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Item 49

GEOLOGY OF THE PARADISE PEAK
GOLD/SILVER DEPOSIT
NYE COUNTY, NEVADA

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INTRODUCTION

The Paradise Peak deposit is located in northwestern Nye County, Nevada, (Section 4, T. 10 N., R. 36 E.). The closest town is Gabbs, Nevada, 8 miles to the north. Access is via State Road 89, locally known as the "Poleline Road", from Gabbs to Tonopah (Fig. 1).

The Paradise Peak deposit area is composed of Tertiary volcanic rocks of andesitic to rhyolitic composition emplaced as lava and pyroclastic flows. Silver and gold anomalies are associated with epithermal hot spring alteration. Higher precious metal values occur in silicified rhyolite tuffs surrounded by argillic alteration.

Metallized rock crops out at the top of a low rounded hill which is approximately 2,500 feet across at its base. The hill has about 275 feet of relief being surrounded by alluvium. The ore zone is approximately 1400 x 600 feet with thicknesses up to 400 feet.

Drilling indicates a fairly shallow consistent southeast dipping ore zone. Mineable ore reserves are estimated at approximately 12 million tons ore grading 0.097 oz/T gold and 3.53 oz/T silver.

Stratigraphic units fall into three groups: an older andesite group, a series of felsic tuffs, and a group of younger andesites. The Composite Tuff of the felsic group is the main ore host. The unit was originally composed of

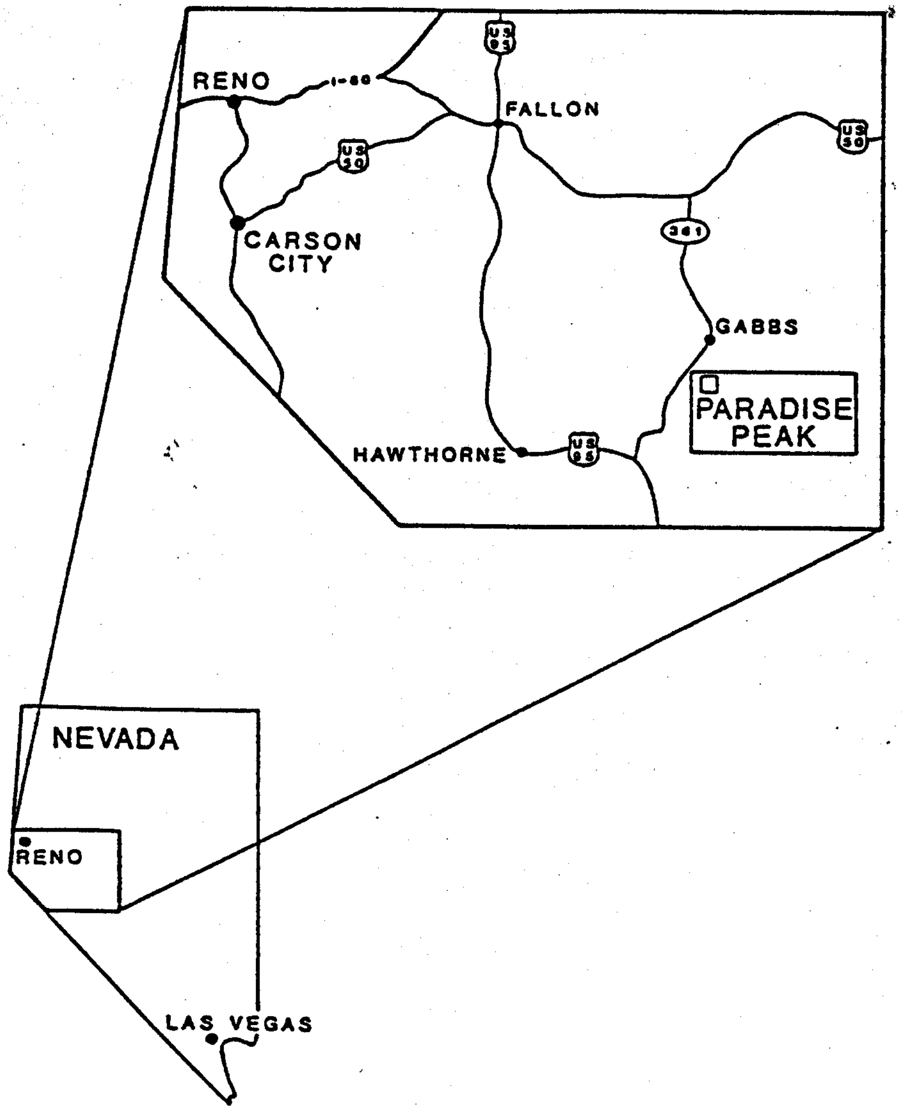
RENO
FALLON
CARSON CITY
GABBS
PARADISE PEAK
HAWTHORNE
NEVADA
RENO
LAS VEGAS

Figure 1.

pyroclastic vitric to lithic-rich rhyolite crystal tuffs. In the ore zone the Composite Tuff has been subjected to intense argillization and silicification.

There is a strong northwest-trending, "Walker Lane," structural grain throughout the area. The central part of the ore zone is structurally down dropped by a northwest trending fault zone on the southwestern edge and by curvalinear faults on the north and northeast sides.

DISCOVERY AND PRODUCTION HISTORY

During September 1982, prospectors Bill and Ardith Anell contacted FMC concerning an area of interesting visible alteration they had recognized in eastern Mineral County, approximately 2 miles west of the deposit now known as Paradise Peak. Mr. and Mrs. Anell and FMC geologists collected rock samples from the area and several contained anomalous gold. In November 1982, FMC initiated claim staking and broad area rock and soil sampling. Early in 1983, the first rock samples were collected from the Paradise Peak ore zone. In June 1983, reconnaissance drilling was initiated based on detailed surface evaluation of major gold anomalies. Four of the first five drill holes intersected mineralization in the Paradise Peak ore zone. The first drill hole encountered more than 80 feet of 0.35 oz/T gold.

Drilling of the deposit on 100 foot centers was completed by mid-1984. Detailed ore reserve calculations and mine planning provided the bases for favorable economic evaluation. Metallurgical testing and mill design were completed by the end of 1984.

Mill construction started on January 1, 1985, and was completed in early 1986. Mining and stock piling of ore commenced during December 1985. Metal extraction is accomplished by cyanide leaching in a counter current decantation circuit. After mill start-up, the first pour of silver-gold bullion occurred on April 24, 1986.

PARADISE PEAK STRATIGRAPHY

The Paradise Peak deposit is in Tertiary volcanic rocks ranging in composition from andesitic to rhyolitic. The lowest stratigraphic unit studied in the local mine area is a Latite being overlain successively by Pumice Tuff, Opalite alteration horizon, Composite Tuff, and Andesite. Composite Tuff and Andesite are cut by a fragmental breccia. The outcrop exposure and subsurface relations of these units are shown on the accompanying geologic map and cross sections (Fig. 2).

Latite

The oldest unit of consequence in the mineralized zone is a green to gray latite flow which forms a distinctive marker horizon at the bottom of the drilled portion of the rock sequence. The Latite does not crop out on or around the ore zone "knob". It may be correlative with rocks exposed along a ridge approximately 2,000 feet to the south.

Pumice Tuff

The Pumice Tuff is a coarse vitric tuff that is distinctly very pale orange to white in drill cuttings. It is poorly exposed at the surface in a few road cuts on the west flank of the ore zone hill. Surface weathering and alteration of the unit in these cuts are not characteristic of its appearance in drill cuttings and core. This unit varies from a few feet to 50 feet in thickness.

PARADISE PEAK

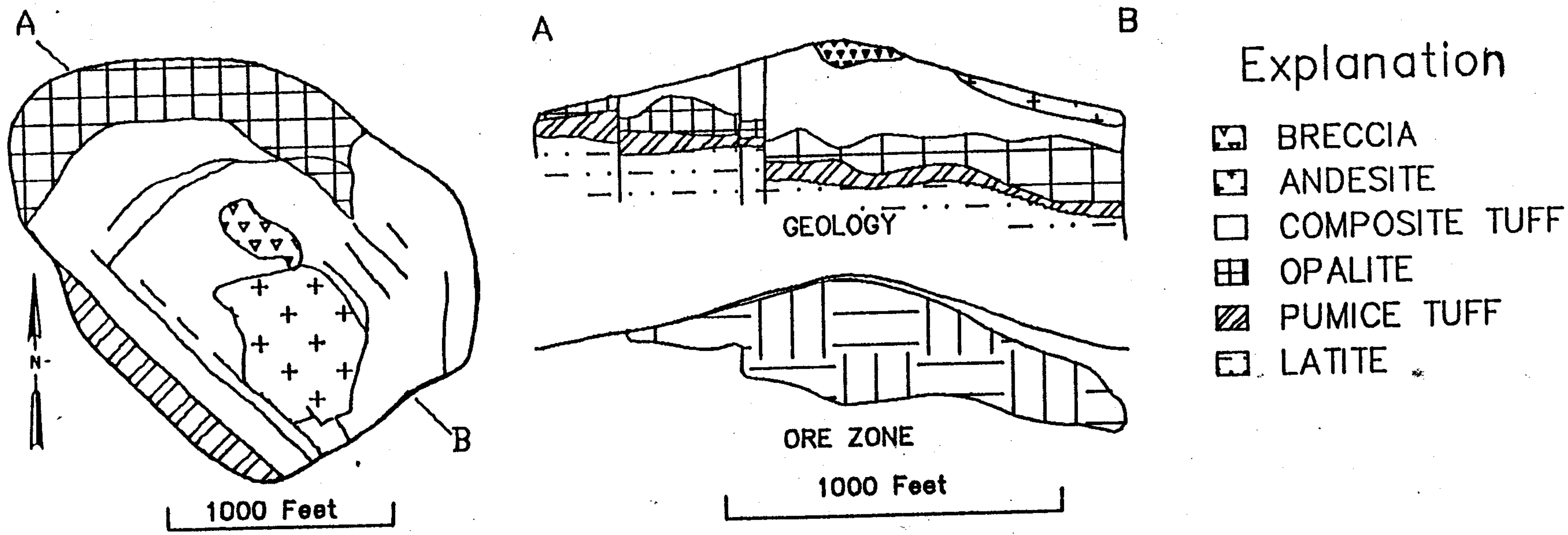

Figure 2.

Opalite

The Opalite layer is not a stratigraphic unit but a very distinctive strataform alteration horizon. It is composed of extremely fine granular cryptocrystalline quartz, coarser-grained quartz, and opal replacing the original rock. The thickness of this horizon is 40 to 180 feet, averaging approximately 80 feet.

The Opalite zone appears to be confined to the lower part of the Composite Tuff. The original rock was a welded vitric tuff consisting chiefly of large glass fragments that are streaky and kneaded into a banded fabric. The lowest section of the original rock was an irregular fragmental vitrophyre.

Zonal changes may be seen in this alteration horizon. Fine-grained quartz dominates near the center of the ore zone with silicification becoming more opaline laterally.

Composite Tuff

The Composite Tuff is a sequence of volcanic tuffs, flows, and breccias of dominantly felsic composition. The unit appears to have been originally composed of pyro-clasitc vitric to lithic-rich rhyolite crystal tuffs. There may be thin intratuff andesitic flows or intermediate composition dikes. Individual units and original rock types are difficult to determine due to the intense argillization and silicification which has affected these rocks.

Composite Tuff forms most of the ore zone knob. Here the unit is at least 300 feet thick. Surface exposures of the tuff in the mineralized zone are commonly bleached grayish-pink to dark yellowish-orange.

Upper Andesite

The Upper Andesite crops out along the south flank of the ore-zone hill. The unit appears to have been deposited conformably on the Composite Tuff. Its lower contact with the Composite Tuff dips slightly steeper than topography to the southeast. On the lower flank of the ore-zone hill the andesite is approximately 100 feet thick. The andesite is highly altered and has not been correlated with other units in the area at this time.

Siliceous Fragmental Breccia

The top of the ore-zone hill is capped by a matrix-supported hydrothermal breccia showing a jumbled array of mostly angular and variously-sized volcanic clasts. The breccia forms an irregular oval outcrop approximately 400 x 200 feet oriented northwest-southwest. In cross-section, the breccia is a downward-convergent wedge extending to a depth of 85 feet. A "root zone" has not been recognized.

STRUCTURAL GEOLOGY

Rocks of the Paradise Peak ore zone are most affected by high-angle faults and shear zones. A major northwest trending fault zone cuts off mineralization on the west side of the hill. This zone consists of several parallel faults over an area 300 feet wide. The fault zone is marked by intense clay alteration in the intermediate composition rocks. Dip-slip displacement overall is approximately 150 feet, being downthrown on the northeast. Strike-slip displacement, if present, has not been determined.

The central part of the ore zone is structurally downdropped by the northwest-trending fault zone on the southwestern edge and by curvalinear faults on the north and northeast side. The two major curvalinear faults cutting the northwest part of the ore zone appear to have had dominantly post-mineralization offset. The faults offset stratigraphy and mineralization approximately 100 feet across the area. These faults are expressed on the surface by silicified breccia zones. The western ends of the faults are terminated by the west side fault zone.

The two curvalinear faults merge on the north edge of the ore zone and curve to the southeast. As the fault continues to the southeast it splinters into at least three segments. Offsets all along the faults downdrop the central ore zone area.

FORM OF THE OREBODY AND DISTRIBUTION OF MINERALIZATION

The ore zone may be idealized as having the shape of a flattened elongate elipsoid. The mineralized zone is approximately 1400 feet in its longest dimension, trending northwest-southeast, dipping 25^{o} to the southeast. The average width is approximately 600 feet with thicknesses up to 400 feet.

The main section of the ore zone is found within the Composite Tuff and upper part of the Opalite layer. Approximately 49% of the mineralization is in the Composite Tuff having an average grade of .107 oz/T gold and 3.9 oz/T silver. The Opalite layer contains 36% of the ore with an average grade of 0.74 oz/T gold and 2.5 oz/T silver. A minor percentage of ore is found within the capping Siliceous Fragmental Breccia which is all strongly mineralized. Only a few weakly mineralized intercepts were encountered in the other units.

ORE MINERALOGY

Precious Metals

Gold occurs as relatively pure native gold. Silver occurs as the silver halide, cerargyrite, less commonly as the silver sulfide, acanthite, and as native silver. Due to the small size of the ore minerals identification in most cases is possible only by ore microscopy and/or scanning electron microscope.

Native gold is relatively pure as indicated by the deep gold-yellow color in polished section. The coarser-grained native gold appears lumpy or platey, finer-grained native gold is mostly platey. Native gold was observed to occur most frequently as inclusions in cerargyrite and as disseminations in quartz aggregates.

Silver has undergone an intricate sequence of alterations. Early forming native silver has been pervasively replaced by cerargyrite. Ceragyrite was in turn replaced by acanthite. All these types of alteration appear to have occurred under hypogene (ascending solution) conditions rather than by supergene enrichment.

Several minerals appear to be closely associated with the precious metal mineralization. These include: pyrite and its dimorph marcasite, bismuthian stibnite, barite, cinnabar, native sulfur, orpiment, and realgar.

HYDROTHERMAL ALTERATION

Chemical and mineralogical changes produced in the host rocks by the mineralization and related processes may be classified as silicification, pyritization, and intermediate and advanced argillization. Of these, silicification is most closely associated with gold-silver mineralization.

Silicification within the ore zone host rocks was intense. The main ore host, Composite Tuff and its lower vitrophyre section, have been flooded with secondary silica. Several episodes of silicification or re-silicification can be distinguished. The Composite Tuff initially had a fairly

GEOLOGICAL SOCIETY OF NEVADA

1986 FALL FIELD TRIP ROAD LOG

- SPECIAL PUBLICATION NO. 5 -

PARADISE PEAK DEPOSIT, SANTA FE DEPOSIT, CANDELARIA DEPOSIT

September 19-21, 1986

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