GOLD MOUNTAIN MINING DIST. Gold Mountain Esmeralda County (Nevada)

Tonopah Divide Mining Co.
Brougher Divide Mining Co.

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REPORT ON THE GEOLOGY

OF THE

GOLD MOUNTAIN MINING DISTRICT

ESMERALDA COUNTY, NEVADA.

BY

HERBERT N. WITT.

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C O P Y

REPORT ON THE GEOLOGY OF THE GOLD MOUNTAIN MINING DISTRICT, ESMERALDA COUNTY, NEVADA. PARTICULARLY THE PROPERTIES OF THE TONOPAH DIVIDE MINING CO. AND THE BROUGHER DIVIDE MINING COMPANY

INTRODUCTION

The field study of this District covered a period of twenty-one days during June, 1918, at which time the underground development consisted mainly of new shafts with but little lateral work. The Gold Zone had re-opened about 200 ft. of an old level at 290 ft. below the shaft collar. The Tonopah Divide had established the 165 ft. and 265 ft. levels and the shaft had been sunk to 350 ft. The Brougher Divide had sunk to 200 ft. and started North and South cross-cuts, which were then in about 30 ft. The Divide Extension had sunk to 150 ft. and started cross-cutting to the south. The Dividend had sunk to 235 ft., but this shaft was not visited.

The study of the geology, therefore, was of necessity confined largely to the surface and while such data is naturally inaccurate in detail, the general outline of the structure of the District is probably close to the truth.

Several specimens were gathered for microscopic study, which the writer is now conducting at the University of California. A supplemental report on the results of this study will be submitted at an early date.

GENERAL GEOLOGY

The rocks exposed in this District in the immediate vicinity of Gold Mountain consist of andesite and rhyolites with intercalated tuff beds. The oldest rock is the andesite which underlies the rhyolite terrane and probably has a thickness in excess of 1,000 ft. Overlying this is a rhyolite breccia about 600 or 700 ft. thick, which contains the new ledge exposed in the Tonopah Divide shaft workings. This breccia grades rather abruptly into a series of intercalated tuffs and breccias, which are in turn overlain by a white platy rhyolite with some perlite breccias and tuffs.

STRUCTURE

In general the flows and beds lie nearly flat with a slight dip to the South and West.

The andesite is strongly sheeted in an East and West direction, which obscures its structure over most of its exposures. Its position below the rhyolite breccia was found from a study of the Bazaar Group, South of Gold Mountain, where a very coarse phase of the rhyolite breccia outcrops prominently. This outcrop is about 400 ft. stratigraphically above a point where the rhyolite breccia can be seen resting on the andesite at a point on the steepest grade on the road leading to the Bazaar Group. What appears to be the same coarse rhyolite breccia outcrops North of the Dividend shaft about 50 ft. below it, thus giving an index to the thickness of the rhyolite breccia. If the difference in elevation between the Divide and the Dividend shafts is known, the depth at which the Divide shaft will pass into andesite can be obtained by adding this figure to 450 ft. The former figure was not available at the time of this examination, but the writer estimates that at about 600 ft. the Divide will pass into andesite. The first water will probably be encountered at this level.

The rhyolite breccia lying nearly flat occupies the greater part of the flat extending North from Gold Mountain beyond the limits of the accompanying map.

The upper limit of the main rhyolite breccia is a rhyolite tuff with intercalated breccia flows. The contact can best be seen to the South and Southwest of the Brougher-Divide shaft, as indicated on the accompanying map.

The exact thickness of the tuff terrane could not be measured since its relation with the overlying platy white rhyolite is obscured by complex minor faulting on Gold Mountain not shown upon the map. On the Gold Zone side of Gold Mountain the platy rhyolite is lying in what appears to be a normal position upon the tuff, but the base of the tuff is not visible because of faulting which has brought the andesite against it. The tuffs probably have a total thickness of several hundred feet but contain many intercalated breccias and rhyolite flows. The narrow gold veins described later occur both in the tuffs and the rhyolite on the Gold Mountain.

Faulting while adding greatly to the complexity of detail has not resulted in many faults of great displacement. Near the Gold Zone are the only large faults and these have dropped the tuffs down against the andesite as shown upon the map. On the West side of the Mountain, the tuff is faulted down against the breccia and numerous nearly North South faults displace the tuff-breccia-contact Southwest of the Brougher shaft, but none of these are large. Faults exposed in the long crosscut on the 265 level of the Tonopah-Divide show the tuff faulted down against the breccia. These faults continued to the East should cut the Divide ledge before it passes in Gold Zone ground, but the surface showings and the evidence from the workings of the Gold Zone indicate that the ledge was not seriously faulted. This suggests that the direction of movement on these faults has nearly coincided with the traces of the ledge on the fault planes. This while giving no displacement in strike would leave the ledge now on the hanging wall side of this fault at a higher horizon in the breccia than that part of the ledge now exposed. It is probable that in cutting this fault to the East, the ledge will be found only slightly offset but in the tuff. Such is the condition shown in the Gold Zone workings.

Within the platy rhyolite mass forming the main peak of Gold Mountain, the structure is exceedingly complex and its representation is not attempted on the map. Some of the complexity is no doubt due to accidents of flow but much of it is due to numerous faults of minor displacement, some of which are gold bearing and have been mined. The rhyolite flow lines dip and strike in every

direction and the working out of this structure would not be rewarded by any results of practical importance.

ORE DEPOSITION

Two types of deposits have thus far been developed in the Divide property. One type consists of numerous narrow brecciated ore streaks in the platy white rhyolite high up on Gold Mountain. The other type is a soft kaolinized zone exposed in the workings from the new shaft of the Divide. The former contains gold principally, while the latter contains Silver with small amounts of Gold and Molybdenum.

The gold veins are small fault breccias locally and erratically mineralized with gold and are silicified near the surface. The work in the long crosscut on the 265 level of the Divide indicates that they do not persist in depth. All the ore produced in these veins by leasers has been by screening the breccia and shipping the fines and although considerable work has been done, the actual tonnage shipped and gold produced has been relatively small. They, therefore, do not invite further development in depth.

The new ledge carrying molybdenum can best be classified as a "freak". It consists of a nearly vertical Zone from six to thirty feet wide bounded by one good wall and one less definite wall and has a tabular form, striking about Northwest Southeast. Silicification is not common and the only general rock alteration seems to be a kaolinization of the rhyolite breccia between the walls. The values occur almost exclusively in the black gouges which are confined to this zone and lie at all angles within it. In places oxidation and leaching have produced local bunches of horn silver, secondary argentite, molybdite and powellite, but these bunches are not persistent.

The primary mineralization seems to be confined to the gouges which, because of their high values and large number in certain places, make ore for the whole width or for part of the width of the zone. Accompanying these black gouges, but not as numerous, are white "gouges" up to four inches in thickness consisting principally of soft kaolinized rhyolite heavily impregnated with powellite, sometime assaying as high as 30% molybdenum but carrying little gold or silver. They probably are not of commercial importance. Powellite also occurs in specimen crystals along oxidized fractures in the harder less altered breccia in the zone, on the 265 level and in this form is probably secondary. In the upper levels powellite in either form is less common and the mineral molybdite, molybdate of iron, is found in oxidized fractures.

The black gouges are often heavily impregnated with pyrite and probably owe their black color to finely divided sulphides, including argentite and molybdenite. They are not oxidized on either level.

The minerals and rock alteration will be described more fully in the supplemental report on the results from microscopic study.

Surface showings indicate that the ore bearing zone is persistent from the Gold Zone property through the Divide to the Brougher Divide. The zone will probably pinch and swell but there is nothing to indicate any serious displacement by faulting. The ore zone outcrops on the Gold Zone property, near the powder magazine, on the Divide property near the new shaft and what appears to

be the same zone although less heavily mineralized and probably fingering into two splits, shows near the Brougher Divide shaft. None of these outcrops look promising, although the one near the Divide shaft is more heavily iron stained than the rest. Similar looking outcrops, but striking more nearly North than South occur West of Brougher Divide on the Anchor-Leland and Anchor Leland No 1 claims and on the High Divide ground near the common end line of the St. Patrick and St. Ignatius claims is an outcrop nearly parallel to the Divide zone. Both are in rhyolite breccia. Of these the one on the High Divide carries more promise.

The origin of this deposit on the Divide property is not clear, although microscopic study may throw some light upon it. It is the writer's opinion that sulphide mineralization preceded the kaolinization and that the fracturing accompanying or just preceding this mineralization facilitated the later kaolinization and the deposition of the secondary ore mineral found on oxidized fractures. Inasmuch as the primary ore in the gouges is not easily oxidized, the secondary ores are not of commercial importance. The origin and probable habit of the primary ore of the black gouge is of principal interest for the purpose of this report. Preliminary study of specimens indicates that some of the powellite in the ore gouges was deposited in cavities resulting from the dissolving out of quartz and feldspar phenocrysts before kaolinization was accomplished and suggests that powellite accompanied the original sulphide mineralization, although secondary action has deposited coarse powellite along oxidized fractures. The kaolinization has largely obscured whatever rock alteration may have accompanied the sulphides.

It is probably that the primary ore wherever found will contain argentite and pyrite with small amounts of powellite and some molybdenite. The location and persistence of the black gouges is doubtless determined by some local factor as yet unknown but from their nature they can be expected to continue in depth in the rhyolite breccia. Whether or not they will be as numerous or as high is not definitely indicated by the limited data available, but in the writer's opinion they will not be as numerous although possibly of the same grade. The assays on the two levels indicate a marked depreciation in value, but this is not due so much to the reduction in values contained in the gouges as the reduction in their number. This is immediately apparent on an inspection of the two levels.

The question of the locii of ore shoots cannot be answered since there is no data to disclose the local conditions which result in the presence of the ore-bearing gouges. Thus far only one shoot on each level is exposed. These may be parts of the same ore shoot plunging to the East. Such a condition is assumed in the approximation of ore that will be blocked out which is included in this report. That other ore shoots may exist in the zone is not to be denied but it is extremely doubtful if any amount of geologic study can predict their location. Only thorough prospecting can find them if they exist.

On the 365 level, the ore shoot is probably farther East than on the 265 for which reason it would be well to drift East as soon as the zone is cut on this new level.

Because of the freakish nature of this deposit, the writer is pessimistic about the probability of finding another similar shoot of this size and value elsewhere within the zone. It is the writer's opinion, however, that the present shoot will persist in depth in a rhyolite breccia. For this reason, vertical (shaft) development on this shoot is favored for the immediate future, rather

than horizontal development in search of a new shoot. What will happen to the zone and the ore shoot in the andesite is a matter for conjecture. It is the writer's opinion that the andesite is a flow lying normally below the breccia and as such should not be an unfavorable rock. However, any guesses regarding its affect upon the ledge would have little value in this stage of the development and our knowledge of the District.

ORE RESERVES

The detailed geology of the underground workings is plotted on the accompanying white print and from this information, together with that of the assay maps, an attempt is made to estimate the value of the present ore shoot. This estimate is by no means an accurate appraisal of positive ore since there are no raises between levels to even show continuity. It is simply an attempt to show in figures a fact which is particularly important in view of the general optimism regarding this property. Particular attention is called to the assay map compiled from data collected by Mr. D'Arcy and Mr. Sharp. It will be noted from this map that values are extremely erratic. That very high and very low assays occur adjacent to one another, that often a streak will return high assays on one side of a crosscut and return nothing on the opposite side, that keeping in mind the manner of occurrence of the values it is difficult to group assays so as to get an ore shoot that is probably continuous, and that the whole ore shoot outlined on the 265 level is nothing more than closely spaced bunches of ore and no samples across the backs of drifts between crosscuts are available. Because of the localization of the values in soft gouges, which are more easily sampled than the tough rhyolite, all high assays on the 165 level have been reduced to $100.00 and in some places on the 265 foot level high assays have been arbitrarily reduced where it seems wise to do so. On the 265 level no ore is admitted West of the main crosscut. Some values are shown here on the assay map but lack continuity and are the result of local secondary action and probably of small volume. Both ends of the ore shoot are exposed on the lower level and the easterly end is exposed on the upper level. Further development to the West on the upper level will probably increase the length of the shoot.

The assay map of the 165 level indicates a shoot of ore 30 ft. long and 25 ft. wide with an average value of about $39.00. On the 265 level, there is indicated a shoot 120 ft. long with an average width of 20 ft. and average value of $31.00. On the upper level the area represented is 753 sq. ft. and on the 265 level 2400 sq. ft. The ore is estimated to extend 50 ft. above the 165 level and 50 ft. below the 265 level, which gives approximately 25,000 tons. It is estimated that this ore will stope to run about $20.00 and will return a profit of $10.00 a ton, or a total profit of about $250,000.00 for this shoot. Assuming that on the 365 level ore will be developed for a length of 100 ft. for an average width of 15 ft. with an average value of $25.00 a ton, the profit to be made would be approximately $400,000.00 contained in 40,000 tons. Extension of the ore shoot on the 165 level will increase this amount and it is, therefore, probable that when the ore shoot from the 365 level to the surface is blocked out, the profit in sight will approximate half a million dollars. It is emphasized again that this is not an appraisal of ore in sight, but simply an attempt to approximate the value of the ore shoot that is now being developed.

BROUGHER DIVIDE

When the writer left Gold Mountain the two crosscuts from the 200 ft. level of this shaft had been extended about 30 ft. The South crosscut was nearly under a cropping on the surface which looked like the same zone found on the Divide and lined up with it in strike. The North crosscut had not then reached a point under a similar showing North of the shaft. In the South crosscut a few oxidized slips had been cut which could be correlated with the surface showing. The writer is of the opinion that these oxidized slips are all that will be found hereor to the North. They are probably the same as the slips and gouges in the Divide but have not been mineralized. Further development laterally and in depth may find an ore shoot but for the reasons expressed under the discussion of the Divide property as well as the lack of heavy iron staining on the Brougher showings, the writer is not optimistic about this property.

DIVIDE EXTENSION

This Company has little to warrant its existence. The zone does not pass through its property and it has no surface showing worthy of development.

DIVIDEND

The same may be said of this property.

GOLD ZONE

In this property what appears to be the Divide ledge was opened in early days for a distance of about 100 ft. on the 290 ft. level. This is now being re-opened. The ledge here has an appearance very similar to that in the Divide but lacks the black gouges. The fact that low values are found invites further development. There is about 100 ft. of unexplored ledge on this level, lying between the face of the drift and the side line to the West. Due to faulting this level is at a higher horizon in the rhyolite breccia terrane than is the shaft collar of the Divide. It is in fact in the basal part of the tuff terrane. It may be, therefore, that by sinking another lift and cross-cutting to the ledge that conditions in the Divide may be duplicated here. For reasons already expressed the writer has little hope for success here, although the Gold Zone has more promise than any property other than the Divide.

Respectfully submitted,

(Signed) Herbert N. Witt.

July 18, 1918.

Maps.
Claim Map of District with Surface Geology.
Underground geologic map of Tonopah Divide.
Underground assay maps of Tonopah Divide.

Form 502 Ton. 1-25

COPY

THE TONOPAH MINING COMPANY OF NEVADA

PHILADELPHIA

March 25, 1925.

Walter J. Hunt, Esq.,
20th & Mifflin Streets,
Philadelphia, Pa.

Dear Mr. Hunt:

You will recall writing me, under date of March sixth, relative to Tonopah Divide and Acme Lead Mines.

I have the following information from our Engineering Department in the west:

"The Tonopah Divide proper has ceased operations at Divide, and is now working the Tonopah Midway at Tonopah. They have replaced at the Midway the small head frame which they had been using and have equipped this property with a modern hoisting plant and a head frame that is about equal to the Jim Butler or the Silver Top head frame. The Midway shaft is down about 1500 ft. and they have cross-cut north from the bottom of this shaft to the Murray Vein, and after cutting it drifted both east and west. At no point was commercial ore found on this level. Furthermore, the vein on this level is badly broken up and faulted. As you know, the ore on the Murray Vein in our property played out below the 1100 ft. level, and we were not able to obtain any commercial ore below this level during the sinking of the Merger Winze, which is 100 ft. deeper than the lower level of the Midway. Further, the only ore that has been found below the 1100 ft. level on the Murray Vein is in the Victor workings, which would be several thousand feet west of the Midway workings. I would therefore say that while it is not impossible to find ore in the Midway mine, it is not very probable. According to a statement which I saw the other day, the Tonopah Midway, or Tonopah Divide, has $247,000. cash in its treasury, the balance of their assets being made up of mining property.

"In regard to the Acme Lead Mines Company, of which Mr. Chas. F. Spillman is president, I am unable to getyany information whatever about this property. I intend going to Reno next week, and shall make it a point to see Mr. Spillman and get whatever information I can from him, and will then send it to you."

I trust this information will be what you desire, as it is about as near the facts as I am able to obtain them for you.

With kind personal regards,

Very truly yours,

President.

TONOPAH BELMONT DEVELOPMENT CO.
MINES AND GENERAL OFFICES AT TONOPAH

CLYDE A. HELLER, PRESIDENT
FRED'K. BRADSHAW, GEN'L. MANAGER
CHARLES DUCHENEAU, COMPTROLLER

IN REPLY REFER TO FILE

TONOPAH, NEVADA June 17, 1917.

Mr. Clyde A. Heller, President,
Tonopah Belmont Development Co.
500 Bullitt Bldg., Philadelphia, Pa.

Dear Mr. Heller:

Mr. H. C. Brougher has been here for several days past and has been very desirous that I go out again to see his property on Gold Mountain, where he is at present sinking a shaft. He advised me that he had some new and interesting developments, so I went out with him for a couple of hours on Friday.

Mr. Brougher would very much like to have the Tonopah Belmont Development Co. take an interest in this property. I told him that I did not believe that careful examination would show results that would warrant going into the thing on any other than a very long gamble basis. The new development so far as I could see consisted of some highly silicified rhyolite that contained some low values. On some of the fissures there is a little enrichment and I took one sample that ran 7.44 oz. gold and 1337 oz. silver, but this was only a high grade specimen and there is very little of this ore.

Mr. Brougher said that he had wanted to carry this himself but conditions were such that he now wanted some help.

I do not believe that in the present stage of development Mr. Garrey or anyone else would recommend going into the matter, save only as a gamble, and a long shot at that.

Yours very truly,

F Bradshaw
General Manager.

FB-EH

Oct. 27, 1916.

Mr. H. C. Brougher,
6335 Florio Street,
Oakland, California.

Dear Mr. Brougher:

I went out to the Gold Mountain property with Billy Douglass and Billy Taylor yesterday and spent a couple of hours going through the workings with the lessees. It would take an engineer eight or ten days, I think, to make a thorough examination of the property and I will write Mr. Garrey to this effect.

Personally, I don't think, from the casual visit I made to the property, that it would interest Belmont, though a closer study of the thing might change this opinion. I don't mean that I don't think that it would not be worth while to get greater depth on the veins, as you said you proposed doing, for a comprehensive examination might show up a lot of things that I missed.

I will write Mr. Garrey, as above, and ask him when one of his men could make a close examination.

Yours very truly,

General Manager.

FB-VD

TONOPAH BELMONT DEVELOPMENT CO.
MINES AND GENERAL OFFICES AT TONOPAH

CLYDE A. HELLER, PRESIDENT
FREDK. BRADSHAW, GENL. SUPT.
CHARLES DUCHENEAU, AUDITOR

IN REPLY REFER TO FILE

TONOPAH, NEVADA Oct. 27, 1916.

Mr. George H. Garrey,
Palace Hotel,
San Francisco, Cal.

Dear Mr. Garrey:

I went over to see Mr. H. C. Brougher's Gold Mountain property yesterday. This is the property that Mr. Brougher spoke to you and Mr. Heller about. It is about seven miles from Tonopah on the Goldfield road.

There are three or more so called veins in one or more rhyolite flows -- similar to our Oddie rhyolite. On the foot and hanging of a so called wide vein quite a little development work has been done and considerable ore extracted from the development headings and from stopes. And there are several little open cuts and tunnels on the other so called veins. The leads are fault shear zones in the rhyolite, one of them being in places a contact between two rhyolite flows and in places a contact between the rhyolite and tuffs. There is little or no primary quartz, the so called quartz being a silicification of the rhyolite. The values -- gold predominating, with varying amounts of silver -- lie in thin streaks of oxidized material where the crushing has been intense and along joint planes in the shattered rhyolite. There are some leasers on the property who make wages or better. These bring the ore up to a shipping grade by sorting out the larger pieces as waste and screening through grizzlies with openings of anywhere from 1/2" to 2". These leasers are really pocket hunting. There is one good sized stope where evidently there was a fair ore shoot. I should say that at least five tons of rock had been broken to get one ton of ore, so far.

The veins dip to the north on the northerly slope of the hill and Mr. Brougher is considering a lower tunnel or a shaft and a tunnel to get the veins at greater depth. I should gather, from what I saw of the workings, however, that there was less ore at the present lowest level than higher up near surface.

It would probably take an engineer from eight to ten days to go over the property thoroughly and carefully. If Mr. Brougher sees you and brings the matter of an examination up I think it would be well to tell him that you would have one of your men look at it or would look at it yourself some time, but that if there was any great hurry in the matter that you could not get to it on account of a press of other engagements. I am writing Mr. Brougher as per the copy herewith.

Yours very truly,

FB-YB

General Manager.