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December 9, 1954

Grace Management Corporation
901 Sherman Street
Denver, Colo.

Tom Edward Wisser, Dr.,

To professional services, examination of McCoy mine, Nevada, and preparation of report thereon.....	$500.00
Expense account (attached).....	91.94
	$591.94

CC George E. Roberts

December 27, 1954

Mr.George E. Roberts
Grace Management Corporation
901 Sherman St.
Denver 3, Colo.

Dear Mr.Roberts:

Thank you for your cordial letter of December 22,and for the x check enclosed.

Since writing the report I have had several talks with C.N. Schuette,whom you called into consultation also. He is a classmate of mine;we were associated in a number of operations during the '20s and in 1938 renewed our association as consulting associates, a connection which terminated only in 1950 when Schuette left the Bay area for Sebastopol. We still work together as consultants for the Corps of Engineers, U.S.Army.

It was natural,therefore, for us to discuss your problem. The task assigned me by Art Sweet was to determine whether developments since my first examination of the McCoy property in 1943 had disclosed anything to modify my favorable opinion formed in that year.The answer of course was "no"; I like the property as well as ever and urge its aquisition and development.

I was not primarily concerned with the method of exploration and of mining. While I recommended underground work based on the notion of a small-scale but high-grade operation, I nevertheless,as you may note from my report,left the door open for large-scale surface mining if further examination should justify this. My report does not mention the cinnabar showing in conglomerate north of the present mine,but I examined this on my recent trip and realized its potentialities.

It follows that I have nothing against Schuette's recommendation for extensive stripping,bulldozing etc.,to obtain a better look at the distribution of cinnabar and to determine whether a large-scale surface operation is justified;it is entirely possible that this may be the case. My point is that now is the time to determine whether or not such is the case,and that if it prove not to be,then the underground work I suggested should be done,and if ore is found,probably a smaller kiln installed than that to go with a larger-scale surface operation.In either case I think development of the McCoy mine will prove successful.

I shall be most pleased to meet you here and discuss this further.

With best wishes for the New Year

Sincerely

Edward Wisser

GRACE MANAGEMENT CORPORATION

901 Sherman Street **Phone TAbor 5-2192**

DENVER 3, COLORADO

December 22nd, 1954

Mr. Edward Wisser
422 Acheson Building,
2191 University Avenue
Berkeley 4, California

Dear Mr. Wisser:

I wish to thank you very much for your co-operation and making the examination of the McCoy Quick-silver mine in Nevada. Your report is most interesting.

Enclosed please find check in the amount of $591.94.

Hoping to have the pleasure of meeting you soon so we can discuss some of the future operations of the McCoy Mine.

Wishing you a very Merry Christmas and a most Happy New Year, I remain,

Very truly yours,

GRACE MANAGEMENT CORPORATION

George E. Roberts

George E. Roberts

GER/r
Encl. 1 ck. $591.94

EXPENSE ACCOUNT OF EDWARD WISSER, TRIP TO McCOY MINE, NEVADA

Dec.2,1954	Airplane ticket.....	$60.94
4	Cabs.....	4.00
	Phones.....	8.50
	Dinner, Elko.....	3.50
5	Breakfast.....	1.50
	Lunch.....	2.00
	Dinner(with Murdock).....	5.50
	Hotel, Elko.....	8.00
	White prints, etc.....	5.00
		$91.94

Expense Account of Edward Wisser,

R and F Mine, Nevada, examination, April, 1943.

April 3	Round trip ticket, San Francisco-Reno.....	$11.60
	Pullman tickets.....	4.57
April 5	Taxi.....	1.00
10	"	1.00
12	Films and devloping.....	1.80
	Report covers,.paper etc.....	2.59
	White prints.....	1.86
	Office assistance.....	12.00
		$36.42

Expense account

198
259
457

Round Trip	11.60
Pullmans	4.57
Taxis	2.00
Films	0.74
Devel.	1.06
Report covers	2.59
paper etc	12.00
office help	1.86
	36.42

12

16
.75
80

112

To professional services, 4 d
examination of R & F mine, Nevada, $ 20
4 days @ $50 100
Preparing report 4 days @ $25
Expense account (attached) 36.42
336.42
Received 150.00
Balance due $ 186.42

REPORT ON McCOY QUICKSILVER MINE, NEVADA

INTRODUCTION

The writer examined the McCoy mine in detail in 1943, and wrote a report describing it ,with recommendations for exploration. The property was revisited December 5, 1954,to check earlier conclusions and examine operations of the present owners.

The present report is based on my 1943 work,on the recent re-examination,and on a publication describing the McCoy mine and the Wild Horse district within which the mine lies.[1]

1. The Wild Horse Quicksilver District, Lander Co.,Nevada, by C.H. Dane and C.P.Ross, U.S.Geol.Survey Bulletin 931-K,1942.

LOCATION. TOPOGRAPHY. WORKING CONDITIONS.

The Wild Horse district lies 75 miles airline from Fallon,near the common corner of Pershing, Churchill and Lander Counties. The U.S.Geological Survey Map Index of Nevada places the district 3 miles inside of Lander County,notwithstanding which,claims staked in the district have always been recorded at Fallon, county seat of Churchill County. It would seem prudent to record claims both at Fallon and at Austin, county seat of Lander County,

The district is reached from Battle Mountain by driving south on State Highway 8A about 45 miles,thence west by winding unimproved road about 30 miles. From Fallon the district is reached by driving east on U.S.50 to Eastgate, 52 miles,thence northward on an unsurfaced road 55 miles.

The district is one of considerable relief (Photos 1 and 2). The climate permits operation throughout the year,except that transportation is halted at times by winter snow. Water is hauled from a spring 9 miles north of the McCoy mine and making in 1943 about

50 gallons per minute.

Fallon and Battle Mountain are centers for purchase of supplies. Mining labor is probably scarce,but no scarcer than elsewhere throughout the western region.

HISTORY. PRODUCTION.

The first discovery of cinnabar was made by Bert McCoy,at what is now the McCoy mine,in 1915. In 1918-1919,and again in 1928,retort operations produced about 250 flasks of quicksilver(C.N. Schuette,personal communication). According to present owners,the Nevada State Bureau of Mines credits the property with some 600 flasks. The Quicksilver Corporation of America did considerable underground development in 1936,driving,apparently,the Long, Upper and Lower tunnels(see Geologic Plan of Surface and Composite Plan of Underground Workings). The average 1936 price of quicksilver was $80 per flask ,that for 1937 about $90,but the price dropped to $80 by the end of the year. There are small stopes opened from the Upper and Lower tunnels,but the ore is said to have been low-grade and production must have been small.

Between 1937 and 1941 or later,the Quicksilver Corporation did assessment work only.

In 1943 the property was under option to L.Rose and S.E.Friedman of Detroit,for whom the writer made his first examination. No retort existed at the time,the property was idle and the writer's recommendations for development were never carried out. The only mining done since 1943 appears to be the gophering by the present owners,from dumps and small surface workings. It is doubtful,therefore,whether McCoy production exceeds 300 or 400 flasks.

STRATIGRAPHIC SECTION

Age	Formation	Description	Thickness
Tertiary, Recent	"Cover"	Rhyolite flows, tuffs, fanglomerate, wash.	
Middle Triassic			
	Dolomite	Dolomite, limestone.....	250' plus
	Shale	Shale, minor limestone, sandstone.....	1200'
	Limestone	Light gray fossiliferous limestone.....	25'
		Black limestone.....	5'
Lower Triassic			
	Upper sandstone	Tan colored sandstone, thin-bedded shale. Local conglomerate at top, thin conglomerate beds in lower half.....	325'
	Conglomerate	Ledge-forming bed; siliceous pebbles.....	25'
	Lower sandstone	Red and tan sandstone, sandy shale; thin beds of siliceous conglomerate.....	150' plus

Ore from the McCoy property retofted during early operations came from the Outcrop shaft workings, from the Incline and from cuts on the south side of the canyon (see plans mentioned). The grade ~~ver~~ varied from 6% Hg at the start to 2% in later operations.

The Wild Horse mine, about 3/4 mile south of the McCoy, was discovered in 1939. By the end of 1939 a 20-ton Gould rotary furnace was installed, operating through 1940 and for the first 4 months of 1941. During this period 827 flasks of quicksilver were produced from 6400 tons of ore, average grade being about 10 lbs Hg per ton. Exploration in 1941 failing to find more ore, the mine was abandoned.

PRESENT OPERATIONS

At some period after 1943 the McCoy claims were dropped; during the present year they were relocated by Messrs. Melvin McCoy, son of the discoverer, Frank Pedlar and James Castile. On November 2, 1954 a four-tube retort started operations, handling 2800 lbs. of ore in 24 hours, ore coming from dumps and from the surface workings on the south side of the gulch, near the pipe ore slide (see Geologic Plan of Surface). It is claimed that the retort produces one flask in three days, in which case the average grade of ore retorted is 18 lbs. per ton.

GENERAL GEOLOGY

The principal rocks of the region are Lower and Middle Triassic sandstone, shale, conglomerate and limestone (see Geologic Map of District and Stratigraphic Section, facing this page). The principal locus of ore is the fossiliferous limestone at the base of the Middle Triassic, although ore occurs also immediately beneath the limestone bed, in the Lower Triassic Upper sandstone.

These sediments were folded in pre-Tertiary time, and form an

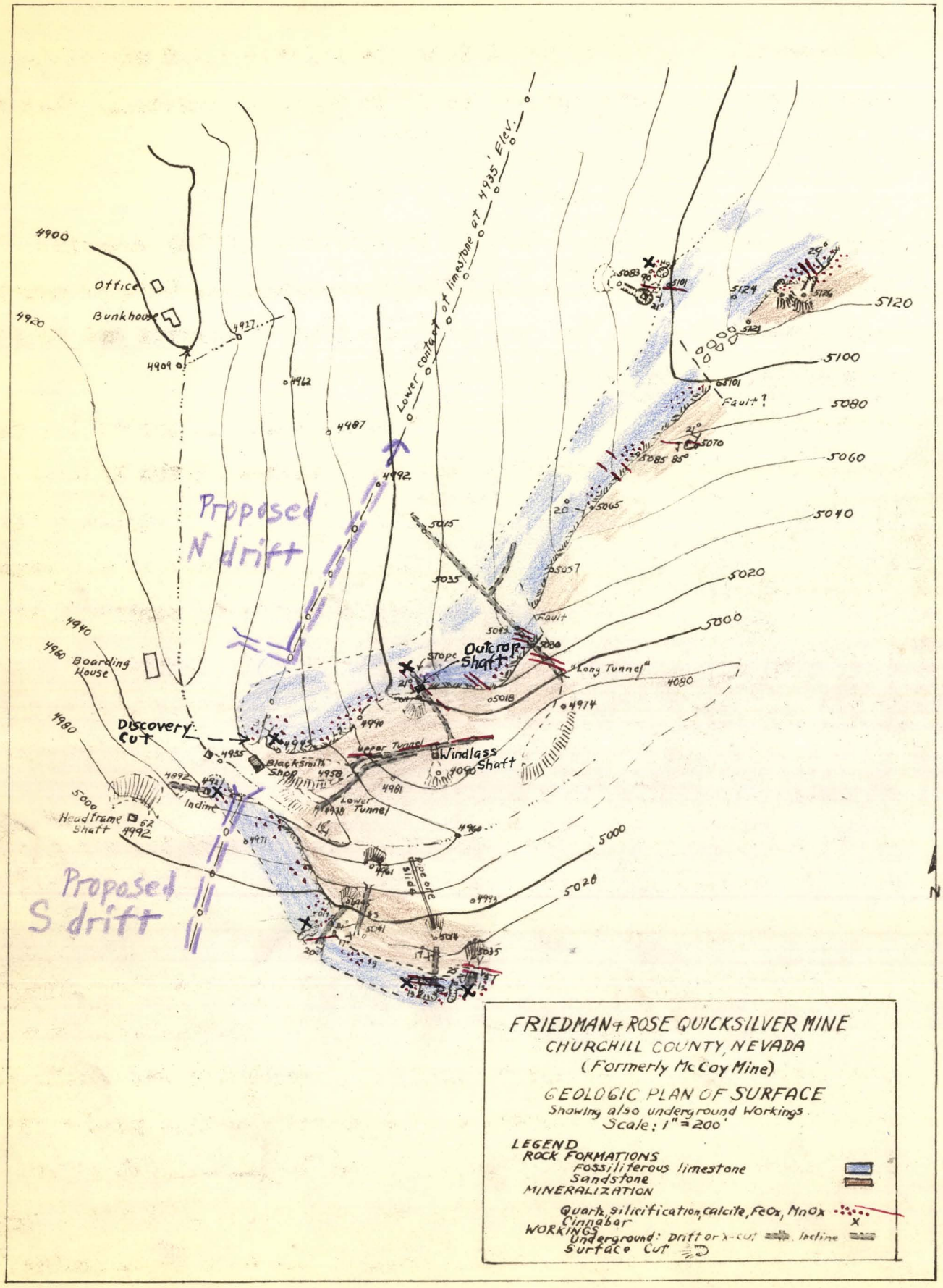
anticline trending NNE and plunging SSW.The structure is suggested on the district plan,which shows the beds striking east of north and dipping gently west near the McCoy mine,and the strike swinging through northwest,east-west and northeast near the Wild Horse mine, which lies on the plunging nose of the anticline.

The anticline is considerably faulted,most faults striking west of north,with downthrow on the west. In addition the beds are cut by innumerable small fractures which tend to lie perpendicular to the bedding planes,so that at the McCoy mine these fractures strike mainly about east-west,at the Wild Horse mine, north-south. These minor fractures are important ore localizers.

ORE DEPOSITS

The fossiliferous limestone at the base of the Middle Triassic,and in places the rocks just above and below that unit have been silicified, forming a belt extending from well north of the McCoy mine southwards over a mile to the Wild Horse mine. Silicification is most intense in the limestone, toward its base.Here not only was silica added,but in places lime was extracted,leaving cavernous openings lined with calcite,chalcedony and in places cinnabar. Better mineralized segments of the limestone bed are marked on the surface by stains,nodules and irregular masses of iron and manganese oxides.

In the Upper sandstone underlying the ore limestone, quartz,calcite and cinnabar are mainly confined to east-west and northwest fractures at the McCoy mine,and to north-south fractures at the Wild Horse mine. These veinlets in sandstone are mostly knife-blade seams, but where close enough together they form ore bodies,chiefly low-grade. The chief ore-bearer is the silicified limestone. While mineralization in this rock is not confined to fractures,fractures in the underly-



FRIEDMAN + ROSE QUICKSILVER MINE
CHURCHILL COUNTY, NEVADA
(Formerly McCoy Mine)

GEOLOGIC PLAN OF SURFACE
Showing also underground Workings.
Scale: 1" = 200'

LEGEND
ROCK FORMATIONS
Fossiliferous limestone
Sandstone
MINERALIZATION
Quartz, silicification, calcite, FeOx, MnOx
Cinnabar
WORKINGS
Underground: Drift or x-cut, Incline
Surface Cut

ing sandstone continue upward into the limestone,and mineralization in the limestone appears stronger the more intensely that rock is fractured.

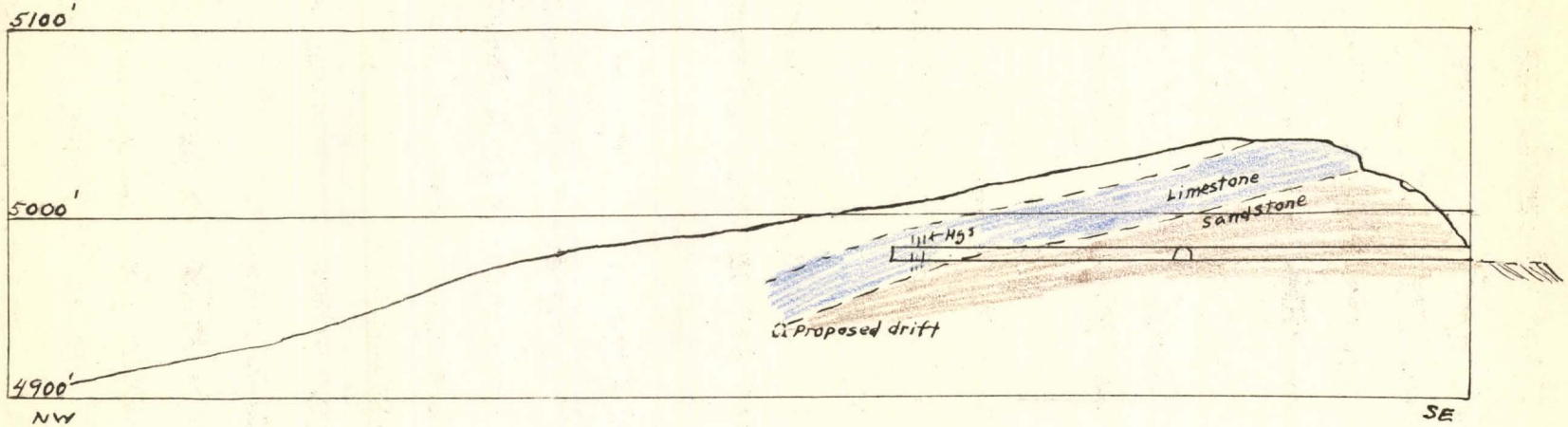
McCOY MINE

Localization of Ore.- Most of the production has come from the silicified limestone,from the Outcrop workings,the Incline and the cuts south of the canyon (see Geologic Plan of Surface and Composite Plan of Underground Workings).

East-west or northwest fractures controlled the ore at all three places.At the Outcrop workings the small stopes in the limestone are elongated northwest,although fracturing here is masked by heavy limonite. The Incline ore body lay,not near the base of the limestone as elsewhere but along its top,partly in overlying sandstone of the Shale formation,but distinctly along a zone of east-west fractures. In the productive cuts south of the canyon east-west fractures abound; and although cinnabar prefers certain limestone layers,individual cinnabar seams strike east-west and dip steeply.

Ore bodies stoped in the Upper and Lower tunnels lay along an east-west calcite-bearing fracture in the Upper sandstone,well below the base of the ore limestone.

Prior Development.- Nearly all production has come from gophering of small high-grade ore bodies at or close to the surface. More formal exploration at depth by the Quicksilver Corporation was poorly planned. The ore limestone strikes east of north and dips gently west (Photo 1 and Section along Course of Long Tunnel). North of the canyon the limestone dips almost with the west slope of the ridge,as shown in the photo and on the section;but the Long tunnel,driven from



R and F QUICKSILVER MINE
CHURCHILL COUNTY, NEVADA.

VERTICAL SECTION ALONG COURSE OF LONG TUNNEL.

Scale: 1" = 100'

the footwall side of the limestone,took 320' to reach the ore limestone at a point reachable by a 180' adit or 30' incline (See section). Although the limestone near the face of the Long Tunnel shows cinnabar along an east-west fracture zone, no drifting on the zone was done.

The Upper and Lower tunnels were driven on an east-west fracture in the Upper sandstone,well below the base of the ore limestone.For the entire mine,most workings,even at the outcrop,were done in the soft but usually barren sandstone in preference to the hard but productive limestone.

EVALUATION OF THE McCOY MINE

The mine gives strong promise of further and increased production, for the following reasons:

1. Past production is respectable considering the limited depth to which mining extended and the unintelligent nature of deeper exploration.

2. Geologic conditions are favorable for extension of ore with depth. At the Wild Horse mine,the ore limestone is a mere slab resting on the Upper sandstone.As the district plan shows,the limestone there dips less steeply than does the surface,so that the underlying Upper sandstone is exposed both north and south of the limestone. At the McCoy mine,the ore limestone extends below the surface indefinitely,as shown in the section facing this page.

3. While ore bodies found are apt to be small,they should be of good grade. Ore controls are simple,i.e. the ore limestone and east-west or northwest fractures that cross it;hence exploration may be concentrated in a few workings,which,thanks to the topography, may be limited to adits,at least for some time.

4. Economic conditions are presently favorable: the U.S. Government guarantees a price of over $200 per flask while the present market price is over $300, the highest dollar price in history. It is likely that shortage of miners will cause difficulty, but the same shortage applies to mining ventures everywhere in the west.

The writer knows of the pending deal on the property by hearsay only, and for that reason will not comment on it. Assuming the deal to be reasonable from the standpoint of your company, I recommend that the McCoy property be taken over and exploration started with the least possible delay.

PROPOSED EXPLORATION

The feasible way to explore the base of the limestone is to drift on it north and south from the canyon, as shown on the Geologic Plan of Surface and the Composite Plan of Underground Workings. Exact position of the adit protals will depend on details of topography not at hand but the base of the limestone should be followed at as low an elevation above the canyon floor as will permit of sufficient dump room.

The north drift could be started at the discovery cut, but backs would be low for some distance, so that a preferable way would be to start with the short east crosscut shown. The north drift should probably be driven at least 800 feet. While it would be close to the surf for some distance, near the Long tunnel there would be 300 feet of backs up the dip of the limestone, between the north adit and the surface. Natural ventilation could be secured by raises inclined upward to the west to meet the surface; both exploration and ventilation would be provided by raising from the 400 ft. point in the north drift to connect with the face of the Long tunnel, as shown in the section facing page 6.

The south drift may start in near-ore, since the small cut near the collar of the Incline exposed 4 lb. Hg per ton material (see Composite Plan of Underground Workings). Judging from the surface it would be worthwhile to drive the south drift at least 500 ft.

While both drifts would follow the base of the limestone, promising cross fractures should be driveh on west or northwest through the limestone, and with especially favorable showings, fractures leading east or southeast into the Upper sandstone should be followed.

Exploration should also be started from the face of the Long Tunnel; the present situation there illustrates the scheme of exploration just outlined. The limestone belt there strikes east of north, but the cinnabar-bearing fracture zone strikes east-west. The fracture zone should be driven on west, to the upper contact of the limestone, and east, to the lower contact. The lower limestone contact, which lies somewhere in the cavernous zone, should be drifted on to the SSW from the crosscut, and NNE, probably from where it will have been cut in the east drift on the fracture zone.

It seems extremely likely that the above proposed exploration will find ore. The question arises as to probable scale of operation.

PROBABLE SCALE OF OPERATIONS

In 1940-1941, when the Wild Horse mine was in profitable production, the average price of quicksilver was about $177 per flask; the current price is about $320 per flask. However, the purchasing power of the dollar has been cut in half since 1940, so that the real present price in terms of 1940 conditions is about $160 per flask. This means that we cannot mine ore today of any lower grade than that mined in 1940.

The Wild Horse ore bodies were mined largely by open cut. The

small size of the cuts indicates that no great tonnage of, say, 5 lb. rock lay at or near the surface, for such material could probably have been mined in 1940, to yield a small profit per ton.

It is my impression that this condition holds for the McCoy mine as well, and that the high-grade ore bodies there are surrounded by quite limited blocks of lower-grade ore. Contrary to the opinion of the present owners, I doubt if sizeable tonnages of 5 lb. material exist on the property. I believe the ore bodies to be typically small, although high-grade, and that the quicksilver content fades rapidly away from the ore bodies.

I may be wrong. The first thing to be done on aquiring the property is to sample carefully all mineralized areas as well as the dumps. A representative series of samples should be assayed, and each such sample panned. After the pannings are compared with the assays, most of the later sampling can be done merely by panning.

Mr. Gordon Gould who ran the Wild Horse mine in 1939-1941, informs me that a new 20-ton Gould rotary furnace costs $30,000-$35,000 installed, and a 50-ton furnace, $50,000-$60,000. Total costs per ton, for either the 20-ton operation or the 50-ton, would run about as follows:

Mining on surface.....	$3.50	
Furnacing.....	3.50	
Overhead.....	2.00	
Royalty (10%).....	2.00	(assuming 5 lb. ore @ $4.00 per lb.).
	11.00	

The cut-off grade for ore furnaced would therefore be 3-4 lbs Hg per ton. With 5 lb. ore, 15,000 to 30,000 tons of ore would be needed to repay the cost of a 20-ton furnace, not to mention that of mining equipemnt, camp construction etc. For a 50-ton furnace, twice

these respective amounts of ore would be needed. The Wild Horse mine produced only 6000 tons of ore.

For underground mining of the hard silicified limestone, total cost per ton would approximate $20.00, leaving a profit, at the present price of quicksilver, of about $20.00 per ton on 10-pound ore. About 3000 tons of such ore would repay the cost of a 20-ton furnace, 6000 tons, that of a 50-ton furnace.

The Gould company, with long experience in the quicksilver industry, installed a 20-ton furnace at the Wild Horse mine. The small size of the ore bodies, and their scattered distribution suggests that the McCoy mine also warrants nothing larger than a 20-ton furnace. Costs of mining, furnacing and overhead are not materially lowered as between a 20-ton and a 50-ton furnace; it follows that a 50 tons per day operation would not permit the mining of material any lower in grade than that which could be mined with a 20 ton operation.

Unless the sampling campaign recommended proves the presence of a sizeable tonnage of ore running 5 lbs. per ton or better, I recommend that installation of a furnace be delayed until the exploration outlined above shall disclose sufficient ore to pay for such a furnace, together with the additional capital investment involved. Unless the ore discovered occurs in sizeable bodies capable of yielding a larger daily tonnage than I expect, I recommend installation of a 20-ton rotary furnace, assuming that enough ore is found to make return of capital investment certain or highly probable.

E.W.

Edward Wisser

Berkeley, Calif.
December 8, 1954

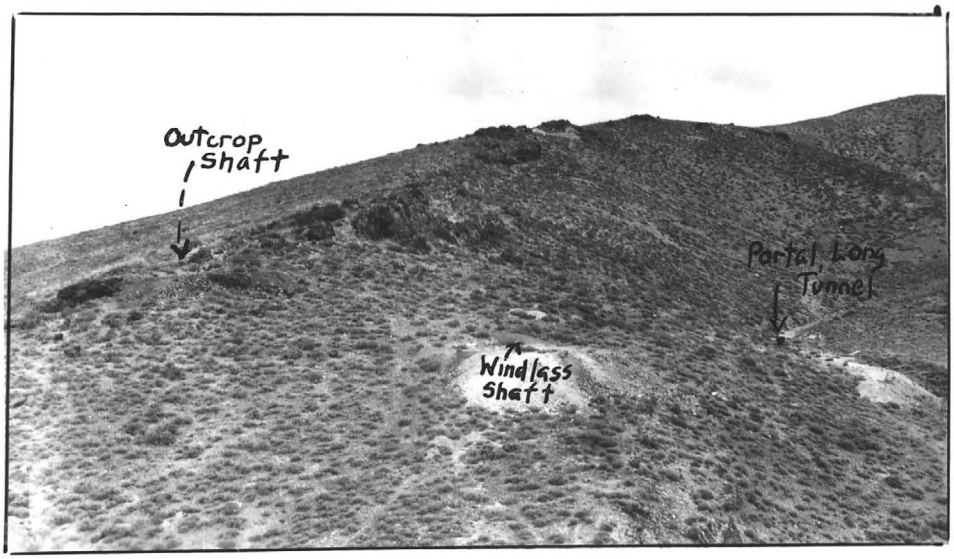


Photo 1: Looking north toward ridge above Long Tunnel. Limestone outcrop is the dark bluff toward crest of ridge.

Photo 2: Looking northwest down canyon. Pipe ore slide on lower left. Limestone outcrop in middle distance.

April 16th, 1943

Messrs. Lewis Rose
and S.E.Friedman
Detroit, Michigan

Dears Sirs:

Pursuant to your request, I have examined your R and F quicksilver mine, Churchill County, Nevada, and submit herewith a report embodying results of that examination.

Yours very truly,

Edward Wisser

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REPORT ON THE R and F QUICKSILVER MINE

CHURCHILL COUNTY, NEVADA.

INTRODUCTION.

The following report is based on a stay of two days on the property, April 7 and 8, 1943, in the company of Mr. S.R. Friedman and two local miners. A report by C.N.Schuette[1] is

1. Report on the McCoy Quicksilver Property in Nevada. Dec.1936.

available. The U.S.Geological Survey has issued a bulletin on the district.[2] The present writer omits details of early operation

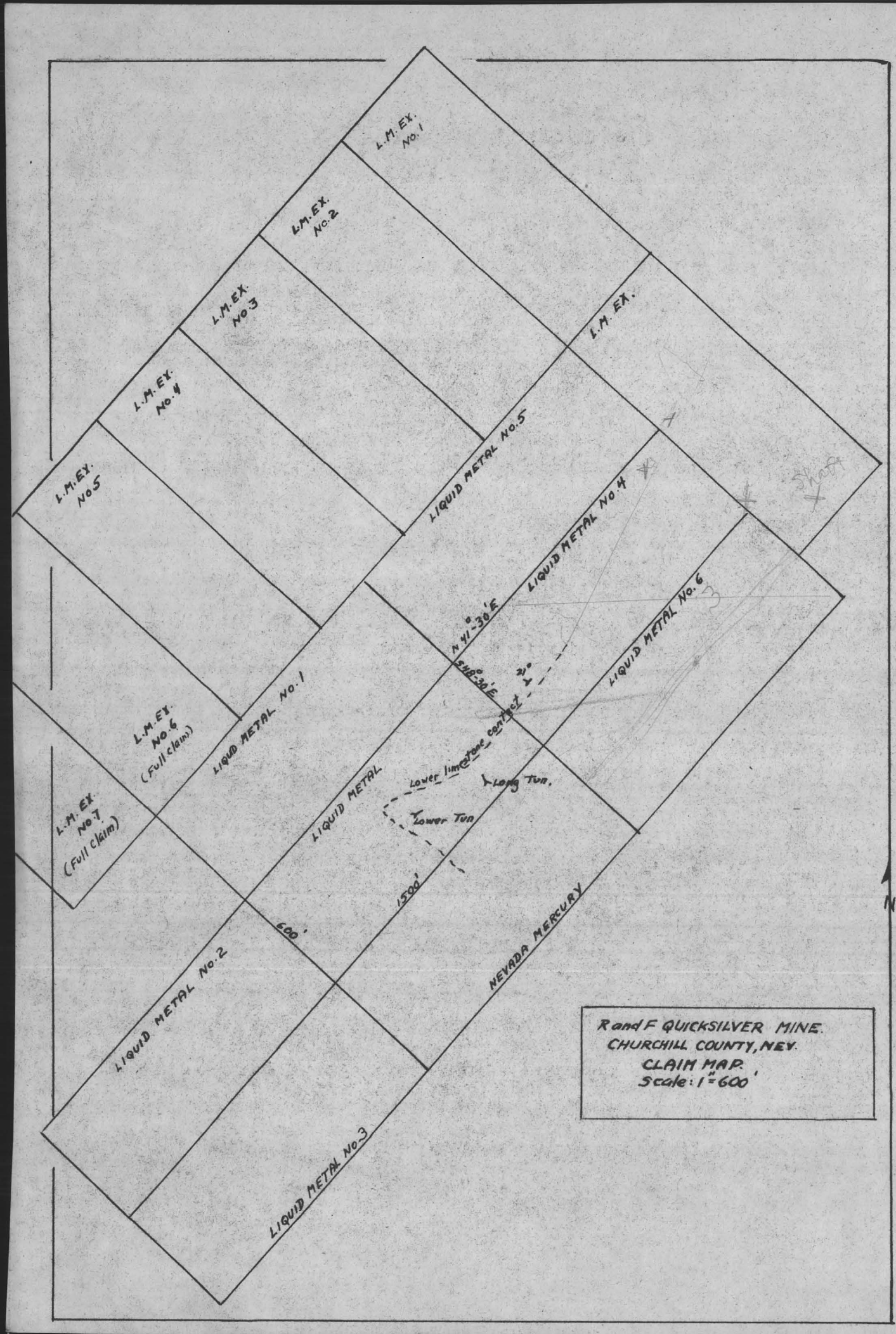
2. The Wild Horse Quicksilver District, Lander Co., Nevada, by C.H.Dane and C.P.Ross. U.S.G.S.Bull. 931-K, 1942.

given in the Schuette report, and data on regional geology presented in the Survey Bulletin.

LOCATION. TOPOGRAPHY. WORKING CONDITIONS.

The mine lies 75 miles N70°E from Fallon, county seat of Churchill Co., and near the common corner of Pershing Co., on the northwest, Churchill Co. on the southwest and Lander Co.on the east. (See Fig.1, Schuette report). The Survey Bulletin places the Wild Horse district in Lander Co.,but it is accepted in Fallon at present that the mine lies just within Churchill Co.

The property is reached from Reno via U.S.Highway 40 to Fernley,via State Highway 2 to Leetville and U.S.50 to Fallon, total 64 miles; thence via 50 to Eastgate, about 50 miles. From Eastgate the route lies north through the Alpine, Glan Alpine and Byers ranches, 52 miles to the mine. The first 25 miles of


L.M. EX. No. 1
L.M. EX. No. 2
L.M. EX. No. 3
L.M. EX. No. 4
L.M. EX. No. 5
L.M. EX.
LIQUID METAL No. 5
LIQUID METAL No. 4
LIQUID METAL No. 6
N 41-30' E
S 48-30' E
21°
Lower limestone contact
Long Tun.
Lower Tun
1500'
600'
L.M. EX. No. 6 (Full claim)
L.M. EX. No. 7 (Full claim)
LIQUID METAL No. 1
LIQUID METAL
LIQUID METAL No. 2
LIQUID METAL No. 3
NEVADA MERCURY
Shaft
N
R and F QUICKSILVER MINE.
CHURCHILL COUNTY, NEV.
CLAIM MAP.
Scale: 1" = 600'

this stretch have been graded and gravelled by the C.C.C., but the remainder is unimproved.

The mine lies in rolling bare hills (Photos 1 and 2). Water is hauled from a spring 9 miles north of the property, and making during my visit about 50 gallons per minute.

The climate permits operation throughout the year, except that transportation over the unimproved part of the road is halted at times by snow in winter.

Mining labor seems more plentiful than in other Western districts, but it would be unsafe to assume this under present conditions.

Fallon is an excellent center for purchase of supplies.

HISTORY. PRODUCTION.

The R and F property was formerly known as the McCoy. The first discovery of cinnabar in the district was made here by Bert McCoy in 1915. In 1918-1919, and again in 1928, retort operations produced a total of about 250 flasks of quicksilver (Schuette). Ore retorted during the earlier operations yielded 6% Hg, and in the later, 2% (Schuette). The bulk of the high-grade ore came from the Outcrop shaft workings, from the Incline and from the cuts on the south side of the canyon. (See Geologic Plan of Surface and Composite Plan of Underground Workings).

The Wild Horse Mine adjoining the R and F on the southeast, was discovered in 1939 and produced, according to the Survey Bulletin 827 flasks during 1940 and the early part of 1941. The operators were H.W.Gould and Company, using a 20 ton

rotary furnace. According to the Survey Bulletin, 6000 tons of ore yielded an average of 10 lbs. quicksilver per ton in this operation. The Wild Horse Mine is at present abandoned.

GENERAL GEOLOGY.

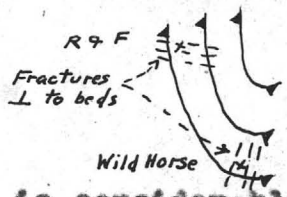
Rock Formations. Structure.- The principal rocks of the region are Lower and Middle Triassic sandstone, shale, conglomerate and limestone. Of these Mesozoic sediments, only three units are of present interest. The most important of the three is a bed of light-gray fossiliferous limestone, about 25' thick in the mapped area. (See Geologic Plan of Surface and Photo 1). This bed, as shown below, is the principal locus of ore, both at the R and F and the Wild Horse Mine. The bed is the basal unit of the Middle Triassic.

Directly above the gray limestone lies a nearly black limestone, not very thick and above this a great thickness of calcareous shale and thin-bedded limestone, in the fine-grained sandstone and sandy shale at its base, just above the black limestone mentioned.

Below the fossiliferous limestone lies the upper sandstone of the Lower Triassic, 325' thick. The sandstone is commonly thin-bedded, fine-grained, tan in color, with thin beds of hard shale and lenses of conglomerate.

These sediments were gently folded in pre-Tertiary time. At the mine they strike uniformly east of north and dip about 21° west. The Survey Bulletin shows that the sediments at the R and F mine lie on the NW flank of a major NE anticline, plunging SW. The Wild Horse mine lies at the southwest end

of the anticline, astride the plunge:

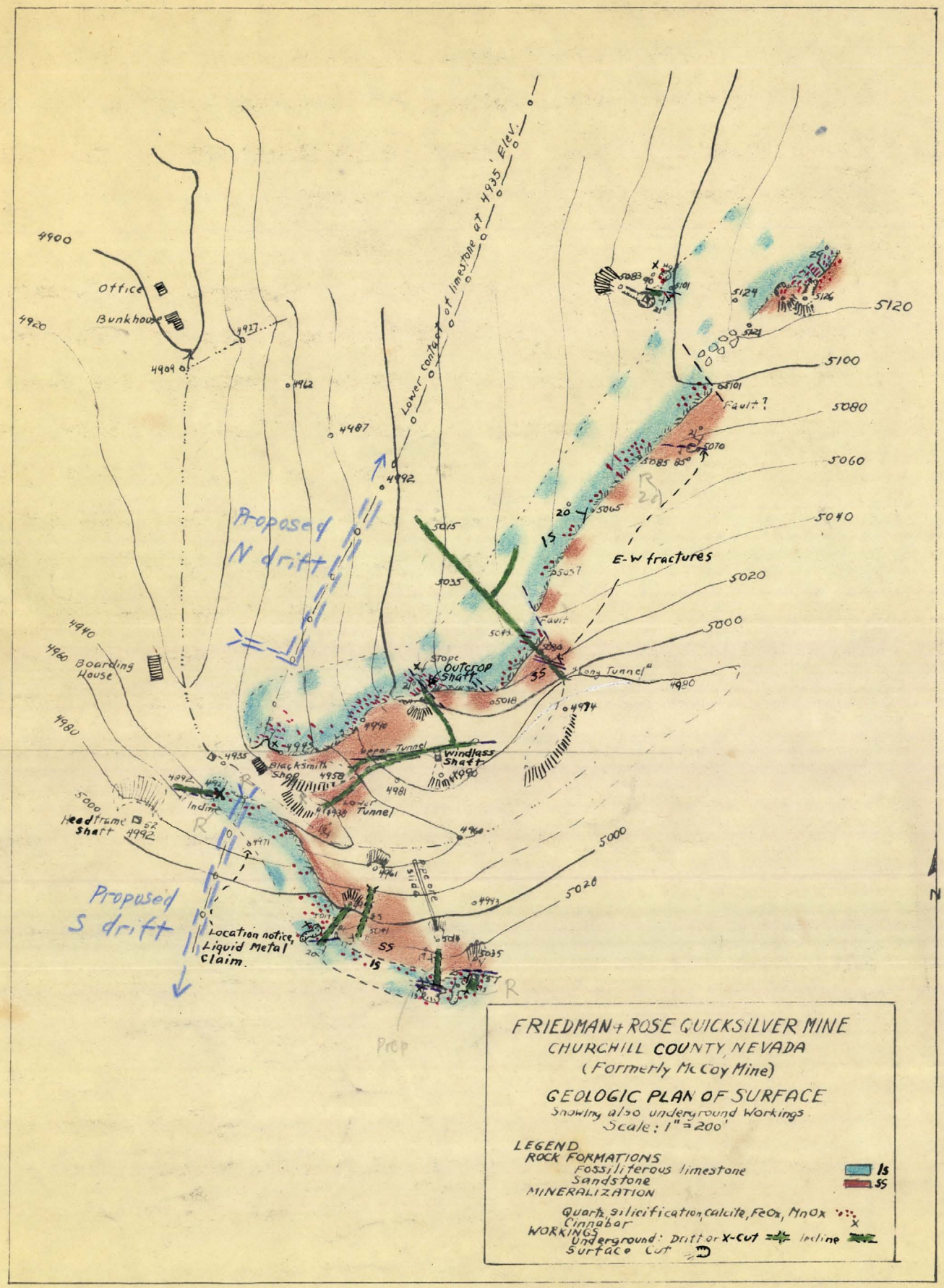


The anticline is considerably faulted, most faults striking slightly west of north, with downthrow on the west. In addition the beds are cut by innumerable small fractures which tend to orient themselves perpendicular to the bedding planes, so that at the R and F mine these fractures strike nearly east-west, at the Wild Horse mine, north-south.

Mineralization. Ore Deposits.- The fossiliferous limestone at the base of the Middle Triassic, and in places the rocks just above and/or below that unit have been silicified, forming a belt extending from well north of the R and F workings southwards over a mile to the Wild Horse workings. Silicification was most intense in the limestone horizon, toward its base; here not only was silica added to the rock, but lime extracted in places, leaving cavernous openings often lined with calcite, chalcedony and sometimes cinnabar.

Silicification of the limestone is commonly accompanied by iron and manganese oxide, as staining, nodules or irregular masses.

In the sandstone underlying the limestone, quartz, calcite and cinnabar are mainly confined to northwest or east-west fractures (R and F mine) or north-south fractures (Wild Horse mine); these veinlets in sandstone are mostly knife-blade seams, but where close enough together they form ore bodies, chiefly low-


FRIEDMAN + ROSE QUICKSILVER MINE
CHURCHILL COUNTY, NEVADA
(Formerly McCoy Mine)
GEOLOGIC PLAN OF SURFACE
Showing also underground Workings
Scale: 1" = 200'
LEGEND
ROCK FORMATIONS
Fossiliferous limestone ls
Sandstone ss
MINERALIZATION
Quartz, silicification, Calcite, FeOx, MnOx
Cinnabar
WORKINGS
Underground: Drift or X-Cut Incline
Surface Cut
Office
Bunkhouse
Boarding House
Lower Contact of limestone at 4935' Elev.
Proposed N drift
Proposed S drift
E-W fractures
Fault?
Fault
Stope
Outcrop Shaft
"Long Tunnel"
Upper Tunnel
Windlass Shaft
Blacksmith Shop
Lower Tunnel
Incline
Headframe Shaft
Location notice, Liquid Metal Claim.
Pipe line
Prep
5120
5100
5080
5060
5040
5020
5000
4900
4920
4940
4960
4980

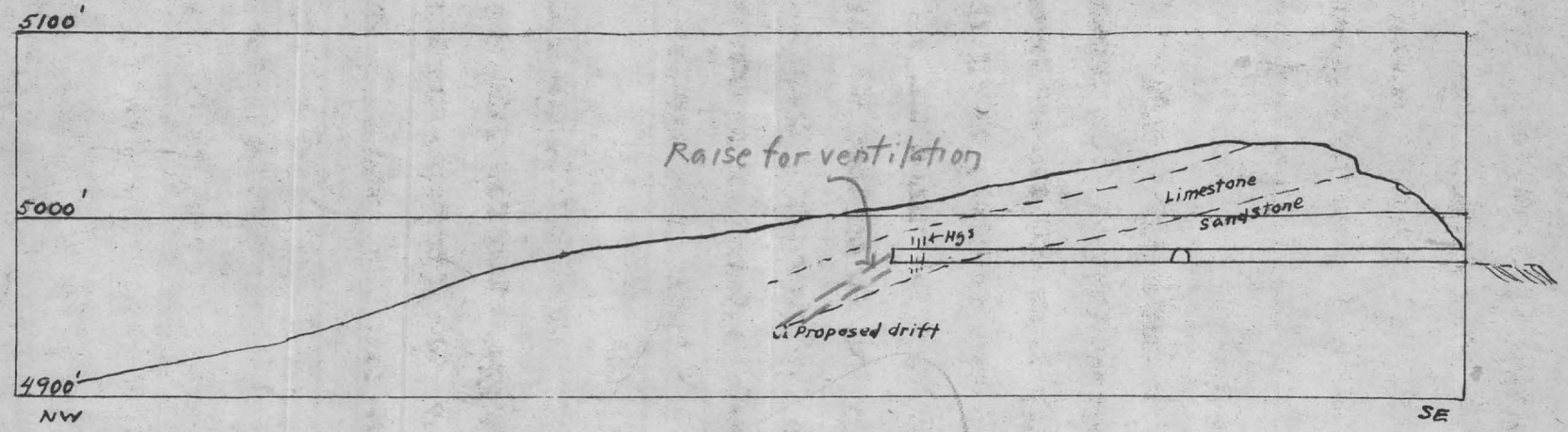
grade. The chief locus for ore in the district is the silicified limestone; while mineralization in this rock is not confined to fractures, the fractures cutting the sandstone continue into the limestone, and the mineralization in limestone appears stronger the more intensely that rock is fractured.

THE R and F MINE.

Localization of Ore.- Most of the 250 flasks of quicksilver produced came from the silicified limestone, from the Outcrop workings, Incline and the cuts south of the canyon. (See Geologic Plan of Surface and Composite Plan of Underground Workings). East-west or northwest fractures controlled the ore at all three places. At the Outcrop workings the small stopes in the limestone are elongated northwest, although the fracturing here is masked by heavy limonite. The Incline ore body lay, not toward the base of the limestone as elsewhere, but along its top, partly in limestone, partly in overlying sandstone, but distinctly along a zone of east-west fractures. East-west fractures abound in the productive cuts south ofthe canyon, and although the cinnabar is found in certain limestone layers, the individual seams strike east-west and dip steeply.

The Upper and Lower tunnels follow an east-west fracture carrying calcite and entirely in sandstone; the ore bodies stoped along this fracture were small andreportedly low-grade.

Prior Development.- Schuette in his report describes the unintelligent exploration from which the mine has suffered. The ore-bearing limestone strikes slightly east of north and dips gently west (Photo 1 and Section along Course of Long Tunnel).



R and F QUICKSILVER MINE
CHURCHILL COUNTY, NEVADA.

VERTICAL SECTION ALONG COURSE OF LONG TUNNEL.

Scale: 1" = 100'

North of the canyon the dip of the limestone is almost with the west slope of the ridge, as shown in the photo, but the Long tunnel was driven from the footwall side and took 330' to reach the ore-bearing limestone at a point reachable from the west slope by a 30' incline. Most of the workings, even near the outcrop, were done in the barren but soft sandstone in preference to the hard but productive limestone.

Conclusions on the R and F Mine.- The above facts must be considered in judging the possible worth of the mine. The Wild Horse mine produced over 800 flasks from a small segment of the limestone, and a glance at Plate 46 of the Bulletin mentioned shows that the operators got in, mined the easily found ore and got out without attempting to explore the limestone elsewhere, either down the dip or laterally. There seems no reason why as much or more ore may not be found along the same horizon at the R and F mine, provided that horizon is systematically examined. I recommend that this be done.

PROPOSED EXPLORATION.

Work Recommended.- The feasible way to explore the base of the limestone, i.e. the favorable horizon for ore, is to drift on it north and south from the canyon as shown on the Geologic Plan of Surface and the Composite Plan of Underground Workings. The exact positions of the portals will depend on local topography not shown, but the idea will be to follow the base of the limestone at as low an elevation above the canyon floor as will permit of sufficient dump room. The north drift may go 800' or more, but natural ventilation may be secured by raising at the 400' point to connect with the face of the Long Tunnel, as indicated on the

Section through that tunnel. This north drift could be started at the discovery cut back of the blacksmith shop, but backs are low for some distance, so that a cheaper way would be to start with a short crosscut from the canyon east of the boarding house as shown on the Geologic Plan of Surface.

While this north drift will be close to the surface for some distance, the prospective ore ground slopes up to the east flatly, so that near the Long tunnel there exists over 300' of inclined backs between the proposed drift and the limestone outcrop.

The south drift may start in ore, since the small chamber at the Incline collar carries 4 lb. ore (sample 2, Composite Plan of Underground Workings). Judging from the surface it would be worth while to run the south drift at least 500'.

Should either drift encounter ore, inclined raises will be put up on the ore, with sublevels where indicated. North of the canyon ventilation may be secured almost anywhere by putting up raises inclined upwards to the west to meet the surface, sub-parallel here to the limestone bed the drift follows. Ore encountered should be followed down also, by small inclined winzes from the drift. If several nearby winzes disclose ore at depth, one of them can be enlarged for use as a hoisting shaft.

Cost of Exploration. Equipment at the property consists of buildings and facilities for a crew of 12 - 15 men;the houses are well-built but need minor repairs. Mining equipment consists of a blacksmith shop with forge, blower, drill-press etc.; a Sullivan model 2-2 class WL60 compressor deliv-

ering 210 cu. ft. free air per minute; a 2 1/2' x 6' receiver; about 600' of rail varying in weight from 8 to 16 lbs. per yard: about 600' of pipe, 1 1/4"-2"; 3 16 cu.ft. mine cars, poor but possibly useable; also other equipment.

A rough estimate of additional plant expenditures needed for 1400 feet of drifting is as follows. All prices are for new material.

60 H.P. gasoline 4 cylinder motor for compressor	$700
2 jackhammers, mounted	800
2 sets hoses	71
1500' of 1 1/2" pipe at 18 cents per foot	270
5 sets shanked and threaded steel for jack bits @ $26 per set	130
1000 jack bits @ 32 cents each	320
3 16 cu.ft. ore cars @ $110 (roller bearings)	330
2800' of 8 lb. rail @ $100 per ton	750
Ties for drifts and dumps, 1150 @ 30 cents	350
Pickup Ford Truck	900
1000 gallon gasoline storage tank	200
Repairs to buildings	400
Miscellaneous	500
	$5320

The cost per foot of the 1400 feet of drifting will increase with the length of tramming but a general average might be $10, or $14,000 for the drifting alone. Since the Incline ore body lay on the upper side of the limestone, crosscuts, preferably along strong east-west fractures crossing the limestone, will be needed from the foot wall drift at intervals. These will average about 70' each and assuming 6 of them give 420', while other incidental driving, crosscutting and raising will probably raise the total to 800', costing say $7000 (raising being cheaper than crosscutting).

The cost then for recommended exploration underground will reach about $21,000 if the full 1400' are drifted out.

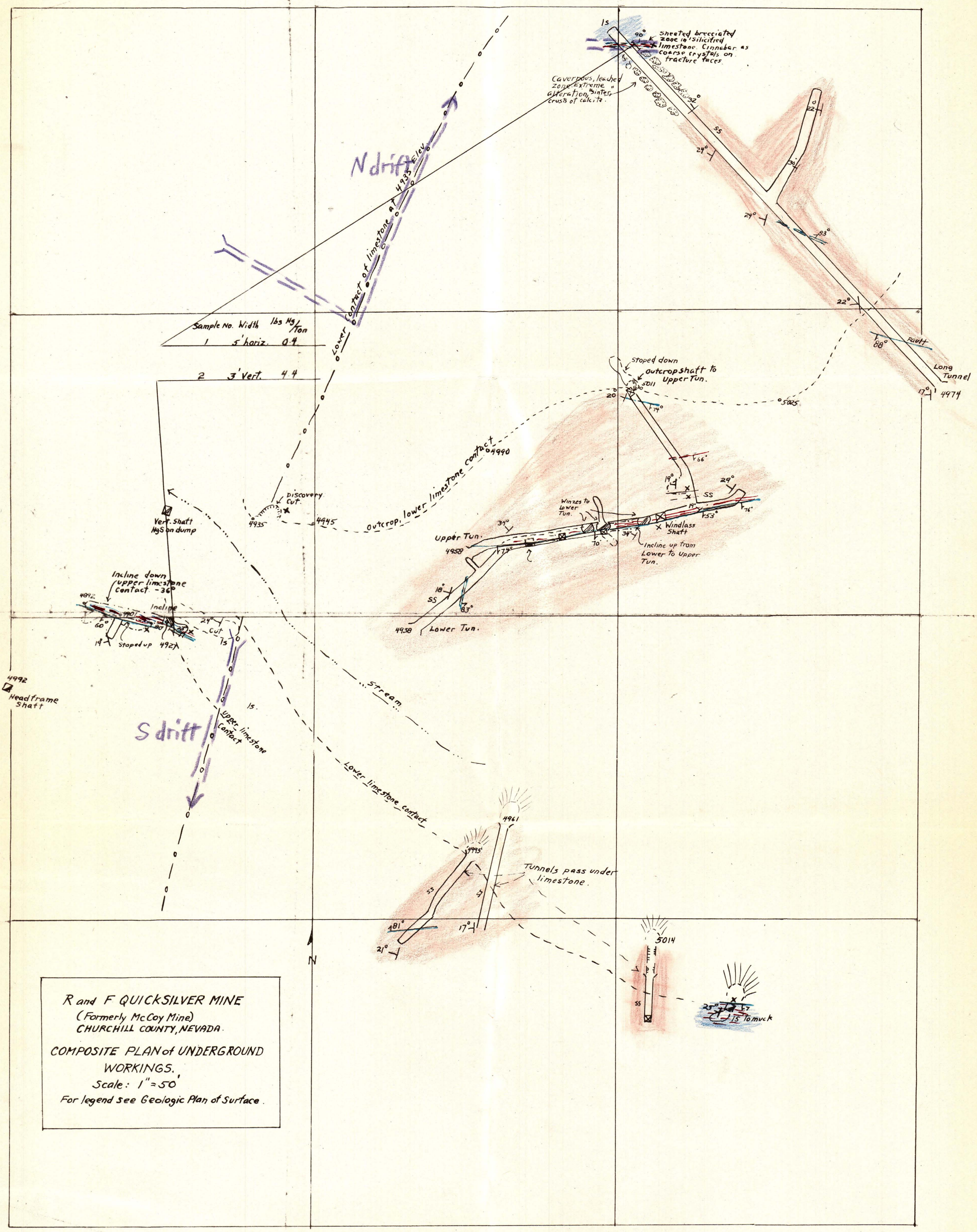
With cost of equipment at $5300, the total cost of this operation will be about $26,000. If ore is found, however, more drifting and raising than outlined may be needed. Adding $4000 for this plus incidentals brings the total expenditure indicated to prove up the property to $30,000.

The Wild Horse quicksilver district, within which the R and F mine lies, shows a very widespread cinnabar mineralization. In contrast to the large area within which cinnabar is found, exploration has been surprisingly limited and the reverse of systematic. Structural conditions at the R and F mine are favorable for the formation of sizable ore bodies; judging by ore mined, the grade of ore found should prove profitable. It seems likely that enough ore may be found before the $30,000 suggested above is expended to justify the erection, either of a retort or furnace; in this case cost of doing the balance of the exploration program should be met out of operating profits.

San Francisco, Calif. Edward Wisser

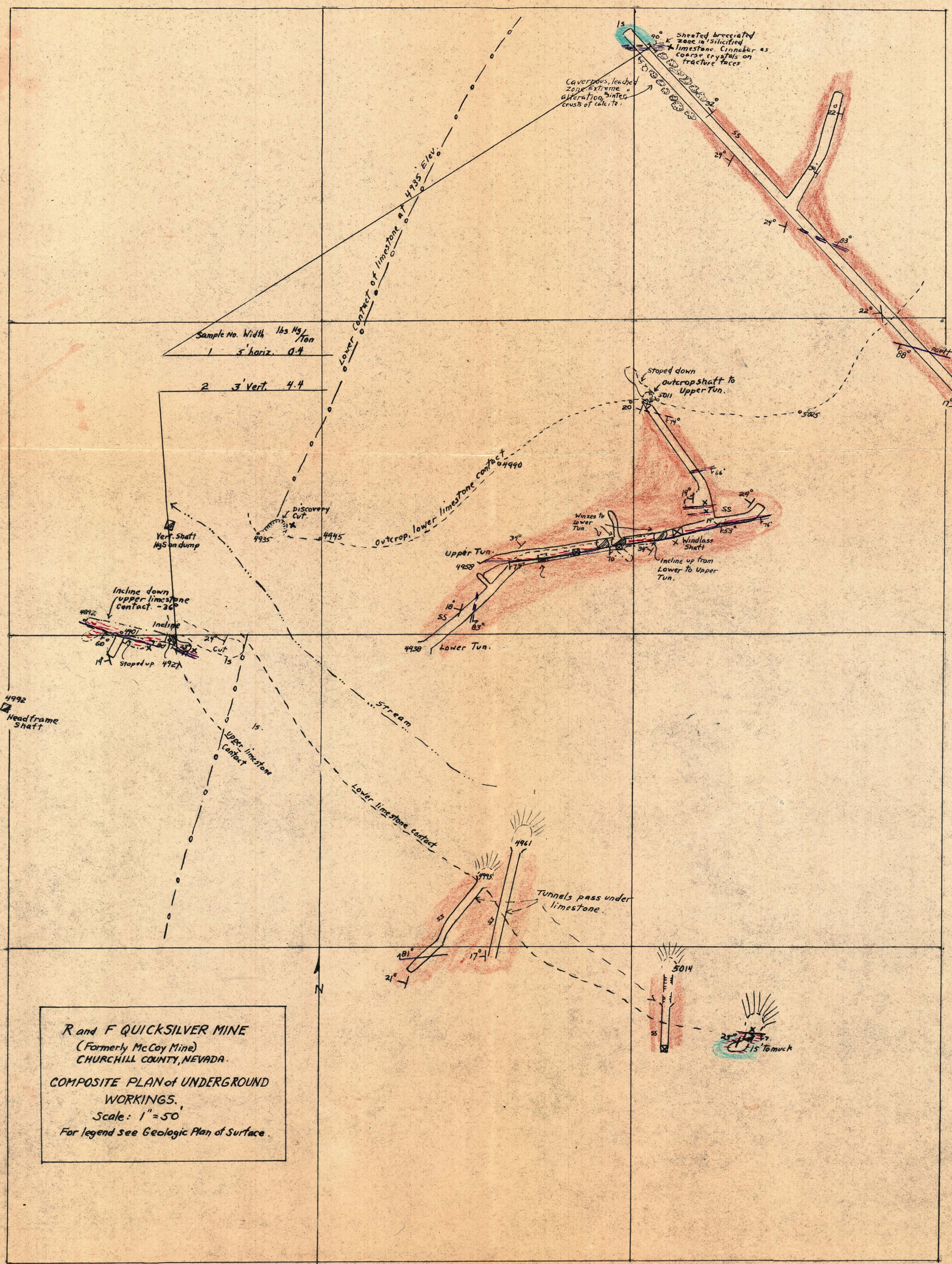
April 15, 1943. Mining Geologist

To Battle Mountain 72 mi.
40' shaft in Conglom H2S
Cover
Long Tunnel
McCoy Mine
Wild Horse Mine
To Eastgate 52 mi.
GEOLOGIC MAP OF WILD HORSE QUICKSILVER DISTRICT, NEVADA
Scale: 1"=500'
0 500'
LEGEND
Rock Formations
Cover (Tertiary rhyolite & fanglomerate):
Middle Triassic
Dolomite TRd 6
Shale TRsh 5
Limestone TRls 4
Lower Triassic
Upper Sandstone TRuss 3
Conglomerate TRc 2
Lower Sandstone TRlss 1
Fault:
Down
Silicified Rock:
Shaft:
Adit:
N



R and F QUICKSILVER MINE
(Formerly McCoy Mine)
CHURCHILL COUNTY, NEVADA.

COMPOSITE PLAN of UNDERGROUND WORKINGS.
Scale: 1" = 50'
For legend see Geologic Plan of Surface.


Sheeted brecciated zone in silicified limestone. Cinnabar as coarse crystals on fracture faces
Caverpous, leached zone. Extreme alteration, "sinter" crusts of calcite.
Lower contact of limestone at 4935' Elev.
Sample No. Width lbs Hg/Ton
1 5' horiz. 0.4
2 3' Vert. 4.4
Stoped down outcrop shaft to Upper Tun.
Long Tunnel
Discovery Cut.
Vert. Shaft HgS on dump
Outcrop, lower limestone contact
Winzes to Lower Tun.
Windlass Shaft
Upper Tun.
Incline up from Lower to Upper Tun.
Incline down upper limestone contact. -36°
Incline
Cut
Stoped up
Lower Tun.
Headframe Shaft
Stream
Upper limestone Contact
Lower limestone contact
Tunnels pass under limestone.
15' to muck
N
R and F QUICKSILVER MINE
(Formerly McCoy Mine)
CHURCHILL COUNTY, NEVADA.
COMPOSITE PLAN of UNDERGROUND WORKINGS.
Scale: 1" = 50'
For legend see Geologic Plan of Surface.