



## **CONTACT INFORMATION**

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11/10/94

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: ANTELOPE PEAK

ALTERNATE NAMES:

UNPATENTED CLAIMS MS 3589

PINAL COUNTY MILS NUMBER: 401

LOCATION: TOWNSHIP 6 S RANGE 15 E SECTION 19 QUARTER S2  
LATITUDE: N 32DEG 53MIN 33SEC LONGITUDE: W 110DEG 50MIN 34SEC  
TOPO MAP NAME: WINKELMAN - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:

COPPER SULFIDE  
COPPER OXIDE  
STONE

BIBLIOGRAPHY:

BLM MINING DISTRICT SHEET 659  
ADMMR ANTELOPE PEAK FILE  
WEED, WALTER HARVEY, THE MINES HANDBOOK,  
VOL. XVI, P. 225  
AZ. MINING JOURNAL, VOL. III, NO. 11, APRIL  
1920, P. 28  
ADMMR FILES

12 mi W. of Winkelman in Pinal Co. Ariz  
70 mi NE of Tucson

Phoenix, Arizona,  
June 16th, 1919.

Mr. H. F. Hannay,  
Mgr. Antelope Peak Copper Mining Co.,  
Winkelman, Arizona.

Dear Sir:

I have at your request visited the property of the Antelope Peak Copper Mining Co., and after examination report as follows:

The general formation in which your property is located is diorite, much of which is schistose. This diorite has been intruded by younger granitic rocks, the intrusions occurring as dikes and masses.

At the contacts of the schistose diorite and the later intruded rocks as shown in the mine workings the schist is brecciated and now occurs in its original broken condition with very little cementation by deposition from the circulating waters. From the appearance of the rock large quantities of water have circulated through the breccia and the ordinary mica has been changed to sericite and the feldspar to kaolin and talc. But on account of the looseness of the breccia any minerals which might have been in the solution in the circulating waters have passed on without deposition.

Lying at nearly right angles to the contact and extending from it into the schistose diorite about seventy feet, as already proven, there occurs a spur of brecciated material from which practically all of the ore to date has been mined. At the time of my visit the whole breast of the drift on the 350 foot level was in this material and well mineralized. Much of it as mined runs around 12% copper. This mineral is chalcopyrite (copper sulphide) and melaconite (black copper oxide). This is the deepest working in the mine and the only place where sulphides in any quantity have been encountered.

The brecciation here is not as intense as at the contact and instead of the water passing rapidly through the broken rock zone it has been sufficiently delayed to allow the deposition of the minerals contained in the circulating waters. This explains why the good ore body is found in the more compact breccia of the spur and in the intensely shattered area of the contact.

I believe that with sufficient depth attained that the contact breccia will be as well mineralized as the spur vein. Just what depth will be required I am unable to say but it will be necessary to reach comparatively stable water table where the water has been held for sufficient time to allow the minerals contained in solution in the water to become deposited.

There is a considerable change in conditions between the 300 and the 350 foot levels and should the same or relative changes continue to a depth of 500 feet or 600 feet should reach comparatively stationary water level where a minimum oxidation has occurred.

The upper levels of the mine have shown considerable oxidized ore and carbonate ore, of good grade, and there is much still left in the mine, I am told, although the conditions of these levels was such from caving that I could not inspect them.

On the 200 level both the contact and the spur vein have been opened. The former by a drift 200 feet in length and the latter for 70 feet. The conditions in the contact are as heretofore described and the spur vein produced quite a quantity of carbonate and oxide ore. The cars shipped gave a return of between 7 and 8% copper with very little sorting. By careful sorting much higher grade ore was obtained.

The ore now coming from the 350 foot level is high in grade and of very desirable character, the abundance of sulphides indicating the the bottom of the oxidized zone is about being reached.

More depth should be attained. Sinking on the shaft should be continued and improvements in both character and quantity of the ore can reasonably be expected up to at least a total depth of 1000 to 1200 feet. At this depth I believe that a mineralized condition will be found to exist in the brecciated contact at the schist and diorite as this should be deep enough to reach the present comparatively static water table. Should this predicted condition be found it would mean a very large additional ore body in addition to the ore already known and too much importance cannot be placed upon the necessity for greater depth.

After doing sufficient work to determine the extent of the ore on the 350 foot level I would not advise further development on the levels already opened except to connect the 300 and 350 foot levels by a raise on the ore until more sinking has been done and deeper levels opened.

The surface equipment consists of a 25 horsepower Western gasoline hoist, a compressor, capacity 300 cubic feet of free air per minute, Chicago Pneumatic Tool Co., type, a duplex pump, capacity 150 gallons per minute at 200 feet and eighteen horsepower Western gasoline engine for operating pump, a good head frame, tanks, buildings etc, a No. 7 Cameron sinking pump is used in the sump, to raise the water to the 300 foot level where it is pumped to the surface by the duplex which at the present time is about 40 gallons per minute. The equipment is sufficient for present purposes.

You undoubtedly have the making of a good copper mine as the grade of ore is high and with sufficient depth should you as I believe you will find the contact breccia sufficiently mineralized to form commercial ore body the quantity will be greatly increased. Of course until actual development work is done one must be governed in their opinion by entirely upon what has heretofore been proven in similar cases and the actual conditions at this particular property and it is upon this line of reasoning that I base my opinion as to the results from the future development work at depth.

The work being done at present is well done and no just criticism can be made upon the methods employed and the results obtained.

Respectfully yours,

(Signed) R. E. Hollis,  
Mining Engineer.

ADVISORY REPORT COVERING THE PHYSICAL FEATURES OF THE  
ANTELOPE PEAK COPPER MINING COMPANY.



by

A. ROOS, E.M.

INTRODUCTION

The object and purpose of my examination and report and geological maps, is strictly advisory and only such data was compiled and note as would have a bearing, directly or indirectly on the general outlook, the future of your mine, the advisability of continuing operations, the location and extent of the veins and where best to prosecute new work and all from an economic viewpoint.

The geological conditions were found to be very intricate and the analysis of the situation complex with its several apparent contradictions and the final conclusions were arrived at and formed from the compilation of all the available positive data together with a reasonable assumption of probable geological events and conditions.

After correcting an error in azimuth of 30 degrees in the maps and survey made by F.N. Holmquist in September, 1916, the courses and measurements of this old survey were used in the accompanying geological maps of the levels and were assumed to be correct.

GEOLOGY

While the maps show but two kinds of rock members, there are in fact several flows of diorite material, differing somewhat in texture and structure but similar in chemical analysis and no attempt was made to differentiate between the successive flows and for the purpose of convenience, all the fine grained, semi-acid eruptive material has been charted as diorite or diorite-schist as distinguished from the later chystalline granitic member, which has intruded the diorite. There are no sedimentary rocks in evidence anywhere on the limits of this property. The granetic rock is shown to be later and an intrusive into the diorite by its penetrating stringers and shattering of the latter. The mineralization and formation of the vein was after the later granetic intrusive since it cuts both formations. I base this conclusion on the fact that the vein is shown on the 203' level to cut the granite rock without displacement and continues on into the diorite in the east. However this is the only place in all the workings where this is demonstrated, as in all other places the vein has been opened up only in the diorite. From this I would assume that the vein will eventually be found strong to the east and north of your most easterly workings on the 302' level, in the body of diorite which I assume to be a few feet beyond your most easterly drift on this level. In fact there are strong indications that you are now at this junction of the two rock members. On my maps the most easterly diorite division will be designated as B while the main granetic intrusive will be designated as A and the western division of the diorite will be C.

The VEIN.

The vein is of the fissure type and appears to be limited by a great north south faulting system in the west, while it gradually merges and loses itself in the country rock in the east. The vein is in two sections which has a general east-west course and dips into the north, I will designate as section A, while the vein which has a northerly -southerly course and is closely connected with the great fault, I will designate as section B. Section A is well opened up on the 170', 203' and the winzes connecting, has not yet been prospected on the 142' level or on the 302'. I predict that the section A will be found in less than 40' to the north of and paralleling the drift on the 302' level, in the C division of the diorite. Its richness and value on this level can not be foretold with certainty.

OFFICE OF  
ALFORD ROOS  
CONSULTING  
MINING ENGINEER  
TUCSON, ARIZONA

On the 142' level its probable course has been drawn on the map of this level and it can and should be out into from this level. Vein section A is the same as that which is so splendidly on the surface in the region of the old 70' incline 230' south east from the main shaft. This section is limited in the east as shown on the 203' and 170' levels and I would not advise further expenditure of funds in following it out in this direction. Section B of the vein is closely connected with the big fault system. This fault itself has two phases. It is shown to be in two separate movements which appear to cross each other in the vertical plane. On the 142' level the two planes dip towards each other at a distance of 25', while on the 170' level they join or cross and probably diverge again going down.

On the 142' level section B of the vein is plastered up against the east sides of both divisions of the fault as shown on the map on plate IV. The showing of the vein here is truly splendid and is 15' wide on the east fault where it is more in the form of a chimney without great lateral extent. It has been stoped out here to some extent but there is a considerable tonnage in sight of both positive and probable ore, all in carbonate form.

It was disappointing to note that the mineralization does not continue with depth along the great fault system, as would naturally be expected. The fault was absolutely barren on both the 170' and 203' levels which would indicate that the fault was not the cause or source of mineralization.

The genesis of the ore deposition in relation to the period of faulting is obscure and the data available appears directly contradictory making a positive conclusion in this respect uncertain. If it is assumed that ore deposition took place in the post faulting age, as in several respects it appears to have done, then it is difficult to explain why no ore has formed along the great fault where it is so well prospected on the other levels, especially in the long north drift, on the 170' level which is driven directly on its course. Here the brecciated and crushed decomposed granite and diorite offer an ideal locus for a replacement ore body and gives eloquent testimony to the conclusion that the important fault took place after the main age of mineralization. However controversial to this assumption is the ore deposition directly on the fault on 143' level and evidently caused by and formed on the fault planes. It is difficult to settle the apparent contradiction here.

Accompanying and after the main faulting which was not a single throw, but rather a series of oscillating movements, which fractured and crushed the rock for a considerable distance on each side of the main throw, making a rather wide brecciated zone, was a series of minor fractures and faults.

In later ages a fluctuation of the water level, caused a superficial and secondary mineralization as shown by the many veinlets of copper carbonates in the cracks and crevices of a shattered diorite. This is typically illustrated in the area west of the powder house on the 170' level. This is not of economic importance and should be ignored.

The zone of oxidation was observed to extend to approximately to the 200' level. Below this is the sulphide zone.

Section A and B of the vein may be properly classed as two separate, for while they blend and join on the 170' level they have a totally opposite strike and apparently were formed at different periods. Section A is a fissure vein while B is a chimney on a fault zone. The former is by far the most important.

Accompanying this report are five plates or maps showing all of the workings and the geology of each. In your future work these tracings should be consulted closely and additions made as the work progresses and have them thus kept up to date. They are all matched and made on translucent linen so that by superimposing the plates on each other so that the border and main shaft match or coincide and thus the various geological features may readily be interposed and the course you are to follow will be made evident as the approximate location of your objectives will be evident.

Recommendations and conclusions  
ALFORD ROOS  
CONSULTING  
MINING ENGINEER  
TUCSON, ARIZONA

In the past, much of the work has not been wisely placed and has evidently lacked proper guidance of skilled direction. This is especially noticeable on the 170' level and on the 302' level. In the future I would recommend that the work be confined to the vein where it is known to be and especially on the parts of it which are strongest. In opening it up on the new levels it will be well to accomplish this with the least possible amount of dead work. The maps I have made will greatly assist you in this.

The splendid showing of ore on the 142' level should be exploited. This shoot probably extends close to the surface and in taking it out new shoots may be found to connect with it. On this level the east-west section of the vein or vein A as in no place been prospected. A continuation of the drift at 8 (plate 4) on in the same north east direction should cut section A in not more than 40 feet. I would suggest that this be done. On the 203' level a very short crosscut at 7 (plate II) north would cut section A as well as tell you the nature of the limitations of the vein in this direction, which at present is somewhat obscure.

The nature, richness and limitations of the vein on the 302' level should be determined as quickly as possible. A short crosscut in the neighborhood of 5 or 6 (plate I) should establish the vein in less than 35 feet, and if it is found to be encouraging it would be advisable to continue the easterly drift 25 feet farther into the A section of the diorite where a short north crosscut will establish it here. Simultaneously with this the main shaft should be sunk another 50 feet so as not to have any one part of the development hold up the schedule of the rest. I advise the abandonment of the working face at the end of the long south drift on this level, as I can see no probable objective which would warrant its continuance.

I recommend that the ore be taken out wherever found on all levels. It will not injure the mine and ever foot will open up new vein as well as pay for itself, thus a vigorous new system of development can be carried out at little or no cost and perhaps even at a profit.

In general I can say that the general aspect of the mine from a physical standpoint is very encouraging. The surface showing of the vein is especially good, showing strength and promise. The different levels have shown its persistence in depth for the main vein and while its lateral extent is not as might be wished for, still the hundred feet of its economic length gives room of an attractive tonnage if the ore body continues in depth as it probably does. There is still a possibility that it extends westerly beyond the great fault zone, which future development only will determine. I would estimate that there are 15000 tons of probable ore in the mine with a great deal more possible ore. I base these figures on a conservative width of 5' and a lateral extent of 100' and a probable depth of at least 300'. The depth of course is purely speculative and may possibly be vastly more.

The nearness of your mine to the Hayden smelter eliminating

ADVISORY REPORT COVERING THE PHYSICAL FEATURES

ANTELOPE PEAK COPPER MINING CO.

ALFORD ROOS, E.M.

**INTRODUCTION:** The object and purpose of my examination and report and geological maps is strictly advisory and only such data was compiled and noted as would have a bearing directly or indirectly on the general outlook for the future of your mine the advisability of continuing operations, the location and extent of the veins and where best to prosecute new work and all from an economic viewpoint.

The geological conditions were found to be very intricate and the analysis of the situation complex with its several apparent contradictions and the final conclusions were arrived at and formed from the compilation of all the available positive data together with a reasonable assumption of probable geological events and conditions.

After correcting an error in azimuth of 30 degrees in the maps and survey made by F.N. Holmquist in September 1916 the courses and measurements of this old survey were used in the accompanying geological maps of the levels and were assumed to be correct.

**GEOLOGY:** While the maps show but two kinds of rock members there are in fact several flows of diorite material, differing somewhat in texture and structure but similar in chemical analysis and no attempt was made to differentiate between the successive flows and for the purposes of ~~the~~ convenience all the fine grained, semi-acidic eruptive material has been charted as diorite or diorite-schist as distinguished from the later crystalline granitic member, which has intruded the diorite. There are no sedimentary rocks in evidence anywhere on the limits of this property. The granitic rock is shown to be later and an intrusive into the diorite by its penetrating stringers and shattering of the latter. The mineralization and formation of the vein was after the later granitic intrusion since it cuts both formations. I base this conclusion on the fact that the vein ~~is~~ <sup>is</sup> continuous <sup>to</sup> the 302' level to cut the granitic rock without displacement and continues <sup>to</sup> the east. However, this is the only place in all the workings where this is demonstrated as in all other places the vein has been opened up only in the diorite. From this I assume that the vein will be found eventually strong to the east and north of your most easterly workings on the 302' level, in the body of the diorite which I assume to be a few feet beyond your most easterly drift on this level. In fact there are strong indications that you are now at this junction of the two rock members. On my maps the most easterly diorite division will be designated as B while the main granitic intrusive will be designated as A and the western division of the diorite will be C.

**THE VEIN:** The vein is of the fissure type and appears to be limited by a great north-south faulting system in the west, while it gradually merges and loses itself in the country rock to the east. The vein is in two sections which has a general east-west course and dips into the north, which I designate as section A. While the vein which has a northerly-southerly course and is closely connected with the great fault I will designate as B. Section A is well opened up on the 170', 203' and the winzes connecting but has not been prospected yet on the 142' level or the 302'. I predict that section A will be found in less than 40' to the north of and paralleling the drift on the 302' level in the C division of the diorite. Its richness and value on the level cannot be foretold with certainty. On the 142' level its probable course has been drawn on the map of this level and it can be and should be cut into from this level. Vein section A is the same as that which is so splendidly shown on the surface in the region of the 70' incline 230' southeast from the main shaft. This section is limited in the east as shown on the 203' and 170' levels and I would not advise further expenditure of funds in following it out in this direction. Section B of the vein is closely connected with the big fault system. This fault itself has two phases. It is shown to be in two separate movements which appear to cross each other in the vertical plan. On the 142' level the two planes dip towards each other at a distance of 25' while on the 170' level they join or cross and probably diverge again on going down.

On the 142' level section B of the vein is plastered up against the east sides of both divisions of the fault as shown on the map on Plate IV the

SUPPLEMENTARY ADDITION TO REPORT ON THE PROPERTY OF THE ANTELOPE  
PEAK COPPER MINING COMPANY Made JUNE 3rd, 1918. BY A. ROOS;

July 12th, 1918.

On my third visit to your property it is was gratifying to note that the north crosscut on the 302' level had cut section A of the vein at approximately the place indicated on the map and to note that the strength, width and value was beyond my expectations. I found the drift on the vein had been driven 40 feet with the best showings of all in the working face at that point. The vein here is at least 7 feet wide with the south wall as yet undetermined and continuing strong going west with good ore on the wall, floor and back. The copper is all in the form of covellite and bornite, ideal for flotation. An average sample taken across 7' of the vein in two sections gave an average of 5-1/2 % copper. This sample was impartial and included material of ribs of barren chert which of course will be sorted out of the shipping product, thus raising the grade.

I would advise discontinuing the crosscut north beyond where it cuts the vein as nothing can reasonably be expected to be found in this direction beyond here.

On this visit, I took the opportunity of checking up the Holmquist survey on the levels, which I had suspected of being in error. I found that the whole survey was in error, both in directions as well as actual measurements. Only the 302' level was found to be approximately correct. This was most unfortunate for after discovering an error of 30 degrees in this survey on my first visit to the property, the remainder of the survey was assumed to be reasonably correct. This discovery of error has made necessary the re-drawing of the maps. The 302' level has been redrawn and made up to date showing the late work. The 203' level which was most in error was also made over. The remaining levels should be made over correctly, when opportunity permits.

After this visit to the property, I can say that the general prospects are decidedly improved. Your vein on the 302' level has now been proven and it is most gratifying to note that it is stronger and richer than at any other point. It is decidedly encouraging. I would advise driving ahead with all speed and at the point where the vein comes nearest to the main shaft, I would advise that you connect up with the shaft so as to get better air. You are not more than 60' from the shaft at present and you will probably approach it considerably closer on the vein. You should now establish a raise and an ore shoot preparatory to stopping out your ore and it would be advisable to connect up with the 203' level by sinking at 4 (plate 11) and raising at 3 (plate 1) to meet it. This would be your main ore shoot and the tram to the main shaft will be short. You will then have established your ore body for a continuous depth of 300'.

Preparations for sinking the main shaft and opening up new levels should go forward immediately. I would advise that this level be put at a depth of about 60' below the 302' level. You will find it profitable and to your advantage to put in a compressor and air drills as it is quieter and cheaper. I would also advise that you establish enough laboratory equipment to assay copper by cyanide method. The cost of this should not exceed \$250.

Respectfully submitted,

July 12th, 1918.

Alford Roos, E.M.

ANTELOPE PEAK COPPER MINING CO.

REFERENCES

YUMA COUNTY  
SAN PEDRO DIST.  
T6S R15E Sec. 19

*Pinal*

~~Yuma~~ County MILS Index #401

AKA: Unpatented Claims M S 3589

BLM Mining Dist Sheet 659

The Mines Handbook, Vol. XVI, p. 225

AZ Mining Journal, Vol. III, No. 11, April 1920, p. 28

BLM Plat M S 3589

Winkleman 7.5' Topo (included in file)



Published by the Geological Survey  
USC&GS

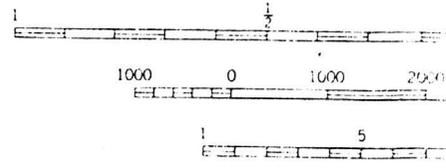
photographs by multiplex methods  
in 1947. Field check 1949  
1927 North American datum  
on Arizona coordinate system,

site approximate location  
Transverse Mercator grid ticks,

Compiled from aerial photographs  
checked

*Winkelman 7.5'*

★  
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13°  
0°06' 23" N  
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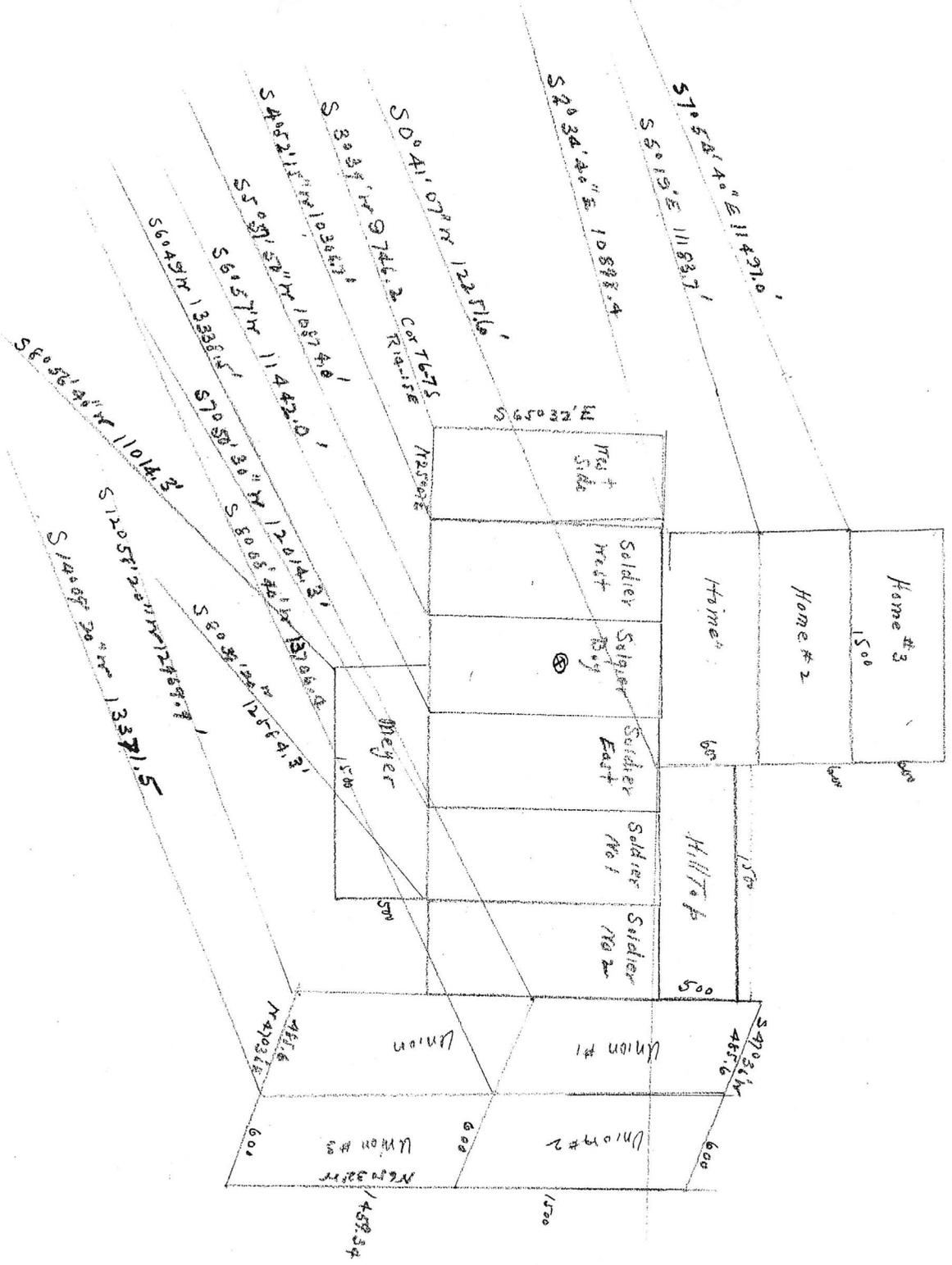


UTM GRID AND 1972 MAGNETIC NORTH  
DECLINATION AT CENTER OF SHEET

CONTOUR  
DATUM  
THIS MAP COMPLIES WITH  
FOR SALE BY U.S. GEOLOGICAL SURVEY. D  
A FOLDER DESCRIBING TOPOGRAPHIC

Antelope Peak Camp  
# 3589

SECS. 19-20-29-30 T4S R15E  
SECS. 24-25 T4S R14E Wmwa.



ADVISORY REPORT COVERING THE PHYSICAL FEATURES OF THE  
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The VEIN.

The vein is of the fissure type and appears to be limited by a great north south faulting system in the west, while it gradually merges and loses itself in the country rock in the east. The vein is in two sections which has a general east-west course and dips into the north, I will designate as section A, while the vein which has a northerly -southerly course and is closely connected with the great fault, I will designate as section B. Section A is well opened up on the 170', 203' and the winzes connecting, has not yet been prospected on the 142' level or on the 302'. I predict that the section A will be found in less than 40' to the north of and paralleling the drift on the 302' level, in the C division of the diorite. Its richness and value on this level can not be foretold with certainty.

GEOLOGY

OFFICE OF  
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CONSULTING  
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TUCSON, ARIZONA

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Section B of the vein is closely connected with the big fault system. This fault itself has two phases. It is shown to be in two separate movements which appear to cross each other in the vertical plane. On the 142' level the two planes dip towards each other at a distance of 25', while on the 170' level they join or cross and probably diverge again going down.

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The genesis of the ore deposition in relation to the period of faulting is obscure and the data available appears directly contradictory making a positive conclusion in this respect uncertain. If it is assumed that ore deposition took place in the post faulting age, as in several respects it appears to have done, then it is difficult to explain why no ore has formed along the great fault where it is so well prospected on the other levels, especially in the long north drift, on the 170' level which is driven directly on its course. Here the brecciated and crushed decomposed granite and diorite offer an ideal locus for a replacement ore body and gives eloquent testimony to the conclusion that the important fault took place after the main age of mineralization. However controversial to this assumption is the ore deposition directly on the fault on 143' level and evidently caused by and formed on the fault planes. It is difficult to settle the apparent contradiction here.

Accompanying and after the main faulting which was not a single throw, but rather a series of oscillating movements, which fractured and crushed the rock for a considerable distance on each side of the main throw, making a rather wide brecciated zone, was a series of minor fractures and faults.

In later ages a fluctuation of the water level, caused a superficial and secondary mineralization as shown by the many veinlets of copper carbonates in the cracks and crevices of a shattered diorite. This is typically illustrated in the area west of the powder house on the 170' level. This is not of economic importance and should be ignored.

The zone of oxidation was observed to extend to approximately to the 200' level. Below this is the sulphide zone.

Section A and B of the vein may be properly classed as two separate, for while they blend and join on the 170' level they have a totally opposite strike and apparently were formed at different periods. Section A is a fissure vein while B is a chimney on a fault zone. The former is by far the most important.

Accompanying this report are five plates or maps showing all of the workings and the geology of each. In your future work these tracings should be consulted closely and additions made as the work progresses and have them thus kept up to date. They are all matched and made on translucent linen so that by superimposing the plates on each other so that the border and main shaft match or coincide and thus the various geological features may readily be interposed and the course you are to follow will be made evident as the approximate location of your objectives will be evident.

Recommendations and conclusions  
ALFORD ROOS  
CONSULTING  
MINING ENGINEER  
TUCSON, ARIZONA

In the past, much of the work has not been wisely placed and has evidently lacked proper guidance of skilled direction. This is especially noticeable on the 170' level and on the 302' level. In the future I would recommend that the work be confined to the vein where it is known to be and especially on the parts of it which are strongest. In opening it up on the new levels it will be well to accomplish this with the least possible amount of dead work. The maps I have made will greatly assist you in this.

The splendid showing of ore on the 142' level should be exploited. This shoot probably extends close to the surface and in taking it out new shoots may be found to connect with it. On this level the east-west section of the vein or vein A as in no place been prospect. A continuation of the drift at 8 (plate 4) on in the same north east direction should cut section A in not more than 40 feet. I would suggest that this be done. On the 203' level a very short crosscut at 7 (plate II) north would cut section A as well as tell you the nature of the limitations of the vein in this direction, which at present is somewhat obscure.

The nature, richness and imitations of the vein on the 302' level should be determined as quickly as possible. A short crosscut in the neighborhood of 5 or 6 (plate I) should establish the vein in less than 35 feet, and if it is found to be encouraging it would be advisable to continue the easterly drift 25 feet farther into the A section of the diorite where a short north crosscut will establish it here. Simultaneously with this the main shaft should be sunk another 50 feet so as not to have any one part of the development hold up the schedule of the rest. I advise the abandonment of the working face at the end of the long south drift on this level, as I can see no probable objective which would warrant its continuance.

I recommend that the ore be taken out wherever found on all levels. It will not injure the mine and ever foot will open up new vein as well as pay for itself, thus a vigorous new system of development can be carried out at little or no cost and perhaps even at a profit.

In general I can say that the general aspect of the mine from a physical standpoint is very encouraging. The surface showing of the vein is especially good, showing strength and promise. The different levels have shown its persistence in depth for the main vein and while its lateral extent is not as might be wished for, still the hundred feet of its economic length gives room of an attractive tonnage if the ore body continues in depth as it probably does. There is still a possibility that it extends westerly beyond the great fault zone, which future development only will determine. I would estimate that there are 15000 tons of probable ore in the mine with a great deal more possible ore. I base these figures on a conservative width of 5' and a lateral extent of 100' and a probable depth of at least 300'. The depth of course is purely speculative and may possibly be vastly more.

The nearness of your mine to the Hayden smelter eliminating

ADVISORY REPORT COVERING THE PHYSICAL FEATURES

ANTELOPE PEAK COPPER MINING CO.

ALFORD ROOS, E.M.

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The geological conditions were found to be very intricate and the analysis of the situation complex with its several apparent contradictions and the final conclusions were arrived at and formed from the compilation of all the available positive data together with a reasonable assumption of probable geological events and conditions.

After correcting an error in azimuth of 30 degrees in the maps and survey made by F.N.Holmquist in September 1916 the courses and measurements of this old survey were used in the accompanying geological maps of the levels and were assumed to be correct.

**GEOLOGY:** While the maps show but two kinds of rock members there are in fact several flows of diorite material, differing somewhat in texture and structure but similar in chemical analysis and no attempt was made to differentiate between the successive flows and for the purposes of ~~the~~ convenience all the fine grained, semi-acidic eruptive material has been charted as diorite or diorite-schist as distinguished from the later crystalline granitic member, which has intruded the diorite. There are no sedimentary rocks in evidence anywhere on the limits of this property. The granitic rock is shown to be later and an intrusive into the diorite by its penetrating stringers and shattering of the latter. The mineralization and formation of the vein was after the later granitic intrusion since it cuts both formations. I base this conclusion on the fact that the vein ~~is~~ continues on into the level to cut the granitic rock without displacement and continues on into the diorite to the east. However, this is the only place in all the workings where this is demonstrated as in all other places the vein has been opened up only in the diorite. From this I assume that the vein will be found eventually strong to the east and north of your most easterly workings on the 302' level, in the body of the diorite which I assume to be a few feet beyond your most easterly drift on this level. In fact there are strong indications that you are now at this junction of the two rock members. On my maps the most easterly diorite division will be designated as B while the main granitic intrusive will be designated as A and the western division of the diorite will be C.

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On the 142' level section B of the vein is plastered up against the east sides of both divisions of the fault as shown on the map on Plate IV the

12 mi W. of Winkelman in Terrell mts  
70 mi NE of Tucson

Phoenix, Arizona,  
June 16th, 1919.

Mr. H. F. Hanny,  
Mgr. Antelope Peak Copper Mining Co.,  
Winkelman, Arizona.

Dear Sir:

I have at your request visited the property of the Antelope Peak Copper Mining Co., and after examination report as follows:

The general formation in which your property is located is diorite, much of which is schistose. This diorite has been intruded by younger granitic rocks, the intrusions occurring as dikes and masses.

At the contacts of the schistose diorite and the later intruded rocks as shown in the mine workings the schist is brecciated and now occurs in its original broken condition with very little cementation by deposition from the circulating waters. From the appearance of the rock large quantities of water have circulated through the breccia and the ordinary mica has been changed to sericite and the feldspar to kaolin and talc. But on account of the looseness of the breccia any minerals which might have been in the solution in the circulating waters have passed on without deposition.

Lying at nearly right angles to the contact and extending from it into the schistose diorite about seventy feet, as already proven, there occurs a spur of brecciated material from which practically all of the ore to date has been mined. At the time of my visit the whole breast of the drift on the 350 foot level was in this material and well mineralized. Much of it as mined runs around 12% copper. This mineral is chalcopyrite (copper sulphide) and melaconite (black copper oxide). This is the deepest working in the mine and the only place where sulphides in any quantity have been encountered.

The brecciation here is not as intense as at the contact and instead of the water passing rapidly through the broken rock zone it has been sufficiently delayed to allow the deposition of the minerals contained in the circulating waters. This explains why the good ore body is found in the more compact breccia of the spur and in the intensely shattered area of the contact.

I believe that with sufficient depth attained that the contact breccia will be as well mineralized as the spur vein. Just what depth will be required I am unable to say but it will be necessary to reach comparatively stable water table where the water has been held for sufficient time to allow the minerals contained in solution in the water to become deposited.

There is a considerable change in conditions between the 300 and the 350 foot levels and should the same or relative changes continue to a depth of 500 feet or 600 feet should reach comparatively stationary water level where a minimum oxidation has occurred.

The upper levels of the mine have shown considerable oxidized ore and carbonate ore, of good grade, and there is much still left in the mine, I am told, although the conditions of these levels was such from caving that I could not inspect them.

On the 300 level both the contact and the spur vein have been opened. The former by a drift 200 feet in length and the latter for 70 feet. The conditions in the contact are as heretofore described and the spur vein produced quite a quantity of carbonate and oxide ore. The cars shipped gave a return of between 7 and 8% copper with very little sorting. By careful sorting much higher grade ore was obtained.

The ore now coming from the 350 foot level is high in grade and of very desirable character, the abundance of sulphides indicating the the bottom of the oxidized zone is about being reached.

More depth should be attained. Sinking on the shaft should be continued and improvements in both character and quantity of the ore can reasonably be expected up to at least a total depth of 1000 to 1200 feet. At this depth I believe that a mineralized condition will be found to exist in the brecciated contact at the schist and diorite as this should be deep enough to reach the present comparatively static water table. Should this predicted condition be found it would mean a very large additional ore body in addition to the ore already known and too much importance cannot be placed upon the necessity for greater depth.

After doing sufficient work to determine the extent of the ore on the 350 foot level I would not advise further development on the levels already opened except to connect the 300 and 350 foot levels by a raise on the ore until more sinking has been done and deeper levels opened.

The surface equipment consists of a 25 horsepower Western gasoline hoist, a compressor, capacity 300 cubic feet of free air per minute, Chicago Pneumatic Tool Co., type, a duplex pump, capacity 150 gallons per minute at 200 feet and eighteen horsepower Western gasoline engine for operating pump, a good head frame, tanks, buildings etc, a No. 7 Cameron sinking pump is used in the sump, to raise the water to the 300 foot level where it is pumped to the surface by the duplex which at the present time is about 40 gallons per minute. The equipment is sufficient for present purposes.

You undoubtedly have the making of a good copper mine as the grade of ore is high and with sufficient depth should you as I believe you will find the contact breccia sufficiently mineralized to form commercial ore body the quantity will be greatly increased. Of course until actual development work is done one must be governed in their opinion by entirely upon what has heretofore been proven in similar cases and the actual conditions at this particular property and it is upon this line of reasoning that I base my opinion as to the results from the future development work at depth.

The work being done at present is well done and no just criticism can be made upon the methods employed and the results obtained.

Respectfully yours,

(Signed) R.W. Hollis,  
Mining Engineer.

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ALFORD ROOS, E.M.

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SUPPLEMENTARY ADDITION TO REPORT ON THE PROPERTY OF THE ANTILOPE  
PEAK COPPER MINING COMPANY Made JUNE 3rd, 1918. BY A. ROOS

July 12th, 1918.

On my third visit to your property it is gratifying to note that the north crosscut on the 302' level had cut section A of the vein at approximately the place indicated on the map and to note that the strength, width and value was beyond my expectations. I found the drift on the vein had been driven 40 feet with the best showings of all in the working face at that point. The vein here is at least 7 feet wide with the south wall as yet undetermined and continuing strong going west with good ore on the wall, floor and back. The copper is all in the form of covellite and bornite, ideal for flotation. An average sample taken across 7' of the vein in two sections gave an average of 5-1/2 % copper. This sample was impartial and included material of ribs of barren chert which of course will be sorted out of the shipping product, thus raising the grade.

I would advise discontinuing the crosscut north beyond where it cuts the vein as nothing can reasonably be expected to be found in this direction beyond here.

On this visit, I took the opportunity of checking up the Holmquist survey on the levels, which I had suspected of being in error. I found that the whole survey was in error, both in directions as well as actual measurements. Only the 302' level was found to be approximately correct. This was most unfortunate for after discovering an error of 30 degrees in this survey on my first visit to the property, the remainder of the survey was assumed to be reasonably correct. This discovery of error has made necessary the re-drawing of the maps. The 302' level has been redrawn and made up to date showing the late work. The 203' level which was most in error was also made over. The remaining levels should be made over correctly, when opportunity permits.

After this visit to the property, I can say that the general prospects are decidedly improved. Your vein on the 302' level has now been proven and it is most gratifying to note that it is stronger and richer than at any other point. It is decidedly encouraging. I would advise driving ahead with all speed and at the point where the vein comes nearest to the main shaft, I would advise that you connect up with the shaft so as to get better air. You are not more than 60' from the shaft at present and you will probably approach it considerably closer on the vein. You should now establish a raise and an ore shoot preparatory to stopping out your ore and it would be advisable to connect up with the 203' level by sinking at 4 (plate 11) and raising at 3 (plate 1) to meet it. This would be your main ore shoot and the tram to the main shaft will be short. You will then have established your ore body for a continuous depth of 300'.

Preparations for sinking the main shaft and opening up new levels should go forward immediately. I would advise that this level be put at a depth of about 60' below the 302' level. You will find it profitable and to your advantage to put in a compressor and air drills as it is quicker and cheaper. I would also advise that you establish enough laboratory equipment to assay copper by cyanide method. The cost of this should not exceed \$225.

Respectfully submitted,

July 12th, 1918.

Alford Roos, E.M.



# High Line Copper Company

408 FLEMING BUILDING

Phoenix, Arizona

PROPERTIES AT COCHRAN, PINAL CO., ARIZONA

2717 N. 1ST ST. PHOENIX - ARIZ. 2002  
RECORDED 24th 91 177 74-48 1002

