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SAVAL/STEER CANYON AREA

1990
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F.M.G.C.

INTRODUCTION

The Saval/Steer Canyon area is one of the original gold anomalies located during regional antimony reconnaissance by FMC Corporation in the early 1970's. The first exploration drilling was conducted in 1974 with nine shallow holes, all of which intersected strong, but erratic gold mineralization. During the following years, 1975 through 1987, geologic mapping, soil and rock chip sampling, and 214 drill holes were completed. A modest mineable reserve was defined in Saval Canyon and several small areas of gold mineralization were located in Steer Canyon. During 1988 and 1989, added emphasis was placed on the Saval/Steer area and approximately 597 drill holes were completed. To date, a mineable reserve containing over 600,000 ounces of gold has been identified but not completely delineated.

STRATIGRAPHY

Saval and Steer Canyons are underlain by folded and faulted lower Paleozoic rocks of the upper and lower plates of the Roberts Mountains thrust. The lower plate formations which crop out over most of the area through a window in the upper plate include the Ordovician Eureka Quartzite, the Ordovician-Silurian Hanson Creek Formation, and the Silurian-Devonian Roberts Mountains Formation. These units were deposited in a miogeosynclinal basin. The upper plate rocks consist of siltstone, argillite, chert, and intermediate to mafic flows of the Ordovician Snow Canyon Formation. This assemblage was deposited in a eugeosynclinal basin.

The Eureka Quartzite crops out in Steer Canyon and is commonly intersected by deeper drill holes in Saval Canyon. The Hanson Creek Formation is divided into five lithologic units(Hawkins, 1982). The basal unit is an interbedded dolomitic limestone with chert lenses locally and siltstone. A small outcrop of these rocks occurs in Steer Canyon. Unit 4, a carbonaceous dolomitic limestone and limestone with chert nodules, crops out mostly in Steer Canyon. The third unit is a carbonaceous, micritic limestone with clayey, dolomitic, limestone partings and is well exposed in both Saval and Steer Canyons. Unit 2, a dolomitic limestone, crops out to a lesser extent. In the project area, unit 1 is well exposed and is pervasively silicified to an interbedded, dark-grey jasperoid and black chert. The overlying Roberts Mountains Formation is a carbonaceous, dolomitic siltstone with occasional interbeds of limestone. The less resistent siltstone forms extensive, gradual slopes with platy float in the upper parts of Saval and Steer Canyons.

The Ordovician Snow Canyon Formation which surrounds the lower plate rocks in the upper elevations of Saval and Steer Canyons forms gentle slopes of soil and float. The Snow Canyon units, where exposed in road cuts and in drill hole intercepts, are moderately to strongly oxidized.

Tertiary dikes of intermediate to mafic composition cross the project area, generally, in a northwesterly direction. The dikes form poor outcrops and are primarily exposed in road cuts.

STRUCTURE

The Jerritt Canyon district has undergone multiple episodes of folding and faulting from early Paleozoic time through Miocene Basin and Range tectonism. Gentle folding and uplift during the Ordovician and Silurian Periods produced local unconformities between the Roberts Mountains and Hanson Creek formations(Dahl, 1989). East-west compressive forces during the Mississippian Antler Orogeny placed the western eugeosynclinal Snow Canyon Formation over roughly time-equivalent, eastern miogeosynclinal Roberts Mountain and Hanson Creek formations along the Roberts Mountains thrust (Merrian and Anderson, 1942; Roberts et al., 1958). Where exposed in road cuts and intersected in drill holes, the Roberts Mountains thrust is marked by oxidized Snow Canyon Formation and contorted, weak to unoxidized Roberts Mountain Formation.

The Permo-Triassic, Sonoma/Nevadan Orogeny produced north-south compression developing east-west-trending, south-verging folds and low-angle faults(Dahl, 1989), such as the Saval fault. The Saval fault usually occurs between unit 1 of the Hanson Creek Formation and the overlying Roberts Mountains Formation; however,it frequently cuts across units 1, 2, and 3 placing the Roberts Mountains Formation on units 2, 3, and 4. The fault is generally marked by oxidation, argillization, or silicification; commonly brecciation; and intermediate to mafic composition dikes. In Saval Canyon, the surface trace of the Saval fault outlines a, generally, east-west trending-anticline with an easterly plunge(Loranger, 1985). The western extent of the Saval anticline is disrupted by northeasterly-striking, high-angle faults; thus, it is not clearly outlined in Steer Canyon. However, outcrops of Eureka Quartzite flanked by the younger Hanson Creek Formation indicate an anticline is also in Steer Canyon.

The Cretaceous, Sevier/Laramide Orogeny produced north-south-trending folds and east-west-, northeast-, and northwest-striking faults(Dahl, 1989). North-south folds are not, to date, evident in the Saval/Steer Canyon area. However, there is a prominent set of east-west- to east-northeast-trending, high-angle faults across the central part of Saval Canyon. Extensional tectonics produced northeasterly-trending, high-angle faults in the Oligocene, and northwesterly-striking faults and intermediate to mafic composition dikes in the Miocene(Dahl, 1989). The N50°-60°W striking dikes in the Saval/Steer area were implaced in the latter event. Basin and Range tectonism in the Miocene produced north-northeast and north-northwest-striking high-angle faulting.

Northwest- and northeast-striking, high-angle faults are readily evident in the Saval/Steer area. A prominent northeast-striking fault in Steer Canyon and across the district is the Mill Creek fault(Hawkins, 1973). Other subparallel, northeast-striking faults occur in Saval Canyon. A major northwest-striking fault, called the SC fault, has been mapped in the main branch of Saval Canyon. These northly-striking faults offset east-west- to east-northeast-trending faults.

MINERALIZATION AND ALTERATION

Favorable sites for gold mineralization and associated alteration occur at the intersections of high-angle faults with structurally permeable zones proximal to the Saval fault and lithologically permeable zones in close proximity to the contact between units 3 and 4 of the Hanson Creek Formation. Permeable zones along the high-angle faults may also contain gold mineralization.

Silicification is interpreted as the earliest and dominant alteration event in the Jerritt Canyon district(Birak and Hawkins, 1985). In the Saval/Steer area roughly tabular jasperoid bodies stand out in relief from the surrounding unsilicified rocks. The bold jasperoid outcrops occur most often within sections of unit 1 and to a lesser extent in units 2 and 3 of the Hanson Creek Formation beneath the Saval fault. Drilling shows unit 1 to be pervasively silicified throughout the area, unit 4 to be very frequently silicified at its contact with unit 3, and units 2 and 3 be occasionally silicified.

Other forms of alteration include oxidation, argillization and carbonization. Oxidation and argillization generally occur together in all rock types. Oxidation is also commonly associated with silicification. Carbonization produces sooty-black, somewhat decalcified zones in the third unit of the Hanson Creek Formation and the Roberts Mountains siltstone. Intermediate to mafic composition dikes are always either propylitized or argillized and oxidized.

Gold-bearing hydrothermal solutions are interpreted to have ascended along high-angle faults and migrated along permeable zones adjacent to the Saval fault and near the contact between units 3 and 4 of the Hanson Creek Formation (Loranger, 1985). The east-west-, northwest-, and northeast-striking, high-angle faults and the N50°-60°W intermediate to mafic composition dike structures appear to have been the prime pathways. The resulting orebodies are generally tabular in form and concordant with either the Saval fault or the bedding and thickest adjacent to the high-angle faults.

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