MAJUBA HILL PROPERTY
Pershing County, Nevada

Tin, Copper and Silver

PROPERTY DESCRIPTION, ANALYSIS AND PROPOSED DEVELOPMENT

David LeCount Evans, May 1966

Foreword:

Excellent outcrops provide surface details. Tunnel 2 is open for mapping throughout its 2809 feet. Tunnel 3 is caved at 1600 feet and 1941-1942 observations must be accepted until clean-up and retimbering through the Majuba fault zone can be completed.

Concerning the details of crosscut, overlying stopes and Freeport's inclined raise in the dominantly-tin zone, again, examining parties must accept the detailed mapping and sampling of 1941-1942 and 1943. Greenan and Kerr completely gutted the detail worked out by Freeport Sulphur and Hyler, with 1944 shipments of tin ore (reduced to concentrates) to Metals Reserve.

This analysis is based on the writer's close association with the Majuba project in 1941-1942 and in 1962. One either agrees with the school of thought that ore-centers are (1) a series of pockets on an otherwise unmineralized structure or (2) areas of better grade along 1400 feet of continuous trend, mineralized, and controlled by a contact between rhyolite and later aplite, complicated at the Tunnel 2 level by faulting. There appears to be no middle approach.

Approach (1) is without attraction. Approach (2) opens the door to the development of commercial tin-copper-silver mineralization, an attractive enough program in 1962, but especially appealing today, in light of the supply and demand picture for tin and silver, and 1965-1966 values.

Plans and Sections:

Reference is made to the attached plans and sections. They are listed as follows:

Number	Description	Where Filed
Unlettered	Legend Sheet	Affixed
A	Index Map	"
B	District Index Map	"
Geology and Values 100 Scale		
C-1	Surface Plan	Affixed
C-2	Stope Levels	"
C-3	Tunnel No. 2	"
C-4	Tunnel No. 3	"

Number	Description	Where Filed
Geology and Values 100 Scale		
D-1	Section I-I'	Affixed
D-2	Section M-M'	"
D-3	Section O-O'	"
Pre-faulting		
E-1	Tunnel No. 2	"
E-2	Section I-I'	"
E-3	Section M-M'	"
E-4	Section O-O'	"
Myler Workings and Adjoining Gilmet Eliptical Area of Mineralization; 200 Scale:		
G-1	Surface	In Pocket
G-2	Tun. 2 Level	"
G-3	Tun. 3 Level	"
Claims:		
H-1	Claim Map	In Pocket
Samples:		
I-1	Samples: tin area; Tunnel 2;10 scale.	In pocket
I-2	Samples: tin area; above Tun 2. 10 Scale	In Pocket
Proposed Development Ten Scale:		
J-1	223 Drift; & Projections above Tun.2 Lev.	In Pocket
J-2	223 Drift;Tun.2 Lev.	"
J-3	224 Drift;Tun.2 Lev.	"
J-4	225 Drift;Tun.2 Lev.	"
Proposed Development Fifty Scale:		
K-1	Surface	In Pocket
K-2	Stope Datum	"
K-3	223. 224. & 225 Drifts	"
K-4	307 X cut; Tun.3 Lev	"
Proposed Development Gilmet Area	Refer to Plat G-1	In Pocket

Property and Location:

With reference to Plats A, B, and H, the Majuba Hill deposit is covered by three patented claims and 15 unpatented claims, all in section 2, Township 32 North, Range 31 East; as well as fee section 35 in Township 33 North, Range 31 East. The acreage lies in the Antelope Mining District, Pershing County, Nevada.

The above covers about 75% of a northeast-southwest trending rhyolite porphyry intrusive. Workings at the southwest limit of the intrusive area are 20 miles west of Imlay, Nevada, via good gravel road. Imlay is on the Southern Pacific Railroad.

History of Property:

The property has experienced several periods of development and production. Mason Valley Mines (1915-1919) mined copper-silver ores (5000 tons averaging 12% copper and 5 ounces in silver) and accidentally found the tin "pocket" while drifting on the Majuba fault, at that time considered a vein structure. Freeport Sulphur, diamond drilling in 1941-1942, failed to prove a theory and dropped its option. Greenan and Kerr (1942-1945) mined 22,000 tons of 3.9% copper and 1.4 ounces of silver, from the copper-plus area, and 350 tons of 3.4% tin ore from the tin-plus area. Kansas City Exploration Inc. completed 303 feet of critical crosscut in 1962, definitely establishing the continuity of mineralized structure, back of the fault, but ran out of funds and returned the properties to their owners.

Physical Description:

Plats C-3, C-4, K-3 and K-4 are concerned with the following description. Tunnels 2 and 3 cover the bulk of exploration and development. Tunnel No. 1, very short and 200 feet above Tunnel No. 2, is not shown. Total horizontal development amounts to 5,604 feet, divided into 195, 2,809 and 2,600 feet for Tunnels 1, 2, and 3, respectively.

Inclined and vertical workings approach 1100 feet; approximately 3800 feet of diamond drilling have probed the property.

Tunnel 2, with elevation at 6250 feet, has a maximum back of 550 feet in the area of particular interest. Tunnel 3, with elevation of 5774 feet at portal, lies 476 feet below Tunnel 2, and has 1000 feet of back in the area of projection.

Tunnel 2 is directly beneath outcrops of mineralized brecciation and has cut the downward extension of values, approaching an average of 3 % tin, on the hanging wall side of the Majuba Fault System.

Tunnel 3 (also see Plat F-2), with face at 2000 feet from portal, is close to but not at the downward extension of structure, as projected through Tunnel 2 from surface outcrops. An horizontal hole, from the face to the northeast, cuts the proper contacts and the downward extension of mineralization at its easterly extreme.

Geology:

Summary:

Tin-copper-silver mineralization is associated with a large mass of rhyolite porphyry in a region where acid intrusives are, for the most part, granodiorite. The original rhyolite porphyry has been intruded, locally, by a finely crystalline white felsite which for years has been referred to as 'aplite'. Contacts between rhyolite and aplite appear to be the major influence in the distribution of mineralization. Tourmalinization is common throughout the porphyry, but especially well developed along the aplite contact, or slightly removed but parallel to it. The south half of the 12,000 by 4,000 foot area of rhyolite porphyry is featured by several areas of iron stained breccia, well cemented, only one of which has been extensively explored.

With reference to this last, carrying tin mineralization, non-pegmatitic and similar in many respects to Bolivian ores, it is associated with a brecciated trend. The trend is seemingly close to and controlled by the aplite contact and can be followed on surface for at least 1400 feet. With reference to our map C-4 (Tunnel 3), about 2000 feet of peripheral opportunity are indicated. Tunnel 3 has 1000 feet of back and tin values occur throught the vertical extent. The trend is 'S' shaped, reflecting the aplite intrusive pattern.

Petrography:

Sedimentary: Flanking the intrusive mass and also as occasional included areas, are upper Triassic slates, with persistent N35°E to N45° E strike and a general dip of 80 degrees to the northwest.. The Triassic sediments have been effected by the later sequence of rhyolite intrusives.

Igneous Intrusives: Intrusives of Miocene or Pliocene age, in this analysis, are rhyolite porphyry and a later, white to cream colored felsitic intrusive (of probable like mineral make-up but much finer texture) possibly, too, a rhyolite, but referred to as aplite, throughout this report. It is believed that this simple two-type rhyolite approach will be added to with future mapping.

Significance: The association of tin mineralization with a rhyolite intrusive area meets an accepted standard for other lode-tin occurrences.

Alteration and Mineralization:

Tourmalinization is the dominant alteration. Distant from centers of intense mineralization, feldspars have been replaced by tourmaline. Angular fragments in brecciation at the contact between rhyolite and aplite are cemented by dense, black tourmaline. Masses of greenish-black tourmaline occur throughout the mineralized trend, as a gangue component in those mineral masses with economic potential.

Possibly-economic mineralisation consists of copper and tin compounds. Copper occurs in secondary sulphides and oxides as well as carbonates and silicates; the copper arsenates, olivenite and chalcophyllite, characterize centers of increasing cassiterite mineralisation. At depth, secondary copper minerals go to chalcopyrite, and one remanent of undigested chalcopyrite, accompanied by strong cassiterite, was mapped and sampled in the copper stope above the Tunnel 2 level.

Tin is found only in the cassiterite form, as an oxide. No stannite, the double sulphide, has ever been observed. Cassiterite is consistently grainy, medium to finely crystalline, in chocolate brown masses.

At the Tunnel 3 level and below, traces of molybdenite and sphalerite have been noted.

Gangue mineralisation consists of arsenopyrite and pyrite, the oxides limonite and hematite, as well as heavy tourmaline and considerable fluorspar and quartz.

The uranium mica, torbernite, is common in the gouge of the Majuba fault.

Significance: The above suggests the complexity of mineralisation, a normal expectancy in lode-tin areas.

Structure and Other Controls:

Pre-Mineral: With reference to all plans and sections, the contact between aplite and rhyolite porphyry, paralleling alteration and later mineralised trends, appears to be a major control.

Zones vary from those directly at the contact to others as much as fifty feet from the contact. Zones, following trend, vary from heavy brecciation (with mineralisation between fragments) to mineralised shears, alligned with the trend of the zone. Width of zone might average 15 feet, with an observed minimum of 9 feet and a maximum up to 25 feet.

Significant is the persistency of this trend, mapped on the surface for 1400 feet, and carrying to at least 1000 feet of depth, as indicated by observations in Tunnel 3, and drill holes from Tunnel 3.

Post Mineral: With reference to all plans and sections, major faulting (in deep blue) consists of the Majuba fault system, with reverse throw (as indicated by Section I-I' and Plat D-1) and subsidiary faulting (as mapped in the tin area and shown in light blue) with normal movement.

Contacts and mineralisation trends have been offset by movements on both systems. By graphic measurement, movement up dip on the Majuba fault amounts to about 150 feet, and horizontal displacement approaches 95 feet, as indicated by Plat E-1.

With reference to Plats C-3, D-2, and D-3, the segmented character of the mineralised structure (in red) on the hanging wall side of the major fault, reflects a series of displacements from faulting on the subsidiary faults, dipping into the Majuba structure. This is the interpretation, after the detailed mapping in stopes, open and available at that time. Subsequent mining and 'gouging' by operators in 1944 destroyed the area and nothing can be seen today.

The staggered, block-faulted effect and distribution of the tin-plus (in red) mineralisation has caused concern to some who have reviewed this discussion. The greatest concern has been expressed by oil geologists; the phrase "unnecessarily complex" has been used.

The pattern is not complex and is not an unusual one in Nevada. Note our Plat F-1, showing the block-faulted pattern at Manhattan, Nevada. This has been copied from detail released in 1917. Operators at that time accepted such "complexities" without unfavorable comments.

Reference is made to Plats B-1 and C-3, showing, first, our interpretation of the original pattern, and, then, the pattern after faulting. A comparison of Plats B-2, B-3, and B-4, with plats D-1, D-2, and D-3, provides the same approach in section.

Distribution of Values:

Considering Plats C-2 and C-3 (stopes above and Tunnel 2) the area in green is copper-dominant with bi-values in silver and very minor, but persistent, values in tin. The circular and very sharply faulted pattern has produced 27,000 tons of direct shipping ore, averaging 5.1% copper, 1.9 ounces in silver, and an estimated 0.15% tin. An estimated 30,000 tons remaining, with more or less, 3% copper, perhaps 2 ounces in silver and about 0.18% tin, are not considered economic.

The continuation of the trend, now shown in red and segmented after crossing the Majuba fault, exhibits an abrupt change in mineralisation, with cassiterite prominent, copper mineralisation, persistent but of lower grade, and silver values comparable to the green (or copper) area. Four segments are represented, three of which were recognised and sampled in 1941. A weighted average of samples cut at that time amounted to 2.94% tin, 1.44% copper, and 2.72 ounces in silver. From the fourth segment, fringed by Freeport work in 1941, and then developed by Myler and Greenan, 350 tons of 3.4% tin were shipped for milling, with concentrates then sold to Metals Reserve.

11.6 feet of average width and 60 feet of vertical extent were indicated as tin bearing by this work. Length along strike amounted to 85 feet.

The ochre interval between red and green areas represents heavy sheeting, with intense limonite mineralisation, with copper and tin values of 0.12 and 0.11 %, tin and copper. Perhaps a clearer suggestion of mineral change can be gained from Plat B-1, an adjustment to the pre-faulting pattern.

Significance:

Renewed interest in the merits of Majuba have always been impeded by the acceptance of the premise that the Majuba fault structure is the Majuba vein structure, with mineralization and opportunity limited to those occasional "pockets", found erratically along its trend.

Our analysis, indicating a mineralized zone controlled by a contact, trending at an angle to the Majuba fault structure, and offset by a complex movement as it crosses the Majuba fault, opens the door to continued and legitimate exploration.

And of possible equal significance is the suggestion of E-1 that mineralization may be changing from east to west.

Samples:

Plan maps and sections present individual samples, or averages of many samples, as in the case of the tin-plus area.

No detailed list of samples is provided. In the event of interest, additional sample detail is at hand for continued study.

Ore Reserves:

As indicated above, except for the continuation of the copper-plus area to the north and northwest, no reserves are suggested. For this possible block, 30,000 tons of 3% or less coper, 2 ounces of silver, and 0.18% tin might be expected. Such would not be considered economic. Future possibilities for constructive development are considered below under "Reserve Possibilities".

Properties and Leases:

With reference to Plat E-1, Mrs. Mary A. Myler controls three patented mining Claims and all of section 35. The latter is fee acreage. Myler ground is bounded in red. Myler properties carry an asking price of $175,000. The asking price is without adjustment possibilities. erms, however, appear to be negotiable.

It has been indicated that a down payment of $3000 and the start of monthly minimum payments of $300 might be put off until 6 months from the date of the signing of an agreement if intended lessee would place in escrow 50% of the $42,000, pegged for Tunnel 3 exploration. Shown under E-1 of Table 2, on page 10, the $42,000 represents an estimate for clean up and the driving of 700 feet of crosscuts and drifts. Mrs. Myler's main interest is to prove or disprove the property and she believes that 350 feet of effort from the face of Tunnel 3 would serve that purpose.

To apply against purchase price, Mrs. Myler would ask (1) 10% on net smelter returns or a minimum of $300 per month from the end of the 6th to the end of the 36th month; then (2) minimum payments of $12,000 per year until the asking price is paid out.

Alfred L. Gilmet is the owner of the 15 standard mining claims, bordered in blue, all held by location and the performance of annual assessment work.

Gilmet provides no asking price, since he requests a perpetual royalty on ores mined from his property. Terms include the payment of $3000 at the start, $2000 at the end of six months, and annual payments of $10,000, starting at the end of the first year; $200 monthly payments in lieu of production, or 10% royalty payments on the gross production have been specified.

When all of the above totals $50,000, the royalty on gross production would be reduced to 5%, and no other payments would be required; except the royalty or the $200 per month in lieu of production.

Gilmet also has requested the completion of 3000 feet of diamond drilling on his property during the lease period.

Considering the possibility of a program limited to Hyler ground and with no inclusion of Gilmet ground, note that Gilmet Claims Majuba I and Majuba J control the first 950 feet of Tunnel 3. The two claims must be acquired by purchase or a lease understanding. Negotiations would be a requirement. Gilmet has indicated that he would sell, but would name no figure.

Concerning D.L. Evans and his associate, Mr. Benjamin C. Charles, a return of their investment in the property, as well as some reasonable royalty arrangement is asked. Such is a matter for discussion.

Objectives:

A program to fully establish or disprove the above reasoning is proposed. The program consists of Phases A and B. Phase A, Operation 1, with drifting and crosscutting at Tunnel 2 level, as shown on Plats J-2, J-3, J-4, K-2 and K-3, if successful, would justify proceeding with Phase B, Operation 1. Phase A, Operation 2, diamond drilling the Gilmet elipse, if confirmatory, would warrant continuing with Phase B, operation 2.

Depending, therefore, on the results of Phase A, the program can be stopped after an expenditure of $30,200, or continued to the full estimated cost of $85,700.

Tables 1 and 2, on pages 9 and 10, summarize proposed development and estimate the costs.

Considering Phase A, Operation 1, it is believed that exploration should be continued from where Kansas City Exploration's efforts stopped in 222 and 221 crosscuts. 310 feet of drifting and crosscutting are proposed, as shown on Plats J-2, J-3 and J-4, and two months are the estimated time requirement.

Phase A, Operation 2, on Gilmet ground, would consist of angled to vertical diamond drill holes, drilling from just southeast of Tunnel 7, in a northwesterly direction, to crosscut at depth the mineralized zone, believed to be plunging to the southeast.

The estimated cost of Phase A (both operations) amounts to $30,200. $10,100 or 33% of the total represents payments to owners.

Assuming that Phase A establishes the reasoning at Tunnel 2 level, the program would then proceed with Phase B, Operation 1, consisting of clean-up, retimbering and equipping Tunnel 3 ($14,000) and the driving of 307 feet of crosscut, drifting on the mineralized section (308 drift) and four crosscuts, a total of 700 feet ($28,000).

Phase B, Operation 2 would require another $8,000 appropriation for the Gilmet program, either in the form of diamond drilling, or crosscutting at depth the possibly-affirmative results from initial drilling.

The estimated cost of Phase B (both operations) is placed at $55,500, of which $5,500 or 9.9% equals payments to owners.

The estimate for both phases amounts to $85,700, including $15,600 or 18%, payments to lessors.

Considering Gilmet requirements, diamond drilling before or contemporaneous with the opening of Tunnel 3 is a 'must'. By thus meeting a stipulation in the Gilmet lease, Tunnel 3 is made available.

Gilmet, with his claims Majuba I and Majuba J, controls the first 950 feet of tunnel. The diamond drilling would be confined to Majuba M and the Gilmet elipse, shown on Plats G where a sample, just below surface, carried 0.55% copper, 4.9 ounces in silver and traces of tin. Here, too, mineralization is closely associated with an area of aplite intrusive into rhyolite porphyry.

None of these objectives proceed far enough to add, positively, to ore reserves. But by establishing the true nature of the property, by adding to assay detail, et cetera, the door would be opened to the establishment of reserves, as discussed below.

Reserve Possibilities:

It has been pointed out that about 1400 feet of structure can be followed at surface. With reference to our summary under 'Geology', we have been brave enough to suggest '2000 feet of peripheral opportunity'. The use of neither of these figures in an estimate of reserve possibilities is proposed.

With reference to Plat E-1, from the start of red coloration, or first promising tin and assuming 600 feet of tin-bearing trend; and using 750 feet of vertical continuity from a point 250 feet below surface outcrops to the Tunnel 3 level; and with 12 feet of average width, 500,000 tons would be indicated.

Accepting the 2.93% tin, 1.44% copper and 2.72 ounces of silver as representative, and on today's (May 5, 1966) market of $1.72 per pound for tin, $0.36 per pound for copper, and $1.293 per ounce for silver, a gross value per ton of $114.68 is calculated. In the event that testing indicates the impossibility of recovering copper and silver, and assuming only an 80% recovery on tin, recoverable value would be reduced to $80.63 per ton. Such a figure would be well within the 'ore' catgory.

Beyond Phases A and B, the objective would be, through continued effort, the blocking out of a 500,000 ton reserve, and the further extending of initial blocks.

The above is not to discount Gilmet possibilities. The ellipse shown on Plats G-1, G-2 and G-3, an area of crackling, sheeting and brecciaition, accompanied by oxide mineralization, covering 33,000 square feet, would develop at the rate of 250,000 tons per vertical 100 feet.

Other areas throughout the Majuba rhyolite mass invite continued exploration and add to future possibilities.

Estimates:

Table 1
Proposed Program
Detail

Phase A
Operation 1

1. Drifting and Crosscutting, Tun. #2
2. Reference: Plats J-2, J-3, J-4 and K-3

3. Involving:

223 Drift @ 100 ft.			
Crosscuts	75 ft.	175 feet	
224 Drift	50 ft.		
Crosscuts	30 ft.	80 feet	
225 Drift	35 ft.		
Crosscuts	20 ft.	55 feet	
		310 feet	

Time requirement:
2 months(maximum)

Phase A

Operation 2

1. Diamond drilling; Gilmet claims
2. Reference; Plat G-1.
3. Involving 1000 feet of diamond drilling; the first 1/3 of an ultimate 3000 feet required by lease.
4. Estimated time requirement; within the two month estimate for A-1.

Phase B

Operation 1

1. Clean-up, retimbering and equipping of Tunnel 3, followed by 307 Crosscut, 308 drift, etc.
2. Reference, Plat K-4
3. Involving: 700 feet, ie: 307 Xc @220'; 308 Dr. @ 250', and secondary crosscuts at 230 feet.
4. Estimated time requirement; five months.

Operation 2

1. Diamond drilling or crosscutting; Gilmet
2. Reference: Plat G-1.

Table 2
Proposed Program

Estimates of Cost

Phases A and B	Payments to Owners		Operation	Sub-Tot	Phase Totals
	Lump Sums	Monthly			
A-1; Mylar	$ 5,000	$ 1,500			
Gilmet	3,000	600		$ 10,100	
310 ft. of Xcuts-Drifts			$ 12,100	12,100	
A-2 Diamond drill			8,100	8,100	
					$ 30,200
B-1 Mylar	———	$ 2,500			
Gilmet	$ 2,000	1,000		5,500	
700 ft. Tunnel ($14,000 preparation)			42,000	42,000	
B-2 Diamond drill			8,000	8,000	
					55,500
Grand Total for Phases A and B					$ 85,700

Recapitulation:

1. It must be emphasized that this is a matter of exploration and the word 'objective' signifies that which can be expected if geological reasoning is correct, projections substantiated and mineralization, sampled to date, continuous.

2. It appears equally fair to point out that with increases in Myler dimensions, as well as favorable results from untested areas on Gilmet ground, objectives and reserves could be increased tremendously.

3. There have always been two approaches to the Majuba picture. Government efforts through the U. S. Geological Survey and Bureau of Mines have persistently discredited the property and its possibilities. Private initiative has, each time, provided new detail, always pointing to the property's dormant but ultimate potential.

4. Efforts by the Freeport Sulphur Company, Greenan and Kerr, and Kansas City Exploration Inc. have all served to question, if not disprove, the "pocket on a vein" premise. It is our contention that these three programs, over the years, have, at long last, opened the door to successful exploration and development.

5. Today's prices for copper, tin and silver; the indicated price expectancy for silver; the supply and demand picture for future silver and tin, and especially the latter in view of the fact that our supply is tied to the "trouble spots" of the world, improve the outlook.

6. The opportunity of indicating a reserve possibility, as indicated, at the cost of a program as estimated, is an attraction.

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