.

The contact of the Osgood stock with the sedimentary section generally parallels the strike and dip of the intruded formations along its eastern side. The stock is a medium-grained, biotite granodiorite and has been dated as Cretaceous age (90 my). In general, the intrusive shows a lack of late-stage diking, but some aplite and dacite dikes are present locally. The granodiorite stock has a conspicuous metamorphic aureole, as much as 10,000 feet wide, within which Preble shales have been transformed to hornfels and limestones transformed to marble, light-silicate rock, and dark tactite.

The most distinctive structural feature of the Osgood range is the Getchell fault and its related, parallel fault zones. The Getchell fault system is a northerly striking basin and range type structure along the eastern flank of the Osgood Range. This steeply-dipping fault zone is traceable from Granite Creek on the south end of the range to at least two miles north of Getchell Camp. Berger and Taylor (1974) concluded that the displacement on the Getchell fault has been predominately vertical since the Cretaceous, and that the fault system controlled the emplacement of the granodiorite stock and related dikes. The fault zone is up to several hundred feet wide at points along its strike and it cuts both sedimentary units and the Osgood stock. At the Getchell Mine where gold mineralization is spacially associated with it, the fault has a definite footwall strand, a central zone, and an eastern, hanging-wall structure. All of these structures dip 45 degrees to 55 degrees to the east, with the eastern structures tending to have steeper dips.

ORE DEPOSITS

Two types of metallic deposits have been mined in the Potosi mining district. Tungsten-bearing skarns occur along the margin of the Osgood stock and disseminated gold ores occur in the Getchell fault system. Although there has been production from both types, the gold ores have accounted for the larger part of the value. In addition to metals, barite

has been mined from two localities in the range, one north of Anderson Canyon on the north end of the range, and one near the mouth of Hogshead Canyon on the southeast side of the range.

The tungsten-bearing skarn, or tactite, deposits occur around the margin of the Osgood stock where it is in contact with limestone units of the Preble Formation. On the east side of the stock, the contact with the sedimentary rocks dips about 40 degrees to 60 degrees to the east, roughly conformable to the bedding. On the west side the contact is near-vertical and in large part cuts across bedding. The tactite ores consist of scheelite in a gangue of garnet, diopside, quartz, and calcite. Minor amounts of chalcopyrite, pyrite, molybdenite, phyrrotite, galena, and pyrite occur with some ores. Silver occurs with the galena and the tactite body in Anderson Canyon (Richmond tungsten mine) was first prospected in 1874 for silver. Larger tactite masses appear to be localized by irregularities in the contact, particularly by projections of limestone into granodiorite, and the main granodiorite stock usually forms one wall of each of the ore bodies that have been mined. The ore mined ranged from about 0.3% to a little over 1% WO3, and averaged between 0.5 and 0.6% WO3. The major tungsten mines were the Riley and Richmond mines operated by Union Carbide Corporation, the Granite Creek, Tip Tip, Pacific, Valley View, Kirby, Marcus, Riley Extension, Tonopah, and Alpine mines operated by Getchell Mines, Inc.

The gold deposits of the Potosi district are epithermal-replacement deposits which are localized along the Getchell fault system and related structures. The ore zones occur most frequently in interbedded limestones and shales. The ore zones are irregular pods that are essentially confined to fault zones and are usually long, narrow features. At the Getchell Mine, mineralization is known to extend at least 3000 feet down-dip on the main structure. To date, commercial deposits have been found at three localities along the fault trend (Getchell Mine, Section 4 Pit, and Pinson Mine), and the gold ores at these deposits are typical of other disseminated gold occurrences in Nevada. The gold occurs as micron- to submicron-size particles associated with arsenic, antimony, and mercury minerals. Gold mineralization is found at numerous other localities along the Getchell structure and other deposits may be found as exploration continues in the district.

Barite occurs in two localities in the Potosi district. At the head of Anderson Canyon, on the north end of the range, bedded barite has been mined from lenticular units occurring in the Cambrian Preble Formation. At the Redhouse deposit, near the mouth of Hogshead Canyon on the south end of the range, a flat-lying barite body has been mined from part of the Ordovician Comus Formation (Papke, 1984).

Other mineral deposits in the Potosi district include the Bluebell copper prospect south of Granite Creek in the main Osgood Range, and small manganese and silver prospects in the Dry Hills to the northeast of the Osgood Range. None of these have recorded production. The prospects in the Dry Hills are interesting in that they may be related to a center of mineralization other than the Osgood stock.

GEOCHEMICAL RELATIONSHIPS

The geochemical relationships within the disseminated gold ores in the district are well documented in Erickson, 1964, and Berger, 1975. In

summary, gold in the ores occurs in association with highly anomalous arsenic, mercury, and anomalous antimony. Base metals are generally low, but tungsten is locally anomalous. Fluorite is associated with gold in some areas of the Getchell deposit. Arsenic is present in the Getchell ores up to several percent. At the Pinson gold mine, arsenic is present but is in the range of a geochemical anomaly rather than as a major component of the ore.

Samples of the tactite ores taken during this study were high in manganese, tungsten, molybdenum, and tin. Copper, lead, and zinc were locally high. Bismuth values were generally low contrasting with other skarn tungsten ores in Nevada which are commonly high in bismuth.

SELECTED REFERENCES

Berger, B.R. (1975) Geology and Geochemistry of the Getchell Disseminated Gold deposit, Humboldt County, Nevada: SME Preprint No. 75-I-305.

Berger, B.R., and Taylor, B.E. (1974) Pre-Cenozoic age for "Basin and Range" faulting, Osgood Mountains, North-Central Nevada: abstract, GSA Cordilleran section, Las Vegas, Nevada.

Erickson, R.L., Marranzino, A.P., Uteana, O., and Janes, W.W. (1964) Geochemical Exploration near the Getchell Mine, Humboldt County, Nevada: USGS Bull. 1198-A.

Hobbs, S.W., and Clabaugh, S.E. (1946) Tungsten Deposits of the Osgood Range, Humboldt County, Nevada: NBMG Bull. 44.

Hotz, P.E., and Wilden, R. (1964) Geology and Mineral Deposits of the Osgood Mountains quadrangle, Humboldt County, Nevada: USGS Prof Paper 431.

Joralemon, P. (1951) the Occurrence of Gold at the Getchell Mine, Nevada: Econ. Geology, v. 46, p. 267-310.

Papke, K.G. (1984) Barite in Nevada: NBMG Bull. 98.

Silberman, M.L., Berger, B.R., and Koski, R.A. (1974) K-Ar age relations of granodiorite emplacement and tungsten and gold mineralization near the Getchell Mine, Humboldt County, Nevada: Econ. Geol., v. 69, no. 5, p. 646-656.

Stager, H.K. (in prep.) Tungsten Deposits of Nevada: NBMG Bull.