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I.

RECENT STUDIES

REPLY TO:
2940 N. CASA TOMAS
PHOENIX, ARIZONA 85016
TELEPHONE (602) 277-6053

Richard E. Mieritz

MINING CONSULTANT

ARIZONA REGISTERED
MINING ENGINEER AND GEOLOGIST

GEOLOGY
EXPLORATION
EVALUATION
FEASIBILITY
OPERATION

July 15, 1980

Mr. Michael Tanner
2109 W. Campbell
Phoenix, Arizona, 85015

Re: Relief Gold or
Gold Rush Mining Property

Dear Mr. Tanner:

In response to your telephone request of a few days ago, herewith my estimate of cost to complete a geological examination, conduct a sampling program, complete ore reserve calculations where possible and evaluate the Relief Gold or Gold Rush underground mine located in Maricopa County, Arizona.

As you remember, some work was done on this mine for your father in 1972 but for an entirely diferent purpose. During that time I took seven samples, four of which showed fair to moderate values of gold at todays prices. I also surveyed some on the surface and the 200 Lv. No geological work was done nor was the 300 Lv. surveyed. Inother words, much of the basic work has been completed to move forward on an evaluation of the gold ore potential that may exist at the mine.

I really can not tell you exactly how long such work would consume in time, because I am not sure what problems we may encounter as to accessibility to some of the stopes. As I recall, some of the area was pretty wild-hairy.

My daily Fees are $300.00/ per day plus any expenses as meals, map printing, copying, etc. Assaying of samples would be for your account. If a month of working days (22) is consumed, my charge would be $5,000.- for those days. I mention this in the event that the project would require that much time. I anticipate something less than that, thus the cost would be less. On the other hand, if per chance, more time is required, than the rate per day would be 1/22nd of the monthly rate. I really anticipate 6 days in the field-underground- and about 10 days in the Office.

I must tell you that I am engaged for a project which could take me into the month of September of this year. You have indicated this is fine. Also, I would appreciate if you could obtain the services of John Thompson or somebody to assist me and accompany me underground--safety reasons.

Sincerely yours,

R. E. Mieritz

REPLY TO:
11031 WHITE MOUNTAIN RD.
SUN CITY, ARIZONA 85351
TELEPHONE (602) 977-1711

Richard E. Mieritz

MINING CONSULTANT

ARIZONA REGISTERED
MINING ENGINEER AND GEOLOGIST

GEOLOGY
EXPLORATION
EVALUATION
FEASIBILITY
OPERATION

November 14, 1973

Mr. Stan Tanner
Phoenix, Arizona.

Gold Relief Mine Sampling

At your request, I completed a very limited sampling of the Gold Relief Mine stopes between the 300 level and the 200 level on November 10, 1973. The purpose of this sampling was merely to obtain a very general idea of the material which remains in the stope walls since this is where the early mining had been done.

The writer was limited in his sampling of the stope walls due to the steepness of the stopes and the "slick" footwall in some areas, consequently, walls were sampled only where they were accessible.

Six wall samples and one grab sample of stope muck were taken. The discriptions of these samples follows:

	Au-Oz	Ag-Oz	Cu-%
#1147 - 5 foot vertical length, Mod. red FeO_x, CuO_x as malachite, somewhat soft.	0.350	0.23	0.35
#1148 - 3.5 feet vert. length, granitic, siliceous, little FeO_x	0.275	0.33	0.14
#1149 - 6.0 feet, white material above red FeO_x zone. Blackish rock below FeO_x contains CuO_x	0.120	0.05	0.26
#1150 - 4.0 feet below fault gouge, fresh granite, broken, sparse CuO_x.	0.115	0.13	0.15
#1151 - 6.5 feet, siliceous, below fault, orange red FeO_x, altered granite, pebblely. (large sample also for Stan Tanner)	0.080	0.24	0.06
#1152 - 4.5 feet, siliceous granite, yellow-brown FeO_x, some red FeO_x, some CuO_x showing west of sample.	0.055	Tr.	0.06
#1153 - Grab sample of muck in stope, broken, more or less fines.	0.040	0.05	0.03

The location of the samples are shown on the included "Sample Location Map".

The observed geology of the stopes indicates that the gold was present in two or three rock types and that mining was done based on an assay wall and not necessarily on the presence of a particular geologic structure.

It is the writers opinion that the early miners pretty well "leamed" the "good stuff", at least in the present stopes. Additional sampling in detail might prove this opinion wrong. However, it is thought that enough material of 1/3 to 1/2 ounce gould per ton might exist to satisfy the requirements for the "pilot mill" operation (1 Mton per day) you have in mind.

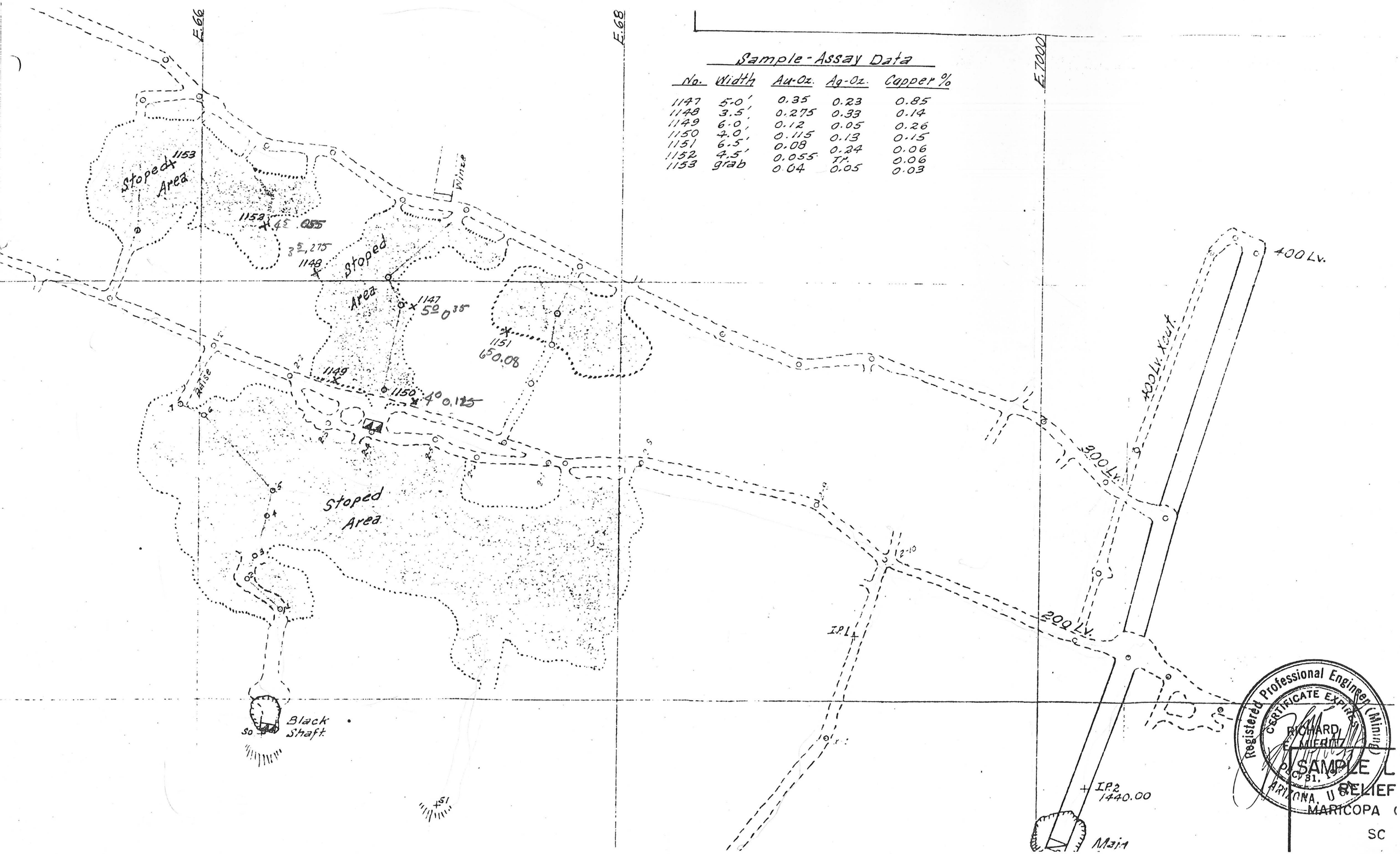
Respectfully submitted,

R. E. Mieritz.

Registered Professional Engineer (Mining) CERTIFICATE EXPIRES DEC. 31, 19 RICHARD E. MIERITZ ARIZONA, U.S.A.

Sample-Assay Data

No.	Width	Au-Oz.	Ag-Oz.	Copper %
1147	5.0'	0.35	0.23	0.85
1148	3.5'	0.275	0.33	0.14
1149	6.0'	0.12	0.05	0.26
1150	4.0'	0.115	0.13	0.15
1151	6.5'	0.08	0.24	0.06
1152	4.5'	0.055	Tr.	0.06
1153	grab	0.04	0.05	0.03



Preliminary Sampling of Tailings/Dumps

A brief survey of the tailings and dump material remaining from past operations was conducted in January of 1980. The results are:

I. Tailings:

Mound #1 -	approx.	3,400	tons	X	average	.0547	oz./ton	=	185.98 oz.
Mound #2 -	"	8,000	"	X	"	.014	"	=	112.00 oz.
Mound #3 -	"	14,250	"	X	"	.0351	"	=	500.18 oz.
Mound #4 -	"	5,000	"	X	"	.0367	"	=	183.50 oz.
Totals		30,650	tons						981.66 oz.

Overall average ounces of gold per ton, .032

II. Dumps:

Mound A - (Samples R3 & R4)	approx.	40,000	tons	X	average	.064	oz./ton	=	3,040.00 oz.
Mound B - (Sample R2)	approx.	100	"	X	"	.072	"	=	7.20 oz.
Mound C (Sample R1)	"	2,500	"	X	"	.004	"	=	10.00 oz.
Totals		42,600	tons						3,057.20 oz.

Overall average ounces of gold per ton, .072

Note: a later sampling of material screened at 3/8" minus from a trench cut in Mound A disclosed a range of a trace to .016 oz./ton. This indicates that a thorough sampling with various screen sizes is needed to determine reliable ore reserve figures.

The metallurgical tests necessary to determine the recoverability of the gold indicated in the tailings and dump material have not been conducted as of January, 1981.

IRON KING ASSAY OFFICE

ASSAY CERTIFICATE

BOX 14 — PHONE 632-7410
HUMBOLDT, ARIZONA 86329

REGISTERED ASSAYER CERTIFICATE NO. 2978 WALTER G. STATLER Date Signed 1/14/80 ARIZONA, U.S.A.

ASSAY MADE FOR: John B Thompson, 8013 E Palm Lane, Scottsdale, AZ

Jan. 14, 1980

REF. NO.	DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
01-5-1	B #1	.024						
2	B #2	.072						
3	B #3	.050	Nil					
4	B #4	.078						

IRON KING ASSAY OFFICE

ASSAY CERTIFICATE

BOX 14 — PHONE 632-7410
HUMBOLDT, ARIZONA 86329

REGISTERED ASSAYER CERTIFICATE NO. 2978 WALTER G. STATLER Date Signed 1/14/80 ARIZONA, U.S.A.

ASSAY MADE FOR: John B Thompson, 8013 E. Palm Lane, Scottsdale, Ariz

Jan. 14, 1980

REF. NO.	DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
12-27-17	#I 0-2'	.032						
18	#I 2'-4'	.026						
19	#I 4'-6'	.106						
20	#4 0-4'	.040						
21	#4 4-8'	.028						
22	#4 8-11'	.042						
23	#2	.014						

CHARGES $33.25

ASSAYER

C
A
B
3
2
1

II.

R E L I E F G O L D M I N I N G

C O M P A N Y

circa 1900-1912

A PRODUCING MINE

RELIEF GOLD MINING COMPANY

Mines and Works : : ARIZONA

OFFICE :

20 BROAD STREET

ROOM 1401

NEW YORK CITY

CAPITAL STOCK, $400,000. 40,000 Shares, Par Value, $10.

30,000 Shares, Treasury Stock; with 20,000 Shares still in the Treasury for a Working Capital

THE MINE IS WELL OPENED AND EQUIPPED WITH REDUCTION MACHINERY

PRESENT EARNING CAPACITY - - - - - $30,000 PER ANNUM

OFFICERS AND DIRECTORS :

Professor GEORGE A. TREADWELL, President, 27 William St., New York City.
WILLIAM G. LELAND, Vice-President, Glens Falls, N. Y.
SCHUYLER S. MOORE, Secretary and Treasurer, 20 Broad St., New York City.
GEORGE HAMLIN, Superintendent, Phoenix, Arizona.
Judge JOHN Q. THAYER, Meriden, Conn.
RICHARD N. SCHOTT, 1849 Eightieth St., Brooklyn, N. Y.
C. EBERHARDT, Madalin, N. Y.
GEORGE A. TWEED, Phoenix, Arizona.
WALTER R. BRISTOL, Meriden, Conn.

LOCATION : The Relief Gold Mining Company's property is located twenty-three miles north-west of Phoenix, Arizona, between the Agua Fria and New Rivers, and fourteen miles from Glendale, our nearest railroad station. Elevation, about 1,400 feet above sea level and about 300 feet higher than Phoenix. There are good wagon roads to the railroad and Phoenix.

MINE : The property consists of six claims—about 120 acres of mineral land. The mine proper is patented ground. The accompanying photograph offers a comprehensive idea of the property, including the surface improvements and underground workings. The surface improvements and development work shown in the picture are located in about the center of the property, as the mill and incline working shaft are but 500 feet east of the center line.

FORMATION : The hill in which this mine is located is composed of coarse granite with black specks of syenite, and the vein matter is quartz, black syenite and granite.

THE VEIN : The vein runs north-east and south-west, ten points north of east and south of west, and the dip varies from thirty-five degrees to forty-five degrees into the hill. The walls are coarse granite with black specks of syenite. The vein varies on the surface from 20 to 40 feet in width, while a crosscut in the 200 foot level is 60 feet long without having reached either of the walls, and in the 500 foot level a crosscut to the south is 328 feet long without having yet reached the footwall.

THE LEDGE : The ledge can be traced for nearly a mile on the surface and the ore taken from the various openings is all of the same general character and average values.

DEVELOPMENT WORK : In addition to breaking down ore in the stopes more than 3,000 feet of development work has been done, consisting of shafts, drifts, crosscuts, air levels, upraises for ventilation and two winzes, including an incline working shaft which is 500 feet in depth, and a crosscut at the bottom of the incline working shaft, 428 feet long.

The mine is well ventilated with two airshafts besides the incline working shaft. The drift in the 200 foot level is 700 feet long, running west from the working shaft, and 75 feet east; while the drift in the 300 foot level is about 500 feet long running west from the shaft.

LEDGES : The ledges in the levels vary from four to twelve feet in width *while in the 500 foot level there is an aggregate of 18 feet of ore in three different ledges including one quartz ledge 14 feet in width.*

ORE: The ore is absolutely free milling and the values are found in quartz, black syenite and granite. Extremely high values sometimes are found in the two latter. The general average saving on the ore treated has been about $7.00 per ton.

WATER: Splendid water for domestic and milling purposes is available in the mine and an abundance can be developed for a large reduction plant.

FUEL: We have been using wood for fuel. The price varying from $2.50 to $3.25 per cord. Through experiment, we find that coal can be delivered at the mine at a price that will make the expense of burning coal about the same as that of wood, and we shall probably use coal exclusively within a short time.

SURFACE IMPROVEMENTS: The improvements consist of a mill for the reduction of ore, house for hoist, steel water tank, 25,000 gallons capacity, blacksmith and machine shop, metallurgical house, bunk house, cook house and dining room, company's office, corral, etc. All in perfect condition.

MACHINERY: The machinery installed consists of Blake 8 x 10 rock breaker, Allis roughing rolls, Lane 7' mill, amalgamating plates 5 x 10 feet, 50 H. P. boiler, 30 H. P. engine, Cameron pump of 40 gallons per minute capacity, return water pump, etc., and Fairbanks & Morse 12 H. P. gasoline hoist. The Lane slow speed mill is an ideal method for treating our ore as the saving on the copper plates average fully 95 per cent. of the gross values.

EARNINGS OF THE MILL: *We have treated 6,277 tons of ore, from which the saving was $42,264.54, averaging to save about $7.00 per ton on the ore treated; while an average of only about 40 cts. per ton has gone into the tailings. With a 100-ton plant we could mine and treat our ore at an expense of something like $2.25 per ton.*

BULLION: Our bullion is exceedingly fine. The average on the ore treated is 974 fine, and the average received from the United States Mint for the bullion has been $20.20 per ounce out of a possible $20.67 for absolutely pure gold. There is no base metal in our ore.

With the proceeds received from the sale of 10,000 shares of treasury stock, together with the earnings of the mill, our company has developed and equipped a mine with an earning capacity of at least $30,000 per annum with the first unit of our proposed reduction machinery. The mine promises to be a big one and worthy of a larger expenditure of money.

In order to make more rapid progress in developing and equipping the mine so as to put the enterprise on a dividend paying basis as quickly as possible, the Company at the Annual Stockholders' Meeting, held on May 7th, 1907, increased the capitalization from 20,000 shares of the par value of $10.00 each, to 40,000 shares of the par value of $10.00 each, and placed the entire increase of 20,000 shares in the treasury for a working capital; and we now offer a series of convertible certificates for sale with a like amount of the Company's capital stock reserved in the treasury for conversion.

These certificates are to be known as the RELIEF GOLD MINING COMPANY'S CONVERTIBLE CERTIFICATES, registered in the office of the company, payable in gold coin of the United States at the office of the Company in the City of New York on the fifteenth day of January, 1917, and to pay interest in like gold coin semi-annually at said office at the rate of six per cent. per annum on the fifteenth days of January and July in each year, commencing with January, 1908.

These certificates may be called and retired at any time after the expiration of two years from date of issue and before maturity at the option of the Company, by payment in gold as aforesaid. Thirty days notice of the call having first been given to the registered holder thereof.

The certificate may at any time from its date at the option of the holder be converted into a like amount at par value of the capital stock of the Company on demand at the office of the Company upon the surrender of the certificate.

The certificate is transferable on the books of the Company the same as regular stock certificates are.

As said before, our present earning capacity, operating the mill twenty-four hours a day, is at least $30,000 per annum and probably more, and the interest on the convertible certificates can be legitimately paid out of the earnings of the Company.

This plan is undoubtedly an attractive one for it guarantees the investor interest on his money from the time he makes the investment, with the advantage of receiving the benefit of the increased value of the Company's capital stock as the property grows in value.

Only a limited amount of convertible certificates are offered for sale. Those wishing to make a safe investment that will pay handsome returns on the money invested should lose no time in sending in their applications. The investor has the privilege of paying in installments; 25 per cent. with subscription, 25 per cent. within thirty days, and the remaining 50 per cent. within sixty days from the date of subscription.

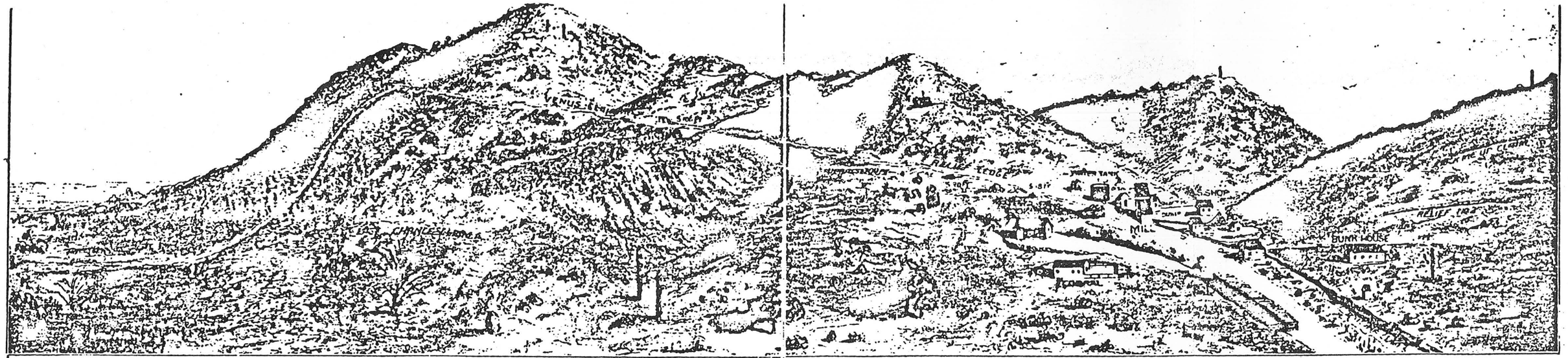
The money received through the sale of convertible certificates will be used to further develop the ore bodies, install power drills, enlarge the mill capacity to at least 100 tons a day, and for the general benefit of the Company.

For quotations on convertible certificates, address:

SCHUYLER S. MOORE, Secretary and Treasurer,

20 Broad Street, New York City.

RELIEF GOLD MINING COMPANY.



RELIEF GOLD MINING CO.

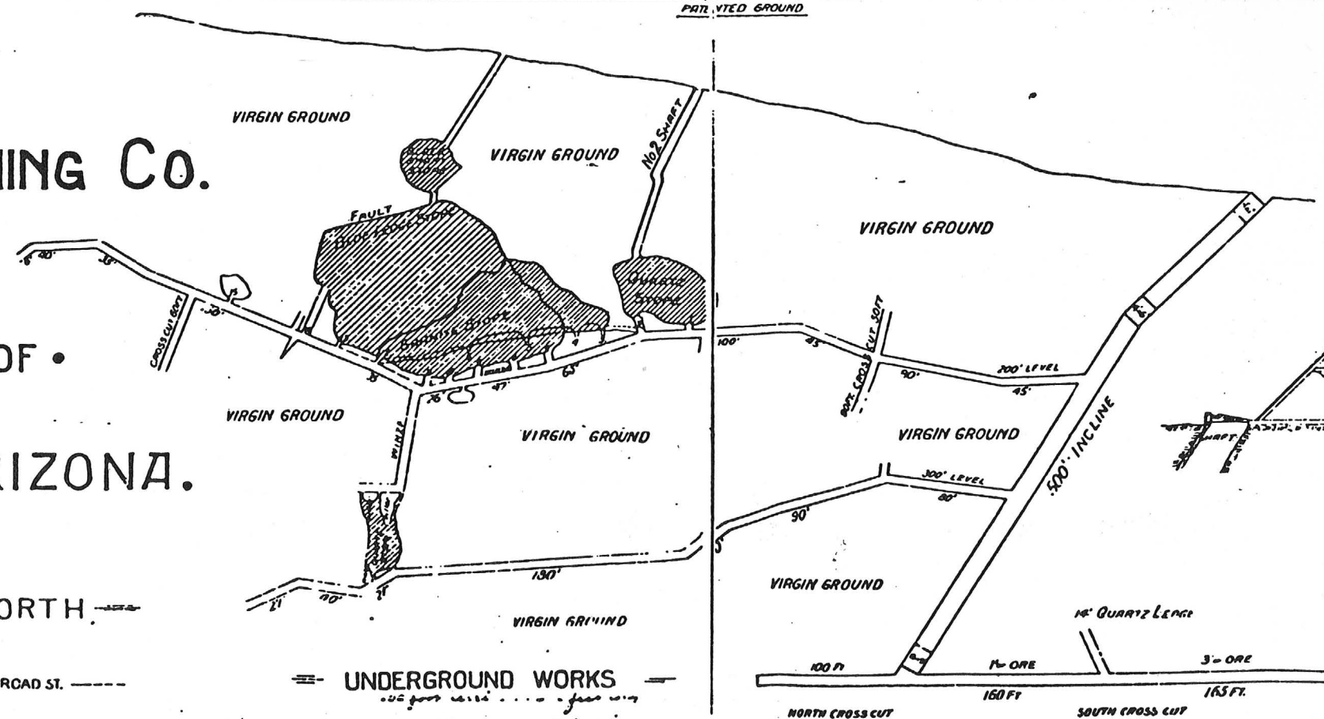
— 23 MILES —

• NORTH WEST OF •

PHOENIX, ARIZONA.

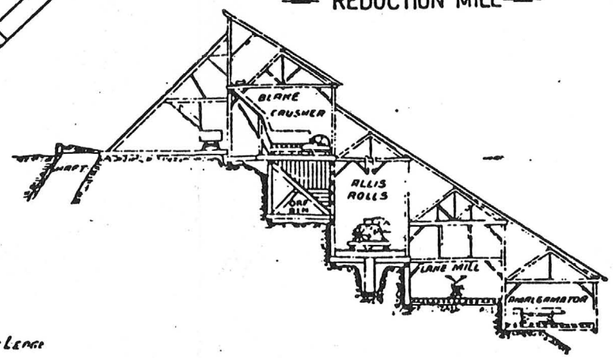
—VIEW LOOKING NORTH—

—— NEW YORK OFFICES 20 BROAD ST. ——



— UNDERGROUND WORKS —

— REDUCTION MILL —



9 c. [illegible]

Phoenix, Arizona,

December 1908.

Through an arrangement with Mr. Ezra W. Thayer, of Phoenix, Arizona Territory, the writer made a survey and map of the workings of The Relief Gold Mining Company's property, and, with a view of obtaining a general idea of the distribution and value of the ores secured a number of samples from the various levels and stopes.

By this means a certain degree of familiarity with the deposit was acquired, and, at Mr. Thayer's request I have written the following report on such features as appear to be of importance or interest.

The work referred to was done during September and October 1908.

In taking the samples, I was obliged to work entirely alone; the rock was broken with a small pick, and I depended more for accuracy to the selection of the place and material than upon the amount taken. My precautions were such that I have confidence in believing that the samples fairly represent the values in place. As the value of the ore in the stopes had been practically tested, I limited my work in these to sampling an occasional pillar and directed my attention more particularly to the margins of these openings and to such parts of the levels as had not been exploited for ore, with the object of getting at the value of those portions of the fissure that had been rejected.

In view of enlarging the output of the Mine and adopting a permanent method of treating the ore, it became essential to know whether large masses of vein stuff remaining in the stopes and in undeveloped portions of the vein, carried sufficient values to allow of their being removed with the richer portions, to furnish a tonnage such as was contemplated.

The samples taken by me therefore DO NOT represent the ore

bodies in the Mine, but of outside vein stuff, or rejected portions, excepting only the few samples taken from pillars.

The Mine is in a northerly direction from Phoenix, and something over twenty miles distant; the roads are good, and country traversed is interesting.

Peoria, a station on the Prescott & Phoenix branch of the Santa Fe Railway, is within eight miles of the property, with excellent transportation facilities to or from either.

The Company has made public the information regarding the organization and capitalization, the exact location of the property, its acreage and the number of patented claims, etc. in prospectus form, and I will therefore confine my writing to less familiar aspects of the Mine.

The elevation is only slightly above that of the surrounding country at the foot of a small group of low granite hills, which rise island-like from the sea of level, cactus covered plain, only to achieve an altitude of a few hundred feet, quite out of keeping with the massive character of the rock.

The group is composed of a type of Granite known locally as "Bradshaw" from the name of the neighboring mountain ranges; it is coarse in texture, light grey in color, and is characterized by prominent bunches of black mica (biotite); in the mass it contains numerous enclosures of mica schists or fine grained segregations of theoriginal magma. Extending across the South slope of the hills, in a nearly Eastward direction the Relief vein occupies a zone of shearing in this granite which conforms with more or less irregularity to areas of the enclosed schists.

Several hundred feet west of the main workings, a second distinct type of granite occurs as a dyke or elongated boss, rending the face of the hill from top to bottom with a strike approximately north-south; this rock is very hard and compact; pink in color, and shows large pink feldspars and scarce diminutive crystals of

mica (muscovite).

Where the dyke intersects the line of the fissure, the latter is much shattered and faulted locally; the vein, however, continues many hundred feet to the West of the dyke fault, and its values have been proved by two prospect shafts on that portion.

Some four hundred feet south of the working shaft, and at the foot of the hill's slope, there is a large mound of cinter, representing the site of a defunct geyser, or group of thermal springs, and is of interest, since the original waters were without doubt active in relation to the ore deposits.

The mound is of considerable extent, suggesting a long period of activity; the material has the appearance of being composed of silica and shows the fine banded structure and grotto-like cavities consequent to its origin.

The deposit I should classify as an unusually strong vein occupying a shearing zone in granite along enclosures of mica schist, mineralized by ascinding hot solutions or pregnant magmatic waters.

The type is not an uncommon one, and is considered one of the most promising for producing large and continuous amounts of diffused ore. The vein stuff consists of a quartzose gangue and impregnated portions of the "country" or wall rock.

Free gold occurs both in the schist and in the granite; considerable portions of each has been stoped, especially of the latter.

The mica schist forms with some irregulatiry the footwall of the stopes and leached portions of it compose a considerable portion of the vein, filling sometimes occuring as large "horses" and more rarely as patches replacing the hanging wall.

The quartz stopes hug this footwall and the adjacent portions is broken with the quartz and furnishes from eight to eighteen inches of rich ore and many beautiful specimens. The average combined width is about five feet. The granite ore lies above and parallels the quartz vein; it shows only slight alteration in texture, but is blocky and full of minute cracks or seams, on the face of which the gold

appears as little flakes. The metal is also found disseminated throughout the homogeneous rock itself, occasionally forming specimens of rare beauty. This granite ore rarely forms the immediate hanging wall of the quartz vein; there is a zone or partition of altered schist separating the two, unfortunately too low in values to permit of its being broken with the ores.

The absence of other metals than the gold in these ores is noteworthy. Except for a very low percentage of the usual iron oxides and an almost negligable appearance of copper carbonates there is only gold.

This condition furnishes a product unusually simple of treatment either by amalgamating or by cyanide treatment.

The recovered gold is of an unusual degree of purity.

I failed to discover any trace or indication of sulphides anywhere in the Mine.

The stopeing so far done extends from surface workings to a depth of two hundred and eighty feet measured on the dip which approximates to 45 degrees. Above the two hundred foot level (140 feet vertical) the double stopes of the parallel veins average about two hundred feet in length and about eighty feet on the dip; the combined width of the quartz and granite stopes averages not less than eight feet.

The size of these shoots promises much for the future possibilities of the Mine.

Stopeing is now being carried on from the three hundred foot level (240 feet vertical) in the quartz stope which averages here not less than five feet in width. From a small winze sunk in the foot wall six feet below the level floor in granite ore three and one-half feet wide to the west face of the working stope the distance along this drift isthree hundred feet.

Unfortunately this drift is irregular and does not run in ore throughout its length. The work has been prosecuted in the

softer portions of the fissure, thus making it impracticable under conditions to sample the shoot continuously. From the bottom of the inclined shaft at the water level a crosscut has been run to the south two hundred feet in length. Two veins of quartz are intersected by this drift. The smaller one is within a few feet of the south face and was not measured by me. The larger vein crosses the drift at 160 feet from the shaft and occupies a brecciated zone of considerable width. This portion of the drift has caved in to some extent and is very wet; the vein evidently connecting with the surface and forming a water course. A portion of the filling is composed of a prominent band of quartzose material of irregular width averaging about two feet. The connection of this vein with the one in the upper workings is a matter of some doubt. It possesses the same strike in an east-west direction but dips decidedly nearer to the perpendicular. No driftins has been done on this vein from this level.

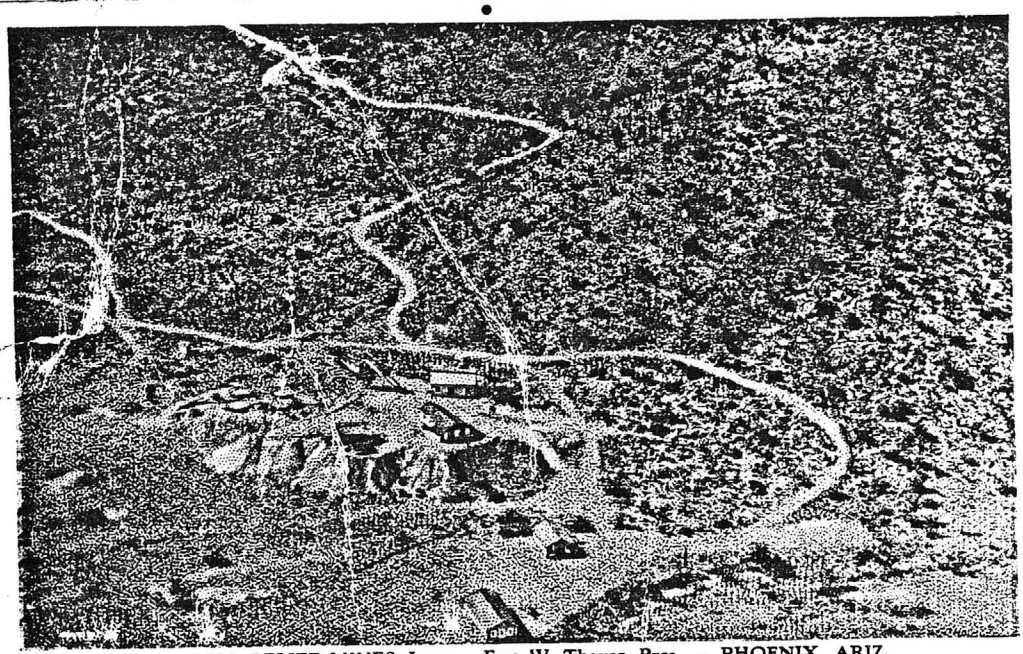
Shortly after passing below the three hundred foot level, the working shaft, which is unfortunately several hundred feet east of the ore bodies, passes through the vein, and conditions below this level must remain a matter of speculation waiting further development. Throughout the workings, the fissure shows a tendency to minor faults across the dip and parallel with the strike. In view of this feature, I should condemn further exploitation by means of inclined shafts; a fault of any magnitude at right angles to the dip (across the dip) would cause great inconvenience in carrying on the work. I am furthermore convinced that the ores could be treated successfully by cyanidation at much less cost than by the present method of milling them.

Undoubtedly, however, the first step should be to exploit and block out sufficient ores below the present working levels, in order to justify the installation of a plant on a scale sufficiently large to handle the ores on an economic basis.

III.

S U N R I S E R E L I E F M I N E S, I N C.

circa 1929-1933



SUNRISE RELIEF MINES, Inc. - Ezra W. Thayer, *Pres.* - PHOENIX, ARIZ.

2174-30

26 miles northwest of Phoenix, the SUNRISE RELIEF MINES, Inc. are opening and developing a gold mine. The company has been operating steadily for over two years and much underground development can be seen by the visitor. Gold from this mine has run as high as .996 fine.

The property is only 50 minutes drive from Phoenix and is one of the many interesting sights in Arizona. Visitor permits can be procured from the office of Ezra W. Thayer, President, 179 East Adams St., Phoenix, Arizona.

PUBLISHED BY HARRY HERZ, 734 E. CULVER ST., PHOENIX, ARIZONA

C. T. AMERICAN ART COLORED

POST CARD

THIS SPACE FOR ADDRESS ONLY

PLACE ONE CENT STAMP HERE

8-6

Phoenix, Arizona,
December 30th, 1927

Mr. Ezra Thayer, Sr.,
Phoenix, Arizona.

Dear Sir:

At your request I have made, December 14-29th, 1927, a reconnaisance of the Relief Mine. I went over the surface area, through the 200 level, and did such sampling as seemed justified. At this time it seemed unwise to recommend a detailed geological survey, withcomplete sampling. Such a proceedure would cost nearly as much as the reopening of the mine.

I find a mineralized area of considerable extent probably at least 1500' long and in places 40' or more wide. In this area appear at least two ore zones, 1 W being at least 400' long, and 3 W being nearly 200' long, with a possibility of developing both to a greater length. Between these two is another zone 2 W, which may present some exploration possibilities.

There appears such a general distribution of low values, with occasional spots of good ore left from former operations, that development is justified. With the mine once reopened, and new development under way, all technical facts necessary to proper operation, can be systematically gathered, and the probable grade of ore determined.

On the present exposures it is impossible to even guess at the amount or value of ore which can be developed. Myfirm impression is that a considerable tonnage, low in average grade, but still profitable, can beddeveloped.

General conditions and the character of the ore body should permit low costs.

The property presents a good development chance, speculative in the early stages, but susceptible to a rapid reduction of investment hazard if ore is found.

I recommend that the mine be reopened and development prosecuted on the known ore bodies. The operation should be held under very strict financial and technical control. Every effort should be made to avoid dead investment - in either equipment or development.

There are attached - Observations-Subject to Rivision after further study.

Plan of Reopening and Development.

Assay Record.

Thin Section Record.

Very truly yours,

R N D -- C I

D-8

OBSERVATIONS -- Subject to Revision after Further Study.

The general country is granite, showing many phases. Along the mineralized zone the granite is generally coarse grained, dark, contains much biotite and is rather soft. To the North (on the N.W. side) appears a great mass of light colored, hard, very siliceous granite. Here and there small tongues of the softer, coarser granite, extend into this mass. In places, particularly west of the gulch, (about 900' W of the shaft) this siliceous phase cuts across the softer phase, appearing there as a N-S intrusive tongue. South of the Black shaft quite a mass of the siliceous phase is noted, showing, near its contact with the softer phase, included angular fragments of the latter. In the more siliceous phase some minor quartz and aplite segregations are found - in the coarser and softer phase, almost none.

In the mineralized zone are numerous dikes of fine grained dark rock (perhaps syenite or trachyte-syenite). These dikes vary in width from 2" to many feet, and cut the granite on every conceivable course and dip - the major ones, however, roughly paralleling the course of the mineralized zone or cutting it at nearly right angles. Angular fragments of the dark dike rock are frequently found included in the softer granite mass. Only seldom do the dark dikes intrude the harder, more siliceous granite.

At the extreme West end of the claims some rhyolite and Andesite were noted.

Thin sections, followed by proper classifications, should be made of all the rocks mentioned.

A structural survey is necessary.

The mineralized zone thus far known extends roughly perhaps 200' East and 1300' West from the Main shaft. This zone may eventually be limited only by the ultimate limits of the favorable softer granite.

On surface, fracture zones, showing low values across their entire width, with some free gold in narrow streaks, and good values over widths of several feet, have been found up to 40' wide. It is noteworthy that the wide fracture zones found on surface in area 1 W overlie the stopes and known wide underground orebody. Also is it noteworthy that, inarea 2 W where the ore exposed on the 200 West is narrow and limited, no fracture zones or the same type have yet been seen on surface.

The principal values found at surface and shallow depths seem to occur in or near the dark dikes in the fracture zones - particularly near cross fractures or dikes. Values frequently here - and still more frequently at greater depths, where the dikes are harder and narrower - penetrate the softer granite

to a considerable distance. Free gold is frequently seen both in the dark dike rock and in the granite. The gold occurs occasionally as thin flakes along cleavage planes, but more frequently as fine particles in the hard rock. Quartz streaks, rudely tabular, are found in the fracture zones, and while not as a rule carrying the best values, can be considered excellent "indicators". Copper stain usually accompanies values. Silver this far has been negligible. A trace of lead was found in Area 3 W, 150' West of the Intrusive Tongue. Other metallic minerals are suspected, and should be determined as work progresses. Phosphorus has been found at several points and Manganese shows wide-spread. There is some evidence of surface leaching of gold values at a number of points, in Areas 1 W and 3 W. Sulphide casts, pretty well oxidized, are found in the quartz. The values are very "spotty."

The gold is not freed from the rock except by fine grinding. The ore slimes readily, and some of the gold floats on water in panning.

Much cross fracturing and a good deal of minor faulting is noted at surface and shallow depths. There is some evidence of major faulting, particularly just West of the main shaft and again in Area 2 W about 300' West of the shaft.

It is noteworthy that at some points severe cross shattering has not particularly disturbed the main N-W fracture zone and that no vein material has entered the cross fracture, but yet free gold has penetrated the surrounding rock. On the 200 W about 300' West of the shaft is an illustration of this.

The orebody- at least in Area 1 W, does not occur as a vein, but as a series of irregular masses - more or less parallel - along one or more fracture zones within the main mineralized zone. Offhand I should call it an irregular replacement along a major line of weakness - with concentrations of values at favorable points extending at times into the adjacent favorable granite and dark fine grained dike rock. It may easily be that the hard siliceous intrusive phase of granite, and the dark dikes, have influenced deposition. An exact statement of the type and cause of the deposit is impossible until after considerable geological work has been done with thin sections and mineralogical studies by a geologist experienced in this typeof deposit. Such a determination may be safely left until development has opened new ground and furnished adequate technical data.

Careful gathering and co-ordinating of all possible technical data is essential.

Development must be kept as far as possible on ore - following it or its indicators to the limits of favorable ground - and all exposures, whether of vein material or country rock, must be carefully sampled.

I think that there can be developed a method of stope sampling

D-10

and sorting that will be effective in eliminating waste and keeping hoisted ore up to a profitable grade. In places mining widths up to 40' at least will be encountered and I think rather cheap mining costs can be realized.

The ground encountered above the 200 level stands well. It will apparently drill and break easily.

AREA EAST OF MAIN SHAFT is pretty much covered by debris. I did not see any interesting exposures and think that surface discoveries would be accidental.

The 200 level East is apparently driven on a narrow fracture. It is questionable whether or not this is the principal ore zone. Development does not seem justified now, but this level should be sampled and later explored by extension of the drift and adequate crosscutting.

AREA 1 WEST - Main Shaft to Black Shaft, for a distance of about 400' on surface is very important. It shows parallel exposures (not continuous, but broken) of wide fracture zones, filled with crushed dark dike, quartz streaks, and favorable granite. Numerous cross dikes are seen. Several cuts, pits and shafts show widespread values, usually low, but good in places over substantial widths. Much copper stain and manganese is seen. Free Gold is frequently found in dike rock. Some evidence of leaching in granite is found. The main ore body of the old mine underlay this area. This body still contains much material in the old stopes that should make low grade sorting ore and above the stopes there remains about 100' of depth from surface that is virgin. Just above the old stopes - below the Black shaft, at about 120' deep a cave has exposed a very wide mineralized area, verifying the surface indications.

On the 200 level W cross cut 2 South was driven toward the fracture zone exposed in surface cut A but apparently not far enough. An extension of this cross cut and more N-S cross-cutting between the main shaft and a point 250' west may show segments of ore as yet undiscovered.

This area should be developed to the 500 level as quickly as possible. The main shaft can be cheaply repaired. Some cutting out to straighten both vertical and horizontal curves is needed. The shaft must be retimbered. Lagging is probably needed on the roof only. This shaft offers an excellent point of attack for immediate development (using it for hoisting only and using the later suggested Black shaft manway for air and escape). The Main shafts will later serve as a pumpway and escape.

Reference is made to assay sheet.

Reference is made to Plan of Reopening and Development.

AREA 2 W NW - Black Shaft to Intrusive Tongue shows little on surface except a great extent of favorable granite with many dark dikes, and at the head of gulch evidence of shattering and possible faulting. At the west end the hard siliceous granite appears as a N-S intrusive tongue cutting the mineralized zone.

On the 200 West a streak of quartz and silicified favorable granite 1' to 5' wide expends to a fault 150' West of Chute 15 accompanied by a parallel dark dike. Four samples were taken here at 25' intervals for 100' W of Chute 15. They showed low values.

Some parallel and some cross dikes are seen. For 30' or 40' about 200' West of Chute 15 the granite is badly shattered and a short cross cut North shows a narrow dark dike, reported to show free gold, in very favorable granite. This cross cut should be extended North.

At about 277' West from Chute 15 a shallow winze on North side of drift shows at least 5' of silicified and fractured favorable granite, adjoining a dark dike and showing copper stain. The dike rock showed free gold. Two samples, not including the dike rock, taken in this winze showed practically no value. It seems very important that this winze be deepened and the ore followed to its limits.

At a point just West of this winze the intrusive hard siliceous granite tongue (mentioned on surface) appears and all the level beyond is more or less in it. The main drift extends about 120' farther with the face in the Intrusive. A 200' drift (probably S W) is all in Intrusive. A short drift (probably N W) starting about 360' West of Chute 15 shows dark dike, some Intrusive, and some crushed favorable granite.

Not much can be said about this area underground until a survey tied into surface survey - gives a real orientation. The area may have possibilities with proper study and cross-cutting.

AREA 3 W - Intrusive Tongue Westerly is important. A fracture zone at least 40' wide and carrying low values, appears just west of the Intrusive. The Red shaft, sunk about 80' on a quartz seam in this fracture zone, shows, with a short adit level, low values, and a favorable dark dike. Just West of this shaft the fracture is apparently faulted, and is disclosed again in a cut West and South. A dike of hard fine grained, dark and very siliceous rock adjoins the fracture on the North. In this zone the quartz looks good, carries copper stain and occasionally fair values. Westerly about 350' from the Intrusion the granite shaft shows a fracture 4' - 6' wide. It is reported to have carried values. One sample at the collar and one at the dump were very low. Still farther West are three cuts which show narrow fractures in the granite. No values were found. Beyond the west end line is an old shaft, the dump from which shows low values and a little lead.

S-12

This area is practically unexplored. No underground work has been done. The granite is favorable. Faulting can be expected. It is my opinion that the quartz seam is an "indicator" and that adequate underground exploration - crosscutting the favorable granite as well as drifting - will show ore. It may be that such exploration, with proper surveys, will show the present exposures to be not the same, but parallel to, the fracture zone of Area 1 W.

Reference is made to Assay sheet.

Reference is made to Development Plans.

GENERAL

Values are disappointly low in many places where the ore looks good and where free gold was seen close by. Until adequate openings in new ore can be driven - underground and the entire mine - including the 400 level, properly sampled, no reliable estimates can be made of grade or amount of ore. In spite of low values encountered in this preliminary sampling, I feel that the mine can be made to pay if properly managed.

PLAN FOR REOPENING AND DEVELOPING

This type of deposit requires very careful mining with strict technical and economic control. Careless or inexperienced management will surely cause a quick loss. Present exposed values are so low that it will require nerve and a firm hand to force development at the proper points.

Investment must be kept as low as possible - providing only essential equipment with every item chosen for its known efficiency.

Development must be started at points of known ore or known "indicators" - which may be more important. A proper technical record must be kept to assist in intelligent planning of further development.

I recommend the following:-

REOPENING 1. Build and equip camp and cookhouse, with water supply - Desert tent houses for 10 men.

2. Install mine accounting system with proper cost analysis.

3. Build blacksmith shop and framing shed - wood frame and sheet iron.

4. Install complete set of hand tools - mine, blacksmith and carpenter.

5. Install sampling equipment - crusher, grinder, etc.

6. Trace and white print present mine map.

Purchase necessary drafting equipment and supplies. Survey and map surface area 500' wide from a point 500' East of shaft to West end line of property, controlling by triangulation. On this map impose co-ordinates, show 10' contours, all openings, geologic structure, surface sampling, and prepare to tie to the underground survey.

7. Catch up Black shaft, stope and Chute 14, and make a safe and easy manway to the 200 level.

At a point on this manway, above old stopes about 100' above the 200 level, cut a station, and open a chute to the 200 West.

8. At the Black shaft collar install a 3 cs., 12" Blower, with 6 H.P. engine, 4-way gates, and 12" air pipe. Extend this air pipe to face of 200 West.

9. Carry a line from new survey down the manway (7), check old survey and extend to all faces. Coincident with other work check survey throughout

mine as fast as opened, plotting all geologic structure and assays.

10. Complete sampling of all surface openings and begin a systematic sampling of all workings as fast as opened, starting with cross cuts and drifts on 200 level.

11. Catch up Main shaft cellar, install 12 H.P. hoist and adequate headframe. Straighten and retimber to 200 level.

12. Put 200level West in good order and lay track to face of main drift.

The mine is then ready for actual development and the 200 level West should be the first point of attack, hoisting thru the main shaft and using the new Black shaft manway.

DEVELOPMENT PLAN

1. With the new surface survey and the extended and verified underground survey as a guide extend the 200 level West into Area 3 W. Drift and crosscut to open the fracture zone found on surface. Develop this ore when found to its limits and sink a winze at the most favorable point.

2. Sink a winze from the 200 W on fracture seen at 277' West of Chute 15.

3. After sampling at 5' intervals for 150' West from Chute 15 on the 200 West, raise on the best ore found.

4. Extend crosscut 2 S on 200 West to cut fracture zone found in cut A on surface.

5. From new station at 100' West in new Black shaft manway drift East and West, cross-cutting to limits of ore. Drop muck to 200 level. Handle tools and men thru manway.

6. During period of 2-3-4-5 clean out one of the raises between the 200 level West and the 100 West and put in a safe manway.

Straighten and retimber Main shaft from 200 to 300.

Put 300 level in order and lay track to face.

Sample 300 level and start development guided by the sampling and by the results of the 200 West work.

8-15

7. Successively open the 400 and 500 levels as rapidly as possible consistent with justification found on the upper levels, following ore down with winzes. At first particular attention should be paid to the orebody in Area 1 W. The map indicates the possibility of very good ore on the 500 West and it is reported that good ore was opened but not followed on the 400 West. No work was done on the 500 where ore could be expected.

It is my impression that given proper funds the above plan will permit starting actual development on ore within 60 days from date of beginning work - and also that a few months work along this plan will expose really valuable ore and justify the hazard.

Very truly yours

R H Dickinson

D-16

ESTIMATED COST OF REOPENING AND DEVELOPMENT

Camp and Equipment			
Not including water supply		$900.00	
Office Supplies		50.00	
Drafting equipment & Supplies		120.00	
Blacksmith Shop & Framing Shed		100.00	
Tools		650.00	
Miscellaneous Supplies		500.00	
Sampling equipment & Shelter		600.00	
1 Ton Truck		750.00	
Blower, engine and pipe		450.00	
Ore cars		130.00	
Track, ties for top & 200' level		450.00	
12 H.P. Hoist	$800.00		
Head Frame & Top Work	350.00		
Skip	120.00	1,270.00	$5,970.00
Surface survey & maps	300.00		
Underground " " "	350.00		650.00
Sampling & Assaying			500.00
Shaft Repair to 200 level			2,500.00
Repair & Track laying 200 level			350.00
Black Shaft Opening with manway & Chute to 200			500.00
Magazine			250.00
Contingincies			1,280.00
Total reopening on 200 level			12,000.00

700' drifts, crosscuts raises & winzes of 200 level		7,000.00
Shaft reopening to 300 level	$1250.00	
Manway " " "	250.00	
300 Level Repair	300.00	1,800.00
350' Drift, cross cuts, raises & winzes on 300 level		3,500.00
		$ 24, 300.00

This work should open considerable ore. If it is successful, then another $25,000.00 should be at once spent in development on the 500 and above, as guided by results of the first work.

P-1 1

ASSAY RECORD AREA 1 W

Assay Number	Sample Taken	$ Gold	Remarks
			Au Oz/ton. OKM. 5-1-74
At Pit #1, 53' W. and 23' S. of Main Graft			
8	Across 1.7' Quartzy streak in fracture W side, 15' down on dip. Footwall of fracture not reached.	0.40	0.02
9	Across 1.8' Granite on S. side of #8	0.40	0.02
10	Across 1.3' Copper stained Granite on N side of #8.	0.20	0.01 P
At Cut A, 106' W and 84' S of Main shaft.			
17	Across 2' Quartz vein material on hanging wall side of fracture zone.	1.60	0.08 Mn-3% Cu
18	Across 5' crushed Dike material on S side of #17	0.20	0.01
19	Across 5' crushed Dike material on S side of #18	0.40	0.02
20	Across 2' Granite on N side of #17	0.20	0.01
At Pit #2, 245' W of Main Shaft			
1	Across 1' Granite on S side of fracture, 3.5' down on W side of pit.	0.20	0.01
2	Across 2.5' Quartzy material on N side of #1.	0.40	0.02
3	Across 1.2' Granite on N side of #2.	0.80	0.04
4.	Across 1' Dike rock on N side of #3. Free gold seen here but none seen in sample.	3.80	0.19
5	Across 1' same streak as #4, but on E side of Pit. Free gold seen here but none seen in sample.	3.00	0.15
6	Across 4' Dike on N side of #4.	0.40	0.02
7	Across 3' of Granite on N side of #6.	Trace	

Sheet Ten.

Number	Sample Taken	$ Gold	Remarks
			Au oz/ton [illegible] 5-1-74
	At Cut in Road about 200' W. of Main Shaft.		
97	Across 2' Soft Dike. Free Gold seen here but none seen in sample.	2.00	[illegible]
98.	Across 6' mixed crushed quartz and Dike in fracture on S side of #97	1.20	[illegible]
	At Pit #3, 284' W. of Main Shaft. This shaft connects to 200 West thru Chute #2.		
11.	Across 5' of crushed Dike on W. Side of shaft in cut above collar S of granite in fracture zone.	0.40	[illegible]
13.	Across 5' same material on S side of #12. Free gold found here but not seen in sample	17.60	[illegible]
12.	Across 5' same material on S side of #11.	0.20	[illegible]
14.	Across 6' same material on S side of #13	3.40	[illegible]
21.	Across 2' Granite on N side of fracture at E sides of cut-opposite #12.	0.20	[illegible]
22.	Across 4.5' Dike on S side of #21 Free gold found here but none seen in sample.	1.80	[illegible]
23.	Across 3.5' crushed mixed granite and Dike on S Side of #22.	0.20	[illegible]
	Check Assay.	0.40	[illegible]
24.	Across 1.8' granite on S side of #23 - copper stain and manganese seen.	0.20	[illegible]
	Check Assay.	0.40	[illegible]
75.	Across 3.' granite - same places as #24 for check on same.	0.80	Dn [illegible]
15.	Across 3' crushed quartz, granite and Dike in small cut 4' W of samples #11-14, and on S side of #14		Discarde error in assay
	Check Assay.	0.80	[illegible]
70.	Resample of #15 for check	0.40	[illegible]
16.	Across 2.5' granite on S side of #15.	0.20	[illegible]
71.	Across 1' Dike on N side of #15-70 free gold seen here-none seen in sample copper stained.	32.60	[illegible]

Number	Sample Taken	$ Gold	Remarks
73.	Across 4,' crushed dike material in cut 6' W and 3' N of #15-70, free gold and copper stain seen here - but not seen in sample.	6.80	
74.	Across 2' Red Granite on S side of #73	0.20	
72.	Across 6' crushed dike in cut 15' W and 5' N of #15-70. Free gold and copper stain seen in cut-but not in sample	1.00	

At Shaft 325' W of Main Shaft.

25.	Across 4' crushed granite and Quartz on F.W. W side of shaft 20' down.	0.40	
26.	Across 3' Quartz of Bootwall 16' down.	0.60	Mn
27.	Across 1' granite and dike on H. W. side of #26 - free gold seen in sample and in cut.	2.00	

At Black Shaft and F.W. Crosscut - 388' W of Main Shaft.

29.	Across 2' crushed dike on F.W. of shaft S of Black shaft on W side 8' down from surface or 18' down in Black shaft.	0.40	
30.	Across 3.5' crushed Dike N side of #29.	0.60	
31.	Across 1.8' quartz on N side #30/	0.80	No Mn
36.	Across 2.5' quartz and Dike in small stope 7' W of #31 - shows copper stain.	12.20	Mn
32.	Across 3.5' good looking granite in roof of cross cut on N side of #31.	15.20	
33.	Across 1.' quartz on N side of #32.	1.40	
34.	Across 2.5' crushed granite on N side of #33.	2.20	
35.	Across 6' granite on W side of cross cut on N side of 34.	0.20	
37.	Across 3.5 Red Dike on W side Black shft on N side #35.	Discarded Assay error	

Sheet Twelve.

8-7-0

Assay Number	Sample Taken	$ Gold	Remarks B/Hn Scan 5-1-74
37.	Reassay	1.20	
76.	Resample #37 for check	1.60	
38.	Across 4.5' Dike on N side #37	trace	
39.	Across 4.5' quartz on N side #38 Check Assay.	1.00 1.20	Mn
77.	Resample #39 for check	1.00	
28.	Picked sample dike each piece showing free gold. W side Black shaft N side #39.	62.60	
40.	Across 3' hard dike in sheared zone 0.5' E of #28. Taken parallel to shear but a cross main fracture.	2.20	
41.	Across 2.5' Dike on E side of Black shaft opposite #40 - Free gold seen here but not seen in sample.	7.60	
42.	Across 2' granite W side Black shaft N from #40 and 12' below.	4.60	
43.	Across 1.8' dike on N side #42 still in fracture.	1.00	

AREA 2 W.

On 200 Level West of Chute 15.

91.	Across 3.5' quartzy vein material in roof of drift 25' West of Chute 15.	1.80	0.09
92.	Across 2.5' same material 50' West of Chute 15.	0.40	0.02
93.	Across 3.5' same material 75' W of chute 15.	9.80	0.49
94.	Across 5' silicified granite 100'. West of chute 15.	1.80	0.09
89.	Across 5' sheared granite 2' down on W side winze on 200 West level 277' W of chute 15 - free gold seen in dike - but not in sample.	0.20	
90.	Across 4' same material same place as #89 but 2' deeper.	0.40	

D-41

AREA 3 [illegible]

Assay Number	Sample Taken	% Gold	Remarks Au Oz/ton
In Surface Cut 43' W. of Intrusive Tongue.			
61.	Across 2' Black Granite at S end of cut.	1.00	0.05
62.	Across 6.4' fractured Dike on N side of 61.	0.60	0.03
59.	Across 6.5' fractured Dike on N side of 60.	0.40	0.02
62.	Across 6' Iron stained Dike on N side of 59.	0.20	[illegible]
63.	Across 1.3 crushed quartz on N side of 62.	0.20	[illegible]
	Same streak as in Red shaft and adit. Check Assay	0.40	[illegible]
79.	Resample of #63 for check.	0.80	[illegible]
64.	Across 7' crushed Dike and granite on N side of #63-79.	0.60	[illegible]
64.	Check Assay.	Trace	
80.	Resample of #64 for check.	Trace	
65.	Across 7' Dike on N side of 64.	Trace	
	Check Assay.	0.20	[illegible]
81.	Resample of #64 for check.	Trace.	
Red Shaft Portal, Adit, and Shaft.			
44.	Across 4' shattered Dike on S side Portal.	Trace.	
45.	Across 1.2' Quartz on N side of #44	6.80	0.34 Mn
46.	Across 3.5 crushed granite, quartz and Dike on N side of #45.	1.60	0.08
47.	Across 4' quartzy material in roof of adit 5' W of #44-46.	3.20	0.16
48.	Across 3.5' same material 5' W of #47.	3.00	0.15
49.	Across 2.5' same material 5' W of #47.	4.80	0.24
50.	Across 3.0' Dike on F.W. side of adit at face - 14' W of #49.	1.20	0.06

Sheet Fourteen.

Assay Number	Sample Taken	# Gold	Remarks.
51.	Across 0.9' quartz, granite on H.W. side of #50.	2.20	Au Pb/Ton 5-1-74
57.	Across 2' quartz and Dike in shaft below adit on W side on F.W.	1.20	
58.	Across 2.2' Quartz and Granite on H.W. side of #57.	0.40	Mn
56.	Across 2' Quartzy material on H W of shaft, W side, 10' below Adit. Check Assay.	4.20 3.60	
52.	Across 1.6' Dike material on F W of shaft W side, 15' below adit. Check Assay.	0.80 0.20	
78.	Resample of #52 for check.	0.60	
53.	Across 2' quartz and granite on H.W. side of #52.	4.20	
54.	Across 2' quartz, 20' below adit. Check Assay.	15.00 16.20	
55.	Across 1' Quartz 25' below adit.	2.00	

Cuts Immediately West of Red Shaft on Same Fracture.

83.	Portions sampled found to be not inplace.	discarded	Pb No Mn
84.	Portions sampled found to be not in place.	discarded	
95.	Across 3.5crushed quartz in cut about 30' West of Red shaft.	2.20	
96.	Across 6' Dike on S side of #95.	0.20	
66.	Across 3' quartz in E side of cut about 67' W and 19' S of Red Shaft	11.20	Mn
67.	Across 4.5' crushed Dike on S side of #66.	0.80	
82.	Resample of #67 for check.	0.40	

Cuts, Etc. on West Portion of Property.

68.	Across 3' of fracture in granite. at collar of granite shaft - E side.	0.20	
69.	Grab sample E dump at Granite shaft.	0.40	
85.	Across 5' crushed quartz and Dike in cut about 200' W of granite shaft.	Trace.	

Number	Sample Taken	Gold	Remarks
86.	Across 5' Iron stained quartz and Dike in cut about 400' West of Granite Shaft.	Trace	
87.	Across 1' siliceous Dike in cut near W end line.	Trace.	
88.	Picked sample from dump of old shaft on property adjoining at W end.	2.40	Pb Mn No Bi

Note:

Distance and locations are approximate. Pegs mark the exact locations, which should be properly plotted on survey.

P and Mn were found. Copper stain showed in nearly all cuppels.

RECORD THIN SECTION SAMPLES

RND #1 T.S.	Hard siliceous Granite from Intrusive Tongue on surface West of Gulch and just East of Red Shaft.
RND #2.T.S.	Hard fine grained dark dike rock from W side Black Shaft about 20' deep - near sample #28.
RND #3 T.S.	Softer, metamorphosed fine grained dark dike rock s owing free gold from near RND #2 T.S.
RND #4 T.S.	Hard fine grained dark dike rock from H.W. side of cut 20' W of Red Shaft. Same dike appears on H. W. side of cut next W. It is apparently similar to RND #2 T.S.
RND #5 T.S.	Metamorphosed dark fine grained dike rock from surface 90' S of Pit #3 - probably a phase of RND #2 - #3 - #4 T.S.
RND #6 T.S.	Sheared granite between Black Shaft and Chute #14 at about 100' deep in productive zone.
RND #7 T.S.	Hard granite from Winze on 200 level about 280' West of Chute #15 in productive zone.

D-24

Phoenix, Arizona,
January 6th, 1928.

Mr. Ezra W. Thayer, Sr.,
Phoenix, Arizona.

Dear Sir:

December 30th, 1927 to January 4th, 1928, I made a reconnaissance of the area immediately adjacent to the Relief Mine. The following preliminary observations - subject to revision after further study - are submitted.

Immediately South of the Relief Claim, near a corner common to this claim, the Lunrs Patent, and the Moore claim, there are wide fracture zones, showing favorable dike material and favorable granite, adjoining the N-S Intrusive Tongue which extends from just East of the Red Shaft (area 3 W). This point shows a condition favorable to an orebody and is worthy of study.

The Moore Claim West of the Venus shows a fracture carrying some gold and lead values (evidenced by dump sample). The shaft here should be sampled. Some faulting is apparent.

Sunrise #7, #9, #10, #11, lie on the desert and are pretty much covered by debris. They seem important chiefly for their protection to future discoveries.

Sunrise #2 shows favorable granite, cut by frequent fine grained dark dikes and by a few light colored more nearly porphyritic dikes. In places the granite is sheared and stained with Mn.

Sunrise #4 shows a considerable area of favorable granite, cut by numerous favorable dikes and by some more nearly porphyritic light colored dikes. The Discovery Pit, near the West end of the claim, is sunk on a granite - dike contact and shows some shearing, with a little quartz. East and North of this Pit there is a mass of the Intrusive Phase.

Sample #101	Across 5' (1' Granite, 1' Quartz Stringers, 3' sheared Dike) on E end (12' down) of Discovery Pit on Sunrise #4, about 300' East of West End Center.	Au -$0.20 Ag -0.3 oz Cu -Trace

Sheet One.

Sunrise #6 shows irregular occurrence of all formations previously noted except the Intrusive Phase. Near the West end of the claim a shallow pit exposes as strong E - W fracture, dipping N, with favorable granite on the Footwall side, and porphry on the Hanging Wall. This fracture - over 12' wide - shows much iron, some lead stain, a great deal of spar, and some "lively" quartz. Some distance up the hill there are two more pits on this same fracture, showing similar characteristics. In the most easterly of these pits the fracture is cut off by a fault.

While this fracture is very attractive, it is quite different in appearance from the main Relief fractures. It carries more mica, spar, and Iron than seen elsewhere. Surface values on this fracture are very low. It is quite possible that gold values have been leached on surface. From a pit near the lower shaft at the West end an adit could be driven on the fracture, gaining some depth. This should be given thought as study progresses and perhaps should be later executed.

Sample #102	Across 5' crushed quartz and Dike, Fe stained, 5' down on E side of Pit 25' E of W end of Sunrise #6.	Au - Trace Ag - 0.1 oz Pb - 0.7 %
Sample #103	Across 2.5' crushed quartz, Granite and dike, adjoining #102 toward S.	Au - Trace Ag - Trace Pb - 0.5 %
Sample #104	Across 5' crushed granite and Dike, adjoining #103 toward S.	Au - Trace Ag - Trace Pb - 1.3 %
Sample #112	Across 6' crushed Fe stained Quartz and Dike E side of pit on fracture zone near top of hill 60' W of Discovery, Sunrise #6.	Au - $0.20 Ag - 0.1 oz Cu - - Mn Yes
Sample #113	Across 4' Dike and quartz, W side of Pit at Discovery, Sunrise #6.	Au - $0.20 Ag 0 0.1 oz Cu - Trace

Sunrise #8 At about 400' East of West end there is a large mass of the Intrusive. Just West of this pronounced E-W fractures in favorable dike rock and favorable granite, are exposed in several shafts (inaccessible). The material on dumps is shistose. South of the most westerly shaft a pit discloses a fault in granite. The condition here is interesting but hardly worthy of work at present. After further study of the whole property it would be wise to retimber the collar of deepest shaft and study and sample the underground exposures - cross-cutting enough to get all the pertinent data.

Sample #114	Quartz taken at random from cut dump just E of most westerly shaft on Sunrise #8.	Au - Trace Ag - 0.1 oz Cu - Trace Mn - No

Sunrise #1 Three shallow shafts (inaccessible) have been sunk on a narrow E-W spar stringer. The Intrusive apparently covers most of the surface, although a little favorable granite is exposed in the upper shaft. A pit at the Discovery shows a fault fracture with included dark dike material.
The present exposures do not seem important. Some low gold values are reported as having been found in the middle shaft.

Sample #115	Picked quartz from dump at lower shaft near W side of Gulch - Sunrise #1 .	Au - $0.20 Ag - 0.3 oz Cu - Trace

Sunrise #3 Here nothing particularly interesting was seen. There are some dikes and one or two narrow fractures.

Sunrise #5 In the Gulch, about 1500' North of the Relief Camp, and about 600' E of the West end of this claim, at Discovery, there is an important E-W fracture zone showing favorable granite, crushed dike, and a copper-stained quartz stringer. There has been severe shattering here, and the effects are visible for 75' South and 150' North. The Intrusive Phase, and various light and dark colored dikes cut this area. Directly East, on top of the hill, an 85' shaft (inaccessible) shows a copper-stained quartz stringer in favorable granite. Some copper-stain is reported as extending easterly along the top of the ridge.
It is possible that this shattered zone bears some relation to the fractures seen on Sunrise #6, #8 and #16. An adit driven East, from the Gulch at #5 Discovery, on the fracture, might, with proper cross-cutting, throw some light on this situation. The area may become important as study and development progress.
The values found are disappointingly low, but do not necessarily condemn the area.

Sample #99	Picked Quartz on Dump at Shaft, top of hill, on Sunrise #5 East of Discovery, shows Cu stain.	Au - $1.00 Cu - 4.88 %
Sample #105	Across 2' Dike (calcified) on South side of cut at Sunrise #5 Discovery.	Au - Trace
Sample #106	Across 3' crushed light colored Granite adjoining #105 toward North.	Au - Trace
Sample #107	Across 1.6' Brown fine grained dike, crushed, adjoining #106 toward North.	Au - $0.20
Sample #108	Across 5' crushed greenish fine grained dike with copper-stained quartz stringer, adjoining #107 toward North.	Au - Trace Ag - 0.2 oz Cu - Trace
Sample #109	Across 0.8' Copper-stained Quartz in Center of #108	Au - Trace Ag - 0.1 oz Cu - 0.18 %

Sample #110	Across 2' calcitized and silicified granite at contact with Dike about 75' South of Sunrise #5 Discovery, on W side of Gulch.	Au - $0.20
Sample #111	Across 4' Calcitized Dike adjoining #110 toward South	Au - $0.20

Sunrise #14 or "Pick-Me-Up". This claim is extremely interesting and may prove very important. From about 200' East of the West end, lying easterly and northerly there is a large well silicified mass of the Intrusive Phase. At one place northerly it is almost entirely quartz. A shaft, about 200' East of the west end shows a strong fracture, dipping South. Near here are a number of fine grained dark dikes and some slightly coarser dikes similar to R.N.D.-T.S. #5. The dikes show a shistose structure and frequent quartz segregations. In the shaft there are copper-stained quartz stringers. To the south lies a large mass of favorable granite. The rocks seen present many phases and show considerable metamorphisem.

Easterly there are massive dark dikes. About 800' East of the Shaft there is a massive "blowout" or gossan of quartz and Fe Oxide - some of it showing a shistose structure. Here some copper-stained quartz float was found. R.N.D. - T.S. #9 and T.S. #10 were taken at this point. A short distance farther East a pit discloses a strong fracture showing crushed dike material and bunches of quartz, with an adjoining great mass of favorable granite.

At first thought the exposures on this claim present the possibility of a faulted continuation of the main Relief Mineralized Zone. There certainly are present favorable conditions for ore, and I consider the area very important in spite of the lack of values in surface samples.
A U. S. Bench mark is reported to be on top of hill on the eastern part of this claim, and it should be made the datum for the Relief Survey.

See Recommendations.

Sample #116	Picked quartz from shaft Dump at Discovery on Sunrise #14. Shows heavy Cu stain.	Au - $0.40 Ag - 0.1 oz Cu - 0.53 % Mn - Yes
Sample #117	Random pieces Iron Oxide and quartz at Blowout about 1000' E of West end of Sunrise #14.	Au - Trace Ag - Trace Cu - Trace Mn - Yes
Sample #118	Copper-stained Quartz float found at #117	Au - $0.20 Ag - Trace Cu - 0.25 %

Sample #119	Random sample, Bunch of Quartz in most easterly pit on Sunrise #14, about 200' East of #117 - #118.	Au - Trace Ag - Trace Cu - Trace

Sunrise #10 This claim is important. South - on other property - considerable copper stain is reported to have been found. On the claim, about 800' East of the West end, and near the Discovery is a condition worthy of very careful study.

A great mass of fine grained, light-colored rock, trending roughly NW-SE, appears here. The rock, in places over considerable widths, is silicified and mineralized. In spots it is metamorphosed and fractured, and is apparently leached. A good deal of iron and manganese stain is noted. R.N.D. - T.S. #11 is a fresh unaltered specimen of this rock from its easterly margin. East of this mass is favorable granite and West and North appears a great mass of the Intrusive Phase.
A shaft (inaccessible), a short distance NW of Discovery shows copper stained favorable dike material on the dump. NW of this shaft is favorable dike material altered to a gneissic structure, and immediately S E is a belt (at least 20' wide) of the same rock showing a shistose structure, considerable quartz and abundant iron. This latter is well fractured. About 100' East of the shaft is an E - W fracture zone, badly leached. A pit, now partly filled, is reported to have carried gold values at its bottom.

The area is extremely interesting - presenting the possibilities of a considerable ore body. Real conclusions cannot be reached until more trenching is done and a structural study made.

See Recommendations.

Sample #100	Picked Dike rock on Dump at shaft, Sunrise #16 shows copper stain.	Au - $0.20 Cu - 0.3 %
Sample #120	Across 6' Dike (same as R.N.D. - T.S. #11) in cut near Discovery - Sunrise #16.	Au - $0.20 Ag - Trace Cu - 0.03 Mn - Yes
Sample #121	Across 3' crushed iron stained Dike about 75' S and 50' E of shaft on Sunrise #16.	Au - Trace Ag - Trace Cu - Trace Mn - Yes
Sample #122	Across 4' NS, on crushed Quartz and dike material on E-W fracture about 100' E of shaft on Sunrise #16.	Au - Trace Ag - Trace Cu - Trace Mn - Yes
Sample #123	Picked Shist from Dump at Cut just SE of shaft on Sunrise #16 shows heavy Fe and Quartz.	Au - Trace Ag - Trace Cu - Trace Mn - Yes

General I understand that Sunrise #12, #13 and #15 are not located.

The area seen is of strategic importance in protecting the main Relief Mine. As study of the mine and general area progresses certain portions of this group may assume real economic importance - particularly Sunrise #5, #6, #8, #14 and #16.

While values shown by present surface sampling are negligible, they are important as "Indicators". Leaching may have been extensive - both as to gold and copper - and must be studied. Sunrise #14 may have an immediate important bearing on the East extension of the Relief orebody. Sunrise #16 may easily become important as a large low grade copper-gold ore body below the leached zoned

I recommend -

1. General study of Gold and Copper Leaching in fractures on Sunrise #5, #6, #14 and #16.

2. Trenching of areas on Sunrise #14
   a. Near Shaft
   b. On Blowout.

3. Extension of Relief Surface Survey to cover areas 2a and 2b, plotting all geologic structure.

4. Trenching of all fractures and dikes in mineralized area discussed on Sunrise #16.

5. Surface survey of area #4 (about 300' x 400') plotting all geologic structure and tying into Patent Plot Survey.

6. Use U. S. Bench mark on East end of Sunrise #14 as datum for Relief Survey.

Very truly yours,

R M Dickinson

RMD
CMI

40

THIN SECTION RECORD - SUNRISE GROUP

R.N.D. #8 T.S.	Fine Grained, Light Colored dike rock from near discovery Monument at East end of Sunrise #10.
R.N.D. #9 T.S.	Heavy Iron stained Rock - showing Shistose structure - from Blowout about 1000' East of West end of Sunrise #14.
R. N.D. #10 T.S.	Heavy Iron stained quartz from Blowout about 1000' East of West end of Sunrise #14 near R.N.D.-T.S. #9.
R.N.D. #11 T.S.	Fine grained light colored dike rock - fresh, unaltered - from large mass discussed on Sunrise #16. Taken about 100' E and 200' S of shaft.

Sheet Seven.

8-41

RELIAN MINE

SUNRISE GROUP - SURFACE

CLASSIFICATION OF THIN SECTION SPECIMENS #1 - #11
By W. H. Tomlinson

	PRIMARY MINERALS	SECONDARY MINERALS
RND-T.S.-#8 Fine grained, light colored Dike on Sunrise #10		Epidote Quartz

Texture - Crystalline, granular, fine
Structure - Probably contact zone
Origin - Probably altered Sediment
Metamorphosis - Contact silicification
Rock Species - Silicated Limestone

Note: "These are secondary minerals and there is nothing to definitely indicate their origin."

RND-T.S.-#9 Iron capping on East end of Sunrise #14		Hornblend Anorthite Quartz Biotite

Texture - Crystalline, granular
Structure - Gneissic
Origin - Igneous, metamorphic
Metamorphosis - Dynamic recrystallization
Rock Species - Hornblend Gneiss

Note: "Ancient igneous rock altered by recrystallization under dynamic conditions to a Gneiss. The original rock was probably a gabbro."

RND-T.S.-#10 Same as #9 but showing quartz.	Quartz Pyrite	Quartz Limonite

Texture - Crystalline
Structure -)Replacement Zone
Origin -
Metamorphosis - Leached
Rock Species - Quartz Replacement

Note: "A quartz replacement or capping, the section shows two stages of Crystalline Quartz. The first or older is the coarser grained. The second or younger is finer grained and penetrates in between the older crystals, and carries oxidized material (Limonite)"

RND Note: In my opinion #9 and #10 overlie an important situation as regards ore.

P-4

	PRIMARY MINERALS	SECONDARY MINERALS
RND-T.S.-#11		
Fine grained light colored dike on Sunrise #16	Feldspar Quartz Biotite	Chlorite

Texture - Crystalline, granular, fine.
Structure,- Gneissic
Origin - Probably Igneous
Metamorphosis - Dynamic recrystallization
Rock Species - Acid Gneiss

Note: "There is no clue to the origin but the mineralogical composition suggests an acid Igneous rock that has recrystallized under dynamic conditions.

ASSAY RECORD

Samples taken by Mr. Ryle

SUNRISE GROUP, ROLLINS MINE

Jan. 1, 1928.

Sample Number	Where Taken	Ag oz	Au $	Pb %	Cu %
A	Sunrise #4, 250' East of West End Line	Tr	Tr	--	--
B	Sunrise #6, 120' East of West End Line	0.2	Tr	Tr	--
B2	Sunrise #6, From Pit on Apex 600' East of West End Line	0.1	0.40	Tr	--
C	Sunrise #5, From Open Cut	0.2	0.60	--	0.5
C2	Sunrise #5, From Deep Shaft on Hill	Tr	0.20	--	5.0
D	Sunrise #8, 400' East of West End Line, Howdy Claim	0.2	1.80	--	0.3
E	Sunrise #1, 250' West of East End Line	0.1	2.80	--	--
F	Sunrise #14 or "Pick Me Up" - Shaft	Tr	0.40	--	1.62
G	Sunrise #16 From red croppings.	0.1	0.20	--	0.3

Sheet One

BELLINE MINE ADDENDA JANUARY 24, 1928

The 300 level and the area exposed by raises and stopes between the 300 and 200 levels seems on inspection to be the most attractive portion of the mine, yet seen underground. The formation is very favorable to ore deposition and I expect wide ore bodies in places. A good deal of iron, well oxidized, is seen. The quartz is "lively" but is apparently well bleached. Free gold was found near chute #1. I think the ore body will prove, on proper development, to be fully as large as that indicated on the 200 level.

The 400 level , east of the shaft, and west of the shaft for nearly all its present length, is driven in an unfavorable and unproductive zone; probably well out of the hanging wall country. Much fault breccia and much of the normal granite intrusive is seen. The early work here was apparently done without proper knowledge or care.

The westerly end of the drift is in granite schist, favorable to ore and already showing some values. The schist here should, when the real ore zone is entered, show very good values.

The shaft below the 300, and both the 300 and 400 levels are open and in good shape. The 400 level may require timbering in the schist ore.

The 300 level should be properly sampled thruout. The 400 level should be sampled for the most westerly 60'. A structural survey, with a number of thin sections samples- to verify the various formations is imperative.

Extension of both the 300 and 400 levels should be guided by exploratory winzes in ore from the levels above.

The Barclay survey will not be adequate for active development as very few reference points are found.

I see nothing disquieting on the 400 level. Conditions there are just what is to be expected, considering the location of the openings.

Costs of reopening the entire mine will probably be lower than previously estimated.

Inspection of the lower levels makes me feel even more certain of profitable development results if the recommendations made are strictly adhered to. I expect a somewhat better grade of ore around water level.

Prompt opening of the mine is recommended.

R M Dickinson

Grab sample by Kirk on 400 West — $100 au

SUNRISE-RELIEF - THIN SECTION RECORD

R.N. Dickinson 3/7/28

RND-TS-27 Diorite showing free gold on surface, about 35' E of Black Shaft on hanging wall side of fracture zone.

RND-TS-28 Diorite showing free gold from back of 300 West Level, 10' E of Chute 1.

RND-TS-29 Granite (?) showing free gold, from N side of 300 West Level, 10' E of Chute 1.

RND-TS-30 Diorite, showing free gold, the diorite frozen to granite, 300 West Level, 10' E of Chute 1.

RND-TS-31 Granite (?) showing free gold, from 300 West Level, 20' E of Chute 7.

RND-TS-32 Granite (?) altered and iron stained, from 300 West Level, 20' E of Chute 7. This specimen was taken from narrow streak adjoining # 31.

NOTE: Specimens #28, #29 and #30 were taken from the same point in the drift on the 300 West Level.

Specimens #31 and #32 were both taken from another point in the drift on the same level.

D-26

RELIEF MINE

CLASSIFICATION OF THIN SECTION SPECIMENS #1 - #7

By W. H. Tomlinson

	PRIMARY MINERALS	SECONDARY MINERALS
RND-T.S. #1	Microline	
	Quartz	
Intrusive Mass.	Muscovite	
	Biotite	
	Hornblend	
	Magnetite	

Texture - Holocrystalline, Granitoid
Structive - Massive Intrusive
Origin - Igneous
Metamorphosis - None
Rock Species - Granite (normal)

RND-T.S. #2 also #3	Oligoclase	
	Granular Quartz and Feldspar	
Fine grained, dark dikes,	Hornblend	
frequently making ore.	Biotite	
	Magnetite	Epidote

Texture - Holocrystalline, Porphyritic
Structure - Massive
Origin - Igneous
Metamorphosis - See Note
Rock Species - Diorite

Note: The phenocrysts of Oligoclase Feldspar are broken down around the edges and replaced by Quartz and Feldspar - also by hemimorphic Hornblend and Biotite, Part of the finer grained Feldspar is Automorphic.

RND NOTE

Kemp's Tables would place this rock as a Diorite-Porphyry, or if the Quartz is purely a later replacement, as a Syenite-Porphyry.

8-27

	PRIMARY MINERALS	SECONDARY MINERALS
RND-T.S.-#4		
Dike adjacent to ore body in Area 3 W	Feldspar Quartz	Muscovite Calcite

Texture - Porphyritic
Structure - Intrusive
Origin - Igneous
Metamorphosis - Granulated
Rock Species - Porphyry

Note: Tomlinson states "This is an ancient porphyry showing phenocrysts of Feldspar which are altering to patches of Muscovite or Muscovite and Calcite. The base is fine granular Feldspar and Quartz."

RND NOTE

This is important, as it undoubtedly has a bearing on the ore deposit in Area 3 W. It may be older that the Granite Intrusive.

RND-T.S. #5		
A phase of fine grained, dark dike.	Granular Quartz and Feldspar Hornblend Biotite Magnetite Apatite	Epidote

Texture - Holocrystalline
Structure - Massive
Origin - Igneous
Metamorphosis-Slight Hydration
Rock Species - Dbrite

Note: This is same as #2-3 but does not show the phenocrysts. (Probably some metamorphism has occured.)

	PRIMARY MINERALS	SECONDARY MINERALS
RHD-T.S. #6	Orthoclase Quartz Biotite	Epidote
Granite Ore from Area 1 W about 120' deep		

Texture - Holocrystalline - Granatid
Structure - Massive, Gneissic
Origin - Igneous
Metamorphosis - Dynamic
Rock Species - Granite Gneiss

RHD NOTE: The gneissic structure is due to shearing stress - perhaps from the intrusion of the later granite. This rock is a favorable ore gangue.

RHD-T.S. #7		
From 200 level West Near Ore	Orthoclase Oligoclase Quartz Hornblend Biotite Magnetite	Epidote

Texture - Coarse Holocrystalline
Structure - Massive Intrusive
Origin - Igneous
Metamorphosis - Slight Hydration
Rock Structure - Monzonite

Note: "Another massive Intrusive and probably a large body."

RHD NOTE: This is a possibly doubtful classification, without quartz it would be unquestioned, the name "Monzonite" marking a transition between a syenite and a diorite. With Quartz, as reported, I should rather call it a transition phase between a Granite and a Quartz Diorite.

It is important as it may mark another intrusion - having a secondary shattering action on the ore bodies, without accompanying mineralization - thus clearing up an interesting question.

8-69

SUNRISE-RELIEF

CLASSIFICATION OF THIN SECTIONS 4/2/28

By W.H. Tomlinson

RND-T.S.-#27	PRIMARY MINERALS	SECONDARY MINERALS
Diorite from surface, about 35' E of Black Shaft, on N.W. side of fracture zone	Plagioclase Hornblend Biotite Quartz Magnetite Gold	Epidote

Texture - Holocrystalline
Structure - Dike
Origin - Igneous
Rock Species - Diorite

NOTE: "Sample 27 is a fine grained Diorite and has the appearance of being a dike rock. Section shows crystalline idiomorphic Plagioclase, Hornblend and Biotite with accessory Magnetite and a slight development of Epidote. In this sample much of the Gold is in extremely finely divided form and even occurs as inclusions within Feldspar crystals. This sample is probably more closely connected with the source of the Gold."

RND-T.S.-#28	PRIMARY MINERALS	SECONDARY MINERALS
Diorite (?) showing free gold. From back of 300 West Level, 10' E of Chute #1	Magnetite	Quartz Biotite Epidote Gold

Texture - Crystalline granular
Structure - Gneissic
Origin - Probably igneous
Rock Species - Biotite Gneiss

NOTE: "Samples 28 and 31 (b) show a biotitic Gneiss which may be a phase of the Diorite. Sections show abundance of the iron-rich Biotite in a base of crystalline granular Quartz and Feldspar with a little Epidote and oxidized Pyrite. The structure is gneissic. This formation has been intruded by the Granite. Section of sample 31 shows the contact. The Gold in these samples occurs in form similar to that in the Granite."

2-20

SUNRISE-RELIEF

CLASSIFICATION OF THIN SECTIONS

By W.H. Tomlinson

RND-T.S.-#29	PRIMARY MINERALS	SECONDARY MINERALS
Granite (?) showing free gold - From N side of 300 West Level 10' E of Chute #1	Orthoclase and Microcline Oligoclase Quartz Biotite (iron)	Epidote Hematite Gold

Texture - Coarse holocrystalline. Granitoid
Structure - Massive
Origin - Igneous
Metamorphosis - By hydrothermal waters
Rock Species - Granite

NOTE: "Samples 29, 30 and part of 31 (a) represent a Biotite Granite intrusive. The sections show Orthoclase, Oligoclase, and Microcline, Quartz, a Biotite rich in iron, and a little Epidote. The texture is coarse granitoid. The Gold in these samples occurs in stringers or plates of rather coarse size and always between grains or cracks.

RND-T.S.-#30	PRIMARY MINERALS	SECONDARY MINERALS
Diorite (?) showing free gold, the diorite(?) frozen to Granite. 300 West Level, 10' E of Chute #1. (Granite also shows free gold)	Orthoclase Oligoclase Quartz Biotite Hornblend Apatite	Epidote Gold

Texture - Coarse holocrystalline. Granitoid
Structure - Massive
Origin - Igneous
Metamorphosis - By hydrothermal waters
Rock Species - Granite

NOTE: "Samples 29, 30 and 31 (a) represent a Biotite Granite intrusive. The sections show Orthoclase, Oligoclase and Microcline, Quartz, a Biotite rich in iron, and a little Epidote. The texture is coarse granitoid. The Gold in these samples occurs in stringers or plates of rather coarse size and always between grains or cracks."

SUNRISE-RELIEF

CLASSIFICATION OF THIN SECTIONS

By W.H. Tomlinson

RHD-T.S.-#31	PRIMARY MINERALS	SECONDARY MINERALS
Granite(?) showing free gold. From 300 West Level 20' E of Chute #7. Shows contact with Diorite (?) which also shows free gold. To the eye this specimen is almost a duplicate of T.S. #30	(31 a) Orthoclase Oligoclase Quartz Biotite	(31 a) Epidote Gold

(31 a)

Texture - Granitoid
Structure - Massive
Origin - Igneous
Metamorphosis - By hydrothermal waters
Rock Species - Granite

	(31 b)	(31 b) Quartz Feldspar Biotite Epidote

(31 b)

Texture - Crystalline granular
Structure - Gneissic
Origin - Probably igneous
Metamorphosis - By hydrothermal waters
Rock Species - Biotite Gneiss

NOTE: "Samples 29, 30 and part of 31 (a) represent a Biotite Granite intrusive. The sections show Orthoclase, Oligoclase, and Microcline, Quartz, a Biotite rich in iron, and a little Epidote. The texture is coarse granitoid. The Gold in these samples occurs in stringers or plates of rather coarse size and always between grains or cracks."

NOTE: "Samples 28 and 31 (b) show a biotitic Gneiss which may be a phase of the Diorite. Sections show abundance of the iron-rich Biotite in a base of crystalline granular Quartz and Feldspar with a little Epidote and oxidized Pyrite. The structure is gneissic. This formation has been intruded by the Granite. Section of sample 31 shows the contact. The Gold in these samples occurs in form similar to that in the Granite.

SUNRISE-APPLIFE

CLASSIFICATION OF THIN SECTIONS

By W.H. Tomlinson

RND-T.S.-#32	PRIMARY MINERALS	SECONDARY MINERALS
Granite (?) altered and iron stained, showing free gold. From 300 West Level, 20' E of Chute #7, a narrow streak adjoining T.S. #31	Hornblend Biotite Plagioclase Orthoclase Quartz	 Epidote Sericite Gold

Texture - Crystalline granular
Origin - Igneous
Metamorphosis - By hydrothermal waters
Rock Species - Diorite

NOTE: "Sample 32 shows a basic phase of Diorite with abundant Hornblend as well as Biotite in the granular Quartz and Feldspar base. Part of the Feldspar is idiomorphic."

RND Note: This is the rock locally known as "Red Granite".

8-33

SUNRISE-RELIEF

COMMENTS ON MINERALIZATION

R.H. Dickinson - 4/2/28

Thin section specimens RHD-T.S.-#27-32 throw some light on the mineralization of the Relief.

Tomlinson classifies the gold in T.S. #27 as primary - in the other specimens, as secondary. In #27 the gold is in "extremely finely divided form and even occurs as inclusions within Feldspar crystals. This sample is probably more closely connected with the source of the gold." In the other specimens the gold occurs "in stringers or plates of rather coarse size and always between grains or cracks."

Tomlinson states that "all these rocks have been profoundly altered by mineralizing waters x x x x The same characteristic minerals (iron-rich biotite and Epidote) have developed in different degree in all the various types of rocks."

Also Tomlinson expresses this opinion: "I would suppose that the Gold present had been brought in by thermal waters which penetrated adjacent formations depositing the Gold in the small cracks and interstices between minerals. With the exception of sample 27 the type of deposition is not one that I would expect to continue below water level. The finely divided Gold in sample 27 however may persist or veins may be found that will carry values to lower depths."

My own opinion - based on field observation and on Tomlinson's detailed notes - is that the mineralization is primary, having as its source hot solutions under fairly high pressure and rising from below - probably accompanying the intrusion of either the Normal Granite or the Diorite.

In any event, taking all evidence into consideration, a deposit of magnitude is almost certain. If the gold should prove to be secondary I agree that the ore values would decidedly decrease at some unknown point below permanent water level, but in that case also I feel that the vertical zone from the 400 level to the unknown point below water level might be greatly enriched - perhaps of far greater value than at any point thus far opened in the mine.

If the gold should prove to be primary, as I think, values should continue, about as at present, to any unknown depth.

(Signed) R.H. DICKINSON

D-45

August 1, 1928

Mr. Emra W. Thayer
179 East Adams Street,
Phoenix,
Arizona.

Dear Mr. Thayer:

I beg to report the samplings of the Sunrise Relief Mine.

All shafts, drifts, raises, crosscuts, and winzes were carefully examined and a sample was cut from across the ledge in these many different openings.

These samples so taken were broken down to about three-quarter mesh fine. Each sample was worked down properly and placed on a canvas, where the 200 pounds was thoroughly mixed and divided into two equal parts of 100 pounds each.

I am sending 100 pounds of this 200 pound sample to your office for your disposition. I am also sending a small sample cut out of the 200 pound lot. This small sample was ground to a 40 mesh fine. About one ounce was taken from this small sample and panned down to a gold residue, which gave an estimate valuation of at least $10.00 per ton. Being an average of ore in place at the mine. However it is difficult to estimate the value of this ore by panning.

In a careful manner of examining and sampling I was unable to find any trace of any other metal, base or otherwise, than gold. Thus with the rich yellow color of the gold, it would indicate the gold to be of a very high grade and near 1000 fine.

I would suggest having the small sample assayed to determine the correct value of the ore in place at the mine.

Development work is progressing in a most satisfactory manner on the 2,3, and 400 foot levels, and as this work progresses more ore of the same grade above stated, is being added to the 110,000 tons blocked out above the 400 foot level.

Sincerely,

David Hile.

8-46

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WAREHOUSE No. 2
8TH & BUCHANAN STS.

PHOENIX, ARIZONA
August 17, 1929.

Southwestern Engineering Corp.
606 So. Hill St.,
Los Angeles,
California.

Dear Mr. Shimmin:

Regarding yours of 14th inst. and bulletin #250A.

I am shipping you a sack of ore (94 lbs from the Sunrise Relief Mines Inc., a gold mine nine miles north of Peoria, Arizona, a station on the Santa Fe R.R.) by prepaid express to # 4800 Santa Fe Ave.

I am enclosing a list of 57 shipments made from this property to the U. S. Mint, taken from about seven thousand tons of ore. I have slides and microscopic analyses of the sundry ores and rock from this property, made by W. Harold Tomlinson, of Swarthmore Pa., if of any value to you in determination.

My foreman tells me the sack represents a fair average of (150000) tons blocked out and pans around $10.00. My sampling of the sack runs higher.

It is my desire that you work this as promptly as possible, and to have no hesitancy in advising me. Kindly know that this is practically a close corporation, and as its backer I do not wish anything but facts.

Kindly advise me if you need further information. Reference--Any bank in town.

Yours very truly,

Ezra W. Thayer

EZRA W. THAYER

For gold--
Have check assay--
Report, if any returned.

"QUALITY FIRST ALWAYS"

D-47

No. 37 14

Phoenix, Arizona,
Aug 9 1929

CHAS. A. DIEHL

ARIZONA ASSAY OFFICE

Phone 4447 · 315 North First Street · P. O. Box 1148

This Certifies That the samples submitted for assay by Mr. Nera W. Thayer contain as follows per ton of 2000 lbs. Avoir.:

SAMPLE MARKED	SILVER OUNCES PER TON	VALUE AT PER OZ.	GOLD OUNCES PER TON	VALUE AT $20 PER OZ.	PERCENTAGE			
1			.89	$17.80				
2			.67	$13.40				
3			1.25	$25.00				
4			.53	$10.60				
5			.86	$17.20				
6			.68	$13.60				
7			1.16	$23.20				
8			.70	$14.00 13 4 8				
9			1.19	$23.80				
10			1.37	$27.20				

Charges $ 10.00

Assayer: Chas. A. Diehl

8-52

SOUTHWESTERN ENGINEERING CORP.

METALLURGICAL TESTING DEPARTMENT

SEPTEMBER 19, 1929

Results of metallurgical tests conducted on a sample of ore from the Sunrise Relief Mines, Inc., submitted by Mr. Ezra W. Thayer, 179 E. Adams St., Phoenix, Arizona.

SOUTHWESTERN ENGINEERING CORP.

1221 HOLLINGSWORTH BLDG.

LOS ANGELES, CAL.

TEST NO. 2258

8-53

SOUTHWESTERN ENGINEERING CORP.

METALLURGICAL TESTING DEPARTMENT

SEPTEMBER 19, 1929

Results of metallurgical tests conducted on a sample of ore from the Sunrise Relief Mines, Inc., submitted by Mr. Ezra W. Thayer, 179 E. Adams St., Phoenix, Arizona.

SAMPLE NO. 2258

A sample of about 100 pounds of ore was submitted for testing. Examination of the sample showed the ore to be considerably oxidized with a small percentage of sulphides and oxidized copper minerals. It was observed that the gold was finely disseminated through the gangue and flaky in form.

The sample was crushed to pass a 4-mesh sieve, carefully sampled, assaying as follows:

Gold	1.02 oz. per ton
Silver	.20 oz. per ton
Copper	.33 per cent

TEST #1

A charge of 700 grams of ore previously crushed to pass a 10-mesh sieve was ground in a laboratory ball mill with 700 grams of water for 15 minutes, then transferred to a bottle, the pulp diluted to 4 parts of water to 1 of ore and amalgamated with 100 grams of mercury by rolling for one hour.

The amalgam and free mercury were recovered by panning the charge.

The amalgamation tailing was then transferred to a laboratory flotation machine and floated after first conditioning the pulp for five minutes with sodium sulphide and P. E. oil.

Reagents used for flotation per ton of ore were as follows:

At conditioning	-	2.85# sodium sulphide
		.5# P. E. oil
At flotation	-	.15# Yarmor pine oil

Results of this test indicate that 71.50 per cent of the gold was recovered by amalgamation; that from every 100 tons of similar amalgamation tailing there would be produced:

4.57 tons of Rougher Flotation Concentrate

	Assaying	Containing
Gold	4.56 oz. per ton	20.86 per cent of the gold
Copper	.72 per cent	---

There would be recovered by amalgamation and flotation 92.36 per cent of the gold.

The ratio of concentration was 21.88 tons into one ton.

TEST #2

In this test a 700 gram charge of minus 10 mesh ore was ground for 15 minutes, then transferred to a laboratory flotation machine and floated in two roughing stages of 5 and 12 minutes each. The rougher flotation concentrate was not cleaned.

Reagents used per ton of ore were as follows:

At Ball Mill - 2.85# soda ash
.5# P. E. oil

At flotation, 1st series - 1.42# sodium sulphide
.1# Yarmor pine oil

2nd series - .08# potassium ethyl xanthate
.26# P. E. oil
2.85# sodium sulphide
.15# Yarmor pine oil

Results of this test indicate that the ratio of concentration was 18.87 tons into one ton; that from every 100 tons of similar ore there would be produced:

5.30 tons of Rougher Flotation Concentrate

	Assaying	Containing
Gold	18.22 oz. per ton	91.89 per cent of the gold

TEST #3

In this test 6 700 gram charges of minus 10 mesh ore were each ground and floated separately; the rougher flotation concentrate combined and the flotation tailings were combined. The combined flotation tailings were tabled.

In this test the sodium sulphide was added to the charge at the ball mill.

Reagents used per ton of ore were as follows:

At Ball Mill - 2.85# sodium sulphide
.56# P. E. oil

At flotation, 1st series - .08# potassium ethyl xanthate
.20# Yarmor pine oil

2nd series - .34# P. E. oil
.08# potassium ethyl xanthate
.10# Yarmor pine oil

Results of this test indicate that the ratio of concentration by flotation was 16.78 tons into one ton; that the ratio of concentration by tabling was 227.36 tons into one ton; that from every 100 tons of similar ore there would be produced:

5.96 tons of Rougher Flotation Concentrate

Assaying		Containing
Gold	13.44 oz. per ton	82.14 per cent of the gold
Silver	.80 oz. per ton	32.88 " " " " silver

.44 tons of Table Concentrate

Assaying		Containing
Gold	22.56 oz. per ton	10.18 per cent of the gold
Silver	.90 oz. per ton	2.59 " " " " silver

Combined recovery by flotation and tabling would be:

92.32 per cent of the gold
35.47 " " " " silver

TESTS #4, #5, #6 and #7

For these tests about 2000 grams of the minus 10 mesh ore was ground dry in a pulverizer to pass a 65 mesh sieve.

Test #4 was a preliminary test conducted to determine the amenability of this ore to treatment by cyanidation by agitation.

After the results of Test #4 had been received, Tests #5, #6 and #7 were made to determine the effect of a stronger cyanide solution with 16 hours of agitation and also 24 and 48 hour agitation periods with a weaker cyanide solution than used in Test #4. Following is the tabulated data of Cyanidation Tests: #4, #5, #6 and #7:

Number of Test	4	5	6	7
Hours of Agitation	16	16	24	48
Grams of ore in charge	400	400	400	400
Ratio of solution to ore	3:1	3:1	3:1	3:1

8-26

Number of Test	4	5	6	7
Pounds of lime added per ton of ore	5.00	5.50	6.50	7.50
Alkalinity of cyanide solution in pounds of CaO per ton of solution at finish	tr	tr	tr	.10
Strength of cyanide solution in pounds of sodium cyanide per ton of solution at start	1.75	2.95	1.03	1.03
Strength of cyanide solution in pounds of sodium cyanide per ton of solution at finish	1.10	2.10	.75	.75
Consumption of sodium cyanide in pounds per ton of ore	1.95	2.55	.84	.84
	Gold	Gold	Gold	Gold
Assay of Heads	1.02	1.02	1.02	1.02
" " cyanide tailing	.06	.06	.05	.015
Indicated extraction	94.21	94.21	95.10	98.53

Results of these tests indicate that for the 16 hour agitation period the indicated extractions are the same, but that the consumption of sodium cyanide was higher when using a 2.55 pound cyanide solution than when the 1.95 pound cyanide solution was used.

Results of Tests #6 and #7 indicate an extraction of 95.10 per cent of the gold with a 24 hour agitation and an extraction of 98.53 per cent of the gold with a 48 hour agitation.

TEST #8

In this test 6-700 gram charges of the minus 10 mesh ore were each ground for 20 minutes and floated separately. The rougher flotation concentrates were combined as were the flotation tailings. The flotation tailings were then tabled.

Reagents used per ton of ore were as follows:

At Ball Mill - 2.85# soda ash
.5# P. E. oil

At flotation, 1st series - 1.42# sodium sulphide
.1# Yarmore pine oil
2nd series - 2.85# sodium sulphide
.08# potassium ethyl xanthate
.26# P. E. oil
.15# Yarmor pine oil

Results of this test indicate that the ratio of concentration by flotation was 23.2 tons into one ton; that the ratio of concentration by tabling was 714.28 tons into one ton; that from every 100 tons of similar ore there would be produced:

8-57

4.31 tons of Rougher Flotation Concentrate

Assaying		Containing
Gold	20.88 oz. per ton	94.77 per cent of the gold
Silver	1.60 oz. per ton	41.80 " " " " silver

.14 tons of Table Concentrate

Assaying		Containing
Gold	13.50 oz. per ton	0.20 per cent of the gold
Silver	.35 oz. per ton	0.30 " " " " silver

TEST #9

This test was conducted the same as Test #8 but with a 10 minute grind for each charge instead of a 20 minute grind.

Reagents used in this test were the same as in the previous test.

Results of this test indicate that the ratio of concentration by flotation was 38.91 tons into one ton; that the ratio of concentration by tabling was 294.12 tons into one ton; that from every 100 tons of similar ore there would be produced:

2.57 tons of Rougher Flotation Concentrate

Assaying		Containing
Gold	35.20 oz. per ton	84.90 per cent of the gold

.34 tons of Table Concentrate

Assaying		Containing
Gold	24.48 oz. per ton	7.81 per cent of the gold

The combined recovery by flotation and tabling would be 92.71 per cent of the gold.

A 700 gram charge of the ore prepared in the same way as the pulp was prepared for the tests for cyanidation, has been submitted to the Dorr Company for tests relative to the settling properties of this ore.

The reagents added per ton of ore to this charge of 700 grams before submitting to the Dorr Company were as follows:

1.00# of sodium cyanide
6.00# of hydrated lime

CONCLUSION - SAMPLE #2268

Results of the metallurgical tests conducted on the sample of ore submitted, indicate that the ore is amenable to treatment with a high recovery of the gold by several methods, namely:

By amalgamation and flotation
By flotation
By flotation and tabling
By cyanidation by agitation

Results of tests relative to the settling properties of the ore when ground to pass a 65 mesh sieve, will determine the feasibility of cyanidation by agitation, using a counter-current system.

It is to be noted that the consumption of cyanide was lower when using a weak cyanide solution.

Considerable difficulty was encountered when filtering and washing the cyanidation tailings due to the slimes forming on the surface of the cake and thus preventing the passage of the solution wash.

The rougher flotation concentrates were not cleaned in any of the flotation tests for the reason that it was thought impossible to keep coarse gold, that had once been floated, from settling out in the highly diluted pulp which would result when cleaning the rougher concentrate. In practice a considerably higher grade concentrate and a higher ratio of concentration can be expected than the results of the flotation tests show.

SOUTHWESTERN ENGINEERING CORP.

By Otis D. Welsch.

GJ
9-20-29

8-6-1

TELEPHONE TR 3-1040 FORM B 10-M 2-29

METALLURGICAL DEPARTMENT

Southwestern Engineering Corporation

LOS ANGELES, CALIFORNIA

METALLURGICAL TEST

20 Min. Grind

Date Sample Received August 21, 1929 Test by Flotation & Tabling

Ore from Sunrise Relief Mines, Inc. Date Sept. 17, 1929

Description of Sample Gold Ore Weight Ore Tested 4200 Grams

Lot 2258 Test 8 Mesh 1 + 65 / 91.3% - 200 Time of Test 5 - 12 MINUTES Ratio of Liquid to Solids 4:1

PRODUCTS	Weight per Cent	ASSAYS							
		oz. Gold	oz. Silver	% Copper	% Lead	% Zinc	% Iron	% Insol.	
Assayed Head		1.02	.20	.33					
Calculated Head	100.00	.95	.17						
Flotation Concts	4.31	20.88	1.60						
Table "	.14	13.50	0.35						
" Tailing	95.55	.05	.10						

DISTRIBUTION—Showing per cent of total metal contained in different products.

	Weight per Cent.	Gold	Silver	Copper	Lead	Zinc	Iron	Insol.	
Calculated Head	100.00	100.00	100.00						
Flotation Concts	4.31	94.77	41.80						
Table "	.14	.20	.30						
" Tailing	95.55	5.03	57.90						

Reagents used pounds per ton of ore: At ball mill - 2.35# soda ash, .5# P.E.oil.

1st series - 1.42# sodium sulphide, .1# Yarmor pine oil.

2nd series - 2.35# " " , .08# xanthate, .20# P.E.oil, .15# Yarmo Pine Oil

Remarks:

Did not clean concts. Tabled flotation tailing

Assayer Perez & Co. Signed

S.W.Engr.

8-64

TELEPHONE TR 3404

FORM 6 10-M 2-29

METALLURGICAL DEPARTMENT

Southwestern Engineering Corporation

LOS ANGELES, CALIFORNIA

METALLURGICAL TEST

10 Min. Grind

Date Sample Received Aug. 21, 1929 Test by Flotation and Tabling

Ore from Sunrise Relief Mines, Inc. Date Sept. 17, 1929

Description of Sample Gold ore Weight Ore Tested 4200 grams

Lot 2253 Test 9 Mesh 15% + 48 84.1% - 200 Time of Test 5 - 12 MINUTES Ratio of Liquid to Solids 4:1

PRODUCTS	Weight per Cent	ASSAYS							
		oz. Gold	oz. Silver	% Copper	% Lead	% Zinc	% Iron	% Insol.	
Assayed Head		1.02	.2	.33					
Calculated Head	100.00	1.065							
Flotation Concts.	2.57	35.20							
Table "	.34	24.48							
" Tailing	97.09	.08							

DISTRIBUTION—Showing per cent of total metal contained in different products.

	Weight per Cent	Gold	Silver	Copper	Lead	Zinc	Iron	Insol.	
Calculated Head	100.00	100.00							
Flotation Concts.	2.57	84.00							
Table "	.34	7.81							
" Tailing	97.09	7.99							

Reagents used pounds per ton of ore: At ball mill - 2.05# soda ash, .5# P.E.oil

1st series - 1.42# sodium sulphide, .1# Yarmor pine oil

2nd series - 2.05# " " , .08# xanthate, .26# P.E.oil, .15# Yarmor pine oil

Remarks:

Did not clean concts. Tabled flotation tailing

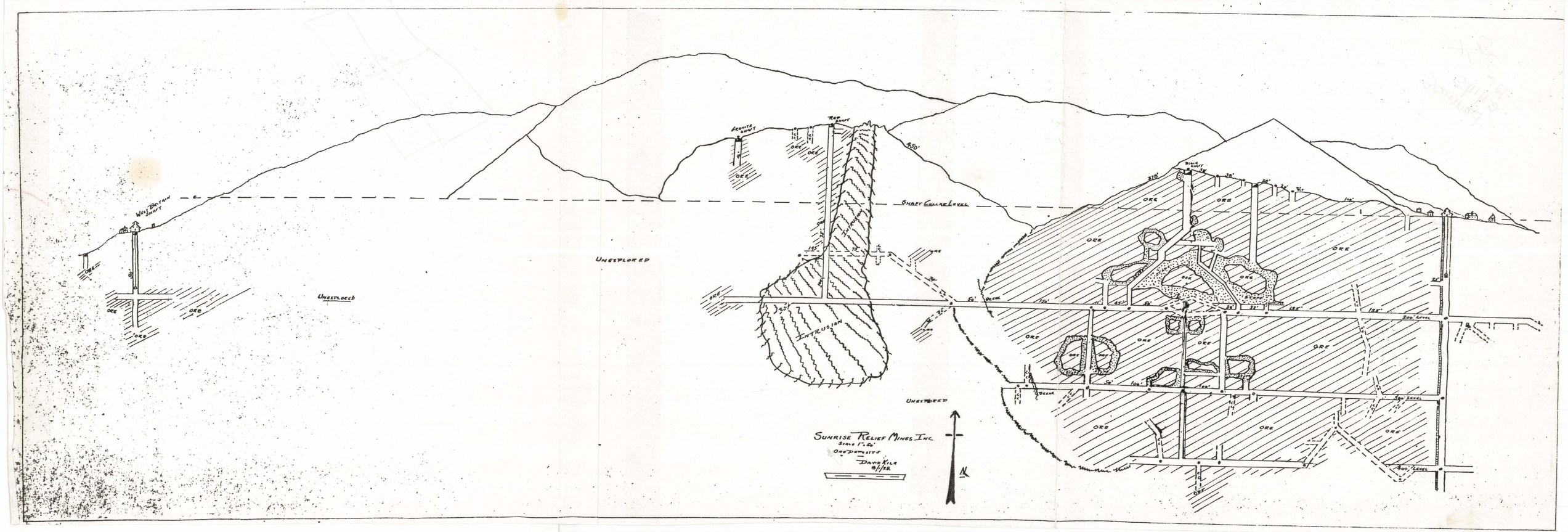
Assayer Perez & Co. Signed

S.W.Engr.

D-6-

SIZING TESTS - SAMPLE #2258

Mesh	Flotation Tailing Test #1	Flotation Tailing Test #2	Table Tailing Test #3	Cyanide Tailings Tests 4,5,6 & 7	Table Tailing Test #8	Table Tailing Test #9
+48	0.0	0.0	0.0	0.2	0.0	0.1
-48+65	0.5	0.6	0.2	0.5	0.1	0.9
-65+100	2.0	1.9	1.7	12.6	1.0	2.8
-100+150	4.7	4.8	4.5	16.8	2.6	3.0
-150+200	7.0	7.0	7.0	12.6	5.0	9.1
-200	85.8	85.7	86.5	57.3	91.3	84.1


West Britain Shaft
Acquitt Shaft
Red Shaft
Black Shaft
Street Collar Level
Unexplored
Unexplored
Unexplored
Intrusion
Ore
Ore Deposits
Sunrise Relief Mines Inc.
Scale 1"=50'
David Kile
9/1/28
N
200' Level
400' Level
600' Level