

Oesterling, W.A., 1966, Silver potential of Allied Properties  
in the Good Hope mining district, Elko County, Nevada.

Private report - CONFIDENTIAL

(60)

late June and early July, 1966. (There are no published geologic maps of the Good Hope district.)

Item 12

(4) Location of lode mining claims in early August and early September, 1966.

(5) Geochemical survey in September, 1966. Samples were obtained from the spoil piles at each claim corner post, side-center post, and discovery post. These samples were screened to minus 40 mesh and analyzed for mercury with a Lemaire Type S1 mercury detector. Most of these same samples were also run for silver content by atomic absorption spectrophotometry. Other samples for a continuing geochemical study are being obtained from the discovery trenches on Allied's claims.

Mercury is known to be closely associated with precious metal and base-metal deposits, commonly forming a dispersion "halo" in the soil and rock surrounding these deposits (Hawkes and Webb, pp. 72-73). Sites of anomalously high mercury content or silver content are desirable places to do further exploration such as geophysical work and drilling.

#### MOUNTAIN CITY TO MIDAS METALLIC MINERAL BELT

Eight historic mining districts, including the Good Hope, form an apparent metallic mineral belt extending for some sixty miles in a northeasterly direction between Midas and Mountain City. Seven of these districts are located within three miles of the axis of the belt as drawn on Fig. 1. Average spacing of mining districts along the belt is about ten miles. The table on the following page, compiled from published literature, summarizes the recorded production and economic geology data for the eight mining districts. (Tuscarora is located 15 miles southeast of the axis of the belt, and is not considered by the writer to be pertinent to the Mountain City to Midas belt.) Total recorded production from the eight districts is \$36 million in copper, silver, gold, and minor amounts of lead and zinc. Of this total, the Rio Tinto copper mine at Mountain City produced \$21.3.

The mineral belt is parallel to the trend of a major graben (down-faulted block) located southwest of Midas, and is on strike with the north fault of the graben (Fig. 1). The graben is one of the most conspicuous structural features of this portion of Nevada, and the mineral belt is probably genetically related to it through faulting.

#### GEOLOGIC SETTING

A complex Paleozoic geology is largely masked by Tertiary lavas in this area. No Mesozoic sedimentary rocks are known in this general region, and if ever deposited, have been removed by pre-Tertiary and possibly early Tertiary erosion.

During early Paleozoic times, this region was a part of the vast Cordilleran geosyncline and was the site of marine accumulations of thick deposits of limestone and dolomite with lesser amounts of sandstone. These rocks are known as the Eastern Assemblage. At the same time, a clastic-volcanic assemblage of marine deposits was accumulating in the geosyncline some 100 miles to the west. These rocks, characterized by chert, quartzite, and a few intercalated andesitic lavas, are termed the Western Assemblage. During the Antler orogeny of late Devonian to early Carboniferous time, the Western Assemblage was uplifted, closely folded, and thrust easterly over the Eastern Assemblage. The great thrust which culminated the orogeny is the Roberts Mountains thrust. A detailed account of the complex pre-Tertiary geology of northern Nevada is given in Roberts, et al. (1958), and in Silberling and Roberts (1962).

The Roberts Mountains thrust is recognized to have localized metallic ore deposits at many of northern Nevada's mines. For example, the deposits at the Rio Tinto, Carlin Gold mine, Gold Acres, Bootstrap, and at several mines in the Aura district occur either in the thrust breccia or in the lower plate rocks. Roberts (1964) describes favorable exploration targets in north-central Nevada in "windows" of the Roberts Mountains thrust, and believes they are among the most attractive targets in western United States.

The Tuscarora Mountains in this area are composed largely of greenish-gray to dark gray andesite, and light gray to pink rhyolite and flow breccias. These lavas are several hundred feet thick in the core of the range, but throughout much of the Good Hope district they are thin and have been removed by erosion in several places to expose the Paleozoic rocks. There are half-a-dozen outcrops of the upper plate quartzite (Western Assemblage) of the Roberts Mountains thrust, and two outcrops of the lower plate carbonate rocks (Eastern Assemblage). (See Areal Geologic Map, Fig. 5.) *NE 1/4 Sec. 9 on E. So. of road - 2000 ft. W. of Good Hope shafts*  
*Center sec. 9, 1000 ft. S. of Good Hope Vert. shafts*

Basin-and-Range block faulting has displaced the Tertiary lavas and all of the older rocks primarily along northeast trending faults. A secondary, and apparently younger, set of normal faults strikes northwesterly.

#### HYDROTHERMAL ALTERATION AND MINERALIZATION

The normal-fault fissures were the conduits for hot, mineralizing fluids which the fissures tapped at depth. These hot fluids thoroughly soaked the lavas over large areas and the feldspars of the volcanic rocks have been altered to clay minerals. Silica

was introduced, and the resulting silicification of the lavas is widespread. Locally, quartz veins contain sulfides of silver, antimony, and lead, and compose the "sheeted zones" of Emmons (1910, p. 65). These lodes strike northeasterly along the principal direction of normal faulting, and northwesterly along some of the secondary faults.

In Sections 3, 4, and 9, and extending into Section 8, a very extensive zone of hydrothermal alteration and silicification trends N55°E parallel to a series of normal faults. The topography here is gently rolling for the most part, and slopes northwesterly. The alteration and silicification of andesite is prominently displayed in the banks of the washes, but is largely covered on the broad crests of topographic noses and on the hill tops. From the west edge of the Geologic Map (Fig. 5) to Chino Creek, the altered zone is 3,000 feet long and about 700 to 1,000 feet wide. The zone extends northeasterly from Chino Creek an additional 8,000 feet to the prominent NNW trending fault just east of the quartzite hill and rhyolite hill in Section 3. Along this 8,000 feet, the zone varies from 1,500 feet to more than 2,500 feet in width (see lavender colored zone on Fig. 5). *Sec. 9, 4, 3*

Outcrops of Paleozoic rocks within this major zone of alteration and silicification indicate the Roberts Mountains thrust is at shallow to moderate depth beneath the altered andesite. This is also indicated by the abundance of Paleozoic chert fragments mixed with the andesite float throughout most of the altered zone. ?

## EXPLORATION TARGETS

Exploration should be concentrated within the major zone of alteration, with the fundamental aim of locating replacement-type sulfide ore bodies in the lower-plate carbonate rocks of the Roberts Mountains thrust. The most obvious areas for such exploration lie beneath the mined areas. Geochemical surveys and induced polarization surveys should outline additional drilling targets.

Probably the most favorable target area from a geological standpoint is the 40 acres in the NE $\frac{1}{4}$  of NW $\frac{1}{4}$  of Section 9, largely covered by alluvium of Chino Creek. Here, NNW trending faults along Chino Creek intersect the major zone of alteration, and immediately to the west, the Roberts Mountains thrust strikes towards the 40-acre tract. Because this area is covered with transported soil, geochemical surveys would not be useful, but induced polarization would be of value.

Secondary exploration targets are located within the altered lavas with the aim of locating lodes similar to those that have been mined. However, such lodes are probably too small to have any great commercial value at the present price of silver. Of course, these targets as well as the deeper ones will become more attractive with a rise in the market price of silver and base metals.

The Office of Minerals Exploration, administered by the U. S. Geological Survey, has funds available to aid in silver exploration, and will pay 75% of the costs of qualified exploration projects. These funds are recoverable by the government at a 5% royalty on the sale price of minerals produced and sold. If no commercial ores are found, the funds are not repaid.