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Geologic Report

LOS COMPADRES PROPERTY

Red Mountain District
Esmeralda County, Nevada

Arthur Baker III
July 1, 1963

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SUMMARY AND CONCLUSIONS

The Los Compadres silver property, consisting of fourteen unpatented mining claims owned by the partnership of Baker and Davis, is in the Red Mountain Mining District, Esmeralda County, Nevada. A small part of one claim is leased to the company developing the adjacent property, and surface rights to parts of several claims are leased to the same company. A single non-owned claim, the Olaf claim, lies in the middle of the property.

The Silver Peak Mountains, in which the Red Mountain District lies, are made up of Tertiary rocks lying on a basement of older metamorphosed limestones and dolomites intruded by acidic rocks. The metamorphosed basement rocks outcrop all around the mountain range, suggesting a more or less flat surface, and the Tertiary rocks lie more or less flat above the basement. The lowest Tertiary formation is the Esmeralda formation, made up of clastic rocks, with highly variable thickness. Above this formation lies a series of rhyolitic flows and tuffs, and finally an uppermost series of andesite flows. In the middle of the Red Mountain District is a group of anomalous andesitic rocks that are interpreted to be an old volcanic pile, probably built up around a group of vents through which at least some of the andesite flows were extruded.

There are three sets of faults in the region. One set strikes about N 20° E and dips steeply northwest, the second set strikes about N 65° E and dips steeply southeast, and the third set strikes N 65° W to Due West and dips steeply either north or south. Displacements are as much as 300' on individual members of each set, and the northeasterly faults, at least, are normal faults. As a rule, northeast faults offset northwest ones, but the reverse is locally true. Faults of all three sets cut and offset the

youngest rocks in the region. There is no evidence of thrust faulting.

The Red Mountain District is about five miles long by a mile wide, trending westerly to northwesterly -- it may be localized by a pre-Tertiary major northwest fault zone, but this is not exposed in the Tertiary rocks. The veins of the district (most of which are too small to be of economic interest) occur at intervals of a few hundred feet, and all strike transverse to the trend of the district: they are localized in faults of both of the northeast-striking sets. They are fissure fillings of quartz, calcite and siderite, with rare sparse galena, sphalerite, pyrite, barite and argentite (?). Calcite and siderite were the first minerals deposited, filling the veins, and quartz was later introduced as narrow veins coursing through the carbonate filling. Silver mineralization was apparently very late, and is invariably associated with quartz -- the carbonates are barren. On all of the explored veins there is a leached zone extending to depths of as much as 350', from which most of the silver values and part of the carbonates have been removed. The leached zone averages about 2 oz. Ag, and because of squeezing in of walls as carbonate is removed, the vein is narrow; in most places, veins that average 20' wide and more at depth outcrop only 3' to 5' wide, with the outcropping vein matter a loose mass of slabby quartz fragments. Each vein has, along one side, a zone of chloritization of the wall rock, and along the other side a wider zone of silicification. The chloritization occurs only immediately adjacent to veins, but silicification also affects large areas not associated with any visible veins.

Only three veins in the district have been explored to a significant depth. The Nivloc Vein produced 350,000 tons of ore averaging about 13 oz. Ag, and the Mohawk (Argentite) Vein has produced about 30,000 tons of ore averaging 23 oz. Ag. The Sixteen-to-One Vein, on the property adjoining Los Compadres, has been diamond drilled, and is now being developed; the

drilling indicates about 100,000 tons of ore.

The Los Compadres property is in the middle of the district, two miles from the Nivloc Mine to the east and the Mohawk Mine to the west, and half a mile southeast of the Sixteen-to-One Vein. The Los Compadres and Sixteen-to-One properties lie in the western part of the outcrops of the old volcanic pile and in an area where faulting is much more intense than anywhere else in the region: in an area half a mile square several major northeaster faults of both sets interweave and interconnect, and two or three northwester faults are chopped into short segments.

The three veins on the Los Compadres property, the Burney, Patience and Kathy Veins, together with the Chico Vein on the non-owned Olaf claim, form a crude zig-zag pattern. The Burney and Kathy Veins strike northerly and dip west, while the Chico and Patience Veins strike easterly and dip south; the Patience and Kathy Veins intersect under shallow cover, and the Chico and Burney Veins probably intersect at depth. Outcrops of all of the veins are mostly in the range of 3' to 5' wide, but three of them should widen to four or five times these widths below the leached zone; the Kathy Vein, which is predominantly quartz, probably will not widen appreciably. The outcrops have the 2 oz. Ag assays typical of the leached zone in this district.

Three diamond drill holes were drilled for the Burney and Chico Veins by the former owner in 1962. The hole aimed for the Burney Vein did not reach it because of a misconception as to the dip of the vein. The two holes into the Chico Vein reached the vein in the leached zone, and found only typical leached-zone values -- one to four ounces of silver. Thus, this drilling accomplished nothing in the way of proving or disproving the presence of ore in the veins.

The Los Compadres veins are identical to the known ore-bearing veins of the district in every respect, and are large enough to carry economic ore bodies. The fact that silver is present in the veins is demonstrated by the low silver values obtained from outcrop samples, and the evidence of the other veins leaves no doubt that better values have been leached out of the upper parts of the veins. There is every reason to expect that higher-grade silver mineralization is present at depth. The only basis on which to estimate the size and grade of the orebodies that might be expected is the size and grade of the orebodies on the other veins of the district. Using the averages of these, a total of 260,000 tons of ore with recoverable value between $15 and $20 per ton is estimated for the Los Compadres veins, or 360,000 tons for the Los Compadres and Olaf properties together. This estimate is made simply to give an idea of the size of the target one is shooting at on the property; while the grade should be reasonably close, the tonnage might well be off 50% either way. Because of the intensity of the faulting and the wide range of rock types at depth, there is a slim chance that the exposed veins might lead to larger orebodies somewhere below, where structure or stratigraphy were more favorable than at the exposed horizon.

Two diamond drill holes, costing about $15,000, are recommended as a minimum test of the property, with several more holes to be drilled at a total drilling cost of about $50,000 if the first holes are encouraging.

GENERAL

The Los Compadres silver property consists of fourteen unpatented mining claims in the Red Mountain (Silver Peak) Mining District, Esmeralda County, Nevada. Thirteen of the claims form a contiguous group, while the fourteenth claim, the Dotty, lies west of this group, separated from it by unpatented claims under other ownership (see Drawing No. LCB 1 for claim layout). Following is a list of the claims, with recordation data:

Name	Book	Page
Morelos	1-P	319
Hidalgo	1-P	320
Dotty	1-O	590
Burney No. 1	1-P	308
Burney No. 2	1-P	309
Patience No. 1	1-P	308
Patience No. 2	1-P	308
Chico No. 1	1-P	326
Chico No. 2	1-P	326
Carumba No. 1	1-P	325
Carumba No. 2	1-P	325
Caballo No. 1	1-P	324
Caballo No. 2	1-P	324
Caballo No. 3	1-P	325

The Olaf claim, an unpatented claim, predating any of the Los Compadres claims, and owned by James Gavin and Harvey Humphreys of Silver Peak, Nevada, lies in the middle of the Los Compadres group.

The Los Compadres property is owned by the partnership of Baker and Davis, 162 Sneden St., Bishop, California. Callahan Mining Corporation, the original owner, has the right to provide any financing the property requires, on the same terms as any bona fide offer from any other individual or organization. Surface rights to parts of some of the claims have been leased to Mid-Continent Uranium Corporation, along with an easement to drive a tunnel across the Hidalgo claim, and in addition, Mid-Continent holds a mining lease on the part of the Hidalgo claim extending 300' on each side of the tunnel center line.

The property is reached from the village of Silver Peak by 8 miles of graded State Highway 47 as far as the abandoned Nivloc Mine, and thence by two miles of dirt road passable for passenger vehicles. Some housing is available in Silver Peak; there are no buildings on the property. A spring on the Hidalgo claim makes about 5 gpm of water, and abundant water is available in Silver Peak. The elevation of the property is about 7,000'. A 200 tpd cyanide mill in Silver Peak, built in the 1950's, is currently idle. The nearest supply point is Tonopah, 60 highway miles northeast, and the nearest rail point if Mina, 60 highway miles north.

Two mines in the Red Mountain District have made appreciable production in the past. The Nivloc Mine, two miles east of Los Compadres, produced in the late 1930's 350,000 tons of ore averaging 0.05 oz. Au, 11 oz. Ag (recovered grade), and the Mohawk (Argentite) Mine, two miles west of the Los Compadres, has produced about 30,000 tons of ore averaging 20 oz. Ag and almost no gold (recovered grade). There has been no production from the Los Compadres property.

The veins (see Drawing No. LCB 1) on the Los Compadres property, and those on the adjoining Sixteen-to-One property (controlled by Mid-Continent

Uranium Corporation) have been known for at least thirty years, and probably much longer. On the Sixteen-to-One Vein three shafts were sunk over the years, none to a depth of more than 100', and none finding oregrade material. On the veins of Los Compadres, the only old work was shallow pits and two or three 10' adits.

In 1961 Callahan Mining Corporation acquired the Sixteen-to-One property and the isolated Olaf Claim, and located in addition the fourteen claims now comprising the Los Compadres property. During 1961 Calahan mapped the entire Red Mountain district on an aerial photo base to a scale of 1" = 2,000', plane-table mapped the central part of its claim area on a scale of 1" - 200', and drilled four holes into the Sixteen-to-One Vein. In the summer of 1962, Callahan drilled three holes into the Chico and Burney Veins on the Olaf Claim, and one more hole into the Sixteen-to-One Vein. The present writer was in direct charge of the 1961 work, and associated to some extent with the 1962 work. Early in 1963 Callahan abandoned its efforts in the district, returning the Sixteen-to-One and Olaf properties to their owners and quitclaim deeding the remaining claims to Arthur Baker III, retaining the right mentioned above.

REGIONAL GEOLOGY

Stratigraphy

The Silver Peak Mountains are composed of Tertiary sediments and volcanic rocks, lying on intricately folded and intruded Mesozoic or Paleozoic metamorphic rocks, predominantly limestones and dolomites. The basement rocks outcrop all around the edges of the mountain range, but not within it, suggesting that on the scale of the entire range, the basement surface is essentially flat. They outcrop three miles east of the Los Compadres property, and are present at a depth of 300' in the Nivloc Mine, two miles to the east, where they are said to have formed the host rock for all of the ore that was mined. There are no basement rock exposures closer to Los Compadres, and drilling to a depth of 1,000' at the adjacent Sixteen-to-One did not reach the basement, so for present purposes the basement rocks are considered to have no importance.

The Tertiary rocks on a regional scale are also essentially flat-lying, though with local dips as steep as 30°. The rocks are divisible into three units: the Esmeralda formation lying directly on the basement rocks, a rhyolitic unit above the Esmeralda, and an uppermost andesitic unit.

The Esmeralda formation, which is composed of a series of conglomerates, snadstones and shales, was gently folded and eroded before deposition of the overlying volcanics, so that its thickness at any given place is not predictable. It is reported to reach a thickness of 2,000', but at the Nivloc Mine only about a 300' thickness remains between the basement complex and the overlying volcanics. In the vicinity of Los Compadres, the Sixteen-to-One drilling did not reach the Esmeralda formation, so it is probable that this formation, like the basement complex, lies too deep to be of immediate concern.

The rhyolitic unit of the volcanics is restricted to an area several miles in diameter on the southeast side of the mountains; the Red Mountain district lies within this area. North of the district the unit consists of a tuff bed a few hundred feet in thickness, overlain by a rhyolite flow of unknown but probably not great thickness. In the Los Compadres area and eastward, it is represented by rhyolite tuffs and flows with an aggregate thickness of perhaps 400'.

The andesite unit, comprising the youngest extrusive rocks, outcrops over most of the mountain range, except in the central parts of the Sixteen-in-One and Los Compadres properties; it is present around the edges of the properties. In the Callahan mapping, only two subunits of the andesite were encountered: a lower hornblende andesite of extremely variable thickness, and an uppermost red latite porphyry. The hornblende andesite, which outcrops near the west edges of the properties, was apparently a local basal member of the andesites, extruded onto an extremely irregular erosion surface of rhyolites. The red latite porphyry appears to have been the last flow in the vicinity of the district. It is at least 600' thick, and outcrops over an area of at least fifteen square miles, capping all other rocks. It has been eroded off in the Los Compadres area, but outcrops within a mile in all directions. To the west it lies on hornblende andesite, while eastward it lies on rhyolites and Esmeralda formation.

In the immediate vicinity of the Sixteen-to-One and Los Compadres properties is a group of atypical volcanic rocks that do not fit with either the rhyolite or andesite units as seen in other areas. These are andesites, andesite breccias and basalts; their basic character indicates that they are related to the andesite unit, but their field relations and detailed rock types are unlike the ordinary rocks of the andesite unit.

The most abundant of these rocks is andesite breccia, which outcrops over an area of one square mile at the east end of Los Compadres and extending farther east and northeast. This rock is predominantly a microcrystalline andesite, usually containing numerous feldspar phenocrysts up to 5 mm in diameter, and almost everywhere containing many fragments of other rocks -- many places the fragments make up 30% of the rock. The most abundant fragments, and in most places the only ones, are of andesite little different from the matrix but distinguishable from it by distinct fragment boundaries and minor differences in texture. In places, however, fragments of all other rocks of the district -- rhyolites, Esmeralda formation sandstones and basement complex limestones and intrusives -- are found. The fragments are mostly angular to subangular, and are of all sizes from barely-distinguishable to 150' in diameter -- the latter being two masses of Esmeralda conglomerate near the center of the map area of Drawing No. LCB 1.

The non-breccia andesites of this group of rocks outcrop in scattered patches throughout the area of andesite breccia and for half a mile farther west. Outcrop areas are as much as 1,500' in diameter, with the largest ones surrounded by andesite breccia and smaller ones in other rocks. These andesites are megascopically indistinguishable from the andesites that form the matrix and fragments of the andesite breccia; the only difference is that they do not contain fragments.

Near the northwest edge of Los Compadres are several areas of dense microcrystalline basalt, locally containing rare phenocrysts of olivine.

Of these three rocks, the andesites and the andesite breccia locally are clearly intrusive into the associated rhyolites and tuffs, into the basalt, and into each other as well. The basalt may be either intrusive or extrusive -- there is no definitive evidence either way.

Three features of these rocks set them apart from the other rocks of the Silver Peak Mountains: their local intrusive nature, their relatively odd petrography (particularly the lack of glassy phases) and their limited and erratic distribution. The most reasonable interpretation that can be made of these features is that these rocks represent a partly-eroded volcanic pile. Since the rocks intrude rocks of the rhyolite unit, they are younger than that unit, and their composition suggests that they are related to the andesite unit of the Tertiary volcanics. The red latite porphyry that is the youngest rock of the region surrounds the outcrops of the old volcanic pile, locally overlying andesite breccia, but field relations are obscure, and the distribution of the two kinds of rocks leaves unanswered the question whether the red latite porphyry surrounded the pile (possibly being extruded from it) or whether the pile was partly eroded and then covered by red latite porphyry. In either case, it seems likely that this pile represents the group of vents through which some of at least the earlier parts of the andesite unit were extruded. Possibly the intrusive andesite areas are actual volcanic necks, while the andesite breccia and basalt are predominantly flows and sills making up the pile.

Faulting

There are two main sets of faults in the district, both striking northeast. Faults of one group strike N 20° to 30° E and dip 45° to 70° NW, with local steeper dips. Those of the other northeast set strike about N 65° E and dip steeply southeast. Both sets are normal faults, with displacement on individual faults as much as 300'; because of the erratic distribution of rock types, however, the displacement on only a very few faults can be estimated. The N 65° E faults seem to predominate in the Red Mountain district, but

several miles northeast, in the old Silver Peak gold district, the more northerly strikes predominate. A few faults of each group are traceable for lengths of as much as three miles.

Much less numerous than the northeast faults are faults with strikes of N 60° W to Due West, and steep to vertical dips. These faults, too, have displacements of about 300', where measureable.

There is no evidence of thrust faulting in the Red Mountain district or the surrounding area.

The most striking thing about the fault pattern, viewed on a regional map, is an area of numerous and complex faults in the western part of the volcanic pile postulated above -- centering in the Sixteen-to-One and Los Compadres properties. Elsewhere in the region, individual faults are traceable for greater or lesser distances, but they are widely spaced and few of them intersect other faults. In the area in question, however, several half-mile-long N 20° E and N 65° E faults, and at least two N 65° W faults, intersect and interconnect to form an intensely faulted block of ground about half a mile square. The map of Drawing No. LCB 1 covers the central part of this faulted area, but few of the faults are shown unless they contain veins: the mapping was done hurriedly to show the topography and general distribution of veins and rock types, with little interpretation, and the area covered was not large enough to trace faults in from surrounding relatively simple areas. Of the contacts shown on LCB 1, many or most of the ones that are not intrusive are probably fault contacts.

The oldest faults in the district are the northwest-striking ones, which are offset by northeast faults of both groups in several places; however, there are also places where northwest faults apparently offset northeasters. The two sets of northeast faults appear to be of essentially the same age, or

at least genetically related, because they do not cut and offset each other, but rather join and part at acute angles. Possibly this is only an apparent effect caused by their only slightly divergent strikes, and in the third dimension they do cut and offset each other. Faults of all three groups cut and offset the red latite porphyry, so at least the final movement on all three groups was post-volcanism.

Alteration

Two types of alteration have been recognized in the district: widespread silicification of country rock, and much more limited chloritization of wall rocks along veins.

The silicification occurs in irregular patches ranging from a few feet to at least one thousand feet in diameter. Northeasterly trends, parallel to the veins of the district, are usually pronounced, though some of the larger masses tend to be equidimensional with only marginal projections showing the northeasterly trend. There is a close relationship between the silicification and the veins, since every vein is accompanied by a silicified mass on at least one wall of the vein, and usually on both sides. However, not all silicified masses are accompanied by outcropping veins: a large mass of silicified rock north of the Los Compadres veins contains only small stringers, although the vein structures persist far into the mass, and the large silicified mass north of the Sixteen-to-One Vein is similarly barren. Possibly these large silicified areas are barren capping over deeper vein groups, but this is pure speculation.

No petrographic work has been done on the rocks of the district, so the detailed effect of silicification cannot be described. Megascopically, the silicification has produced a very hard, erosion-resistant rock that still retains some of its original texture. In andesite breccias, the original dark

color of the rock is bleached to a brownish cream, and partly as a result of this the phenocrysts are fuzzy and obscure, or in some areas obliterated completely. The breccia fragments in silicified rock apparently have been completely obliterated in some silicified areas (or were there no fragments to start with?) but in general silicification leaves the fragments still recognizable, with color and hardness slightly different from the matrix andesite. In rhyolite, silicification produces little visible effect other than hardening, since this rock is light-colored to start with.

Except for rare small stringers of quartz that are interpretated to be simply veinlets of the mineralization phase, the silicified rocks contain no megascopically visible quartz: that the alteration actually was silicification is assumed from the hardness of the resulting rock. The universal light brown staining of weathered surfaces suggests that some pyritization accompanied silicification, but pyrite is very rare in drill cores from unoxidized areas, and pyrite casts are equally uncommon in outcropping rocks.

Wall rock alteration along veins is limited to a zone not more than 100' wide along almost every vein more than two or three feet wide. This last statement is tantamount to saying that the alteration occurs only along veins containing carbonates, since carbonates occur only in the wider veins, and none of the narrower, pure-quartz veins are accompanied by alteration. Whether there is a genetic connection between carbonate vein filling and wall rock alteration is unknown, but the spatial relationship raises suspicions.

To the best of the writer's knowledge, only andesite breccia is affected by wall rock alteration, possibly because in the known exposures only andesite breccia is in a position to be altered. The alteration is found only along one wall of each vein, usually the hanging wall, while the other wall of each vein is silicified rock. As far as can be seen megascopically, the alteration

consists of chloritization of the groundmass of the andesite, with little or no effect on feldspar phenocrysts. Commonly breccia fragments are more thoroughly chloritized than the surrounding matrix, probably because of slight differences in chemical composition. The altered rock is soft and dark, with phenocrysts standing out conspicuously. While outcrops of altered rock are but little iron-stained, drill cores show that it contains small amounts of disseminated pyrite -- much more than the silicified rocks. The pyrite is most abundant in the most thoroughly chloritized areas, and commonly occurs in highly-chloritized fragments while surrounding less-chloritized matrix carries none. Probably the pyrite is formed from iron that was left over from the chloritization of the basic rocks.

Mineralization

In all of the veins of the Red Mountain district silver is the only economically important metal. Gold is everywhere present in them, but in general the silver : gold ratio is at least 100 : 1 and the district average is closer to 500 : 1. About eight miles northeast of the Red Mountain district is the Silver Peak district, which saw its heyday in the early 1900's; here the ratios are reversed, with gold the important metal and virtually no silver.

The Red Mountain district is an arctuate area five miles long by less than a mile wide, trending westerly at its east end and swinging around to a northwesterly trend at its western end. This trend suggests that the main localizing control for the district is a zone of weakness along a pre-Tertiary major fault of the northwest-striking group. The postulated fault is stipulated to be pre-Tertiary because there is no such strong zone cutting the Tertiary rocks -- the two or three northwest faults in the district are relatively minor. The veins of the district all strike northeasterly, transverse to the trend of

the district as a whole; they lie in the northeasterly-striking faults.

Veins and stringers are found at intervals of a few hundred feet from one end of the district to the other, but most of them are short and narrow. Mineable lengths and thicknesses of ore-grade mineralization so far have been found at only three places; the Nivloc Mine near the east end of the district, the Mohawk Mine near the west end, and the Sixteen-to-One Vein in the middle. As has been mentioned earlier, the Nivloc produced about 350,000 tons of 11 oz. Ag ore, and the Mohawk at least 30,000 tons of 20 oz. Ag ore (recovered values). The Sixteen-to-One has not had any production, but diamond drilling indicates at least 100,000 tons of 10 to 20 oz. Ag ore. The Los Compadres property, subject of this report, has not been explored. It lies adjacent to the Sixteen-to-One.

All of the district's veins are fissure fillings, with little or no replacement of wall rocks. The filling material is fine, dense white quartz and coarse-grained carbonates -- calcite, siderite and probably mangano-siderite -- in varying proportions. Other vein minerals are few and sparse: galena and sphalerite occur sporadically, while a silvery-gray sulfide, probably argentite, is found in ore-grade parts of the veins, and one occurrence of wire silver was found in the Sixteen-to-One drilling. Small amounts of barite have been reported from both the Nivloc and Mohawk Mines.

Where the veins have not been leached by weathering processes, the carbonate-quartz filling is solid and massive, with little open space. Although narrow veins usually contain quartz only, carbonates predominate in all the veins large enough to be of economic interest, with quartz present as two- to four-inch stringers threading through the carbonates and, usually, as a single wider band against one wall or the other. Apparently there are no openings at all in the carbonate parts of the vein, but in the quartz stringers small

narrow vugs lined with tiny quartz crystal terminations are common, and some post-quartz fractures are found.

Silver minerals are mostly too rare, even in ore-grade material, to present much evidence as to their mode of occurrance. One thing that is clear from assay data is that nearly all of the silver is associated with quartz: carbonate intervals rarely contain more than one ounce of silver. This association of silver with quartz has been noted throughout the district. Argentite (?) in the Sixteen-to-One Vein is all associated with quartz. Some is disseminated in fine grains through narrow irregular stringers of dark quartz that thread through the ordinary quartz parts of the veins; the appearance of this kind of argentite suggests a primary origin. Some argentite occurs as fine crystals mixed with equally fine crystals of quartz to form porous spongy masses in vugs or fractures in the common vein quartz; this may be secondary. Gold values are closely associated with silver values, the best grade of both occurring together, which tends to make one wonder a little about secondary enrichment. The highest gold assay obtained from Sixteen-to-One was 0.445 oz. Au, but gold has not been identified in any of the vein material the writer has seen. Presumably it is native and very fine-grained.

The upper parts of the veins are thoroughly leached by meteoric waters. As seen in workings on the Sixteen-to-One Vein, part of the carbonate filling has been leached out to depths of 100' or more, leaving the vein filling as a vuggy jumbled mass of slabby quartz fragments and partly-leached carbonates, more or less cemented by secondary carbonates and with some vugs lined with dolomite crystals. Most of this leached filling has a brown color probably resulting from standing by iron released from siderite. There is almost no limonite of the kind to be expected from sulfides, which is not surprising in view of the extremely sparse sulfides in the unleached zone. There is

some dark manganese staining in many parts of the veins, and the Mohawk Vein, which carries much more manganese than any other veins of the district, has strong manganese staining throughout. None of the minor mineral constituents of the veins are recognizable in the leached zone -- they have either been leached out or obscured by the staining.

One result of the leaching of the upper parts of the veins is a pronounced narrowing in the width of the leached veins. This effect is particularly well demonstrated at the No. 1 Shaft on the Sixteen-to-One Vein. Here, the outcrop of the vein is only 3' wide, the filling composed of slabs of quartz separated by narrow spaces more or less filled with fine fragments of quartz and carbonates and unidentified material. At 50' depth the vein is 6' wide , and at 100' depth, at the bottom of the shaft, it is 12' wide, with abundant carbonates. At 300' depth, in Drill Hole No. 2, it is 20' wide. If this widening of the vein with depth (or, conversely, narrowing at the surface) occurred only in the one instance, it could be written off as simply a happenstance, but it is true in every case in which veins can be traced downward from the surface -- on the Mohawk and Nivloc Veins, as well as the Sixteen-to-One. The only reasonable explanation, supported by the change in vein content with depth, is that the walls squeeze in as the vein carbonates are leached out. This point is belabored here to some extent because it is important: veins that are narrow at the surface, if there is evidence of leaching of carbonates, can be expected to widen to several times the surface width at depth.

A second result of the near-surface leaching is the removal of silver from the leached zone and, probably, its redeposition below -- a common situation in precious metal veins of this type. Extensive sampling in the shallow old workings of the Sixteen-to-One Vein gave an average for all assays of 0.08 oz. Au, 2.6 oz. Ag, with the best sample assaying 0.10 oz. Au, 5.8 oz. Ag.

At depths of 350' to 750', however, gold values remained about the same but silver values ranged as high as 39 oz. Ag, and across 6' to 12' widths averaged 9.6 oz. Ag to 20.3 oz. Ag. At the Nivloc Mine, the uppermost 300' of vein also averages about 2 oz. Ag, while below this were mined the orebodies that averaged 11 oz. of recovered silver. At the Mohawk Mine, it is reported that some of the outcrops gave very high silver assays, but it is noteworthy that none of the stopes reach the outcrop. The inescapeable conclusion is that silver has been removed from the upper parts of the veins, and probably redeposited at lower levels.

The size of orebodies to be expected in the district can be judged on the historical basis of the Nivloc and Mohawk Mines and the limited evidence of the Sixteen-to-One drilling. At the Nivloc Mine, the vein was explored underground for a length of 3,650' and to a depth of 1,300'. The mineralized zone was as much as 80' wide on the best level (440 Level), narrowing toward the ends of the explored area and both shortening and narrowing with depth. The wider parts were in limestone walls, and the narrower parts in granite walls, and the operating management of the mine considered that the pinching of the vein with depth was caused by increasing area of granite walls (personal communication from Fred E. Gray, former manager of Desert Silver Mines, Inc.) Stoping was on narrow tabular lenses within the mineralized zone, and there were four zones of such lenses, the zones having average lengths of 700' on the upper productive levels and shortening to 200' on the 900 Level.

At the Mohawk Mine the vein has been explored for a length of 1,500' and to a depth of 600', averaging about 30' wide. Two orebodies of about 200' and 300' strike length were found five hundred feet apart. The shorter orebody is tabular, averaging about 6' wide, while the longer orebody is of irregular width, reportedly reaching 50' wide at one point. Both orebodies apparently shorten and pinch to sub-economic size below the 400' level.

The Sixteen-to-One Vein is traceable for a length of 800' on the surface. Of five holes drilled into it, three found ore-grade material. One barren hole penetrated an oxidized and presumably leached part of the vein, while the other, at a depth of 950', found only galena and sphalerite, with no silver; this may be a local occurrence similar to pods of lead sulfides reported in the Nivloc Mine. The three ore holes are at depths of 350' to 750' and along a vein length of 300'. Although the vein averages 30' wide, not all of this is ore; ore widths range from 6' to 12', and values from 9 to 20 oz. Ag with up to 0.4 oz. Au.

At Nivloc the depth of the leached zone was 300', while at Mohawk it was but 50' deep. At Sixteen-to-One the leached zone is somewhere between 100' and 350' deep, probably closer to the latter. The vertical extent of ore in Nivloc and Mohawk was 600' and 400' respectively, and from the drilling results at Sixteen-to-One a similar vertical extent can be expected there. Presumably the ore-grade material in all of the veins is secondarily enriched, and primary, unenriched vein areas are not of ore grade.

Over the district as a whole, veins occur in all of the major rock units, from basement complex to the youngest Tertiary rock, the red latite porphyry. Since the major stratigraphic units lie essentially horizontal, and the veins are essentially vertical, this means that the veins have a known vertical range of at least 2,000' -- from the deepest Nivloc workings to 600' up into the red latite porphyry as projected across the Nivloc from nearby exposures. Topographically the range is even greater, 3,500', from an elevation of 5,000' at the bottom of the Nivloc to 8,500' at the Mohawk outcrops. Orebodies occur throughout these ranges. Thus, there is every reason to expect individual veins to persist with depth, and where there is evidence of leaching of silver from the outcrops, there is reason to expect that secondarily enriched orebodies will be found below. The Sixteen-to-One - Los Compadres area lies about in the middle of both the topographic and stratigraphic ranges.

LOS COMPADRES GEOLOGY

The Olaf claim, of different ownership than the Los Compadres property, lies in the middle of the Los Compadres group, as inspection of the map (Drawing No. LCB 1) shows. Discussion of Los Compadres geology is impossible without frequent reference to features lying on the Olaf claim -- particularly to the Chico Vein, which lies entirely on the Olaf. Since the geology alone is confusing enough, without introducing distractions in the way of ownership, reference will be made to ownership in the following discussion only where the ownership has bearing on the subject at hand, and the Chico Vein will be referred to as part of the Los Compadres vein system.

Stratigraphy

The Los Compadres property lies at the western side of the outcrop area of the volcanic pile that has already been described. Nearly all of the exposed country rocks are rocks of the volcanic pile -- andesite breccia and basalt -- except around the edges of the property, where some of the older intruded rocks of the rhyolite unit are to be found.

In the main area of interest, around the group of veins in the center of the property, andesite breccia is the only rock type, except for two small areas of basalt. There are some rather subtle variations in the character of the andesite breccia that could be mapped and might lead to a better understanding of this rock type, but such mapping has not yet been attempted.

Alteration

As in the rest of the district, the most conspicuous alteration at Los Compadres consists of silicification of large irregular areas of country rock. The main mass of silicified rock lies northeast of the vein

system, covering the southwest half of the Patience No. 2 claim and the southeast two-thirds of the Burney No. 2. The southern edge of the mass is highly irregular, with a long finger of silicification extending southwest along the Chico Vein, a long, broad projection extending south around the Burney, Patience and Kathy Veins, and several short narrow projections following lesser veins farther east.

Most of the wider Los Compadres veins, like the other veins of the district, are accompanied by zones of wall rock alteration on one side. Only the Kathy Vein does not have the wall rock alteration, except at its extreme northern end of outcrop. On all three of the other major veins -- Chico, Burney and Patience -- the alteration zone is confined to the southeast side of the veins, as it is along the Sixteen-to-One Vein; the northwest side of each vein lies against silicified andesite breccia.

The wall rock alteration zones along all veins are irregular in width, but in general are narrower than the 75' width of the alteration zone along the Sixteen-to-One Vein. Along the Chico Vein and the north end of the Burney Vein, in particular, the alteration zone averages not more than 15' in width. Along the south end of the Burney Vein and all of the Patience Vein the average width of alteration is about 35', though locally it pinches down to almost nothing. Whether the width of the alteration zone has any economic significance is unknown. The character of the alteration is the same as elsewhere: chloritization of the andesite breccia to produce a soft rock that erodes to form narrow draws along the veins, between steep walls of silicified rock.

Mineralization

The outcrop pattern of the four major Los Compadres veins forms a crude zig-zag pattern of alternating northerly and easterly striking veins. The westernmost vein, the Chico, strikes easterly, but ends several hundred feet before its eastern end meets the northern end of the Burney vein. The Burney Vein, striking a little east of north, almost joins with the Patience Vein at the south end of each, and finally, the north ends of the easterly-striking Patience Vein and the northerly-striking Kathy Vein intersect.

The longest veins are the Chico and Burney, respectively 1,000' and 1,100' long; they are also the widest veins, with widths reaching 10' in local exposures on the north side of the canyon. The central parts of both veins are covered by alluvium near the canyon bottom. The Patience and Kathy Veins are each exposed for lengths of only about 500'; one or both of them may extend as much as 300' farther under the canyon-floor alluvium to the north, beyond the point where they intersect. Both veins outcrop with widths of two to four feet, nowhere having the extreme widths locally found on the Chico and Burney.

The strikes of the veins are parallel to the strikes of the two groups of faults found in the region, and there is every reason to suppose that the veins occupy fault zones. The Chico and Patience Veins are in faults of the N 65° E group, and the Burney and Kathy Veins in faults of the N 20° E group. As seen in outcrops, the dips of the individual veins conform with those of the regional pattern: the more easterly veins dip steeply southeast, and the more northerly veins dip steeply northwest. In the original mapping, the 62° NW dip of the Burney Vein just south of the canyon was erroneously transcribed as being a SE dip, and it was inferred that the Burney Vein as

a whole dipped southeast, with the result that Drill Hole No. 6 was drilled from the wrong side of the vein, and did not reach the vein.

Three of the veins, the Chico, Burney and Patience, are quartz carbonate veins along all of their exposed length, with outcrops made up of slabby quartz with more or less remnants of carbonate between the slabs. With this evidence of narrowing of the outcrops of the veins through leaching by meteric waters, there is every reason to expect the veins to be much wider at depth, as was discussed in the section on regional mineralization. The Kathy Vein has carbonate only in limited areas; for much of its length it is all quartz, so that the outcropping width of two to three feet probably represents the width that can be expected at depth.

No minerals other than quartz, calcite and siderite have been identified in any of the veins; these minerals occur just as they do in the other veins of the district. Sampling of the vein outcrops (see samples noted on Drawing No. LCB 1) shows that they contain silver in the same general amounts as do the outcrops of the known ore-bearing veins: the eleven samples average 0.06 oz. Au, 2.3 oz. Ag, and the highest grade sample assays 0.15 oz. Au, 8.6 oz. Ag. (cf. assay results for shallow workings on the Sixteen-to-One Vein of 0.08 oz. Au, 2.6 oz. Ag for the average of all samples, and 0.10 oz. Au, 5.8 oz. Ag for the best sample.)

In 1962 Callahan Mining Corporation drilled holes Nos. 5 and 7, aimed for the Chico Vein on the Olaf claim and No. 6 aimed for the Burney Vein below its outcrop on the Los Compadres property. All of these holes were intended to reach the veins about three hundred feet below their outcrops, which the drilling at Sixteen-to-One indicated was deep enough to reach below the leached zone. It is now clear that these holes were not deep enough, as all of the veins intersected were thoroughly oxidized and siderite-iron

stained, with openings resulting from leaching of carbonates -- this as compared with solidly-filled, unstained or but little stained veins in the Sixteen-to-One ore holes.

Hole No. 6, which found only a very narrow vein with virtually no silver, did not reach the Burney Vein because of the misconception as to the vein dip, as described above. Drawing No. LCE 2 shows the inferred position of the hole with respect to the vein, in cross section. Since the hole did not reach the vein, its results have no meaning other than confirming the northwesterly dip that is indicated by the outcrops.

The results of Holes Nos. 5 and 7, both of which reached the Chico Vein, are rather puzzling. Hole No. 7 alone presents no problem: it had exactly the results to be expected, except that it was not deep enough to reach the unleached zone and ore mineralization. It reached the Chico Vein at about where the vein projects using the dips to be expected (see cross section, Drawing No. LCE 3), and the vein was somewhat wider than the vein at the outcrop, though not as wide as it might have been before leaching. Silver values were above the outcrop average, with one 3.6' interval assaying 8.6 oz. Ag, suggesting that possibly the bottom of the leached zone lies not far below.

Hole No. 5, however, is quite different, though it intersects the vein less than 200' from No. 7 The peculiar thing about the hole is that its vein intersection is vertically below the vein outcrop above, suggesting that here the vein is vertical, as compared with a 72° SE dip in No. 7. Possibly this is actually the case, though none of the other veins in the district are known to have such abrupt changes in attitude, and a vertical dip over such a long vertical extent (400') is equally unknown. A more likely explanation is that the vein has the normal southeasterly dip, but

is offset by a fault between the hole intersection and the outcrop directly above (see cross section, Drawing No. LCE 1). West of the hole, at coordinates N 10,400, E 4,000, the contact between basalt and andesite breccia has the attitude of a northwest-striking fault, and the continuation of this possible fault projects into the proper area to offset the vein between Hole No. 5 and the surface and between Holes 5 and 7. Fault zones are logged in both holes in about the right positions -- above the vein in No. 5 and below it in No. 7. This interpretation is somewhat strained in two respects: in this immediate area the northwest faults ordinarily do not offset northeast faults, and the map does not indicate the required 150' offset of the Chico Vein. The matter of offsetting by northwest faults is not particularly difficult, since these faults do offset northeasters in places, and this could be one such place. The lack of vein offset as shown on the map is at least partly explainable by the limitations of the hurried mapping: on the ground, at least 50' of offset is suggested by sighting along the vein outcrops.

In summary, about all that can be said with certainty of the mineralization in the Los Compadres veins is that in the leached zone it is the same as the leached-zone mineralization in the known ore-bearing veins of the district. The only conclusion that can be drawn from the past diamond drilling into the veins is that 300' to 350' below the outcrops is not deep enough to get below the leached zone: drill holes must be aimed at least 100' deeper to stand a chance of getting into ore.

ORE POTENTIAL

The low average silver values found in the outcrops of the Los Compadres veins demonstrate beyond doubt the presence of silver in these veins. Since other veins in the district have similar low-silver outcrops, with ore below that is probably secondarily enriched, there is good reason to expect that the Los Compadres veins have ore-grade silver values at depth. The evidence of leaching of the upper veins is almost incontrovertible; the chance of enrichment below is good.

If it be granted that silver has been leached from the Los Compadres outcrops, and probably redeposited below, the question of whether there are economic orebodies resolves itself into three separate questions: (1) is the enriched material ore grade? (2) how many and how large are the orebodies? and (3) how deep are they? The only answers that can presently be given to these questions depend on analogies with the known ore-bearing veins.

The two veins with recorded production, Nivloc and Mohawk, produced ore with average recovered values of 11 and 20 oz. Ag respectively, or about 13 and 23 oz. Ag as mined. This spread in grades is largely explainable by operating conditions. The Nivloc was mined at about 300 tpd and milled on the property, so operating costs were low and 8 oz. Ag was the cutoff grade. The Mohawk, on the other hand, was mined at about 50 tpd, the ore was hauled twenty-five miles to Silver Peak, and costly milling techniques were required because of the high manganese content; 15 oz. Ag was the cutoff grade during much of the operation.

The Sixteen-to-One drilling provides illuminating evidence of the way in which grade might be varied to suit management. Each of the three ore

holes had a relatively narrow band of high grade ore, bordered by lower grade ore. The high grade band in the three holes ranged from 5.0' to 6.5' in true width and averaged 5.7' wide at 0.126 oz. Au, 16.6 oz. Ag. The wider zone of high plus low grade ore was 11.5' to 12.5' wide in the three holes, averaging 11.8' wide at 0.125 oz. Au, 11.4 oz. Ag. At current prices of $35.00 per ounce for gold and $1.29 per ounce for silver, with estimated mill recovery of 90% and smelter payment for 90% of the recovered metals, the high grade would have a recoverable value of $20.92 per ton, and the high plus low grade would have a value of $15.45 per ton -- management probably would choose mine to some grade within this range.

The Los Compadres veins should carry ore similar in grade to that of the Nivloc, Mohawk and Sixteen-to-One Veins. Recoverable and payable values of $15 to $20 per ton, depending on the mining widths used, would seem to be reasonably expectable.

The size and number of orebodies to be hoped for also must be estimated on the basis of experience in the other veins. The Nivloc orebodies averaged 700' long at their tops and 200' on the lower levels, while the Mohawk orebodies as mined to their higher grade averaged 250' long at their tops and somewhat shorter on the lower levels. If mined to an intermediate grade, the Nivloc orebodies would no doubt have been shorter and the Mohawk orebodies longer -- perhaps with an average length of 300' to 400'. The Sixteen-to-One orebody is at least 300' long. The width of the orebodies on the explored veins was highly variable -- from 6' to 50' on the Mohawk, reportedly 5' on the Nivloc, and 6' to 12' on the Sixteen-to-One depending on the grade one is interested in. The Nivloc Vein averaged one orebody per 900' of explored length, the Mohawk one per 750', and the Sixteen-to-One one per 800' so far as is known. This suggests an average distribution of

orebodies in the district of about one per 800' of vein.

On the basis of these district averages, orebodies of 350' long should be expectable on the Los Compadres veins. Widths might range from 6' to 12', depending partly on the grade of ore mined; 9' width at an intermediate grade is perhaps a fair enough guess. Since the veins on the Los Compadres property have a total known length of 2,1000', they should have about two and one-half average-sized orebodies. At 12 cu. ft. per ton of ore in place, each orebody would contain 260 tons per foot of depth, and the two and one-half orebodies would contain 650 tons per foot of depth.

The depth to ore-grade mineralization is not very satisfactorily answered by drawing analogies with the other veins, since the Chico Vein drilling already indicates that the Los Compadres veins are leached to the maximum depth of leaching known on the other veins. Presumably leaching should not extend much deeper -- it should bottom around elevation 6,600', which would call for a 400' shaft to reach the top of ore.

The orebodies on the Nivloc and Mohawk Veins had vertical extents of about 600' and 400', respectively, while the Sixteen-to-One drilling indicates at least 400' of vertical extent for this orebody. A vertical extent of at least 400' seems reasonable for orebodies on the Los Compadres veins.

To summarize: the veins on the Los Compadres property have a reasonably expectable potential of 260,000 tons of ore (650 tons vertical foot x 400' vertical extent) with a recoverable value between $15 and $20 per ton. This ore should lie in two or three orebodies several hundred feet apart. If the Chico Vein, of different present ownership, were worked with the Los Compadres veins, as its location dictates it logically should be, it would add another orebody, containing about 100,000 tons, to the estimated potential.

This estimate of potential, it must be remembered, is based purely on

averages of dimensions, grades and spacing of orebodies on the other veins in the district. It is presented here only to provide an idea of the size of the target one is shooting for on the Los Compadres property. While the grade should lie somewhere in the estimate range, the tonnage could lie somewhere between half the estimate and double it.

The Los Compadres veins have one feature that suggests they may have some larger and better-grade orebodies than are known elsewhere: there are apparently two intersections of major veins, as opposed to straight veins without intersections in the rest of the district. The Patience and Kathy Veins almost intersect in their natural outcrops, and the Burney and Chico Veins dip toward an intersection in the zone that can be expected to carry secondary ore. These intersections offer possibilities of unusually rich and large orebodies.

The ore potential considered so far is distinctly limited: the secondarily enriched orebodies in the known Los Compadres veins can well be larger than has been postulated, but a total of half a million tons of ore is about the best that can be hoped for in them. There is, however, a small chance that they could lead to really large orebodies at depth. This chance lies in the fact that the Los Compadres veins are part of a very strong fault system in an area of highly variable rock types: besides the rocks of the old volcanic pile, the fault system at depth must pass through the clastic sediments of the Esmeralda formation and into limestones and acidic intrusives of the basement complex. There is a possibility that somewhere in this series of rocks a highly favorable horizon was intersected by the fault system, and large orebodies or numerous smaller ones were developed either by replacement of favorable beds or by structural shattering of large volumes of rock.

RECOMMENDATIONS

The Los Compadres property is well worth exploration by drilling, particularly in view of the current and projected high price of silver. Further surface exploration is not recommended, since it is obvious that the only answers to the questions of grade and size of potential orebodies lie at a depth of several hundred feet below the surface. Shaft sinking or other underground work also is not recommended at this time -- it would be premature with only postulated ore to sink to.

Drilling should be aimed first at establishing the existence of ore in the veins. For this purpose, all holes should be aimed to reach the veins at elevations not higher than 6,600', in order to be reasonably sure of getting below the leached zone; greater depths for the first one or two holes would not be amiss.

At least two holes will be necessary to give the vein group an absolute minimum test. One of these should be aimed to test one of the veins -- the Burney is best suited -- for tabular orebodies beneath outcrops with promising width. The other should be aimed for the intersection of the Patience and Kathy Veins, to test for the presence of a pipe-shaped orebody along this promising structure.

If the first two or three holes give promising results, more holes should be drilled to give some idea of the dimensions of orebodies. At least half a dozen holes will be required for this.

Assuming an overall cost of $10 per foot of drill hole, the absolute minimum test of the veins will cost about $15,000, while a complete drilling program to test the extent of ore will cost about $50,000.

If the drilling indicates enough ore on the Los Compadres property to make a mine, an attempt should be made to acquire control of the Olaf claim,

in order to mine it in conjunction with the Los Compadres veins. At the time of this writing, the Olaf claim owners apparently have no intention of attempting to develop or mine the property themselves, and have not committed the property to any other parties.

To be completely logical, the Los Compadres, Olaf and Sixteen-to-One properties should all be combined into a single mining operation, for maximum economy. This may eventually come about. It is not recommended that Mid-Continent Uranium Corporation, which controls Sixteen-to-One, be approached to take over Los Compadres, since Mid-Continent appears to have all of its resources committed to Sixteen-to-One, and could only hold Los Compadres for exploration two or three years hence.

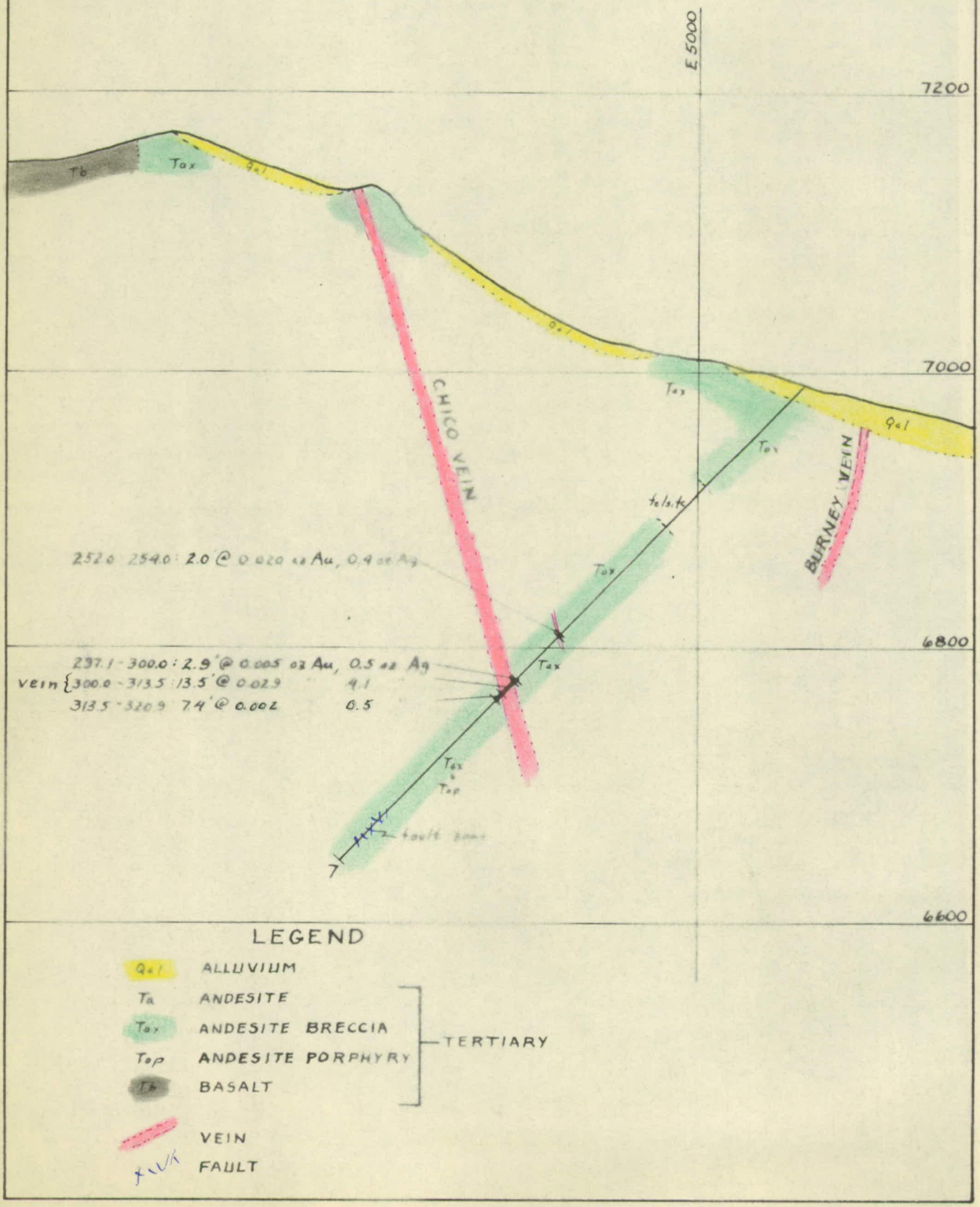
Arthur Baker III

Arthur Baker III

July 1, 1963

Baker & Davis
Drawing No. LCE 3
Red Mt. Dist., Esmeralda Co., Nevada

Chico Vein
Section Thru CMC DDH No. 7
Scale 1" - 100' 6/20/63

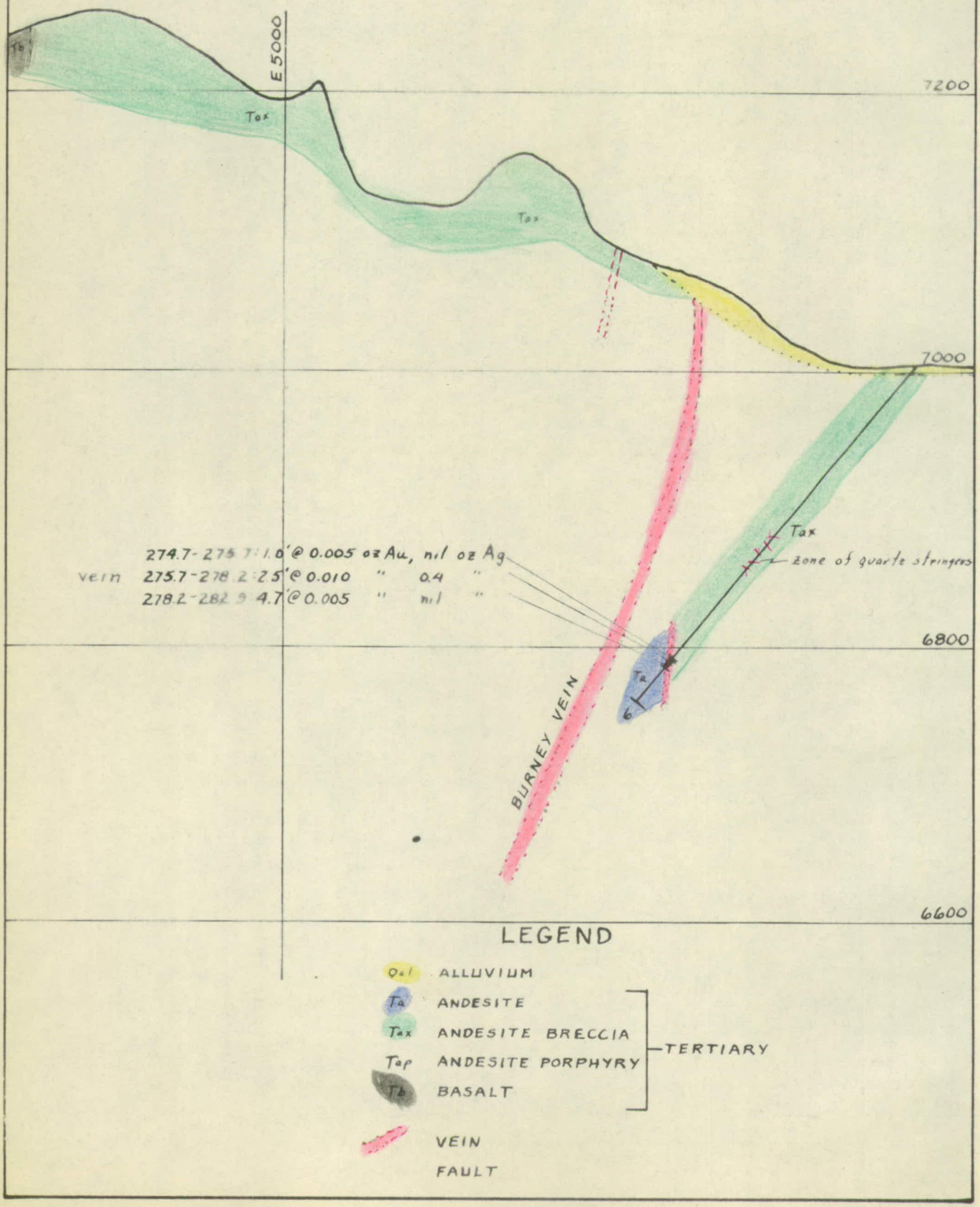


LEGEND

Qal	ALLUVIUM	
Ta	ANDESITE	TERTIARY
Tax	ANDESITE BRECCIA	TERTIARY
Top	ANDESITE PORPHYRY	TERTIARY
Tb	BASALT	TERTIARY
	VEIN	
	FAULT	

Baker & Davis
Drawing No. LCE 2
Red Mt. Dist., Esmeralda Co., Nevada

Burney Vein
Section Thru CMC DDH No. 6
Scale 1" - 100' 6/20/63 ABIII

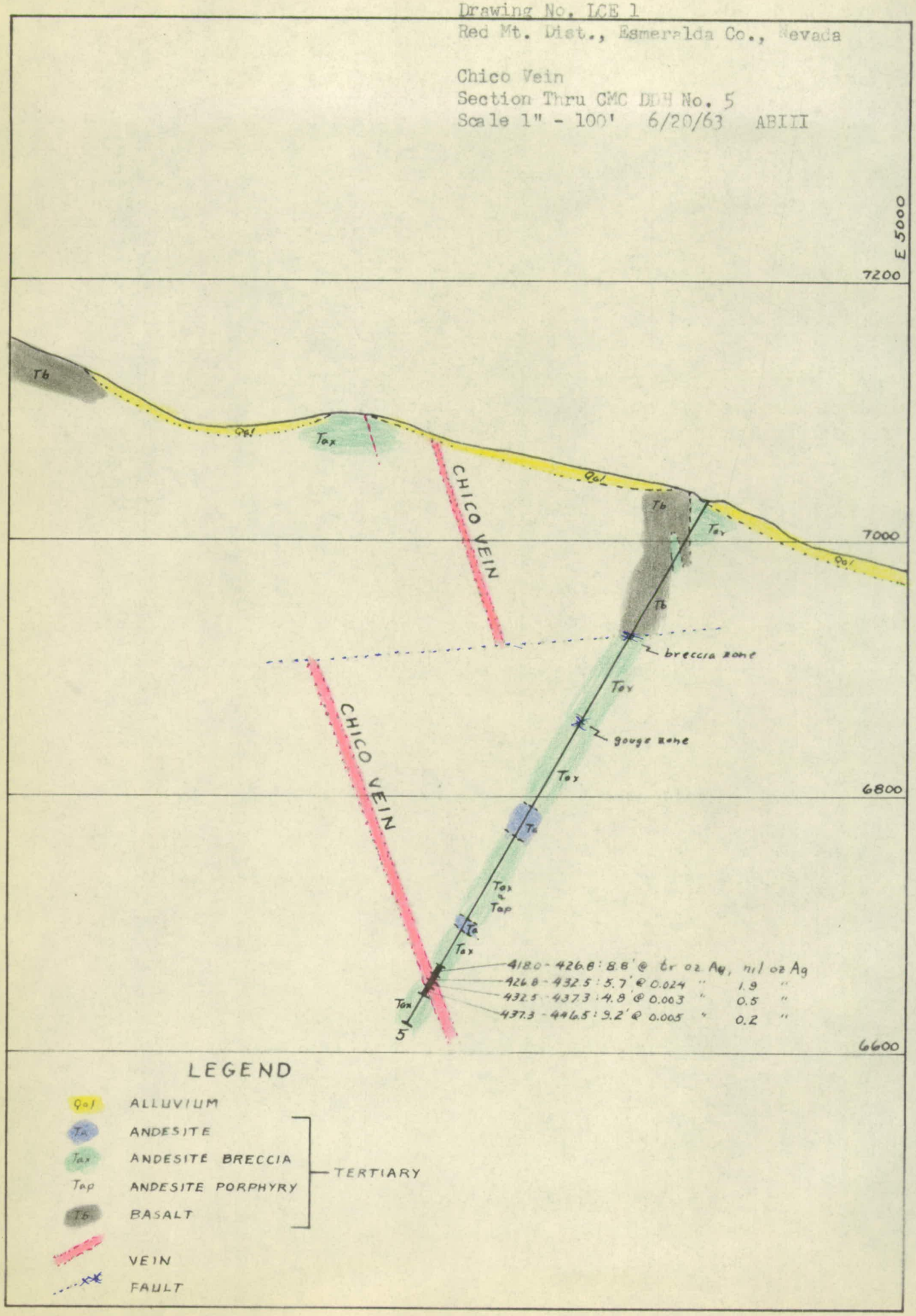


LEGEND

- Qal ALLUVIUM
- Ta ANDESITE
- Tax ANDESITE BRECCIA
- Tap ANDESITE PORPHYRY
- Tb BASALT

} TERTIARY

- VEIN
- FAULT

Baker & Davis
Drawing No. LCE 1
Red Mt. Dist., Esmeralda Co., Nevada

Chico Vein
Section Thru CMC DDH No. 5
Scale 1" - 100' 6/20/63 ABIII