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(48)  
Item 4

PART III

1 Mine Descriptions

Palo Alto Mine

Blue Bird Mine

Bryan Mine

Mammoth Mine Zone

Rattler Mine

Alice Lode



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GRAY MINES DIVISION  
NEVADA COPPER COMPANY

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1967 - 1969



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July 28, 1969

John H. Schilling  
University of Nevada  
Reno  
Nevada

Dear Dr. Schilling:

Enclosed is the booklet you asked me to compile of information on the Contact (Salmon River) mining District, Eastern Nevada.

Some of the information contained in the first part of the report is also contained, generally, in some public reports.

However several of the reports are private reports and works, which you probably do not have.

As you know my company has over 100 Patented claims in this district and approximately 125 Unpatented claims. Part of the claims are leased and part are not.

Banner Mining Company recently brought in the Cordillarian Mining Company and Calta by some sort of Lease and option arrangement. They have done much work and mapping in the area and a lot of drilling. Much of the work has been favorable.

It is my feeling that the area will make a mine of significant production as more development occurs. Recent drilling and mapping and other work has very favorably increased this expectation.

Good Luck,

  
F. W. Lewis



PART I



NEVADA COPPER MINING COMPANY

GRAY COPPER DIVISION  
OF  
FRANK W. LEWIS

SALMON RIVER (CONTACT) MINING DISTRICT

The Gray Copper Division of the Nevada Copper Mining Company is in actuality composed of several related mines on or associated with the principal mineralized contact, known as the North Contact Zone locally, of the Salmon River Mining District, Elko County, Nevada.

The property is composed of 60 patented claims (+ 125 unpatented) ranging along the east west mineral zone. The claims form two main groups. One could be described as the Easterly end of the most productive district of the Salmon River Mining District, and the other could be described as the Western end of the most productive area. The west zone then contains at least 3 transverse lodes that strike SW from the north contact zone of mineralization.

The East end is composed of approximately 3,000 feet of the principal mineralized zone, and the West end is composed of over 10,000 feet of strike length along the main mineral zone.

Between the two groups are the mines of the Brooklyn, Nevada-Bellevue Group which have been most productive (now Banner).

The following descriptions of mines are all properties



owned by the Nevada Copper Mining Company, Gray Copper Division. The ores of the district are principally copper ores, but they contain also varying amounts of silver and gold. Some of the ore, for example, that at the Bryan Mine carried as high as 8 ounces of silver and up to a half ounce of gold to the ton. The Blue Bird Lode carried values as high as 20 ounces of silver.

According to their mode of occurrence, the developed deposits may be roughly grouped into three classes; contact metamorphic deposits, fissure veins, and replacement deposits. With depth and careful prospecting there is little doubt bodies of primary ore will be developed deriving their values from the same source as the surfacial deposits.

Most of the exploitation to date has been in the oxidized zone, which seems to extend to about 200 feet. This work exposes only the oxidized ore, although much sulphide material is observed along the west end of the north contact zone. It is probable that some of the bodies now regarded as contact metamorphic belong to replacement class and all are connected in origin with veins or dikes not yet observed. It should be the underside of the limestone bed that is most mineralized or replaced by ore, and here is the very target that has not been explored to date.

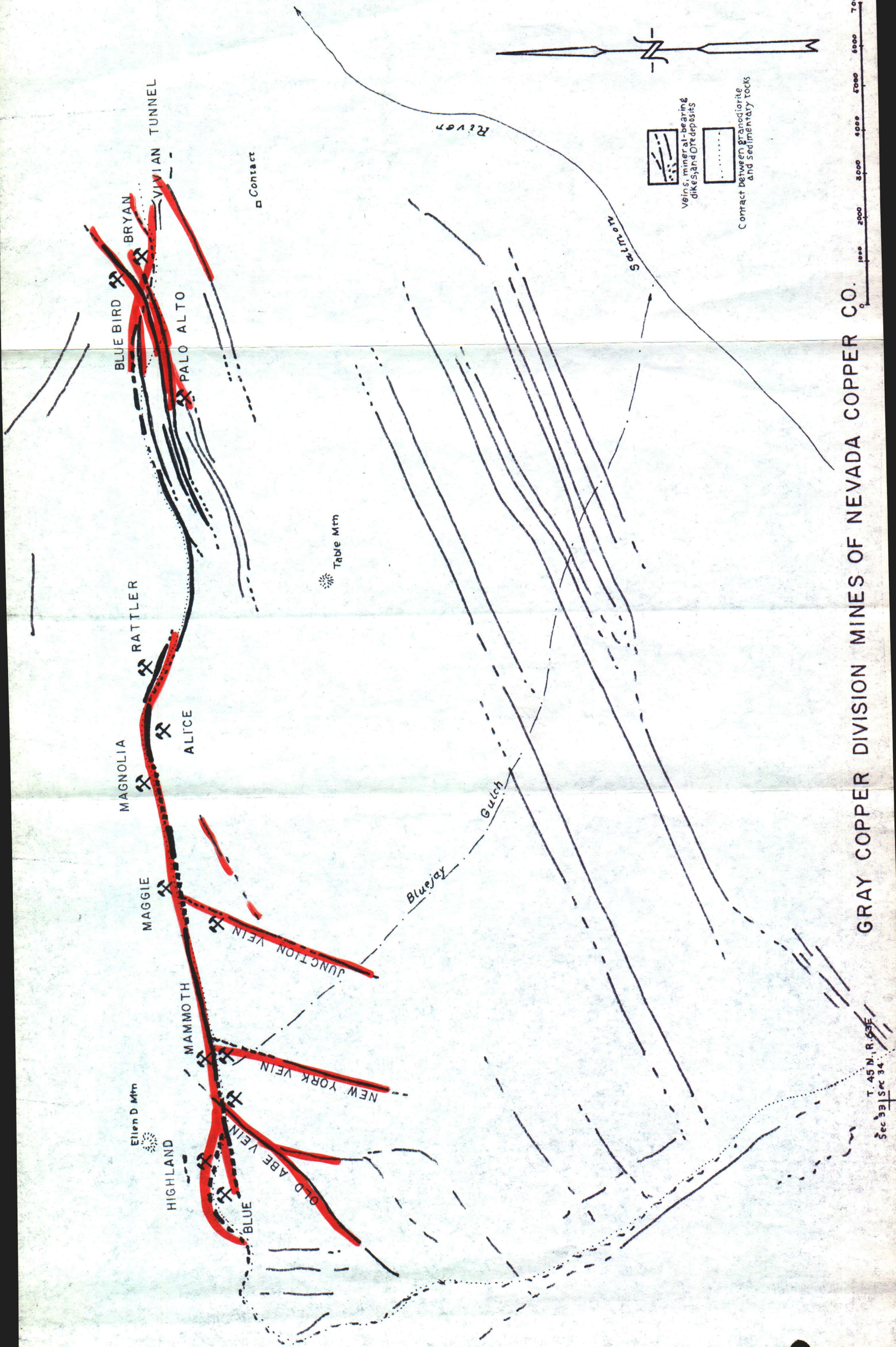
There has been sufficient exploration to show the contact



area as extensive copper horizon. Much of the ore thus far developed contains 5% or less of copper, but this along with the other metals should make the ore commercial in today's economic prediction for all of these metals.

It is reasonable to suppose that shoots of enriched sulphide ore as well as large masses of low grade exists below the oxidized portions of the ore bodies thus far developed along the north contact zone. Below the enriched ore at levels not yet reached by any of the workings, bodies of hypogene chalcopryrite ore, perhaps in very large masses, await modern prospecting techniques to uncover them.





GRAY COPPER DIVISION MINES OF NEVADA COPPER CO.

T. 45 N., R. 63 E.  
Sec 33, 34



ELLEN D. MTN. 8500 ft.

MAMOTH

ALICE RATTLER

X

X

X

X

PALO ALTO

X

BRYAN

X

BLUE BIRD

X

CONTACT

VIVIAN TUNNEL

RAILROAD

Salmon Falls Creek

MT. T.M. 75

Handwritten notes and sketches at the bottom left, including a small sketch of a mountain peak.

Handwritten notes and sketches at the bottom center, including a small sketch of a mountain peak.

Handwritten notes and sketches at the bottom right, including a small sketch of a mountain peak.

Handwritten notes and sketches in the middle right, including a small sketch of a mountain peak.

Handwritten notes and sketches in the middle right, including a small sketch of a mountain peak.

Handwritten notes and sketches at the top right, including a small sketch of a mountain peak.

Nevada Copper Co's. Gray Copper Division mines along North Contact Zone of Salmon River Mining District. Over 3 miles of strike length. Elko County, Nevada.







PART II



### ORE RESERVES - ESTIMATE

Based on Schrader's report and the obvious ore in sight on the property, Robert B. Daniel while working for Circuit Foil Corporation, felt the following calculation of reserves seemed a conservative estimate.

1 Million tons, Actual	1% Cu ore
20 Million tons, Inferred	1% Cu ore
200 Million tons, Possible	1% Cu ore
200 Thousand tons, Actual	4% Cu ore
500 Thousand tons, Inferred	4% Cu ore
2 to 3 Million tons, Possible	4% Cu ore

### ANOTHER ORE RESERVES - ESTIMATE

Another estimate made by Stanton Waterman, Consulting Engineer, Part III (page 5 of Waterman letter) gives a reserve of 4,000,000 tons of commercial ore showing in the Helen B. Smith tunnel alone.



## NEW NOTES

ENGINEERING AND MINING JOURNAL, February 1968

"Option agreement to buy a 142-claim copper-silver property in the north-eastern part of the state (Nevada) has been reached by a Vancouver, B.C. company.

Arnold Armstrong, president of Calta Mines Ltd., said the property being purchased from Idaho mining interests is adjacent to Highway 93 and a Union Pacific rail spur 50 miles north of Wells.

The Calta president said under the option-purchase agreement, an initial payment of \$35,000 will be made to the vendor, Security Mining Co. of Boise. The agreement includes yearly payments of \$50,000 up to \$500,000.

Armstrong said Calta has already installed a crew on the property and is working two shifts in mine rehabilitation and exploration. He said a new operation company will be formed within six months. Calta will hold a 70% interest and Security 30%."



PART III



## PALO ALTO MINE

The Palo Alto Mine is about two-thirds of a mile north-northwest of the town of Contact, on the Palo Alto Claim at an altitude of 5,850 feet.

The mine is credited with the production of about 1,700 tons of ore produced before 1928. Three hundred tons produced prior to 1910 averaged about 30% copper and \$3.00 in gold and 8 ounces of silver to the ton. Two hundred tons produced in 1914 and 1,200 tons produced in 1928 ran 5% of copper and 3 ounces of silver to the ton.

The mine is developed by a 292 foot shaft and drifts and crosscuts on various levels.

The outcropping fissure vein on the Palo Alto Lode was 40 feet wide at the surface and then pinched out within 100 feet or so where it came into contact with slate. However, as elsewhere all along the north contact zone the mineralization is continuous and crosscutting picked up a blind lode to the south. No doubt additional lodes would also be picked up in crosscutting northerly. This blind lode typifies the type of prospecting that could be accomplished by drilling using modern methods off a centralized long east west drift under this entire area. (See Vivian Tunnel)

In the southeastern part of the Palo Alto Claim the slate is here cut by a quartz vein striking N. 60° E. and dipping 70° S.E. It contains a good copper showing.



## BLUE BIRD MINE

The Blue Bird Mine is immediately east of the Palo Alto.

The mine was located in 1884 and its early production is not known. Prior to 1910, 100 tons of ore were sent to the Selby Smelter and contained 32% of copper, and a part of it smelted at Contact was reported to have contained 17% of copper and about 20 ounces of silver and \$2.00 in gold.

After 1910 the Gray Copper Corporation mined and shipped 1,000 tons of 6% ore which went 3 ounces of silver.



## BRYAN MINE

The Bryan Mine is about 1,200 feet southwest of the Blue Bird Mine.

The Bryan Mine was opened by a shaft and tunnel. The production is not known but it is said to have ore in the bottom averaging 4.78% of copper.



## MAMMOTH MINE ZONE

### TWO MILES LONG

To the extent two miles of mines can be described all together this area will be described by the more developed portion of the contact zone.

From the Rattler Mine the mineralization continues interruptedly westward along the contact in the south slope of Ellen D. Mountain for a distance of two miles or more. The zone varies from 100 feet to several hundred feet in width and contains two or more contacts. The contact in places is compound, with outlying or detached vertical bands of limestone contained in the granodiorite and with here and there associated parallel and transverse dikes and veins.



## RATTLER MINE

The Rattler Mine is the most easterly of the westerly group of properties. It has upon it a lode or zone or mineralized belt 120 feet wide and is known as the Rattler vein which seems to be a northerly spur or offshoot from the main north contact zone. It follows approximately the strike of the limestone in which it occurs and which the contact traverses obliquely. The limestone which here consists of heavy-bedded white and thin-layered blue rock, stands about vertical or dips steeply to the south-southeast, toward the granodiorites. The lode is exposed in a gulch which cuts across it. It is similarly exposed in a gulch about 1/8th of a mile to the west, but in the intervening ridge it disappears beneath the limestone, in whose beds at greater depth its mineralization occurs.

Its exposure in the gulches therefore seems to mark approximately the upward limit to which the contact mineralization due to the granodiorite penetrated in the limestone at this place. Toward its west end, at about 100 feet in from the contact, the Rattler Mine property is opened by a 40 foot cut and winze and shows considerable copper carbonate and oxide in garnetized granodiorite with associated syenitic dikes.



## RATTLER MINE

(Continued)

In 1928 the Rattler Mine produced 100 tons of 6% copper ore that contained 3 ounces of silver to the ton. The chief ore mineral is chalcopyrite.

There is also much mineralized porphyry in the Rattler area which could immediately support a leaching plant with little or no stripping.



## ALICE LODE

West of the Rattler is the Alice Lode. Roughly this lode parallels the Rattler Lode on the north and dips 75° south toward the granodiorite. The ore averages well in copper and silver and contains some molybdenite and epidote.

In 1916, 7½ tons of Alice ore ran 14.8% of copper, 10.2% of iron, and 5.05 ounces of silver and .02 ounces of gold. In 1929 the mine produced 400 tons of ore containing 5½% of copper and 13 ounces of silver.

Small amounts of molybdenite are present in the ores.



## MAGNOLIA LODGE

West of the Alice on the Magnolia Patent are two parallel lodes at the contact of granodiorite and with limestone, separated by 150 feet of granodiorite and dipping steeply to the south.

The north or main contact lode is regarded as the extension of the Rattler Lode. Here it has a width of 25 feet and consists of mostly brownish to greenish gangue of axinite, garnet, and chloropal, with a good carbonate and copper oxide ore.



## MAMMOTH LODE

One of the best developed showings is the Mammoth Lode which is at the head of Bluejay Gulch, on the open south slope of Ellen D. Mountain at an elevation of 7,200 feet.

The principal contact, or lode, which has a width of about 20 feet on the surface dips toward the north. Higher on the slope is another development showing another lode 20 feet in width.

Prior to 1926 the Gray Copper Corporation shipped 240 tons of ore containing 7.7% of copper and 8 ounces of silver and .041 ounces of gold.

The Mammoth Mine cannot be described by a claim by claim description as it is too extensive.

The area is developed by the Helen B. Smith Tunnel which starts in granodiorite on the Helen B. Smith Patent and is 2,205 feet long. The tunnel trends N. 62° W. of the Highland No. 5 Patent and is 600 feet below the surface at this point in its face.

The tunnel encounters mineralized limestone at 1,205 feet. This ore body is 20 feet wide and dips 20° N. Old Gray Copper Company records report as follows:

Six assays at intervals of 5 feet in the granodiorite along the main tunnel ranged from 0.96% of copper where ore is first encountered to 1.6% near the contact. Similarly spaced samples in the drift

## MAMMOTH LODE

(Continued)

along the northeast of the contact averaged 1.5%.  
In the opposite drift along the contact for 15  
feet the assays were averaged to 2.69%.

Between the contact and the face the tunnel passed  
for 200 feet through a dark slate-colored, slightly  
laminated rock composed chiefly of diopside and  
quartz, with a little magnetite, hematite, and  
green garnet. In this part of the tunnel also  
beds consisting of wollastonite with some diopside  
and a little quartz with finely disseminated  
chalcocite are cut diagonally for a distance of  
300 feet. This rock assays 1% of copper.



The following mines known as the Junction, New York, and Old Abe all contain large amounts of leaching ore away from the limestone.

Little or no stripping would be necessary to immediately begin production by open pit or open cut methods.

## JUNCTION MINE, NEW YORK MINE, AND OLD ABE MINE

The Junction and New York Mines seem to be identical type veins, so for the sake of brevity they will be described together.

They form parallel veins or dikes about 600 feet apart which strike southwest from the east west contact vein described as the Mammoth Vein or north contact zone. They would be considered vein-like or dike-like in character and lie in the granodiorite.

The Junction Vein starts on the north contact main vein on the Maggie Patent and runs thence 6,000 feet southwesterly on the Junction, Effie, Walter, and Sunrise patented ground. It is from 2 to 4 feet in width and carries ore which averaged for some considerable amount of distance 25% of copper.

The New York Mine and Lode is parallel to this system and 600 feet or so northwesterly along its strike.

The Old Abe Lode Vein crosses the granodiorite-limestone contact but is mainly in the granitic rock. It is 3,500 feet long and 40 feet or more wide.

The extension of the Old Abe Vein in the face of the Helen B. Smith Tunnel strikes about N. 25° E. and stands almost vertical. The Helen B. Smith Tunnel at this point is 2,205 feet from its portal and 600 feet below the surface.



JUNCTION MINE, NEW YORK MINE, AND OLD ABE MINE

(Continued)

It contains chalcopyrite and bornite and locally abundant chalcocite. The host rock is limestone. Part of the rock in the Old Abe vein is granodiorite containing specks of chalcocite and a little molybdenite, chalcopyrite, bornite, and covellite. The ore zone is about 30 feet wide at this point.

The following is an account from the old company records:

The average of 20 assays of the Old Abe Lode in the Helen B. Smith Tunnel gave 4.24% Cu, 1.68 oz. Ag., .145 Au. The range was .96% Cu to 13.38% Cu.

There are three other tunnels that cut the Old Abe Lode at various elevations above the Helen B. Smith Tunnel.

The company report on them continues:

The "Mammoth Tunnel" has a length of 580 feet from its portal. It cuts the Old Abe Vein for 35 feet along the tunnel. Assays here range from 2.4% Cu to 3.4% with some silver.

The 520 foot tunnel exposed bodies of chalcopyrite ore ranging from 3% to 7% copper and as much as 7 ounces of silver.

The 460 foot tunnel cut a body of 5% Cu ore 30 feet wide.

## BLUE LODGE MINE

Adjoining the Mammoth on the west is the Blue Lode patented claim.

The lode is a continuation from the Mammoth of the main contact and here is shown to be 20 feet in width, containing strong mineralization. The limestone at this point is hard and is in contact with the granodiorite. The ore zone is also associated with siliceous syenitic dikes.



## VIVIAN TUNNEL

Strictly speaking, the Vivian Tunnel is not a mine of itself, but its goals and the project are presented here separately as a means to mine not only the Gray Copper Division properties, but also all of the other mines of the district on a toll basis or as a result of a purchase.

The plan of development is to drive a tunnel nearly 4 miles long that will pass under all of the properties of the north contact zone from east to west. When completed the tunnel could be used for a haulageway for all mines along its route.

The portal of the tunnel was begun on the Bobs patent. It is a 7 by 9 tunnel meant to be double tracked from the portal 20,452 feet to a point below the Helen B. Smith development. Thus far it has been completed 310 feet.

The tunnel would provide drainage and depth to facilitate the development of the entire north contact ore zone. From the tunnel then one could use block caving techniques to mine, or any other large scale or small scale type method.

The tunnel would develop the district at depth and should be in the ore zone for most of its entire length.

The tunnel would develop 'backs' up to two thousand feet at the Mammoth Mine, and 650 feet below the Blue Bird

## VIVIAN TUNNEL

(Continued)

Mine. The Blue Bird Lode target is one of the first that could be reached by crosscutting through the Bryan ground.

Another example of the depths that could be developed is the tunnel would pass 1,150 feet below the Brooklyn Mine.

The tunnel should make sufficient water to develop any kind of milling facility as well as to run large leaching plants over the dumps.





PART VI



PRELIMINARY GEOLOGIC RESUME,  
MINING PROPERTIES OF CIRCUIT FOIL CORP.  
SALMON RIVER MINING DISTRICT,  
ELKO COUNTY, NEVADA

Prepared for

Circuit Foil Corporation  
2300 Amboy Road  
Bordentown, New Jersey

1967  
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Los Angeles, California  
626 - 2571

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## I. Introduction:

The Salmon River Mining District is located approximately 15 miles south of the Idaho border in northeastern Nevada. U. S. Highway 93 passes through the middle of the district and the town of Contact (the only settlement in the District) is situated adjacent to this highway approximately 55 miles north of Wells, Nevada. The nearest community of any size to the District is Twin Falls, Idaho, (pop. 23,000) which lies 62 miles by road to the north.

A branch of the Union Pacific Railroad extending from Twin Falls to Wells passes immediately east of the town of Contact. The proximity of this rail line to the District considerably enhances the economics of any mining operation in the area.

Within the Salmon River Mining District as a whole, there are several areas of mineralization, all with some history of ore production. These areas are: The North Contact Zone, and adjacent areas, The West Contact Zone, the China Mountain Area, the Blanchard Mountain Area, the Knoll Mountain Area, and the Trout Creek Area. The properties of Circuit Foil Corporation are situated in the North Contact Zone and the West Contact Zone which represent the most promising part of the entire Salmon River District.

The area of the North and West Contact Zones is mountainous culminating in the summit of Ellen D. Mountain, 8633 feet in elevation. The mountains have generally steep but relatively smooth slopes with little vegetation. The area is drained by a network of intermittent streams which are tributaries of the Salmon River which flows northward just east of the town of Contact.

The areas of interest are quite accessible by dirt roads although until further improvements are made many of the roads require four wheel drive vehicles. The region has a semi-arid climate and most of the precipitation falls as snow in the winter months. Any mining operation could easily operate on a year around basis with minimal maintenance to keep the roads open. Pipelines would have to be buried to avoid freezing as winter temperatures may plunge as low as -20°F. Some heavy but brief thundershowers can be expected in the afternoons from

the months of May through October.

The Salmon River Mining District was discovered in the early 1870's. It was first prospected for gold and silver, however, copper was soon discovered and the vast majority of the previous work in the district has been directed toward the production of copper ores. Early work in the district was hampered by the extreme inaccessability of the area and the comensurate high shipping costs for any ore produced. The later construction of the railroad eliminated this problem, but falling copper prices in the 1930's caused the District to all but shut down entirely. The District saw a renewed period of activity in the 1940's and early 1950's, but little true exploration work was done and most efforts were directed toward mining already known orebodies.

The District has never been adequately explored and only recently has the short supply of copper caused a reappraisal of the District and been indirectly responsible for the discovery of commercial orebodies that had been overlooked previously.

## II. Land Data:

Circuit Foil Corporation currently has under lease approximately 65 patented mining claims and 25 non patented claims. Work is currently going on that will establish a minimum of 75 additional non-patented claims. The total area covered by these claims when staking is complete will aggregate approximately 4 square miles and will include nearly all of the proven, semi-proven or prospective areas in the North Contact Zone, less a small group of claims held by Banner Mining Company which lie east of Circuit Foil's major area of interest.

In addition, the located claims will cover all the necessary acreage for plant installation or related surface improvements. When complete (approximate date, July 31, 1966) the properties of Circuit Foil Corporation will constitute a major holding in every respect and should be sufficient to support mining operations for many years in the future.

## III Geology:

A. General Statement: A detailed geologic report of the North and West Contact Zones is in preparation at this time. This project will culminate in geologic mapping at a scale of 1 inch to 500 feet and a description of all known prospects or ore bodies in the area. This



will serve as a foundation for planning exploration in future years, as well as provide information that will, at least partly, determine the worth of Circuit Foil's holdings in the District.

The area contains a batholith of granodiorite and related rocks of Mesozoic age which has intruded a late Paleozoic sedimentary sequence of sandstone, shale and limestone. The later intrusion of a probable stock and related dikes of syenite porphyry and alaskite has been responsible for much of the mineralization of the District. This intrusion is of probable Mesozoic age also. Remnants of Tertiary volcanic activity are in evidence in the District in the form of andesitic dikes and relic lava flows.

The intrusion of the granodiorite batholith apparently domed and folded the overlying and surrounding sediments into a broad arch, most of which has been subsequently removed by erosion, thus exposing the contact zones between the sediments and the intrusion around the margins of the batholith. It is along the north and west parts of this contact zone that Circuit Foil's holdings are concentrated.

Contact metamorphism and metasomatism are apparent in the sediments for a width of up to a mile away from the contact zone. The contact zones themselves are exceedingly complex with large blocks of sedimentary rocks (mainly limestone) engulfed in the granodiorite and in other dikes cutting the sedimentary rocks. It is along these contact zone that numerous prospects for primary ore deposits are situated.

The intrusion of the syenite porphyry and alaskite was apparently centered near the North Contact Zone. This intrusion further metamorphosed the sedimentary rocks and culminated in a wave of copper mineralization that not only affected the contact zones, but mineralized masses of porphyry and alaskite themselves.

The structure of the area is remarkably homogeneous with little complication by faulting. A few minor faults of small displacement can be mapped in the contact zones but they will not hinder or complicate mining activities. The lack of structural complexity is a factor in favor of more simplified mining engineering and a lower cost of producing ore.



Two joint systems can be mapped in the granodiorite and the path of the later syenite porphyry and alaskite intrusions may have been joint controlled. The syenite porphyry itself is badly fractured and deeply weathered.

B. Mineralization: Mineralization in the District falls into three general classes: 1. disseminated deposits, 2. contact or replacement deposits and 3. fissure veins.

1. The disseminated type deposits are for the most part restricted to the syenite porphyry and alaskite rock bodies. All such exposures are oxidized and the predominant copper minerals are Malachite, Azurite, Cuprite, and Chrysocolla. It is entirely possible that below the water-table sulfide mineralization will be encountered in these rocks. Assays taken in the oxidized portions of these deposits show copper values ranging from 1% to 7% copper. Such deposits are excellent for leaching type extraction methods. Circuit Foil has at least two such bodies of ore. The first, on and adjacent to the Alice Claim, conservatively contains close to one million tons of ore probably assaying more than 1% copper on the average. Drilling and further assaying will further confirm the average grade of this deposit and perhaps increase the tonnage estimates. This deposit is in a dike like mass of fractured syenite porphyry bordered on one side by limestone and on the other by granodiorite. Care will have to be exercised in mining this deposit to avoid contamination by the limestone inasmuch as it is leaching type ore.

The second deposit adjacent to the Helen B. Smith tunnel is also in a dike like mass of fractured syenite porphyry. This deposit contains several hundred thousand tons of oxidized copper ore. The exact quantity will have to await verification by drilling, but it is safe to say this is a commercial ore body.

Several other showings of syenite porphyry and alaskite showing disseminated mineralization have been discovered on the property. Their size and grade must await further examination.

2. The contact replacement type deposits are found associated with tactites in the contact zone. They appear to have been formed at the time of the intrusion of the granodiorite and later enriched by fluids emanating from the syenite-alaskite intrusion. These deposits contain mainly sulfide mineralization with the main copper minerals



being bornite and chalcopyrite.

Several such deposits exist on Circuit Foil property, but inasmuch as the greatest efforts thus far have been toward the two previously described leaching areas, little work has been done on the replacement deposits. They represent most attractive and promising prospects for future exploration.

3. The fissure veins follow lines of fracturing in the granodiorite and in the sedimentary rocks as well. These veins are apparently related to the Syenite-Alaskite period of intrusion. They range from one to twelve feet in width and may contain some lead mineralization in addition to the copper. Several of these veins are present in the west part of the north Contact Zone and should be investigated in the near future. The veins usually carry considerable quartz gangue and may contain values in gold and silver. The geologic mapping currently in progress, will shed some additional light on the mineralogy of these deposits and delineate exploration targets.

C. Water Resources: The water resources of the Salmon River District are limited, with the exception of the Salmon River itself. There are few perineal sources of water in the area. What springs are present are appropriated by the Salmon River Cattlemen's Association and any development of them would require that the cattlemen's right be honored. Potential well sites have been investigated at four separate localities in the District and it is the author's belief that adequate water can be developed in the district without having to go to the Salmon River itself which would require 4 to 5 mile pipeline. A separate memorandum is being prepared describing water resources of the District.

#### IV. Current Exploration Work:

Currently claim staking and geologic mapping are being carried out on Circuit Foil Property. In addition, preliminary work leading up to the building of a leaching plant is being directed by Mr. Robert Daniel. A bulldozer will soon be at work on the property and will aid in the evaluation of the leaching areas.

In the near future a 1 inch to 500 feet claim map will be completed and the geology of the District will be shown at the same scale. These maps will accompany the comprehensive geologic report now being compiled.

Drilling of the orebodies selected for leaching will begin soon and the holes will be logged and sampled. It is recommended that the two aforedescribed leaching areas be plane-table mapped immediately in order to establish the necessary surface control for accurate tonnage estimates and mine engineering.

V. Conclusions and Outlook:

The property of Circuit Foil Corporation in the Salmon River Mining District is the finest copper prospect ever examined by this author. Sufficient ore reserves are now known to guarantee the fact that a mining venture is definitely commercial and will doubtlessly succeed.

The future examination of the numerous exploration targets on the property, once the leaching operation is turning out copper, may well confirm a major sulfide ore body and justify the building of a mill. It is important to realize that the property has many untested prospects in addition to the two prime leaching areas previously discussed. The outlook for copper is continued short supply and any reasonable and prudent exploratory effort on the property is certainly warranted.

Respectfully submitted,

Robert C. Gardner  
Consulting Geologist



PART V

The faith and courage of men of Mr. Gray's caliber and dedication to a dream of development makes us all stand in respect.

Just at the moment of his success when he had brought all of the ingredients together to the development of the mining complex, his efforts were stopped by the depression of the 1930's. With the depression came the subsequent falling off for the demand for copper, its price, and the inability to raise capital. The price of copper at this time dropped from 29 cents a pound in 1918 and 18 cents a pound in 1929 to less than 6 cents a pound in 1932.



The history of Contact and Salmon River Mining District can hardly be considered without mentioning something of C. F. Gray. The history of Mr. Gray is something like the following.

Mr. Gray had been active in mining in the Ely District and sold out prior to the 1920's his interests to Consolidated Coppermines for an amount exceeding \$200,000. His work and experience in the Ely District contributed largely to the extension of copper mining in that area near Kimberly, Nevada.

Mr. Gray then began the systematic development of the Contact Mining area. Over the next 20 years he spent all of his money and time in the single minded conviction that the Contact area could be developed into another Ely. Until the day he died Mr. Gray remained dedicated and convinced that the Salmon River Mining area at Contact would someday be developed into a mine complex rivaling that at Ely.

His genius for development and promotion can only be understood when one recognizes the remoteness of the Contact area at a time when it took several days by horse or wagon to get to the next community and transportation centers.

Building a town, a water system, an electric distribution system, a mining complex, and then promoting the railroads to come through the area were only a part of his contribution to the development of the area.



September 24, 1929.

Mr. J. R. Calhoun,  
San Francisco, California.

Dear Mr. Calhoun:

Re: GRAY MINING COMPANY,  
Contact, Elko County, Nevada.

In submitting this report, I have endeavored to carefully check Mr. Gray's report as to present tonnage, values, potential possibilities and future developments of the company, as contained in his report to you of August 29, 1929. The geology, topography and drainage has been covered in detail by Mr. F. C. Shrader in his Geological Survey Report to the Department of the Interior, Bulletin 497, of 1912, and for this reason I have not gone into these subjects any more than is necessary to make clear the points of my examination, as set forth in this report.

The deposits are of three distinct types: Contact-Metamorphic: Fissure-Vein; and Replacement.

From Mr. Shrader's report, Page 115: "After the intrusion of the Paleozoic rocks by the granodiorite, the rocks were fissured and were subsequently intruded by the syenitic or silicious dikes, also to a less extent by the lamprophic or basic dikes."

The fissure veins are the ones that were worked the most extensively in the early days of the Camp, as usually they showed some stain on the surface, as a guide to the underlying ore. The deepest of these worked, from all accounts, was not over 300 feet, and in most cases less, owing to getting too lean in ore to pay.

The most important appear to be the syenite and aplite dikes, and as a rule are associated with the ore deposits. It is to test these on the Palo Alto and Bryan claims, that Mr. Gray advises the use of the churn drill for prospecting, to see if sufficient disseminated ores can be located to justify a steam shovel plant.

A churn drill can be used for some years to come testing for replacement deposits in the limestone north of the contact, and should be considered a necessary exploration work for the company. Also as a means of ventilation, a churn drill is a valuable asset.

The only example of replacement deposit shown is on the Blue Bird workings, which is in the limestone about 600 feet north of the contact, where the Blue Bird fissure, about 200 feet in width, breaks through the contact and quartzite and forms a large body of ore that is conservatively estimated at 3,000,000 tons of 3 per cent copper ore. This fissure will be reached in less than 100 feet from the present face of the Vivian Tunnel, and as soon as cross cut, a lateral will be run on it through the contact to open up for immediate shipment of the higher grade ores of this large body. This is where the first tonnage will come from through the tunnel.

From the Blue Bird fissure on for the next 1,000 feet, continuous fissures which might prove to be one, and should be



in ore all the time, as proved by the Bryan shaft, which has 4.78 per cent copper in the bottom of the shaft, and is about 350 feet from the present face of the Vivian Tunnel, and 150 feet above the tunnel level.

The Palo Alto is down about 300 feet with the old shaft which is granite and slate contact, (the ladder did not permit of seeing bottom) and is said to have contained rich sulphide ore in the slate. Samples taken in the drifts down 75 feet from East and West faces show 3.07 per cent copper, with some gold and silver values. Two cars shipped last winter ran 10 per cent and 8 per cent of which the first was sorted and the last run of mine ore, and was taken from 25 foot winze, about 100 feet below the surface. It was not necessary to sample this as smelter returns shows the grade of ore. This body Mr. Shrader traced on the surface for about 1,000 feet. When the Vivian Tunnel cuts under this, there should be some very high grade ore, where solutions were thrown back from the slate that it could not penetrate. Although as stated previously, most of the work has been done in the granodiorite and the largest tonnage is easier seen there than in the lime, in which about the only bodies exposed are in the Blue Bird, Mammoth Tunnel and Helen B. Smith Tunnel.

The quartzite formation parallels the contact the whole length of the claims, and appears to have ore in the limestone along side of it, though not enough work has been done to prove this conclusively; but where the cross fissures were strong enough to cut through this formation, the lime carries values north of it, as in the Blue Bird. In the Helen B. Smith Tunnel the fissure runs to this formation and carries values in the limestone. Along this formation should be a body of good ore, as undoubtedly the mineral bearing solutions or vapors came up along the fissures, and when they reached the quartzite, they were turned back and should have enriched the lime for quite a distance back. No doubt there are several places where the fissures were strong enough to break through this mass, although no indications of this were discerned in going over the surface, and this is where some large body of ore will be expected.

The Vivian Tunnel is in purpose similar to the Comstock Tunnel. The company has driven three hundred and ten feet, permanent 7 by 9 foot double track development transportation and drainage tunnel, and are now within 100 feet of the Blue Bird fissure. The company plans extension of the tunnel under eight groups of patented mining claims at a depth of 120 feet on the eastern end, and 2,120 feet on western end. The tunnel will then be about five miles in length. All eight groups of patented claims through which the tunnel will be driven have been developed by shafts and tunnels varying in depth from 50 feet to 1,050 feet, all of which show commercial ore in quantity, and numerous cross fissure veins occurring in the granite. As shown by the various workings from the surface, it is conservatively estimated that there are over 12,000,000 tons of commercial ore in these groups above the tunnel level. A modern power plant is installed, ready for present use. The property owners will pay the Tunnel Company the amount set by the Public Service Commission of Nevada for transporting all broken ores and materials to the mouth of the tunnel and for transporting all supplies from the mouth of the tunnel to the point of operations. The company has a franchise from the Public Service Commission as a public utility to manufacture and sell power and lights to the various interests for a radius of 15 miles from the location of the plant.

Laterals driven every 100 feet or so, as conditions seem to warrant, over the contact or through it, if the ore cuts into



the lime as the Vivian Tunnel advances, will open up a large tonnage of ore, much of which should be shipping ore. This contact-metamorphic, (granite and lime contact) which from the work done to date proves that it will be the most important ore of the shipping grade found in the district, is what seems to have been overlooked by the original locaters of this district, and until the present company, through the faith of Mr. Gray, drove the Helen B. Smith Tunnel in over 2,300 feet to the contact, and conclusively proved that the ore not only followed the contact in depth, but increased in values over 1,000 feet under the surface, there had always been a doubt about finding ore in depth. In driving the Helen B. Smith Tunnel, the following is taken from the report of the Gray Mining Company, written at the time the tunnel was being driven:

"Five bodies of ore were cut in the tunnel, all of commercial grade, ranging up to 7 per cent in chalcopryrite and bornite, with by-products of about .80 gold and 3 ounces silver per ton.

"The first body of ore was cut at 1,205 feet on the contact, dipping north at an angle of 45 degrees, showing 25 feet of ore. A north and south drift was run on this deposit in ore of commercial values. From this point to the cropping on the surface is about 390 feet and the vertical height is 305 feet. Average 1.52 per cent copper.

"At 1,460 feet, 6 feet of ore was cut and a drift run both ways from the tunnel for a distance of 110 feet, the backing being 405 feet, and the distance to the surface along the ore of 520 feet. 1.12 per cent.

"At 1,620 feet an intrusive porphory dike was encountered. 10 feet of ore was cut at this point, following the lime wall, the values being in chalcopryrite. Backing 460 feet and along the inclination of the ore, 560 feet.

"At 1,776 feet, No. 4 ore body was cut, and the tunnel was turned to the west and followed the strike of the body for 125 feet. No cross cuts have been driven on this ore. Vertical height 530 feet. Distance to the surface on the ore, 645 feet.

"At 2,079 feet, 12 feet of ore was cross cut by the tunnel, but no drifts have been started. Vertical height 560 feet, with the angle of the ore 680 feet.

"392 feet of drifts and cross cuts have been driven in commercial ore, with an average backing of 359 feet, proving conclusively that the ores are primary and that they hold their values with depth.

"Considerable evidence of leaching is visible at points sufficiently porous to allow the passage of surface waters, and it is within reason to expect heavy enrichments at the permanent water level."

Since the above report, the tunnel has been driven to the contact with the quartzite, and Drift No. 8 driven 60 feet and Drift No. 7, 40 feet, both in ore, averaging about  $4\frac{1}{2}$  per cent for 80 feet, where the first stopes will be opened to start shipments to the smelter. The ore in Drifts Nos. 7 and 8 widens 4 feet in



about 100 feet from the face of Drift No. 8 to the face of Drift No. 7, and would lead to the conclusion that it will continue to widen until Drift No. 7 cuts the contact of the two quartzite masses and cross fissure of syenite that should come together between the center of Old Abe claim and the present face of Drift No. 7, or about 1,500 feet. This is where the contact between the granite and lime makes a curve to the south and from surface indications, should make a very large body of ore at the junction, as copper forming solutions would have been retarded at this point and spread out over both the lime and diorite.

On the Alice, they are now down about 45 feet, with a 6 foot shaft showing ore on all sides and no walls; ore showing is heavy in sulphides and oxides, and on the south bornite; the bottom of the shaft shows average assay of 6.77 per cent copper and some gold and silver. The last four cars shipped shows smelter returns of 5.49 per cent copper, with both gold and silver. The last car shipped this week should go higher as the ore has been getting richer as the shaft reaches greater depths.

This ore body can be expected to connect up with the Rattler on the south and the Mammoth on the north, as the ores seem to be similar, and carries large proportions of the values in bornite. Also the incline air shaft from the Helen B. Smith shows the same kind of ore for the first 60 feet, and is over 7 feet wide.

The Rattler claim has some work in open cut, about 600 feet from the Alice, in granite, and ore shipped from this ran better than 5 per cent, from reports of leasers.

A cross cut in the Rattler shows some copper stain for the whole length (about 125 feet), the face assaying 1.51 per cent copper and 1.97 oz. silver, but stopped about 50 feet from the contact, and is about 25 feet west of black fissure showing sulphides on the surface. This should be driven to the contact at once, and drifted on east and west, so as to open any shipping ore, to add to the tonnage that will come from Nos. 7 and 8 Drifts in the Helen B. Smith Tunnel, and when under the Alice shaft will have a depth of about 125 feet for stoping.

Shipping can start in about 60 days and within about six months, there will be enough commercial ores blocked out to decide on the kind of plant needed for the treatment of the lower grade ores.

Estimated tonnage, working on the ore bodies previously mentioned, (the Helen B. Smith Tunnel, the Alice and Rattler claims driving ahead the Vivian Tunnel and cross cutting) for the first twelve months of operations, should be as follows:

First 60 days: Getting the power line, compressor, track and machines in the Helen B. Smith, two raises on ore, and drifting on No. 7. Installing compressor for Rattler and Alice claims, also hoist on the Alice to continue sinking on ore, until drift from the Rattler is under the shaft. Putting in the air line and track in the Vivian Tunnel, and driving 300 feet ahead of the present face cutting the Blue Bird fissure.

Third Month: 25 tons from the Helen B. Smith; 5 tons from the Alice; 5 tons from the Rattler, and 25 tons from the Blue Bird fissure daily. Total, 60 tons or 1,800 tons for the month.

Fourth Month: 4 raises and one drift in the Helen B. Smith, 30 tons daily. Two drifts and one shaft, Alice and Rattler, 35 tons daily. One drift and 3 cross cuts, Vivian Tunnel, 35 tons



daily. Total, 100 tons daily, or 3,000 tons month.

Fifth Month: Six raises and one stope, Helen B. Smith, Tunnel, 50 tons daily. The Alice and Rattler, two drifts and one stope, 50 tons daily. Vivian Tunnel, three cross cuts and six drifts, 50 tons daily. Total, 150 tons daily. 4,500 tons monthly.

This tonnage should be increased every month for the next twelve months; and the first year of operation should give in excess of 70,800 tons of shipping ore, figured at 5.63 per cent copper, (present average of Helen B. Smith and Alice) and to be conservative, copper figured at 16 $\frac{1}{2}$ ¢ per pound, should net \$500,000.00.

At the end of twelve months, there should be blocked out or broken in the stopes of the Helen B. Smith, along the contact, 360,000 tons of commercial ore, below 4 per cent copper; and in the Vivian Tunnel laterals and the Blue Bird Mine, 1,500,000 tons, much of which can be sorted to a shipping grade by putting in a sorting belt at the mouth of the tunnel, or held in reserve until plants are completed.

Contact is one of the largest mineralized areas known anywhere, according to reports of engineers, and now that depths have been proven, it should be one of the largest producers of copper that we have, not as large bodies as some of the porphories, but owing to its being richer in copper, it should produce more pounds of copper per ton.

Mr. Gray's report has been ultra conservative in all cases in regard to tonnage expected. A good example is furnished with the Helen B. Smith Tunnel. Although ore is only opened up on two sides instead of three, there is no reason to doubt that it does not continue between the surface cuts, Mammoth Tunnel and the Smith Tunnel below, and figured as 4,000,000 tons of commercial ore, is at least a very conservative estimate.

Although figures are inclined to deceive rather than help, they sometimes help to get a better prospective on what might be expected in a district. For instance, take the approximate distance that the Gray Mining Company owns along the contact as 14,000 feet, and allowing for only 5 feet of 5 per cent ore along here, without taking into consideration the ores along the cross fissures, and in the granite and lime, it would show about 1,000,000,000 pounds of copper. The larger bodies of ore will undoubtedly be in the lime.

In summing up the report, Mr. Gray must be given credit for not only proving that the ore went down, but for planning out the future method of getting out the ore, that will cut the cost per ton to a point that would hardly seem possible when the mine is first looked at. Conceiving the idea of getting depth, and cutting the cost of mining through a double track tunnel running through the whole district, is a master piece of engineering.

No attempt has been made to describe the various individual claims of this company, as such an attempt would run into enormous length. Briefly the company has sixty-two patented claims, (over 1,200 acres) divided into two groups of 36 and 26 claims, respectively. The company also owns the townsite and water distributing system, which must be taken into consideration.

Very truly yours,

(Signed) S. M. WATERMAN



San Francisco, California,  
February 3, 1930.

Mr. Brace Carter,  
San Francisco, California.

Dear Mr. Carter:

Agreeable to your request, we beg to submit the following report on the properties of the Gray Mining Company and enclose a circular fully describing the Vivian Tunnel Company, a subsidiary of and the control of which is vested in Gray Mining Company, both enterprises located at Contact, Elko County, Nevada.

Location, Geology, Topography and Drainage: The following are brief quotations from the report of Mr. F. C. Shrader, as presented to the Department of the Interior, United States Geological Survey, Bulletin 497, of 1912. For further details as to geology, topography and drainage, I refer you to said survey and report.

"The Contact mining district is in the northeastern part of Elko County, Nevada."

"Topography and Drainage: The district lies in the Nevada Plateau and, broadly characterized, is an elongated quaquaversal, produced by the updoming of the Paleozoic sedimentary rocks by an underlying intrusive granitic mass from whose intracontact area all the sedimentary rocks have been removed. The floor of the basin has been lowered by erosion to a considerable depth into the granodiorite.

"The mountains are of the rounded massive type. Of these the principal landmarks are the Ellen D., China and Middle Stack mountains, situated about 8 miles apart, in the western, southern and northeastern parts of the district respectively, at the apices of an equilateral triangle. Important secondary points are Blanchard Mountain towards the southeast, and Toana John Peak on the east. The latter occupies a commanding position and is visible from the vicinity of Rogerson and other points 50 miles distant.

"Geology:

The rock groups of the district, beginning with the oldest, are Paleozoic sedimentary rocks, post-Paleozoic granitic intrusive rocks, Tertiary lavas, Tertiary lake beds, and Quaternary deposits. Of these the most important, with reference to the mineral deposits, are the post-Paleozoic sediments."

Past History of Camp; Mining development work is being carried on adjacent to all of these mountains, and at various places on the contact around the horse shoe and on cross fissures in the core or center. But the principal workings are on the eastern tip and north side of the horse shoe. The core or center of the horse shoe is an intrusive granite formation, intersected by cross fissure veins of syenite and granodiorite dikes. Many of these dikes, especially the granodiorite, have been opened up to a depth of from 100 to



250 feet and the ore showings made in some of them are encouraging for further development. The majority of the dikes intersect with the lime outer wall of the horse shoe, and it is apparent that these dikes were the channels through which the thermal waters were forced up through and re-deposited the mineral values along the contact between the granite and lime and formed the contact deposits occurring around the entire outer rim of the shoe, being very pronounced and making back in the lime at the intersection of the cross fissures with the lime, and thinning out the leaner seams where the distance between the intersection of these cross fissures is greatest.

The camp was first located in the early '70's and various deposits were worked through shallow shafts and tunnels, and shipments were made from various properties, but the distance from the railroad necessitated sorting the ore to a grade where it would bear the cost of freighting to the railroad, transportation to the smelters and working charges, and prevented the camp from being worked on a large scale. All the workings were shallow, the deepest of them not exceeding 300 feet. A fair tonnage had been opened up by these shallow workings, but the greater part of this ore was an oxide and carbonate. The distance from the railroad and lack of proven depth of the ore bodies would not justify the building of a smelter and as most of the ores opened up were oxides and carbonates that could not be treated successfully by concentration, and as the gangue matter from the ores carried a heavy per cent of lime, they could not be treated successfully by the ordinary leaching methods and the ammonia leaching process is complicated, and with the exception of the Kennecott plant in Alaska, has been unsatisfactory.

Total shipments from the camp since the early days exceed 300,000 tons, most of the ores having been taken from shallow workings and nothing from any depth greater than 300 feet.

When the Gray Mining Company acquired and took possession of the property, the first work was to determine whether the ore values carried below the oxide and carbonate zones into the sulphide, in commercial quantities. A tunnel, cross cutting the granite and lime contact was driven for a distance of 2300 feet, which cut the contact and the ores thereon, and under a quartzite dike laying back of the contact in the lime at a vertical depth of 1050 feet. This tunnel developed an indicated tonnage of more than 4,000,000 tons of commercial ore.

This indicated tonnage is arrived at as follows: By the usual open cut, shallow shafts from the surface, and an intermediate tunnel, driven for a distance of 520 feet, giving a backing of 375 feet, which exposed bodies of chalcopryite ore, varying from 3 per cent to 7 per cent in copper and 7 ounces in silver per ton. A second intermediate tunnel driven for a distance of 460 feet, cut the ore at a depth of 640 feet and exposed ore bodies of a grade of 5 per cent copper, 30 feet across the face. The last 2300 foot tunnel mentioned in the preceding paragraph cuts the ore at a vertical depth of 1050 feet, at which lower level the values in both copper, gold and silver have increased. This ore has been drifted on for a distance of 120 feet east and west, and cross cut for a distance of 35 feet in width. While this ore body is not technically blocked out on three sides, still, exposed as it is by the four workings and changing as it does, from an oxide and carbonate ore near the surface to chalcocite and chalcopryite on the lower level, assures permanency and size, giving above this lower tunnel in excess of 4,000,000 tons of commercial ore.



Transportation: When the 2300 foot tunnel proved the ore values below the oxide and carbonate zones, I went before the Public Utilities Commissions of Nevada and Idaho to grant a certificate of public convenience and necessity for the construction of a railroad from Wells, Nevada, to Rogerson, Idaho, which was granted, and the principal consideration was the potential ore production in the Contact District.

Preliminary negotiations were taken up by the Union Pacific Railroad Company, and after a visit to the camp by the officials and engineers of the railroad company a decision to build such a railroad was arrived at. After years of aggressive effort and the expenditure of over \$60,000.00 of my own funds, I secured the right-of-way for the Union Pacific and 103 miles of railroad were constructed by the Union Pacific Company, through Contact, connecting the Union Pacific subsidiary, the Oregon Short Line, at Rogerson, Idaho, with the Western Pacific and the Southern Pacific lines at Wells, Nevada, thus affording railroad transportation and eliminating the last physical barrier that stood in the way of successful development of the Contact District. The railroad is now three-eighths of a mile from the mouth of the Vivian Tunnel, and we are assured of a spur line for this distance as soon as production demands it.

Properties and Holdings of Gray Mining Company:

- (a) 80.6286% of the total outstanding capital stock of the Nevada Copper Mining, Milling & Power Company consisting of 51 patented copper mining claims, and 11 additional patented claims, owned outright.
- (b) All of the unsold portion of Contact City townsite, consisting of 830 lots at a listed valuation of \$479,925.00 as per list attached. The city of Contact at the present time has a population of between 250 and 300 people, and quite a few lots have been sold, and as the remaining unsold lots constitute practically all of the available ground for resident and commercial uses in this vicinity, they should be of considerable value and disposed of readily, once operations are started. Gray Mining Company also owns the only available springs. Water system for City of Contact also owned and installed, and includes tanks, pipe lines, etc.
- (c) 56 per cent of the outstanding shares of the Vivian Tunnel Company, a public utility, organized for the purpose of driving and operating a long drainage and working tunnel, to serve all of the Gray Mining Company properties and six additional companies owning mining ground on the north side of Contact. The Tunnel Company also holds a franchise from the State of Nevada to furnish light and power to Contact City and vicinity for a radius of fifteen miles for a period of twenty-five years. The machinery for the manufacture and sale of this power and light plant is on the ground and installation is completed, and consists of the following:



- 1 240 HP Type "Y" Diesel Oil Engine,  
standard pattern,
- 1 18x11x14 Sullivan Angle Compound  
Compressor,
- 1 120 HP Type "Y" Diesel Engine,  
S. E. pattern,
- 1 90 KVA, 2300 volt, 3 phase, 60 cycle  
alternator, direct connected to engine,
- 1 15 KVA, 2300 volt, 3 phase, 60 cycle  
alternator, belted to engine.

The town of Contact and areas adjacent to the town have been wired for both lights and power. Many of the buildings in Contact have been wired up and the plant is ready for immediate operation.

- (d) Gray Mining Company also owns all waters developed by the Vivian Tunnel, which will be of value for plant operations. Also 320 acres of plant sites held by location, being carried through to patent; offices, lodging house and hotel in Contact.

Mining: It is proposed to commence work immediately as follows:

- (a) The working of the Palo Alto and Blue Bird claims, and other claims of the lower group, by shallow workings where ore is already exposed and available for mining. And test by churn drills the ore on the south slope of the Palo Alto and Bryan claims, for indicated bodies of ore, with the view of determining whether the bodies of ore are of sufficient size to justify steam shovel operations.
- (b) The erection of a power line from the plant at the mouth of the Vivian Tunnel to the upper group and the beginning of mining of the higher grade ores as already exposed by the development work in the long 2300 foot upper tunnel.
- (c) Resuming work in the face of the Vivian Tunnel as follows: As cross fissures of ore are cut by the tunnel, they will be drifted on north and south, and raises will be made in the ore for the purpose of blocking out tonnage and affording ventilation. Smelting ores will be shipped to the smelters as mined. Air and power for this work will be purchased from the Tunnel Company by the Gray Mining Company, for all necessary work. The development shafts have exposed the ore to the extent that these drifts and raises will occur from 125 to 150 feet apart in the tunnel and work done along the contact has proven that a large tonnage of ore along the contact and under the quartzite dike, exists, which can be mined from the laterals driven from the tunnel. Development work on the ore bodies has shown that the ores go down and increase in value with depth as they change from the carbonate and oxide ores to a sulphide and while these ore bodies are not of the same size as the porphyry mines, the ores are of a much higher grade, which will permit shipping a substantial amount of the ore direct to the smelter as mined.



- (d) Treatment of Ores: Preliminary tests made on the low grade ores on the lower group have shown a good recovery by using a very light solution of sulphuric acid and leaching; and a small testing plant should be installed with the view of working out a suitable treatment of the oxide and carbonate ores. Preliminary tests made on the deeper ores give a good recovery as shown by the flow sheet prepared by the General Engineering Company of Salt Lake City, and sufficient ores are now exposed on the upper group to justify the installation of a small flotation unit for the treatment of the lower grade ores.
- (e) Tonnage and Values: The present tonnage indicates in excess of 4,000,000 tons of commercial ore in the upper group (as proven by the 2300 foot tunnel mentioned in a preceding paragraph). Values of smelting ore grade from 4 to 10 per cent copper, with by-products of silver and gold. Plant treatment ores grade from 1 to 3 per cent copper, with fair values of silver and gold. All company assays on the upper group checked by Hanks, of San Francisco.
- (f) Cost of Mining: From 35¢ to \$2.10 per ton.

Estimated First Year's Production: Through the workings of the Vivian Tunnel, as per schedules which I am including in a separate detailed operating report.

The immediate mining and shipment of high grade ores from the upper workings direct to the smelter as mined, which mining will block out the lower grade ores to be treated later on by plants to be constructed near the mouth of the Vivian Tunnel on the company's plant site.

Estimated Net Revenue for the First Full Year's Production: Operations for the first twelve months, based on working at full capacity and on smelting ores only, with copper at 15½¢ per pound, \$550,000.00. The twelfth month should show a net earning of \$100,000.00, which should be substantially increased when plants for the treatment of the low grade ores are constructed on the property and more faces are opened up for mining purposes.

General Points: Water; This district has ample water supplies for plants of any size, first, through water developed by the Vivian Tunnel, and second, through the artesian springs which the company owns.

Labor Conditions; Good. All necessary help available. The principal industries of the State of Nevada are mining and cattle raising, and every assistance is given to the mining interests by both the State and County officials.

Proposed Financing: Contracts will be entered into with a reliable and successful wholesale distributor of investment securities to distribute through established financial sources sufficient shares to net the company a minimum of \$300,000.00. The company will not retail or offer at retail any of its securities. It is the firm decision of the management to have and to hold in the treasury for expansion and not for capital financing, a minimum of three-fourths of its total authorized capital, said \$300,000.00 to be used as follows:



- (a) \$150,000.00 to be expended the first year towards driving the Vivian Tunnel a distance of 3300 feet.
- (b) \$25,000.00 to be expended in churn drilling on the lower group to ascertain if there are sufficient disseminated ores to justify installation of a steam shovel plant.
- (c) \$125,000.00 to immediately start mining and shipping high grade ores already developed from the upper group, such ores to be shipped direct to the smelter; and for corporate uses and for cash reserve.

The Contact District has been known for years to mining engineers as one of the largest mineralized areas in America, having an area of 20 miles across and 55 miles around. But only until the Gray Mining Company proved, by driving a long 2300 foot tunnel, which cut the ores on the contact and under the quartzite dike at a vertical depth of 1050 feet and conclusively proved that the values extended below the oxide and carbonate into the sulphide or primary ores, and developed an indicated tonnage in excess of 4,000,000 tons of commercial ore, was it possible to secure transportation for the district, which now allows the Gray Mining Company, with the necessary machinery and power plant constructed and ready, to start large scale production.

The property will be on a self supporting basis from the start of operations, as soon as the present financing has been completed; and I am confident that it will be on a dividend earning basis during 1930. The total authorized capital of the company, incorporated under the laws of the State of Delaware, consists of 2,000,000 shares of No Par Value, and of which less than one-fourth will be outstanding.

In concluding this preliminary statement as a part of my report, I have endeavored to stay within the limits of the ultra-conservative, realizing that you, as a wholesale distributor of securities, will check as closely on my statements and the property, as our financial advisor has checked on you; and within conservative limits, I state that our properties are greater than those of the Nevada Consolidated, which Mr. David Bartley and I discovered and developed, and whose history is well known in the copper industry. I realize that you will want a competent engineer and geologist to thoroughly examine and report on the properties, which I invite. I respectfully suggest that you carefully select for such purpose, one skilled in copper and the operations of copper properties. I will cooperate and lend all the aid and assistance at our command to expedite such investigation, and on its completion, I will submit full operating plans and schedules, the pro forma balance sheet giving effect to present financing, and such other data as you may call for.

Yours very truly,

GRAY MINING COMPANY,

By *G.F. Gray*

President.



San Francisco, California  
February 3, 1930

Mr. Brace Carter,  
San Francisco, California.

Dear Mr. Carter:

I am herein submitting pro forma balance sheet after giving effect to this financing, the active operating management of the Company, the schedules and plans of operation in detail, as follows:

The Gray Mining Company ore bodies are opened up by various cuts on the surface, one tunnel 300 feet from the surface on the fault, and by a main working tunnel 2300 feet in length through solid rock, requiring no timbering, which cut the fault running along the course of the mountain from the Mammoth to the Old Abe claim, and the quartzite fissure, which crops for a distance of more than 5,000 feet through the Mammoth group 2200 feet in from the portal of the tunnel. This ore was cut at a vertical depth of 805 feet and on the pitch 1050 feet.

Considerable drifting has been done on both the quartzite and the fault fissure, and while not technically blocked out by raises and cross cuts, sufficient work has been done in these drifts, intermediate levels and surface sampling to indicate a tonnage above the tunnel level of 2,327,815 tons of ore between the tunnel level and the surface on the quartzite fissure, of an average grade of 3.45 per cent copper, and 2,232,185 tons of ore on the fault, carrying 3.3 per cent copper, \$4.785 in gold and 2.417 ounces of silver per ton, or a total estimated tonnage of 4,560,000 tons of ore of an average grade of 3.4 per cent copper which would give us 308,520,000 pounds of copper and \$13,075,000.00 in gold and silver.

It is planned to work both the fault and the fissure by driving a main raise at the intersection of the two ore bodies from the tunnel level to the surface, for the purpose of handling men, tools and such timber as is required. Another level, 35 feet above the tunnel, drifts on the ore will be driven, and raises equipped with chute mouths will be driven up on the two ore bodies at a distance of 50 feet apart. The ore will then be broken down, and a sufficient amount of broken ore will be pulled through these chutes to give room for stoping until the ore is broken to the surface. This broken ore will be the reserves from which ore for the plants can be drawn at a uniform level, and as the walls are hard lime, little, if any, timber will be required in operation.

#### TREATMENT

Considerable testing of the ores from both the fault and the fissure has been done at the mine laboratory. These tests have shown a recovery by concentration by flotation methods of better than 80 per cent of total contents, and a smelter recovery of 95 per cent of all values in the concentrates. But small tests are many times misleading and do not give the desired information necessary in working out a flow sheet for a large plant of 1,000 tons and upward, and the company plans to construct a small pilot plant at the mouth of the tunnel, where ample water is available, and test



the ores thoroughly. This pilot mill should give the information desired in from four to six months' time on the ore bodies above the tunnel level, and can then be used for testing the other ore bodies on the company holdings.

The foregoing estimates as to tonnage and grade of ore, treatment and marketing charges give conditions as they are on the ground, and based on available data, I am of the opinion that a 1,000 ton per day concentrator, making a 78 per cent recovery, with a smelter recovery of 90 per cent saving, will show the following profits, based on 14 and 15 cent copper.

#### QUARTZITE FISSURE

Crude ore	1000 tons at 3.45% Cu.	69,000 lbs.
Concentration loss at 78% recovery		15,180 lbs.
Smelting loss at 90% recovery		5,382 lbs.
Pig copper		48,438 lbs.

#### Receipts

Copper Sales	48,438 lbs. at 14 cents	\$6,781.32
Copper Sales	48,438 lbs. at 15 cents	7,265.70

#### Fault

Crude ore	1000 tons at 3.3% Cu.	66,000 lbs.
Concentration Loss at 78% recovery		14,520 lbs.
Smelting Loss at 90% recovery		5,148 lbs.
Pig copper		46,332 lbs.

#### Receipts

Copper Sales	46,332 lbs. at 14 cents	\$6,486.48
Gold and silver values		5,055.80
	Total	\$11,542.28
Copper sales	46,332 lbs. at 15 cents	6,949.80
Gold and silver values		5,055.80

Total	\$12,005.60
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#### Expenses

Nevada Administration	1000 tons at \$ .25	\$ 250.00
Mining	" " " 1.10	1,100.00
Concentrating	" " " .75	750.00 (Ratio 10 to 1)
Tramming	" " " .15	150.00
Flotation Royalty	" " " .15	150.00
Smelting	" " " .70	700.00
Freight on Pig copper to East	" " " 1.60	1,600.00
Refining and Selling	" " " .25	250.00
Taxes and Insurance	" " " .05	50.00

Total	\$ 5,000.00
-------	-------------

Profit per day from Quartzite Fissure on 14¢ Cu.	\$ 1,781.32
Profit per day from Quartzite Fissure on 15¢ Cu.	\$ 2,265.70

Profit per day from Fault on 14¢ Cu.	\$ 1,486.48
Profit per day from Fault on gold and silver	\$ 5,055.80
Profit per day from Fault on total at 14¢ Cu.	\$ 6,542.28



Profit per day from Fault	on 15¢ Cu.	\$1,949.80
Profit per day from Fault on gold and silver		5,055.80
Profit per day from Fault on total	at 15¢ Cu.	<u>\$7,005.60</u>

In preparing for such a production, future financing will not be forthcoming from the issuance of treasury stock, but rather on a basis of 10 year convertible debentures, the convertible privilege of the first three years calling for conversion of each \$1,000.00 debenture into 50 shares of Gray Mining Company stock at \$20.00 per share, and graduating to 10 shares at \$100.00 per share in the last convertible years.

Vivian Tunnel, control of which is vested in the Gray Mining Company, is similar in operation to the Sutro Tunnel under the Comstock Lode, should be a large factor in creating additional earnings for Gray Mining Company shares, which should steadily advance as our program of production advances.

In figuring on the first 1,000 ton plant for the Nevada Consolidated Copper Company, which included concentrator, smelter, power house and all machinery necessary for reducing crude ore to pig copper, the first 1,000 ton section was figured at \$975,000.00 so arranged that each additional 1,000 ton section could be equipped for \$500,000.00. Allowing for the increased cost of labor and material since this plant was installed, I would estimate a plant capable of treating 1,000 tons of ore per day at present wage and supply prices at \$1,225,000.00. The first cost of the plant is not figured in the following annual profit tables, as given below, but \$100,000.00 per year is deducted from the profits, as shown, for new construction and renewals of the old.

#### Annual Profits.

##### Case 1 - Quartzite Fissure - 1,000 tons of ore per day.

Copper at 14 cents	\$1,781.32 per day for 365 days	\$649,181.80
New Construction and Renewals		<u>100,000.00</u>
		\$549,181.80
Copper at 15 cents	\$2,265.70 per day for 365 days	\$826,980.50
New Construction and Renewals		<u>100,000.00</u>
		\$726,980.50

##### Case 2 - Fault - 1,000 tons of ore per day.

Copper at 14 cents	\$1,486.48 per day for 365 days	\$542,565.20
Gold and silver	5,055.80 per day for 365 days	<u>\$1,845,367.00</u>
Total		\$2,387,932.20
New Construction and Renewals		<u>100,000.00</u>
		\$2,287,932.20
Copper at 15 cents	\$1,949.80 per day for 365 days	\$ 711,677.00
Gold and silver	5,055.80 per day for 365 days	<u>1,845,367.00</u>
Total		\$2,557,044.00
New Construction and Renewals		<u>100,000.00</u>
		\$2,457,044.00

In conclusion, I am of the firm conviction that the  
as now proposed by the operating management, which I consider  
e experience in copper and thoroughly capable, will be carried  
and the profits as above shown realized.

Yours truly,

GRAY MINING COMPANY,

By *C. F. Gray*  
President.

EFG:B





## REPORT OF GEOPHYSICAL SURVEY

During the months of July and August 1967, at a cost of at least \$10,100.00, Heinrichs Geoexploration Co. conducted an induced polarization electrical geophysical survey on the contiguous group of claims, enumerated in the attached affidavit of labor, in the Salmon River Mining District, Elko County, Nevada, near Contact, in partial fulfillment of the current annual assessment requirements.

Ten lines of induced polarization work were surveyed, all on a dipole spacing of 1,000 ft. which gives a total surface coverage of 120,000 ft. The electrode array used was the standard colinear dipole-dipole configuration. The dual frequency system was employed and utilized sending frequencies of 0.05 and 3.0 Hz. Lines 1 through 7 and 10 are generally oriented N-S to somewhat NE-SW and Lines 8 and 9 are E-W. For a detailed location of these lines relative to the claim boundaries and points of discovery, see the attached location plans which are a part of this report.

This electrical geophysical work applies to and benefits the group as a whole, these 101 contiguous claims which are listed in the attached affidavit.

Heinrichs personnel involved in the work were R. Fedelchak, an experienced technician and M. Fraker, D. Phelps and D. Hill technical assistants. The Heinrichs staff under the supervision of Mr. Chris S. Ludwig, Senior Geophysicist and the over all direction of Mr. Walter E. Heinrichs, Jr., President & General Manager of Heinrichs Geoexploration Co. and a registered professional engineer with over 25 years experience.

The basic findings of this geophysical survey are as follows:

Most of the northerly-southerly lines show more polarization on the portions of the lines which are over the northern part of the claims rather than over the southern most claims.

There is increased polarization to the west of Line 7 on the north halves of the lines west of Line 7, however, Line 7 itself shows only background polarization effects.

Line 8 shows increased polarization response on its west half going to background to the east. Remainder of the data show only background effects.

The more strongly polarizable areas suggest a content of polarizable material of around 0.5 and 2.0 percent by volume unless confined to zones more narrow than the dipole spacing, in which case it could be a higher percentage.



The resistivities are quite uniform showing only about a three to one maximum range and with only minor correlation with the polarizable zones and different rock types except on Line 8 where the polarizable zone shows as a somewhat more conductive area.

The self potentials show mostly erratic background variations and topographic response and little correlation with the polarizable zones.

Respectfully submitted,  
HEINRICHS GEOEXPLORATION COMPANY

*Chris S. Ludwig*

Chris S. Ludwig  
Senior Geophysicist

Approved: *[Signature]*

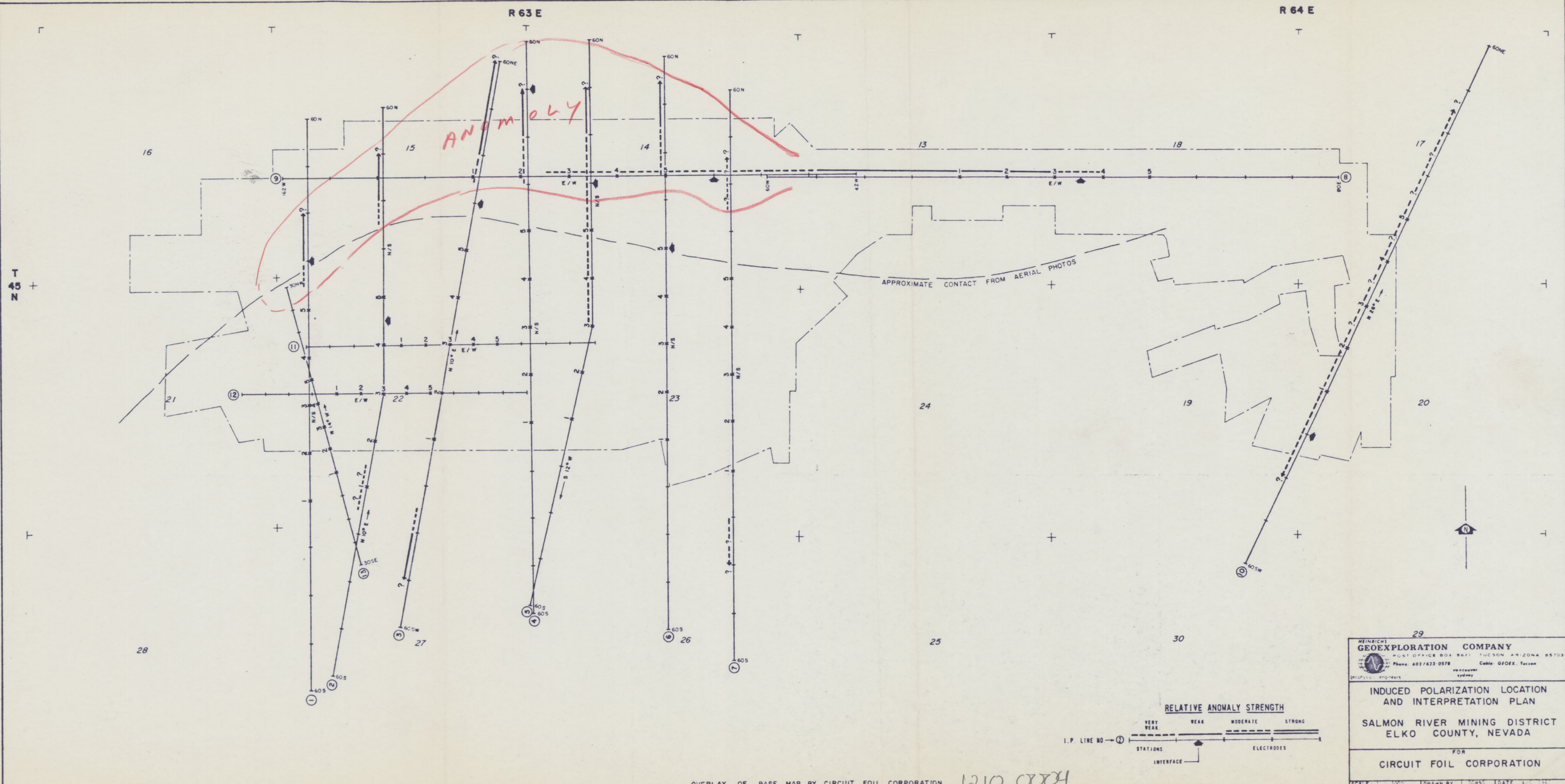


August 26, 1967  
Tucson, Arizona 85703

(P. O. Box 5671)

Frank W. Lewis  
120 Greenridge Drive  
Reno, Nevada 89502  
Phone: (702) 323-0303



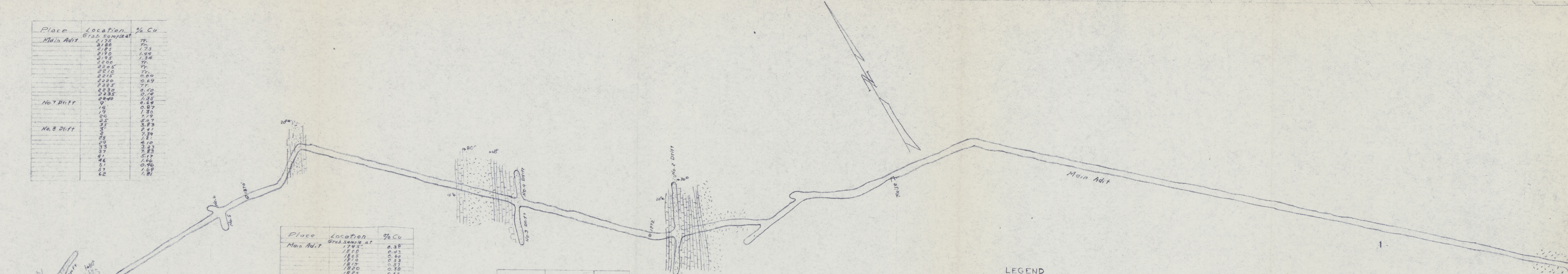




Place	Location	% Cu
Main Adit	Grab sample at	
	2175	Tr.
	2180	Tr.
	2185	1.73
	2190	1.44
	2195	1.34
	2200	Tr.
	2205	Tr.
	2210	Tr.
	2215	0.60
	2220	0.69
	2225	Tr.
No. 7 Drift	2230	0.50
	2235	0.74
	2240	1.35
	9	0.64
	14	0.87
No. 8 Drift	19	1.30
	20	1.9
	25	5.07
	35	3.83
	43	2.11
	45	7.39
	50	4.10
	53	3.23
	57	7.83
	66	5.17
	51	1.66
	57	0.96
	62	1.69
		1.81

Place	Location	% Cu
Main Adit	Grab sample at	
	1745	0.38
	1810	0.43
	1845	0.60
	1870	0.53
	1875	0.57
	1880	0.38
	1885	0.62
	1890	0.62
	1895	1.52
	1900	0.48
	1905	0.33
	1910	0.38
	1915	0.19
	1920	0.43
No. 1 Drift	1865	0.33
	1870	0.33
	2005	0.45
	2005	0.59
	2005	0.89
	2005	0.82
	2065	Tr.
	2070	0.75
	2075	0.00
	2080	Tr.
	2085	Tr.
	2090	0
	2095	0
	2100	Tr.
No. 2 Drift	2110	Tr.
	2115	0.24
	2120	0.67
	2125	0.80
	2135	0.71
	2140	0.89
	2145	1.19
	2150	0.30
	2155	Tr.
	2160	Tr.
	2165	Tr.
	2170	Tr.

Place	Location	% Cu
No. 1 Drift	Grab sample at	
	5	1.69
	10	1.30
	15	1.18
	20	0.88
	25	1.13
	30	3.18
No. 2 Drift	35	1.67
	40	1.35
	45	2.59
	50	2.12
	55	0.12
Main Adit	1205	0.12
	1210	0.12
	1215	0.93
	1220	0.99
	1225	1.54
	1230	1.45
No. 3 Drift	5	0.34
	10	0.65
	15	0.24
	20	0.23
	25	0.53
	30	0.36
	35	0.33
	40	0.36
	45	0.77
	50	1.54
No. 4 Drift	5	2.41
	10	1.25
	15	0.67
	20	0.53
	25	0.29



LEGEND

GRANITE

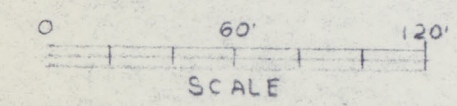
LIMESTONE

QUARTZITE

DIKE

FAULT

NOTE: ALL ASSAYS SHOWN ARE COMPANY ASSAYS - GEOLOGY IS FROM THE U.S. BUREAU OF MINES



PLAN OF HELEN B. SMITH ADIT  
GRAY COPPER CO - CONTACT NEVADA