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Item 8

HAL T. HALL
MINING ENGINEER

OUTLINE REPORT ON ECONOMIC ASPECTS OF RAWHIDE, NEVADA

To elaborate on sections and townships of the subject property is unnecessary, since it's location and production of gold in the early 1900's is very commonly known.

This mining property comprises the entire townsite of old Rawhide, Nevada, located in Mineral County about fifty miles southeast of Fallon, Nevada.

In the year 1907 an Indian guided a Mr. Cal Dunning and Rawhide Jack Davis to this location in search of gold and the fabulous results are also very well known throughout the world. Like many of the early mining camps, the concentrated supply of gold near the surface was soon exhausted. The balance that lay beneath was to remain there until more economic methods of recovery were devisedand of probable value in the realm of very much more than that gold which had previously been harvested.

Time to prepare a report in detail of my own immediate direction of a complete examination of this project has been necessarily denied me, but the economic data accompanying this summary, prepared by Mr. Merrill Yost, is complete in engineering information for ultimate production results; and of which I thoroughly concur.

I have checked his sampling of the placer ground and the original hard ore in place, the latter being a separate mining project which I will refer to later, and I find it very consistent. He indicates there to be 10,000,000 yards of placer dredging ground of which 5,000,000 yards has been completely drilled and proven to contain values of at least fifty cents per yard in gold. The total costs, including a ten percent royalty amounts to twenty cents per yard on the proven five million yards or a thirty cent net per yard which makes a net total of $1,500,000. All royalties apply to anend purchase price of $600,000.00 on the whole property at Rawhide consisting of the hard rock as well as the dredging ground.

The probable 5,000,000 yards of dredging ground mentioned above, as a result of good but sporadic drilling and sampling shows values of at least 35¢ per yard not counting the probable scheelite content. With the costs removed it would indicate a net of 15¢ per yard or a total of $750,000. A total net profit of the ten million yards dredged would amount to $1,850,000. This dredging program will have dug out the total yardage in four years.

There is one other enhancement to this program not considered in the above figures. Just recently a more thorough checking of the sample holes by the writer indicates a probable 15¢ to 25¢ per yard in scheelite and needless to say this would boost the net appreciably.

The hard rock ore in place, above the dredging ground, presents a potential in gold difficult to imagine. Due to a very thorough examination and sampling by Mr. Merrill Yost, he effected 80,000,000 tons of ore with minimum values in gold of $2.15 per ton.

From my personal observations I have gained enough information to assure me that a thorough examination of this orebody is completely and economically warranted. Owing to the magnitude of this deposit and with recent histories of successful large capacity production in the industry and with ores of a similar nature and value, it would suggest an economically feasible operation of this project.

The gold values are within a very large area of what visually appears to be a highly altered Rhyolite. The fineness of the gold is almost microscopic and lays in the fractured planes or boxwork designs throughout the orebody and occurs in widths from several feet to infinitely small seams. The gold is free, but very fine. and there appearsto be no deleterious factors which would not lend itself to cyanide treatment.

In addition to the gold values in this ore, considerable amounts of silver are conspicuous in most of this area and this was not considered in Mr. Yost's estimate of the minimum values of gold per ton. It would be reasonable to assume there is an equal value of silver as the gold per ton.

This would also further the advisability of con-
idering cyanide reduction.

Much more interesting and important data could be set forth here about this huge ore deposit, but it would not enhance it's value any more at this point. Basically the economics can only be proven by a thoro engineering exploration and now this is the first order of the program.

A great deal of the information in this outline is from my own observations and some from Mr. Merrill Yost whom I have personally known for the past thirty five years. He is commonly known to be a very reputable man of sound judgement and of highest integrity. He can stand on a record of having had a repetition of successes during this whole period in placer and dredging acticities.

Accompanying this outline are Mr. Yost's cost estimates.

RESUME COSTS

DREDGING and FIELD OPERATING COSTS

9 - cu. Ft. Dredge - 10,000 Bank Yards ^{3} 24 hours

Personnel:
18 men

6- Winchmen (Mechanics)	@ $3.75 per hr.		$180.00
6- Oilers	@ 3.00 per hr.		144.00
3- Jig Men	@ 3.50 per hr.		84.00
2- Sand Plant Men	@ 3.50 per hr.		56.00
1- Timekeeper (Utility)	@ 3.50 per hr.		28.00
18		Per Shift	$392.00
		20 day Mo.	7840.00
Dredgemaster		per Mo.	650.00
Superintendant		per Mo.	750.00
Total field labor cost per month			$9240.00
Repairs, Upkeep & Replacements			8000.00
Power (Est.?)			4500.00
Add 20% Administration, Etc.			4348.00
Total Field operating cost 20 da month			$26088.00

* * * * * * * * *

In proven dredge yardage - - - -35¢ Free Gold Yd.
Concentrate values in yardage 15¢
Total gold per Yd. 50¢ per yard^3.

Probable WO3 15¢
Probable net total 65¢ per yard^3.
The WO3 content is not considered in operational profit figures herein.

Summation:

5,000,000 Proven yards^3 @ 50¢ per yard^3

Field costs 200,000 Yds^3 per 20 da mo.	15¢ per yd.
Royalty 10% of 50¢	5¢ per yd.
Total Operating cost	20¢ per yd.
Net per yard^3	30¢ per yd.

5,000,000 Yards^3 @ 30¢- - - - - - - - - - $1,500,000.00

COSTS

Dismantling, moving in and setting up 9 cu.foot dredge. 10,000 bank yards^3 in 24 hours.

Dredge cost	$50,000.00
Dismantle	25,000.00
Hauling	40,000.00
Erection	45,000.00
Revamp	30,000.00
Initial preparation	5,000.00
5½ Mile Pipe line (new)	70,000.00
Camp	10,000.00
Shop	10,000.00
Sand Plant Mill	10,000.00
Power	20,000.00
Rolling Stock	6,250.00
Insurance, etc.	5,500.00
Engineering & Supervising	10,000.00
Add 15% Contingencies	16,837.00
Allow 1 month working capital	25,000.00
	$378,587.00

Merrill Yost

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P

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T: BATES

REPORT ON

THE RAWHIDE LODE - PLACER

DEPOSITS IN MINERAL COUNTY, NEVADA

Toronto, Ontario.
November 10th, 1967.

James A. Bates, B.Sc., P.Eng.
Watts, Griffis and McOuat Limited.

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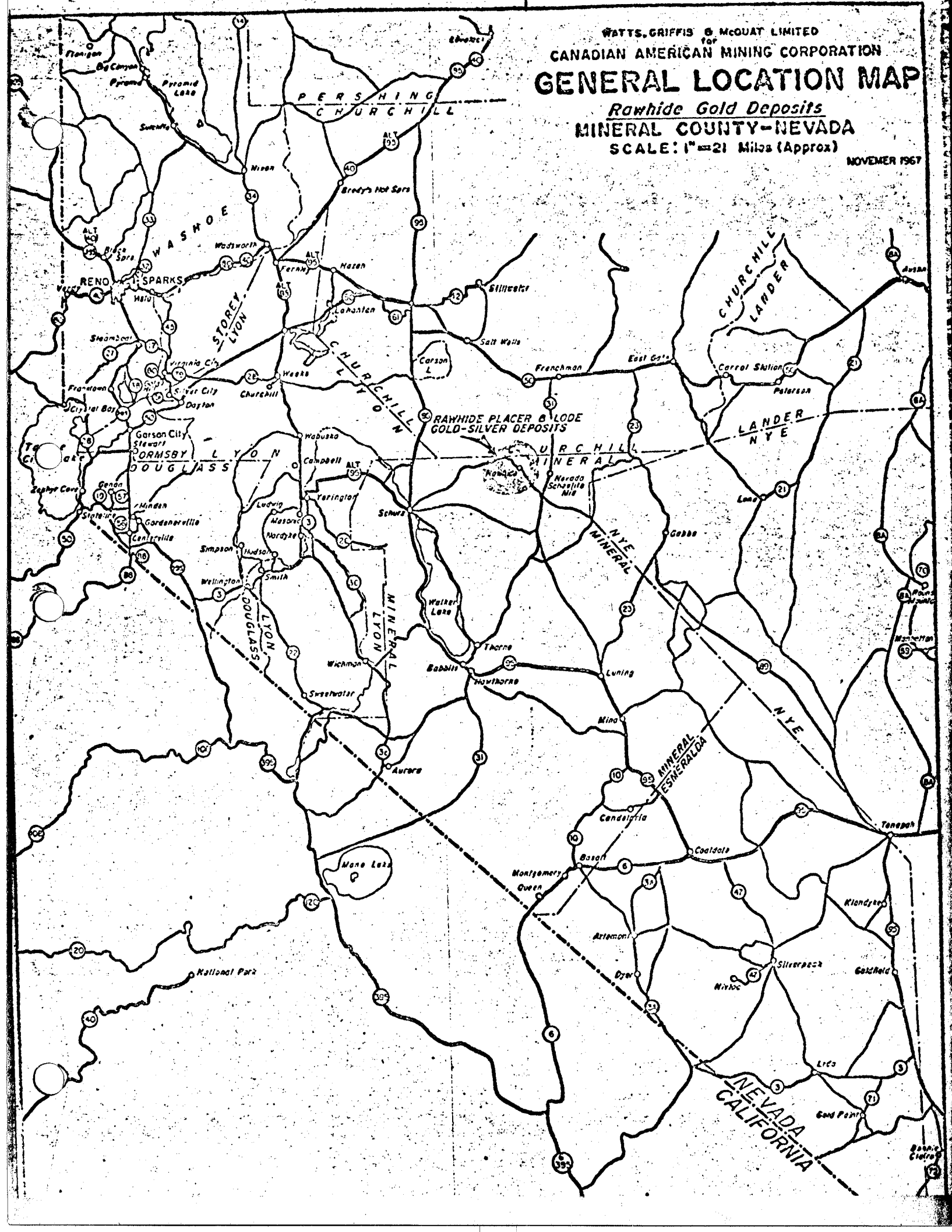
WATTS, GRIFFIS & McQUAT LIMITED
for
CANADIAN AMERICAN MINING CORPORATION
GENERAL LOCATION MAP
Rawhide Gold Deposits
MINERAL COUNTY-NEVADA
SCALE: 1" = 21 Miles (Approx)
NOVEMBER 1967
RAWHIDE PLACER & LODE
GOLD-SILVER DEPOSITS
PERSHING
CHURCHILL
WASHOE
STOREY
LYON
CHURCHILL
CHURCHILL
LANDER
LANDER
NYE
CHURCHILL
MINERAL
NYE
MINERAL
DOUGLASS
LYON
MINERAL
LYON
MINERAL
ESMERALDA
NYE
NEVADA
CALIFORNIA
RENO
SPARKS
Wadsworth
Fernley
Hazen
Fallon
Big Canyon
Pyramid
Pyramid Lake
Nixon
Brady's Hot Spgs
Sutcliffe
Steamboat
Virginia City
Gold Hill
Silver City
Dayton
Crystal Bay
Carson City
Stewart
Genoa
Zephyr Cove
Minden
Gardnerville
Centerville
Stateline
Wabuska
Campbell
Yerington
Ludwig
Mason
Nordyke
Simpson
Hudson
Smith
Wellington
Schurz
Walker Lake
Wichman
Sweetwater
Aurora
Mono Lake
National Park
Stillwater
Salt Wells
Lahontan
Carson L.
Churchill
Weeks
Frenchman
East Gate
Rawhide
Nevada Scheelite Mill
Gabbs
Luning
Hawthorne
Babbitt
Tacna
Mina
Candelaria
Coaldale
Basalt
Montgomery
Queen
Artemon
Dyer
Nivloc
Silverpeak
Goldfield
Klondyke
Tonopah
Lida
Gold Point
Basin Cabins
Austin
Carroll Station
Peterson
Lone
Millerton
Mountain City
Owyhee
Jackpot
Wells
Contact
Golconda
Battle Mt.
Lovelock
Fernley
Hazen
Fallon
Reno
Sparks
Carson City
Fernley
Fallon
Hawthorne
Tonopah
Goldfield
Beatty
Las Vegas
Ely
Austin
Eureka
Winnemucca
Lovelock
Battle Mt.
Elko
Wells
Jackpot
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Gabbs
Schurz
Yerington
Ludwig
Mason
Nordyke
Simpson
Hudson
Smith
Wellington
Campbell
Wabuska
Genoa
Zephyr Cove
Minden
Gardnerville
Centerville
Stateline
Carson City
Stewart
Dayton
Silver City
Gold Hill
Virginia City
Steamboat
Crystal Bay
Fernley
Hazen
Wadsworth
Nixon
Brady's Hot Spgs
Sutcliffe
Pyramid
Pyramid Lake
Big Canyon
Fallon
Reno
Sparks
Verdi
Hallu
Lahontan
Stillwater
Salt Wells
Frenchman
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Carroll Station
Peterson
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Gabbs
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Nevada Scheelite Mill
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Yerington
Campbell
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Hudson
Simpson
Nordyke
Mason
Ludwig
Smith
Wellington
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National Park
Babbitt
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Austin
Eureka
Winnemucca
Lovelock
Battle Mt.
Elko
Wells
Jackpot
Owyhee
Mountain City
Millerton
Lone
Carroll Station
Peterson

SUMMARY

The Rawhide placer and lode gold-silver deposits, located in the northern part of Mineral County, Nevada, show good potential for making profitable mining operations, based on reports of previous work.

The recommendations and conclusions presented here are based on an examination of the area by J. A. Bates in October, 1967, and reports by F. C. Schrader of the Nevada Bureau of Mines on work he did from 1911 to 1920, M. Yost's report for Consumnes Gold Dredging Company in 1951-52, and J. B. Canada's report for Yuba Consolidated Gold Dredging Company in 1960. Extensive sampling and testing was done and reported on by both M. Yost and J. B. Canada.

The placer deposit has been tested over a distance of 6,600 feet. Results of this testing, as reported on M. Yost's placer map, give 3,600,000 cubic yards, with a head assay of $1.10 (U.S.) in gold. Recoverable gold from this, by gravity concentration, is said to be $0.41 per cubic yard. Panning of dry wash tailings showed the placer to be high in scheelite, and recoverable scheelite is indicated. Included in the area held under option are extensive placer deposits down slope from the tested area, which have not been recently tested. This area is reported to have been worked by dry-wash operators many years ago.

It is recommended that an additional twenty test holes be put down to verify testing results presently reported, develop additional reserves, and establish recovery of the gold and scheelite values. A placer operation is considered to be justified if a reserve of 5,000,000 cubic yards of $0.45 recoverable values is proven. The cost of doing this supplementary testing is estimated at $24,000 (U.S.), of which the U.S. Federal Government will pay 75%.

If grade and tonnage are proven, a nine cubic foot bricket line dredge located at Briggs, California, should be purchased for the dredging operation. This dredge has been inspected and is adequate for the job, subject to some additional equipment being added. The dredge is owned by Yuba Consolidated Gold Dredging Company and is for sale. It is estimated that it could be bought, moved, assembled, and put in operation for $525,000. Included in this figure is the cost of bringing power from Nevada Scheelite, five miles distant, and water from Alkali Flats - a distance of five and one-half miles.

Assuming that the reported recovery of $0.41 per cubic yard is obtained, and that $0.15 per cubic yard in scheelite is also recovered, five million cubic yards of gravel would give a gross return of $2,800,000 and a net return, after payback of capital, operating costs, and royalties, of $1,200,000, based on an estimated operating cost of $0.15 per cubic yard. This would be over a period of 1.4 years. At this point, the dredge and all services would be paid for and a much lower grade placer operation would be justified.

Lode deposits of gold and silver-bearing rhyolite rocks occur at Rawhide in Murray, Balloon, Grutt, and Hooligan Hills, and in the valleys between the hills. These hills were mined extensively from 1907 to 1920 for high-grade ore. Sampling of the old workings and waste dumps and limited diamond drilling, as reported by Merrill Yost of Consumnes Gold Dredging Company and J. B. Canada of Yuba Consolidated Gold Dredging Company, confirms earlier reports by F. C. Schrader, that the rhyolite mass carries values, in addition to the high-grade replacement veins which were worked at in the early 1900's. The limited amount of work done by Yuba ($17,000 programme) checked closely with results reports by Yost in 1951-52. Canada concludes that 7 - 10 million tons of $3.00 to $4.00 ore are indicated from the work he did. In discussing this projection with him, he confirms that funds were not available to develop the potential of the deposit as Yuba was in the process of going bankrupt at that time.

A programme of diamond drilling, bulk sampling, and metallurgical testing, to cost $580,000 (U.S.), is recommended and considered justified from results reported to-date. The U.S. Federal Government will pay 75% of this cost, leaving a balance of $145,000 payable by the owners. This programme would be intended to prove up an orebody or orebodies at Rawhide of 20,000,000 tons plus, grading $2.90 to $3.00 minimum, which would be amenable to a quarry operation.

By using conveyor tunnels under the orebodies, and conveyor transporting the ore to the mill, a low cost quarry operation would be maintained. Early reports indicate the ore is amenable to cyanidation. Similar rhyolite gold ore is being treated at Orondo Mine in California, at about one-half inch crushed size and with about a 24-hour leaching time. A low cost milling operation is anticipated for this ore.

It is estimated that an operation, based on the above assumption, and 10,000 tons per day through the mill, would cost $1.33 (U.S.) per ton milled. To bring this operation to the point of a producing mine would require capital of $17,500,000 (U.S.). At a grade of $2.90 per ton, the capital would be paid back in four years. It is therefore concluded that a minimum of 20,000,000 tons of $2.90 ore should be the objective of the recommended exploration programme.

The area outlined by the hills at Rawhide would give a much greater tonnage reserve than this if average grade will allow mining all the rhyolite in the known ore zone. It may be that certain areas are too low-grade, and if this is the case, several quarries would be operated. These could all feed to a central conveyor system below the proposed mining level.

Not nearly enough work has been done on these deposits to establish tonnage and grade. The possibility of developing the required ore to make a big, low-grade mine is promising. Other areas in the hills adjacent to Rawhide have a history similar to that at Rawhide, and the low-grade potential of this much larger area should be investigated.

OBSERVATIONS AND CONCLUSIONS

(1) Placer

The Placer deposit at Rawhide has been tested by the Consumnes Gold Dredging Company of California from Balloon Hill southerly to a point south of Murray Hill. The reported averaged total gold was $1.10 per yard, of which 41¢ would be recoverable in a dredging operation. On an inspection trip to the property in October of 1967, it was found that free gold showed up in every pan of dry wash tailings tested. It was also observed that the heavy minerals in the bottom of the pan contained considerable scheelite. Additional testing is required to verify the gold recovery, determine the scheelite value recoverable, and expand the indicated reserves, before committing the Company to a dredging operation.

History of the area shows that gold values continued for a distance of at least four miles towards "Alkali Flats" and this area was worked intermittently by dry-washers. This ground is all under option to Canadian American and is considered an excellent prospect area for additional testing.

Testing to-date indicates 3,600,000 cubic yards of sand and gravel and the chance of increasing this to five million yards or more is excellent.

A gold dredging operation is justified if five million cubic yards of placer material running 45¢ in recoverable value can be proven. If a lower value is established, the indicated yardage would have to be increased.

(2) Lode Deposits

The Rawhide gold deposits in the rhyolites of Murray, Balloon, Grutt and Hooligan Hills carry gold and silver values in fractures in the rocks and in the rhyolite rock mass itself. Testing by Yuba Gold Dredging in 1960 was incomplete, but indicated large tonnages of about $3.00 rock could be proven. The results of Yuba's work gave a very close check on sampling done by Merrill Yost for Consumnes Gold Dredging Company in 1951-52.

The continuity of ore deposition is further indicated by the report of F. C. Schrader, in which he states that in 1910, each lease was 300 feet by 300 feet, and over 90 shafts were sunk in an area of one-half mile diameter. The miners in those days were mining high-grade. On the lower grade, at which a quarry operation can work today, this entire area might be minable at a profit.

The Rawhide area is only a small part of a much larger area of gold deposition, extending six miles long and two to three miles wide. Because of the extremely high-grade showings at Rawhide, it has received more publicity in the past. Other adjoining areas described in Schrader's report could be of equal potential for a low-grade quarry operation and should be investigated. The rhyolite at Rawhide is said to continue down the valley towards "Alkali Flats" and this region could also be of future interest.

It is concluded that a mining operation is justified if a minimum of 20 million tons of $2.90 (U.S.) per ton (recoverable in gold and silver) can be proven. This is based on the assumption that the deposit is suitable for quarrying and metallurgical testing shows that the ore is amenable to cyanidation with a coarse grind.

RECOMMENDATIONS

(1) Placer

(i) An additional twenty test holes should be drilled on the Placer deposit to verify previous drilling, establish recoverable gold and scheelite values, and increase reserves from the presently indicated 3,600,000 cubic yards to a minimum of 5,000,000. Estimated cost to do this work is $24,000 (U.S.) of which the Federal Government will pay 75% for gold and silver exploration.

(ii) If this minimum reserve is established with a recoverable value of 45¢ or more in gold and scheelite, the nine cubic foot dredge should be purchased from Yuba Consolidated Gold Dredging Company, and a dredging operation commenced on the Rawhide Placer.

(iii) Testing should be continued after the dredge operation starts returning capital to determine the value of the remaining very large placer area held under option. An adjacent placer joins the main wash about a mile south of Rawhide, and this valley should also be checked out.

(iv) If testing of the placer is successful, a staking rush can be expected. All potential placer ground in the area should be checked by panning, and either staked, or if held, options worked out with the staker, before a staking rush develops.

(2) Lode Deposits

A diamond drilling programme should be planned to cross section Murray, Balloon, Grutt and Hooligan Hills and the intervening valleys. This might be done at 400-foot intervals intially, and then be followed by fill-in holes.

A copy of F. C. Schrader's mapping of the old mine workings should be obtained from the Nevada Bureau of Mines. This distribution of the mine workings will indicate the disposition of the ore to some extent. From a study of the old mine workings, and results from initial diamond drilling a programme of bulk sampling should be planned. To-date, it has not been possible to obtain the sample map from the work done by Yuba Consolidated. Detail of this work would also assist in planning the sampling.

The bulk sampling, taken from the walls or backs of the old drifts, and run through a sample plant, should, in conjunction with diamond drilling, prove the grade and tonnage available for mining.

Costs for this work have been estimated at $580,000 (U.S.), of which the U.S. Federal Government will pay 75% and the balance of $145,000 (U.S.) would be at Canadian American's expense.

At an early stage in this exploration programme, all open ground in the area of old mining operations should be staked. Ownership of ground held as patented claims should be negotiated.

Representative samples from the various types of ore should be sent for metallurgical testing. The results of this testing should then be applied to a mill operating cost estimate for comparison with the figures presented in this report.

Respectfully submitted,

WATTS, GRIFFIS AND McOUAT LIMITED,

Toronto, Ontario.
November 10th, 1967.

James A. Bates, B.Sc., P.Eng.

INTRODUCTION

This report is written for Canadian American Mining Corporation and covers the placer and lode gold-silver deposits at Rawhide, Mineral County in the State of Nevada.

Information contained in this report is established from an examination of the properties by the writer in October, 1967, and discussion with Mr. Merrill Yost, who did extensive surface and underground sampling of the deposits in 1951 - 1952. In 1960, Yuba Consolidated Gold Dredging Company did additional placer and lode sampling, reported by John B. Canada, under whose supervision the work was done. His test results agree quite closely with the results obtained by Mr. Yost . and conclusions presented here are heavily weighted on the results of the Yuba test work. The Yuba work has been discussed in some detail with Mr. Canada.

The history and geology of the area is based on detailed work done and reported on by Donald C. Cross in Bulletin 58, Nevada Bureau of Mines, and an eighty page report on the Rawhide area by a Mr. F. C. Schrader. The report by Schrader was never published, but a photostatic copy was obtained from the University of Nevada in Reno. This report is undated, but the field work was done by Schrader from 1911 to 1920. In it he has reported in detail on the major underground workings from 1907 to 1920. Maps of the underground workings were examined at the University, but to-date, have not been obtained for detailed study. Status of the claims is as outlined by Mr. Horace Dunning, an attorney in Sacramento, California.

LOCATION

The Rawhide gold area is situated at 118°22' of longitude and 39°05' of latitude, 4 1/2 miles beyond the limit of Nevada State Highway 31, a hard surfaced road which terminates at the Nevada Scheelite Mine. A dirt road gives access from Nevada Scheelite to the property, as shown on the location map in this report.

The nearest town connected by good road is Fallon, a farming town of 8,000 people about 50 miles distant. The Company town of Gabbs is about thirty miles distant, accessible by dirt road across alkali flats. The Southern Pacific Railway runs through the town of Shurz, 25 miles to the west, and a spur line of the railway services the town of Fallon.

PROPERTIES

The patented mining claims covering the lode area are under option to Canadian American and may be purchased outright over a five-year period for a total of $ 600,000.

The placer claims are under option to Canadian American on the basis of a 10% royalty on recovered gold and silver, and a 5% royalty on the recoverable tungsten content.

A list of these claims is as follows:

1. Patented claims as shown on the map of Township No. 13, North Range No. 32, East of the Mount Diablo Meridian, Nevada.

1.	Survey No. 3450	Davis and Dunning	Lode
2.	Survey No. 3450	Early Bird	Lode
3.	Survey No. 3450	D. & D.	Lode
4.	Survey No. 3450	Nevada Umpah	Lode
5.	Survey No. 3450	Nevada Umpah No. 1	Lode
6.	Survey No. 3450	L.M. No. 1	Lode
7.	Survey No. 3450	L.M. No. 2	Lode
8.	Survey No. 3450	Bald Hornet	Lode
9.	Survey No. 3450	Bald Hornet Fraction	Lode
10.	Survey No. 3457	Grutt Fraction	Lode
11.	Survey No. 3459	Grey Eagle Fraction	Lode
12.	Survey No. 3464	Rawhide	Lode
42.	Survey No. 3612	Climax	Lode
43.	Survey No. 3622	Mascot	Lode
44.	Survey No. 3622	Mascot No. 1	Lode
45.	Survey No. 3637	Owl No. 1	Lode
46.	Survey No. 3637	Owl No. 2	Lode
47.	Survey No. 3637	Owl No. 3	Lode
48.	Survey No. 3637	"400"	Lode
49.	Survey No. 3637	Oriole	Lode
50.	Survey No. 3637	Dolly Varden	Lode
51.	Survey No. 3637	Dolly Varden Fraction	Lode
52.	Survey No. 3637	Kid Fraction	Lode
53.	Survey No. 3716	Lucky Strike	Lode
58.	Survey No. 3865	Morning Star	Lode

2. Unpatented claims in Townships 12 and 13, Range No. 32 East and extending from Rawhide southerly to Alkali Flats.

These claims are designated as: Gateway, Janet, Frontier, Donna, Jean, Martha May, Baldy, Anna, J. A. C., Alice, Pete No. 1, Goldie, Ruby, Stake, Divie, Cario, Karan, Susan, Susan No. 1, No. 2, No. 3, No. 4, No. 5, No. 6, and No. 7. These claims are held under option from C. Devore.

Two shallow wells and a deep (500-foot) well are located on these claims.

Most of the claims held by Mr. Devore are not included on the claim map presently available. A description of the area covered by Devore's claims, as provided by Mr. Horace Dunning, states that these claims include the placer extension southerly into the broad valley below Rawhide, including the Plummer Shaft area. The Devore claims have not been patented, but necessary assessment work, to keep the claims in good standing, is reported by Canadian American Mining Corporation to have been done.

The potential placer ground is shown on the placer map sheet in the map pocket with this report. The placer remains open and untested to the south. Assay results shown on the map are the results of test work done by M. Yost in 1951 - 1952 and reported by him. Silver values, where shown, are based on silver at 94 cents an ounce. For calculation of possible placer reserves, these values have been up-dated to today's price for silver. Where no silver value is given, Yost did not sample for silver.

The lode deposits include Grutt, Balloon, Hooligan and Murray Hills and the valleys in between these hills. The lode extends out underneath the placer parallel to Murray and Balloon Hills. Yost reports a rock sample taken just north of the Plummer Shaft, six feet in depth, which ran over $ 4.00 in gold. This indicates a continuation of the lode, at least as far south as the Plummer Shaft.

HISTORY

The first silver-gold-bearing veins were reported at the site of the Black Eagle Mine, two miles northwest of Rawhide in 1906. A staking boom followed this discovery, and in three months a town of 1,000 people developed. By 1908 this had expanded to 4,000 people, and high-grade mining operations were in progress over an area two miles wide and five miles long. Mining claims were leased on a 20% royalty basis, with 300 feet square representing one lease.

In 1908, 50,000 feet of development work was completed and nearly 80 percent of it was said to be productive or encouraging. Only $ 30.00 ore or better was considered shipping grade, with gold at $ 20.00 per ounce. Ninety-five headframes are reported within a half mile area.

Early in September of 1908 the town of Rawhide was hit by fire which destroyed most of the business section. This was followed by a flood a few weeks later. By this time it was realized that milling ore, rather than direct shipping ore, was predominant and several gold mills were erected. Most of these mills used gravity concentration, but one mill, the Queen, had a 35-ton cyanide plant. The best recovery reported was 96%.

The lowest grade ore reported being mined is $ 8.00 grade with gold at $ 20.00. Production is reported as continuing intermittently through to 1931. A total of two to six million dollars of gold and silver is reported to have been mined in the area. The Mineral Resources U.S., Part I, 1907 - 1921 reports a production of 68,933 tons of ore containing $ 993,000 in gold and 696,673 ounces of silver was produced from 1908 to 1920.

There is no further record of work in the area until 1951 - 1952 when Merrill Yost from California went in and did detailed sampling of the placer and lode deposits. The results of his work are included in this report. In 1960 the Yuba Consolidated Gold Dredging Company re-sampled as they had the properties under option. This work was done by an engineer, John B. Canada, with the assistance of a geologist, Mr. J. Bishop. The final report written by Canada has been studied and this was followed by a detailed discussion with him regarding his conclusions and the work he performed on the property.

Several of the dry wash workings in the placer are open to bedrock and no caving has occurred. These have undoubtedly been worked intermittently over the years in a small way. A substantial tailings pile down in the flats, five miles from the property, is evidence of some operator having hauled the placer gravel to the nearest water (wells in the flats) for a wet placer operation. The economics of this was not good and the operation is said to have been a complete failure.

The old town of Rawhide, which in 1908 boasted a population of 4,000 people, does not exist today. Evidence of previous operations consists of old headframes, numerous shafts, with the lining still intact, headframes, waste dumps, and many adits in Grutt, Hooligan, Balloon and Murray Hills. The only building left is the jail.

TOPOGRAPHY

The Rawhide area is situated just south of the County Line between the counties of Churchill and Mineral. Mineral County, and the southerly part of Churchill County are characterized by an alternation of linear to irregularly-shaped mountain ranges and irregularly-shaped alluvial valleys. The most prominent range is the Wassuk Range, whose summit is Mount Grant, (11, 239'), the highest point in the county. The lowest point is Walker Lake with an elvation of 3, 993. This gives a maximum relief of 7, 246 feet in a five-mile horizontal distance.

From Nevada Scheelite to Rawhide, the road runs in a westerly direction in a large valley, paralleling a ridge of mountains to the north. A ridge of light coloured limestone hills can be seen in the distance from the Scheelite Mine to within a mile of Rawhide, beyond which point they seem to be eroded away, if they did at one time exist. The metamorphosed limestone contact is said to be the host rock for scheelite which has been extensively mined for many years. The ground steadily rises from the flats, called "dry lake", for 5 1/2 miles to Rawhide, so that over this distance there is an increase in elevation of 740 feet. The road is actually built on alluvial deposition from the hills to the north, known as the Rawhide wash. The valley itself is a broad, flat plain, covering 100 square miles. Hot springs are common in this valley and through to Gabbs to the southeast.

The Rawhide area itself is confined to the low western foot hills with the hills running mostly in a north-south general direction. The elevation of Rawhide, as given by the Survey of the Rawhide Western Railroad, is 5, 012 feet. The tops of the hills are about 200 feet above this elevation.

WATER

There is no water at Rawhide, and the water table underground was not reached at a depth 833 feet, as reported in a boring done by the Rawhide Water Company.

The nearest water is located in the alkali flat, 5. 5 miles from Rawhide. Here the ground water table stands at 150 feet and at Deadhorse well, only 35 feet below the surface. This valley covers 100 square miles in area and contains a great thickness of valley fill as storage reservoirs. It is the lowest part of Gabbs Valley Basin, from which it receives drainage of a very large watershed. The supply from this valley is said to be almost inexhaustible.

The only consumers of this water at the moment are Nevada Scheelite, which a consumption of about 300 g.p.m. and a farmer, who is reported to have recently been given a government permit for 17 irrigation wells. One well in the valley, which is not presently operating, is reported to have been tested at 5,000 g.p.m. This well is presently capped, but has a 12-inch discharge pipe installed. A government permit for water would be required for a mining operation. There should be no trouble in obtaining such a permit.

CLIMATE

The climate at Rawhide corresponds fairly well with the climate of the valley portion of the Carson Sink region. It is characterized by extreme dryness, with a 5-inch annual rainfall, occurring as torrential rains. Warm to hot days and cool nights are typical. Hot weather begins in June and continues to October, during which period "cloud bursts" of great magnitude sometimes occur. Frost can occur in the winter, but no severe temperatures are reported. The golf greens are reported to stay in excellent condition all winter at Fallon, and the game is played twelve months of the year.

Excepting a scanty growth of sagebrush, in the valleys, the surface is almost barren of vegetation.

GEOLOGY

The geology of the area is reported on by Donald C. Cross in Bulletin 58, Nevada Bureau of Mines, and by Schrader in his unpublished work available at the Nevada Bureau of Mines in Reno.

The Rawhide district is underlain chiefly by Tertiary volcanic rocks resting unconformably on the eroded surface of a much older series of rocks consisting of limestone, shale and slate. These are particularly evident east of Rawhide in association with felsic volcanic rocks and are shown as the Excelsior formation of the Middle Triassic, but may be in part correlative with Permian rocks known to occur east of Mineral County. To the west and south of Rawhide a series of Tertiary volcanics occur and outcrop over a large area. These are typified by two prominent mountains, known in the area as Black Eagle Hill and the Pilot Cone. The limestone associated with the earlier sediments was intersected in the deep workings of the Black Eagle mine, two miles west of Rawhide.

Tertiary volcanic rocks underlie nearly all of the Rawhide district, and are by far the most important rocks, as they contain nearly all of the ore deposits. They consist chiefly of a series of superimposed lava flows and associated intrusives forming at least ten formations. They are probably 1,000 feet or more in thickness. The well boring at the northern end of Rawhide intersected 833 feet of these lavas and was still in them.

At the borders of the Rawhide district these lavas thin out and give way to the older sedimentary rocks previously mentioned, resting unconformably on the eroded surfaces of these older and deformed rocks. They probably occupy a pre-Tertiary basin or synclinal valley whose floor slopes southward towards Alkali Flat, about the same as does the present surface.

Following their deposition, the rocks were up-lifted and considerably faulted, fractured and crushed in persistent north-southerly lines and zones. Much of the mineralization has been emplaced along these lines.

The earlier members of the series have been cut, intruded and capped by dykes and flows derived from the later series. The rocks have been variously called quartz porphyry, granite porphyry, rhyolite, breccia and silicified rhyolite.

The following age relationship is given by Schrader starting with the youngest:

Basalt, dykes and flow caps (Quaternary)
Pilot Cone Andesite
Black Buttes Andesite and Basalt
Younger Rhyolite and Dacite
(a) East ridge (Iron Hill) rhyolite, etc., intrusive into Balloon Hill.

(b) Younger Dacite.

(c) Cone Mountain Rhyolite.

Quartz Latite Tuff
Portland Rhyolite
Balloon Hill Rhyolite
(a) Ore-bearing

(b) "Mud" formation

(c) Flow-banded

Hooligan Hill Dacite (Mint Shaft - 400-foot level)

The Hooligan Hill dacite, the oldest of the volcanic rocks, is named because of its prominence in Hooligan Hill, which it largely forms. It also is present in Grutt Hill, Last Chance Hill and in Cone Mountain to the southwest of town. The Prince Shaft in the lower east slope of Hooligan Hill has its lower half in the Hooligan dacite, and its upper half in the Portland rhyolite.

Following the deposition and erosion of the Hooligan Hill dacite, there was deposited at the site of Balloon Hill, Grutt Hill and vicinity, a rhyolitic lava which has come to be known as the Balloon Hill rhyolite. From an economic standpoint, it is the most important formation in the district, as it contains nearly all of the principal ore deposits. Schrader has broken this rhyolite into three classifications.

(a) Principal ore-bearing rhyolite
(b) "Mud" formation
(c) Flow-banded rhyolite

ORE-BEARING RHYOLITE

The ore-bearing rhyolite is supposed to rest unconformably on the Hooligan Hill dacite, but this was not observed. Little is known of its extent and thickness. It is found chiefly in the deep part of the mines. It is typically a grey to whitish, medium grained, massive and in part tuffaceous rock, with minor flow brecciation showing in places. It is at least several hundred feet thick. It seems to have been formed as a normal rhyolite, but has since been hydrothermally and otherwise altered by devitrification, kaolinization, recrystallization, silicification and the development of secondary minerals, that satisfactory determination can no longer be made. The rock has been greatly faulted and crushed, and commonly contains adularia, alunite, jarosite, and wide zones of silicification. A sample from the 500-foot level of the Phoenix Mine was pyritic, with minute cubes and grains of pyrite uniformly disseminated throughout the rock, except that the pyrite is in places concentrated along the walls of the veinlets and zones of silicification and is apparently of late vein or post-vein origin.

"MUD" FORMATION

The "Mud" formation intervenes with irregular contacts between the ore-bearing rhyolite and the flow-banded rhyolite. It is a whitish, light grey and light brown to earth coloured rock, resembling dry mud, from which it is named. It is the darker rock composing the upper ends of Balloon Hill, while the lighter

rock forming the intervening central part and most of the crest of the hill is the flow-banded rhyolite, which normally overlies the ore-bearing rhyolite. The "Mud" formation varies locally from soft and talcy to hard and gritty, and resembles rotten remains of the flow rhyolite, containing fragments of what appears to be this rhyolite. Its contact with the overlying flow rhyolite dips generally to the southeast. In a belt of considerable width, it trends north-south through Balloon and Grutt Hills, varying from soft and friable to semi-hard, and from a few feet to several hundred feet in thickness, as shown by the mine workings of Balloon Hill and vicinity. It is suggested by Schrader that this "Mud" formation is probably an alteration of the flow-banded rhyolite brought about by hydrothermal solutions just the right alkali content to decompose the rock. In the St. Ives Shaft the "Mud" formation extends to a depth of 270 feet below the collar, at which point it gives way to underlying tuff. On the 200-foot level its contact with the overlying flow rhyolite dips 75° toward the south-southeast.

FLOW-BANDED RHYOLITE

Succeeding and overlying the ore rhyolite and the "Mud" formation is the member known as the flow-banded rhyolite which forms the upper middle part of Balloon Hill, where it seems to fill a dish-like depression in the ore rhyolite, and has a thickness extending from the top of Balloon Hill to below the 200-foot level in the mines. It is a dense rock, horizontally banded, and composed predominantly of light-dark bands of varying thickness up to 1/2 an inch thick. The rock has been considerably faulted vertically and re-cemented along the fault planes by quartz and alunite. Partial replacement of feldspar by precious metal-bearing minerals has been observed, in veins, indicating the method of ore forming. Several periods of mineralization are reported, following respective periods of eruption.

PORTLAND RHYOLITE

This rhyolite which either followed the Balloon Hill rhyolite or was contemporaneous with it, forms nearly half of Hooligan Hill, where it is intrusive into the Hooligan Hill dacite, and is the main rock in the eastern, north-central and south-central parts. The Yellowstone Tunnel, 300 feet long, in the eastern end of the Hill, is all in this rock. The rock is a light grey to whitish rhyolite, in part tuffaceous, and weathers rust brown. It is porphoritic and in places contains minute crystals and grains of uniformly disseminated pyrite. The rock is all highly altered hydrothermally, and by weathering. All of the deposits in Hooligan Hill and vicinity are associated with this rhyolite.

QUARTZ-LATITE TUFF

This tuff is widely distributed and reported to be 200 feet maximum thickness. It forms the lower slopes of the hills and ridges, where in places, it weathers into bad land forms, and lower down the slopes it passes beneath the detrital wash of the valleys. Samples examined by Schrader are described as composed of buff and whitish pumiceous fine to medium grained matrix, containing dark brown and slate coloured dense volcanic rock fragments.

This rock is not specifically referred to in the Rawhide geology, and, if present, is probably further down the valley towards the Alkali Flats, under the placer deposits.

YOUNGER ROCKS

These rock types are covered in detail by Schrader and are as listed at the start of the Geology section of this report. No attempt is made here to detail them as they do not appear to any extent in the immediate Rawhide area, and are not of specific interest to the area being discussed in this report.

At the south end of Balloon Hill the East Ridge rhyolite appears as small tongues or dykes intruding the ore rhyolite. It does not appear to be genetically connected with the ore deposits.

ORE DEPOSITS

The ore deposits, for which Rawhide is noted, occur as silver-gold deposits in the Tertiary volcanic rocks, chiefly in the rhyolite. The area under discussion in this report covers Grutt, Balloon and Murray Hills and south to the Plummer Shaft and Hooligan Hill.

The Balloon Hill zone is known to extend for three miles in a north-south direction and is one mile wide. The Hooligan Hill, or middle zone, adjoins the Balloon Hill zone, as shown in the area maps accompanying this report.

In the Balloon Hill zone, bodies of good grade milling ore have been reported from 5 to 30 feet wide. In the Hooligan Hill zone many small, but rich veins, were mined. Mining has been done to a maximum depth of 800 feet. The top 400 to 500 feet are regarded as a sulphide-leached zone, and most of the mining was done in this zone as the drillers panned the drill cuttings for grade control.

The lower sulphide zone below 400 feet did not lend itself to this type of control and, therefore, in many cases was not mined. The Keystone drill hole put down at the north end of Rawhide to a depth of 833 feet, cut sulphides and the mud rock rhyolite formation at 420 feet and continued in the mud rock to bottom. Much sulphides were reported in the last 400 feet, but no valuable metal. It is possible that the cuttings in this hole were panned and the sulphides may not have been fire-assayed.

Ore deposition was attended by profound hydrothermal alteration of the wallrock and mineralization including devitrification, silicification, kaolinization, and alunization. Sporadic orebodies are associated with brecciation of the rock. In the Balloon Hill zone of mineralization, particularly in Grutt and Murray Hill, many of the veins trend north to north-northeast diagonally across the trend of the zone. All except two of the veins dip steeply west.

The chief ore minerals in the oxidized zone are cerargyrite, pyrite, native silver, native gold, and electrum and in the sulphide zone argentite, proustite, pyrargyrite, pyrite, gold and electrum. The new gangue minerals resulting from the hydrothermal replacement are adularia, alunite, jarosite, kaolin, pyrite, pyrrhotite, quartz and calcite.

Early ore from the oxidized zone was reported to average three parts of gold to one part of silver. However, certain areas of extremely high-grade silver were mined and a random sample off one of the old dumps ran 0.56 ounces gold and 21.4 ounces silver.

With reference to Hooligan Hill, Schrader states "The gangue contains fragments of rock in part replaced or enriched by ore". The sequence of events in ore deposition seems to have been:

1. Shattering of the dacite.
2. Mineralization along the fractures by siliceous ore-bearing solutions.
3. Intrusion of the Portland rhyolite accompanied or followed by faulting, brecciation, and re-opening of the deposits previously formed in dacite.
4. Mineralization in both the dacite and rhyolite, that in the dacite being the second period of ore deposition.

Schrader makes many references to values extending into the walls. In Hooligan Hill he states "Along most of the ground stoped and mined, nearly all of the country rock left standing on either side for a considerable width ran $ 3.00 to $ 6.00 to the ton". These values were in 1913 when gold was $ 20.00 per ounce

and silver was about 60 cents per ounce. This rock was not mined and considered sub-grade. What is referred to as the "Main Ore Zone" fifty feet wide, 1,000 feet long and 200 feet deep was quoted to be considered "minable at a handsome profit".

In 1930, it was reported that the Hooligan Hill deposits in general maintained their replacement-stockwork character downward, but at depths of about 300 - 400 feet they became leaner.

MINERALS IN RAWHIDE DISTRICT

Adularia (valcencianite), Almagen, Alunite, Argentite, Azurite, Barite, Calcite, Caledonite, Cerargyrite, Chalcedony, Chalcopyrite, Copper (native), Covellite, Electrum, Galena, Gold (native), Gypsum, Halloysite, Hematite, Hisingerite -- hydrous ferric-iron silicate --, Jarosite, Kaolin, Leverrierite, Limonite, Magnetite, Malachite, Marcasite, Molybdenite, Naumannite, Opal, Paligorskite, Proustite, Psilomelane, Pyrargyrite, Pyrite, Pyrolusite, Pyrrhotite, Quartz, Silver (native), Sphalerite, Stibnite (Czar Hill), Tellurium.

RESERVES

1. Placer

The placer deposits overlie the rhyolite in the valleys east and west of Balloon and Murray Hills and continue for 5 1/2 miles to Alkali Flats, widening in the Plummer Shaft area below it to one-half mile wide. Schrader reports two periods of testing up to the early thirties, with no reason given for the fact these placers were not worked. Gold was present over the area tested, but test results are not available. The owners at that time reported 100,000,000 cubic yards at depths to 90 feet with 50 cents recoverable gold.

The Consumnes Gold Dredging Company did extensive testing in 1951, this work having been done by Merrill Yost who has a lifetime of experience in dredging operations. The results of this test work are shown on the placer map accompanying this report, and it is on these results that recommendations for additional work are based. Information on hole depth is missing on some holes and some of the holes were not assayed for silver, so values are not accurate to this extent. The assays shown are for total gold value. A figure of 41 cents per cubic yard of recoverable gold is the average he arrived at by treating the material from the test holes. High values are lost in the tailings on this type of operation.

In making an examination of the placer, samples were taken from the old dry wash workings and panned. Invariably, free gold was obtained from the panning. In the heavy concentrate from the panning, scheelite showed up under ultra-violet light, and from the quantity observed, could run from 0.25 pounds to 0.5 pounds per cubic yard.

Additional testing on gold, silver and scheelite content in the placer is required. Calculations presented here are considered conservative; more scheelite is thought to be recoverable than is allowed for at this time in placing a dollar value on the deposit.

A calculation of grade and volume was done from the test results shown on the placer map, enclosed in this report, using sections one to thirteen as being the limits of the placer, and not including quantities to the east of Murray Hill or west of the dotted outline. A total quantity of 3,600,000 cubic yards averaging $ 1.10 in gold was calculated. The placer deposit is open to the south for a distance of five miles, and with more testing, the reserves might be increased many times over. The valley broadens and the depth increases to 90 feet from the Plummer Shaft south to the Alkali Flats. The one high value of $ 5.56 shown near the Plummer Shaft is significant, but has not been used for calculations. It does indicate that this area also should be tested in detail.

2. Lode Deposits

Extensive sampling of the underground workings and surface shaft dumps was done in 1951 - 1952 by Merrill Yost, and in 1959 - 1960 by Yuba Consolidated Gold Dredging Company. The results of the sampling done in 1951 - 1952 are as shown on the Rawhide map in this report.

The initial Yuba work, as reported in the final report by John B. Canada, consisted of sampling 50 waste dumps, surface sampling on Murray Hill, and sampling of the Grutt Cross-cut Tunnel on the east side of Murray Hill. This sampling (on 270 individual samples) averaged $ 3.18. The sampling was followed with diamond drilling. Holes H-1 and H-2 were drilled in Hooligan Hill, with indeterminate results reported (no assays quoted in the report). Another hole B-3, was drilled at 30° on the southwest end of Balloon Hill, and this hole, for its entire 243 feet averaged $ 3.30 and bottomed in $ 16.00 ore. Two 30° holes were put down in the northwest flank of Murray Hill. M-4 showed 92 feet of $ 2.53 material, with the bottom 65 feet averaging $ 3.36, the last assay being $ 5.17, and M-5 apparently drilled along a fault zone cut 33 feet of $ 1.63 material at the bottom.

While this drilling was going on, considerable dump sampling was done on Hooligan and Balloon Hills and extensive underground channel sampling was accomplished on Hooligan and Murray Hills, with one shaft on Balloon Hill also being sampled.

The last work done by Yuba was the drilling of Diamond Drill Hole M-7, a few feet north of the portal of the Grutt Cross-cut in Murray Hill, on a bearing of N 70° W and a dip of 45°. This hole was stopped at 146 feet as core and sludges averaged less than $ 1.00.

With a total expenditure of about $ 17,000 to explore this very large deposit, Yuba engineers concluded the following. "The Rawhide deposit, from present evidence, has more the earmarks of ultimately developing on the order of seven to ten million tons of $ 3.00 - $ 4.00 ore, in a half dozen or more smaller pits. The breccia ores on Murray and Balloon Hills do not appear to carry values materially greater than the rhyolite ores".

In discussion with J. B. Canada, he agrees that not nearly enough work was done. At the time the work was in progress, the Yuba Consolidated Gold Dredging Company was going bankrupt, and Canada was forced to terminate the programme as no more funds were available. It is significant that three diamond drill holes terminated at shallow depths in high-grade ore. It has been confirmed by Canada that money was not available to deepen these holes.

BRECCIA SAMPLING SUMMARY

(Reported by Yuba)

BALLOON HILL

* WRIGHT			YUBA		
No. of Samples	Range	Average	No. of Samples	Range	Average
70	$1.34 - $10.27	$2.57	-	-	-
7 (S 1/2 of hill)	1.52 - 10.27	3.27	7 (S 1/2 of hill)	$1.23 - $6.93	$3.45

MURRAY HILL

* GRUTT			YUBA		
No. of Samples	Range	Average	No. of Samples	Range	Average
8 (small area) (3 High-grade Not Included)		$3.01	6 (scattered)	$1.20 - $5.06	$2.95

* Reference to Wright and Grutt sampling not explained

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REPORT NO. T-09107

SAMPLE(S) FROM Watts, Griffis & McOuat,
Suite 911,
159 Bay Street,
Tornnto, Ontario.

Attn: Mr. J.A. Bates

SAMPLE(S) OF ROCK

Description	Sample No.	Gold (Au)oz::ton	Silver (Ag)oz:ton	#
WALL SAMPLE - 200' below [illegible] [illegible] Hill Adit	1258	0.02	0.20	1.10 U.S
MORNING STAR SHAFT DUMP	1259	0.19	0.55	8.19 U.S.
SURFACE SAMPLE - SLOT ON WEST SIDE [illegible] HILL	1261	0.18	1.06	8.21 U.S.
SULPHIDES FROM OLD SHAFT DUMP - NOT REPRESENTATIVE	1263	0.02	trace	0.70 U.S.
50' ADIT IN [illegible] HILL - (WALL SAMPLE)	1264	0.18	1.44	8.85 U.S
VEIN MATERIAL - STOPE IN [illegible] HILL	1265	0.22	1.48	10.33 U.S.
OLD SHAFT DUMP IN HIGH AG. AREA	1266	0.56	21.42	56.90 U.S.
SILVER HILL WASTE DUMP	1267	0.06	5.88	12.70 U.S.
PLACER - GRAB SAMPLE	1268	trace	0.15	0.27

Samples, Pulps and Rejects discarded after six months.

DATE Nov. 6/67

SIGNED [signature]
C.S. JOYCE, B.Sc., Manager of Laboratories

SAMPLING SUMMARY

(By J. A. Bates)

October, 1967

Description	Au oz/ton	Ag oz/ton	Value U. S. Dollars
Wall Sample - 200-foot cross-cut in Grutt Hill	0.02	0.20	$1.10 (Ag at $1.80)
Morning Star Shaft Dump	0.19	0.55	$ 8.19
Surface Sample - Slot West Side Murray Hill	0.18	1.06	8.21
Sulphides around old shaft dump (not representative)	0.02	trace	0.70
30-foot Adit in Murray Hill (Grutt Tunnel)	0.18	1.44	8.85
Vein Material - Stope in Grutt Hill	0.22	1.48	10.33
Victory Shaft Dump	0.56	21.42	56.90
Silver Hill Waste Dump	0.06	5.88	12.70

Sampling by others is reported in U.S. dollars only. The relatively high silver values are significant in view of today's silver prices. Dollar values quoted in 1952 to 1960, with this high percentage of silver, would be considerably higher today.

ECONOMIC POTENTIAL

Reference to Government subsidies on exploration subject to further investigation.

1. Placer

It is estimated that a dredging operation on this placer would operate at 15 cents per cubic yard.

A used 9 cubic-foot bucket line dredge, can be purchased in California and would be excellent to operate in the Rawhide placer at 10,000 cubic yards per day. This dredge was inspected and it is estimated it can be put in service at Rawhide, with power and water supplied (60,000 volt power is presently available at Nevada Scheelite) for $ 525,000.

Possible net return on 5,000,000 cubic yards could be:

5 million cubic yards with 41 cents Au per cubic yard recovered	$ 2,050,000
and with 15 cents WO_3 per cubic yard recovered	750,000
Possible Total Gross Value	$ 2,800,000 U.S.

Less 10% royalty on gold	$	205,000
Less 5% royalty on WO_3		37,500
Less Cost of Dredge - (on location)		525,000
Less operating costs at 15 cent per cubic yard		750,000
Less Exploration costs		6,000
Possible Net Return (no allowance for interest charges)	$	1,276,000 U.S.

A period of 8 months would be required to get the dredge operating, after testing is completed.

The five million yard reserve suggested here as a minimum would be worked out in 1.4 years.

It would be anticipated that additional testing would be in progress during this interval to prove up yardage to continue the operation.

2. Lode Deposits

It is possible that large tonnages (20,000,000 or more) can be proven with additional work, whether in a series of orebodies, or as a continuous pit. Values in the valleys between the four main hills do not have test values reported. The rock is mostly very soft and friable, and could be ripped with a D-9 Dozer. Some areas appear to be harder than others, and some drilling and blasting may be required.

An incline, driven underneath the orebodies to a depth of 400 feet could be used as a conveyor tunnel to deliver ore to a cyanide mill. Collector conveyors under the orebodies would collect the ore from bulldozing chambers and deliver it to the main conveyor. In this way the deposit could be mined to 300 feet or more with a maximum 600-foot bulldozer travel.

The ore appears to be ideal for autogenous mills, being mostly soft, but with some very hard, cherty, breccia which should serve as grinding media. Similar rhyolite ores are reported being cyanided in California at Oronda Mine, with a 1/2 inch sizing and less than 24-hour leaching time. Metallurgical testing is required to determine the variables in the Rawhide ore. As early as 1912 a 96% recovery was reported on a cyanide mill in the area. It would seem safe to assume that with today's technology a 98% recovery is possible.

With limited information available on the Rawhide deposit at this time and applying today's costs to an operation of 10,000 tons per day, operating costs are projected as follows:

Quarry	
Drilling	$ 0.05 U.S.
Blasting	0.08
Dozing	0.09
Service	0.02
Conveying	0.02
Labour	0.06
Milling	
Miscellaneous Supplies	0.15
Chemicals	0.15
Grinding Media	0.06
Labour	0.12
Supervision and Head Office	0.12
Power	0.22
Total Operating Costs	$ 1.19 U.S. 1.11
Contingency at 10%	.11
Inflation at 10%	.12
TOTAL	$ 1.33 U.S. 1.37

Inflation on labour and supplies may be partly offset by a continued increase in the price of silver. Also, improved technology in mining tends to keep pace with the rate of inflation in North America. An operating cost of $ 1.33 per ton is considered an average cost for seven years operation.

Capital costs to production would involve mine exploration and development, and a mill. These costs are projected as follows:

Diamond Drilling - 30,000 feet at $ 8.00	$ 240,000
Bulk Sample Plant	50,000
Bulk Sampling of Workings	150,000
Head Office and Consulting - $ 7,000 per month x 20	140,000
Total Property Development	$ 580,000 U.S.
75% of Exploration Costs paid by Federal Government	335,000
Balance charged to Canadian American	145,000
Power and Water Supply	200,000
Main Conveyor and Tunnels	200,000
Collector Conveyors and Tunnels	800,000
10,000-ton Cyanide Mill	15,000,000
Townsite - (60 men) x $ 5,000 per man	300,000
Office, Laboratory and engineering office	125,000
Quarry Equipment	500,000
TOTAL COST TO PRODUCTION	$ 17,370,000 U.S.

Assume an average grade of ore at	$. 2.90 (recoverable)
Operating Costs at	1.33
PROFIT PER TON	$ 1.57 U.S.

On 10,000 tons per day, an operating profit of $ 5,500,000 per year would be realized to give a four-year payback on invested capital.

In projecting these costs it has been assumed that the quarry walls would be kept within the ore, and no waste would be mined.

CERTIFICATE

I, James Andrew Bates, hereby certify:

1. That I am a Professional Engineer and reside at 113 Broadlands Blvd., Don Mills, Ontario.

2. That I am a member of the Association of Professional Engineers of Ontario.

3. That I graduated from Queen's University, Kingston, Ontario in 1949 with the degree of Bachelor of Science in Mining Engineering.

4. That I have been engaged in mining, metallurgical and geological work continuously for 18 years.

5. That I have no personal interest, nor do I expect to receive any interest directly or indirectly in the property or in the securities of Canadian Amercian Mining Corporation.

6. That the foregoing report is based on a visit to the property in October, 1967 and on reports by J. B. Canada, Yuba Consolidated Gold Dredging Company Limited - 1960; M. Yost of Consumnes Gold Dredging Company - 1951-52 and F. C. Schrader's report on field work from 1911 to 1920.

Toronto, Ontario
November 10, 1967

James A. Bates, B.Sc., P.Eng.

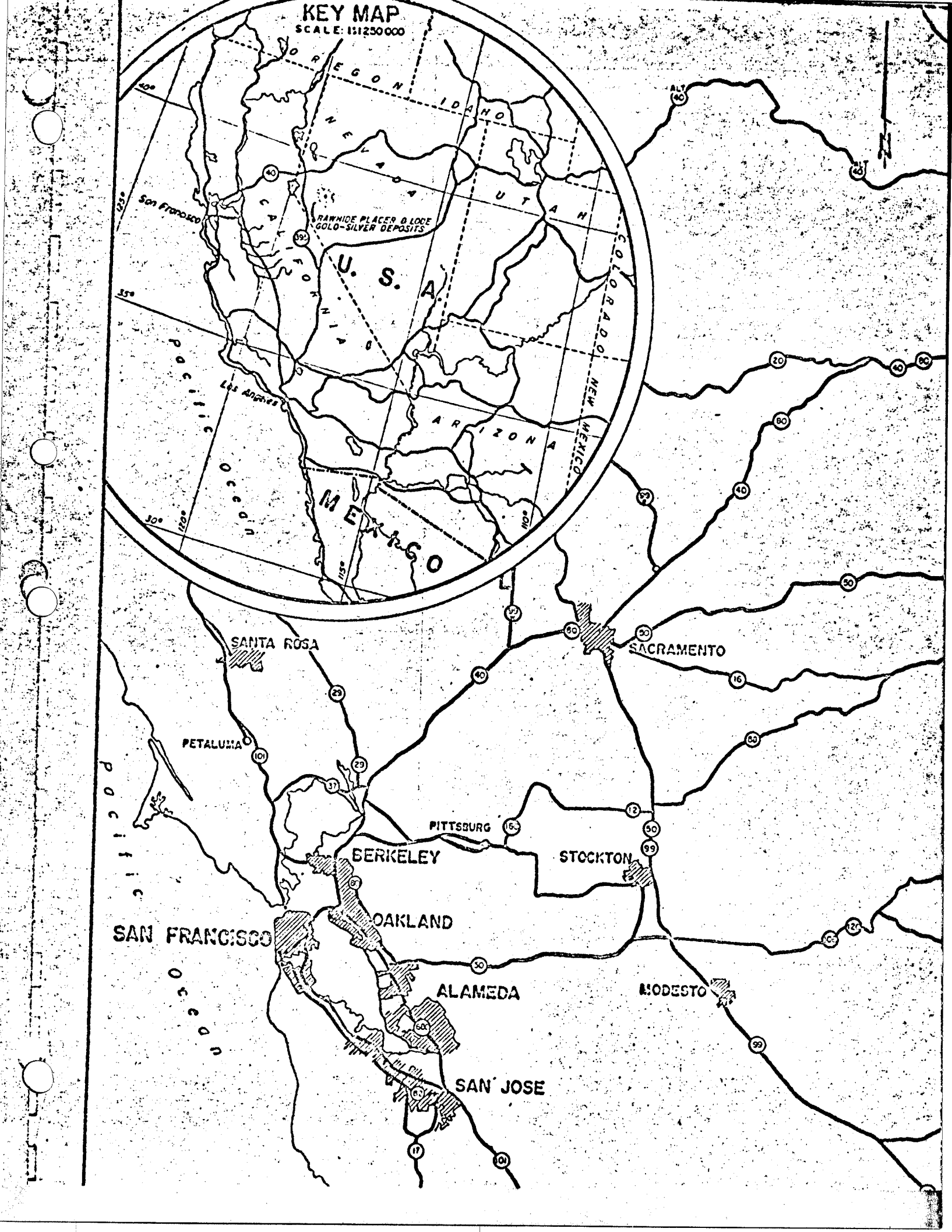
BIBLIOGRAPHY

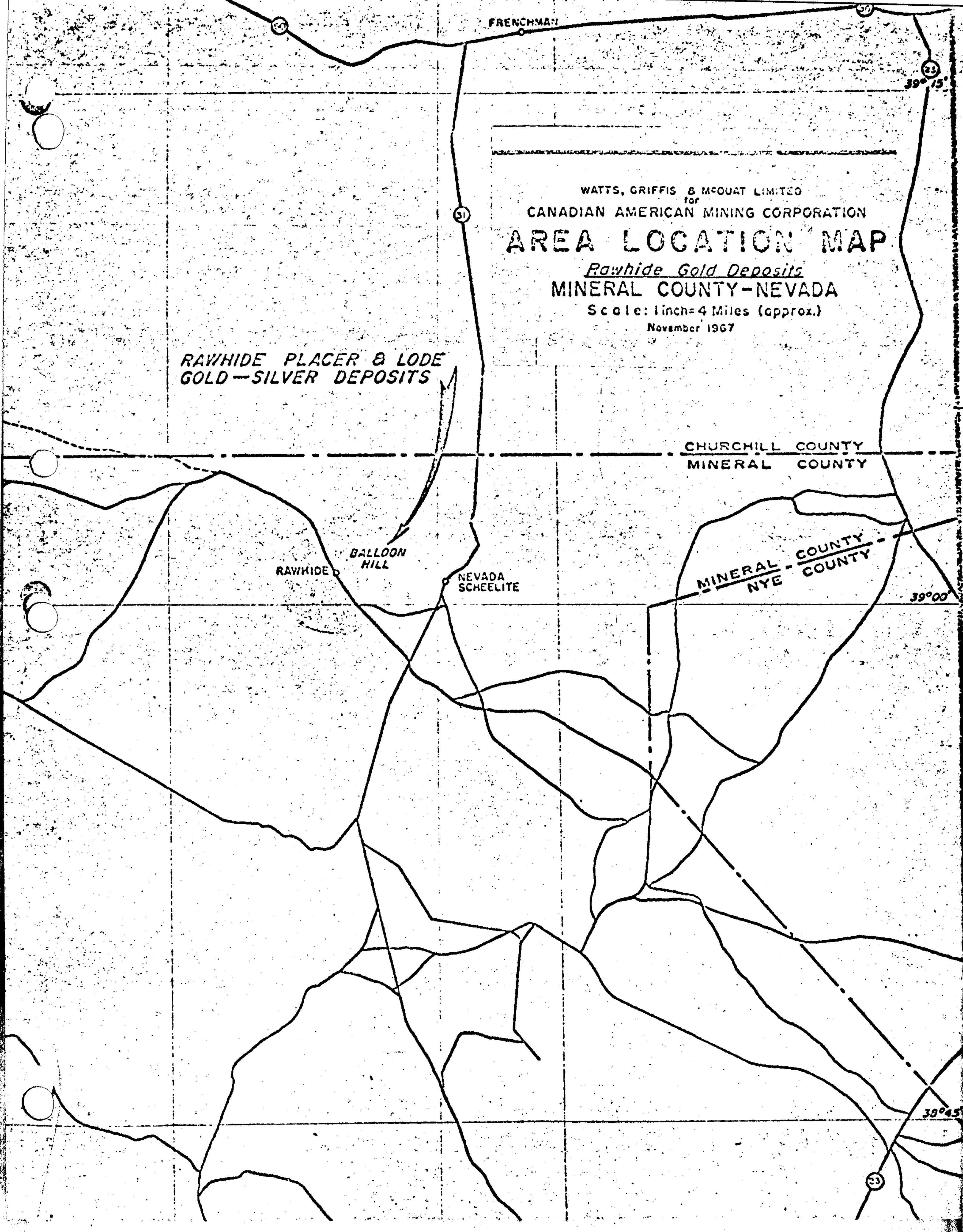
1. Unpublished Report by Schrader of the Nevada Bureau of Mines based on Field Work done from 1911 - 1920.

2. Report by M. Yost of Consumnes Dredging Company based on work done in 1951 - 1952.

3. Report by J. B. Canada for Yuba Consolidated Gold Dredging Company based on work done in 1959 - 1960.

4. Bulletin 58 - Nevada Bureau of Mines, Geology and Mineral Deposits of Mineral County, Nevada.


KEY MAP
SCALE: 1:1250000
OREGON
IDAHO
NEVADA
UTAH
CALIFORNIA
COLORADO
NEW MEXICO
ARIZONA
MEXICO
U. S. A.
San Francisco
Los Angeles
Pacific Ocean
RAWHIDE PLACER & LODE GOLD-SILVER DEPOSITS
SANTA ROSA
PETALUMA
SACRAMENTO
PITTSBURG
BERKELEY
STOCKTON
OAKLAND
SAN FRANCISCO
ALAMEDA
MODESTO
SAN JOSE


WATTS, GRIFFIS & McOUAT LIMITED
for
CANADIAN AMERICAN MINING CORPORATION
AREA LOCATION MAP
Rawhide Gold Deposits
MINERAL COUNTY-NEVADA
Scale: 1 inch= 4 Miles (approx.)
November 1967
FRENCHMAN
50
23
31
39° 15'
RAWHIDE PLACER & LODE
GOLD—SILVER DEPOSITS
CHURCHILL COUNTY
MINERAL COUNTY
BALLOON
HILL
RAWHIDE
NEVADA
SCHEELITE
MINERAL COUNTY
NYE COUNTY
39°00'
38°45'

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T: CANADA

FINAL REPORT

YUBA MINING DIVISION'S INVESTIGATION

OF THE

GOLD-SILVER PROPERTIES

AT

RAWHIDE, MINERAL COUNTY, NEVADA

JUNE 1960

JOHN B. CANADA

INDEX

CONCLUSIONS

1. Although the potential ore areas and a number of our theories at Rawhide have not been tested, (ideas generally exceed available funds), the rather extensive underground and surface sampling and modest drilling in which we assumed to be one of the largest area - Murray Hill has indicated that the originally postulated potential of 50-50 million tons of $2.00 - $2.50 ore, in one large pit, or subsequently more probably, 15-20 million tons of $3.00-$4.00 ore in several pits, are unlikely to exist. Rawhide from present evidence, consequently has more earmarks of ultimately developing in the order of only 7-10 million tons of $3.00- $4.00 ore, in a half a dozen or more smaller pits.

2. The brecciated ores on Murray and Balloon Hills do not appear to carry values materially greater than the rhyolite ores.

3. In summary, the probable ore potential as it now appears is about as follows:

Murray Hill may have a potential of 1.5 million tons of $300-$3.50 ore after selective mining.

Balloon Hill may likewise have a potential of 2.5 million tons of $3.00-$4.00 ore, after selective mining.

Grutt Hill may have a possible 1 million tons of + $3.50 ore.

Hooligan Hill may have a potential of 1 million tons of + $3.50 ore which can evidently be up-graded by stage-crushing and screening.

Other areas may ultimately contribute another 1 -2 million tons.

4. Although the ore indications to date have not been completely proven by sampling of all underground and surface exposures, as well as by pattern drilling, in even one area, it is believed that considering

Yuba's current economic conditions together with our present knowledge of the district, the large expenditures necessary to thoroughly prove or disprove Rawhide are probably not warranted at the present time; and the profit potential is evidently below Yuba's floor of interest. Rawhide is big, but not big enough, by and large, to make ideal operational open pits.

RECOMMENDATIONS

In view of the foregoing, the field staff has made the recommendation, with a certain amount of reluctance it is true, that the Rawhide investigation be terminated; and the management has concurred in this recommendation. Accordingly, all steps necessary to close out the project have been taken.

EXPENDITURES

Yuba's field expenditures at Rawhide, for wages, assaying, diamond drilling, general expenses, and assesement work, have amounted to approximately $17,000 for the entire Rawhide Investigation.

REFERENCES

For information on the property and ownership, option terms, location, history, geology and other such matters, reference is made to INTERIM REPORT, YUBA MINING DIVISION"S INVESTIGATION OF THE GOLD-SILVER PROPERTIES AT RAWHIDE, MINERAL COUNTY, NEVADA, April7, 1960 by J. B. Canada.

PREMISES FOR RAWHIDE INVESTIGATION

In April 1959 the Rawhide properties were brought to our attention. From the reports and maps studied, and discussion on the ground with Mr. Merrill Yost of Sacramento, who spent the greater part of two years in the early 1950's drilling the placers and sampling portions of the area- - his sampling of the old shaft dumps indicating a possibility on the order of 50 million tons or more of $2.15 free-milling gold ore mineable by open-pitting -- we considered Rawhide to be an attractive exploration situation. Recommendation was made that Yuba option the properties and undertake a step-wise sampling and development program. The recommendation was approved and the desirable properties were optioned.

REVIEW OF PROJECT

PHASE I, was started in August and completed in October 1959. It consisted of sampling approximately 50 dumps; some surface sampling on Murray Hill, and sampling of the Grutt Crosscut Tunnel on the east side of Murray Hill. The initial sampling tended to confirm Yost's dumpsampling in a general way and likewise gave support to the possibility of a very tonnage potential of material averaging $2.00 or more per ton. Yost's sampling of 14 dumps averaged about $3.02 per ton. Our sampling in the same general area (270 individual samples) averaged $3.18 - - a pretty fair check. It was concluded that the results merited our further investigation of the properties. It was subsequently recommended, and approval granted, that a small amount of preliminary diamond drilling be done to test the depth at several of the more promising areas on Hooligan Hill and Murray Hill. Ten thousand dollars was authorized for this drilling of four or five holes, in Phase II.

PHASE II was initiated late in January and completed by the end of March, 1960. Two-30 drill holes (H-1 and H-2) were put down on Hooligan Hill, with indeterminate results. Another hole, B-3, was drilled at -30 on the SW end of Balloon Hill, and the hole, for its entire 243 feet below the surface soil averaged $3.30,--the bottom in $ 16. ore. Two-30 holes were put down on the NW flank of Murray Hill: M-4 showed 92 feet of $2.53 material (the bottom 65 feet averaging $3.36, and the bottom still in $5.17 ore); and M-5 apparently drilled along or near a fault zone, cur 33 feet of $1.63 material at the bottom. Holes B-3 and M-4 were considered quite encouraging. Total footage drilled in the five holes during Phase II was 740 feet, at a drilling cost of $4580.

Concurrently with the drilling, considerable dump sampling on Hooligan and Balloon Hills was conducted, and extensive underground channel sampling was accomplished on Hooligan and Murray Hills, with one shaft also sampled on Balloon Hill.

As the result of this Phase II work we estimated that our underground and surface sampling in the Truitt-Miller Shafts area on Hooligan Hill indicated an ore zone containing about 1 ½ million tons of $2.50-$3.00 ore, which based on past operations, was_____able to up-grading by crushing and screening.

Our drilling and underground and surface sampling on Murray and Balloon Hills indicated a potential of some 7 million tons of perhaps $3.00-$3.50 ore in an area 500 feet wide and 1100 feet long. Our calculated average of the channel sampling, both surface and underground, and of the diamond drill holes in this block was $2.37, but we conjectured that selective mining and encounterâdg of other unexposed high-grade zones

would bring the average mill-feed up to between $3.00 and $3.50 per ton.

We also speculated that our sampling and drilling had been done on the fringes of the main breccia like zone, and averaged only $2.37 presumably, because much of the rock we were sampling was not breccia (which was indicated by E. W. Grutt, Jr., to average close to $4.00 from his sampling of the breccia zone on Murray Hill), but was mostly ryolite and tuff country-rock between the several "vein" pendants peripheral to the breccia zone proper. By judiciously proportioning the $4.00 breccia ore with that recovered by selective mining, we thought it possible to up-grade the feed to the mill to perhaps $3.50 at the expense of discarding as waste only a moderate proportion of low-grade material.

We therefore concluded that if the breccia dyke zone theory advanced by Grutt was valid, and if it might indeed be the largest tonnage carrier of $4.00 ore, the potential ore grade at Rawhide was considerably enhanced compared to the results we had thus far secured. We deducted that we had evidently been nibbling at the fringe zone and "pendant veins", and omitting the central "Bullseye" breccia dyke zone from our testing. we thought, moreover, that these breccia dykes or plugs undoubtedly had considerable depth possibilities, with near vertical or at least very steeply-dipping contacts, thus further enhancing the tonnage potential (our tonnage estimates had been based on a depth of only 200 feet, or about as deep as the deepest shafts we had sampled).

Our sampling, thus far, has therefore pretty well confirmed our original postulated average grade of $2.00-$3.00 per ton for the Rawhide ores which might be open-pitted, but geologically with a greatly reduced tonnage potential. Based on the much smaller tonnage potential, profitability estimates indicated that we would need ore averaging upwards of $3.50 per ton on a 3,000 T/D milling basis if we were to achieve a worthwhile return on the investment of perhaps $4.5 million estimated to put Rawhide into production. (Additional estimates have indicated that $2.50 would be just about the"breakeven" grade on a 3,000 T/D operation). So the"breccia zone $4.00 potential" theory was decidedly attractive to us; and we decided to test it in Phase III.

PHASE III was started during the latter part of March. In order to conduct a more intelligently any future drilling we decided to map the surface geology in greater detail than our previous reconnissance mapping had done. Particular emphasis was placed on mapping the contacts between the breccia "dyke zones" and the adjacent rhyolite and tuff formations so as to determine as accurately as possible the share and size of the breccia zones, which zones, Grutt believed might constitute the principal ore potential at Rawhide (as did Lawrence Wright).

In order to test the "Breccia" theory, two diamond drill holes were authorized - one for Murray and the other for Balloon Hill. $5,000. was alloted for this drilling which was to be undertaken and completed by the end of May. These holes were located and directed so as to probe the core of the breccia dyke zones as effectively as possible.

DD Hole M-7 was collared April 30 a few feet north of the portal to the Grutt crosscut tunnel on the east side of Murray Hill, in the breccia near the rhyolite contact, and proximate to the XC tunnel area which both underground and on surface above showed good breccia values. On a bearing of N 70 W and a dip of -45, it was planned for a depth of 400 feet, or so long as it might continue in the breccia. By 9 May it had reached a depth of 146 feet. Observation of the core, and study of the drill-log, indicated the hole was evidently following along the contact zone which here, therefore, had a dip of closer to 45 than to vertical as had been anticipated. And, inasmuch as the assay returns for the core and sludges averaged less than $1.00, decision was made to stop the hole. The breccia near the indicated foot-wall contact certainly did not carry values showing a short distance

away in the tunnel, so there appeared to be no good reason to continue the hole. Diamond bit wear in the siliceous breccia-fault zone was extremely heavy, morover, so with only a limited budget under which to operate, and pending selection of another location on Murray Hill, the drill was moved to its prepared site on the SW end of Balloon Hill where the proposed hole B-8, was planned to cut the northward extension of the promising ore zones cut by DD Hole B-3, in the heart of the Balloon Hill breccia zone as mapped.

While the drill was being moved ans set up on the new hole, B-8, several office studies were made. One was a comparison of breccia sample values resulting from the recorded sampling done by Wright and Grutt, with our own sampling. Another study was made to determine the actual feasibility of selective mining of the Murray and Balloon Hill potential open-pit material we had sofar sampled by our underground channels, surface channels and diamond drill holes; and what grades and what relative tonnage before and waste might be expected. These studies are covered in subsequent [illegible] sections.

As a matter of some concern, the breccia zone mapping indicated the zones on Murray and Balloon Hills to be rather smaller than originally anticipated. Moreover, an extensive fault zone is shown to occur in the saddle between the hills. As a result of these observations we saw that we would have to reduce the tonnage potential of Murray and Balloon Hills.

While the selective mining study indicated that selective mining might be feasible, the breccia study was not so promising. So, taking

all aspects of the Rawhide project into consideration and carefully weighing them (including the fact that it would take a really large amount of money to thoroughly prove or disprove Rawhide and funds of such magnitude were not available currently or in the foreseeable future) decision was made to stop the drilling and to recess the investigation. This brought Phase III (and ultimately the entire Rawhide Project) to an end.

Total drilling accomplished in Phase III was 146 feet with contract drilling and moving charges of $1776.40.

BRECCIA ZONE SAMPLING COMPARISONS

Compilation of the sampling of the average typical breccia material from the breccia zones on Balloon Hill and Murray Hill by Wright, Grutt and Yuba are summarized as follows:

BRECCIA SAMPLING SUMMARY

BALLOON HILL

WRIGHT			YUBA		
No. of samples	Range $	Avg. $	No. of samples	Range $	Avg. $
30-	1.34-10.27	2.57			
7-S 1/2 of hill only	1.52-10.27	3.27	7-S 1/2 of hill	1.23-6.93	3.45

MURRAY HILL

GRUTT			YUBA		
8-1 (small area)	1.15-7.96	3.01	6- (scattered)	1.20-5.06	2.95

The foregoing summarization indicates rather conclusively that although the typical breccias may range in value from perhaps $1.00-$10.00, the average is nearer to $3.00 than to the approximately $4.00 we had anticipated after our conversation with Grutt. (It should be explained, however, that Grutt's sampling included 3 high-grade breccia samples in the vicinity of the Grutt cross-cut tunnel ore zone. These 3 high-grade samples were not included in the above 8 samples. With the 3 high-grade breccia samples included, his sampling in that general area averaged $10.40. He indicates, however, that the average of all the many breccia

samples he took in his sampling on Murray Hill was $3.85 or thereabouts. If we, likewise, include one sample of $18.00 we took along the indicated outcrop of the Murray vein extending NE from the Bald Hornet Shaft, our breccia "typical" samples would average $5.10.

The average breccia samples: 30 by Wright, 8 by Grutt and 13 by Yuba on Balloon and Murray Hills, shows a close agreement, it will be noted at about $3.00. Our hope was to demonstrate a wide and lengthy breccia-ore zone or zones along along the axis of Murray and Balloon Hills which might sufficient + $4.00 breccia ore, (the real heart of the ore bodies, it was anticipated) to bring up to perhaps $3.25- $3.50 mill-heads the extensive $2.37 material we had found by our samplingand drilling around the fringes of the breccia zones in the postulated "pendant" vein fringe zone on the west sides of Murray and Balloon Hills. It is evident, however, that no matter how much $3.00 breccia ore we might combine with $2.37 material, it would be mathematically impossible to achieve any mill-head greater than $3.00. And $3.00 ore is calculated to furnish an insufficiently attractive return (+ 10% only) on the 4.5 million estimated to put the properties into production on a 3,000 ton per day rate.

Incidently, relative to the"breccia", in the overall sampling he did on Balloon Hill, Wright remarks on page 3 of his May 23, 1946 report on results of pilot sampling -- Schealine Property that the average for the 56 samples taken in the zone(all Balloon Hill) as a whole is $2.37 -- thirty of the first fifty-six samples in this zone were of breccia, the

breccia, the remainder being composed of ryolite or dark chert. The breccia samples, averaged separately gave $2.57 in gold and silver. This shows that the other material in the zone is nearly as well mineralized. This, incidently, seem to be what we have found to a large extent.

SELECTIVE MINING STUDY

A study has been made into the possibility of selective mining to higher grade material in an indicated ore zone and discarding as waste the low grade material outside the ore zone. When we first considered the Rawhide area, we envisaged a multiplicity of more-or-less parallel veins, with lower grade material intervening which might carry low mill-grade values and our sampling and proposed drilling was aimed at determining the probable grade and tonnage ratio of this inter-vein material. As a result of our reconnaissance dump sampling during August to October last year, several potential ore zones of large extent were outlined, and it was thought likely that the $3.18 average value our 270 individual samples in the area of interest might reflect, in a general way, the average underground mineralization in the areas. We did not firmly expect that all the inter-vein material would actually be ore grade, but did anticipate that most of it would very likely be.

The area on which we had the most complete sampling information was chosen for our selective study. This area, on Murray Hill, included the Bald Hornet, Aspinwall and the shaft workings, which we had fairly thoroughly channel-sampled and DD Hole M-4 which was also in this general area.

A block roughly 90 feet wide (at right angles to the Bald Hornet vein-zone), 350 feet long in a northeasterly direction along the vein-zone to beyond the Aspinwall Shaft, and 200 feet deep, was investigated. All sampling data within or closely adjacent to the borders, were plotted and the weighed average calculated.

This block is calculated to contain 420,000 tons of $3.04 grade. Outside this area the values on surface and in the underground cross-cuts fall off quite sharply to an average of about $1.00. This $1.00 material in the inter-vein rock which would have to be selectively mined out as waste. The ore-waste ratio on Murray Hill is obviously not as favorable for an open-pit, considering the indicated ore zones alignment and widths.

The area on the south end of Balloon Hill encompassing DDHole B-3, Shaft C, the Morning Star workings and other smaller workings up hill northeasterly from DD Hole B-3 shows a somewhat more favorable ratio than does Murray Hill, for here the two main ore trends are indicated to be closely adjacent.

The results of these selective mining studies are shown on the appended char-----, and indicates that the commercial ore zones are relatively narrow and of limited tonnage with considerable waste adjacent. Accordingly, the pits would be relatively narrow and deep - more in the nature of " slots " than of conventional open-pits; and operational problems in these narrow, deep pits might be expected. The net result is that instead of a large pit in this Murray-Balloon Hill area, there would be several small ones.

REDUCED POTENTIAL

The indications resulting from our Phase II and PhaseIII work at Rawhide are, therefore, that instead of the possibilities of 50-60 million tons of $2.00-$2.50 ore in one large pit that could support a 5,000-10,000 T/D operation (as originally postulated) Rawhide has more

the earmarks of ultimately developing on the order of only 7-10 million tons of $3.00- $4.00 ore in half a dozen or more small pits that might support a 1,000-3,000 T/D mill, thus resulting in a more limited ultimate profit potential below the Yuba's floor of interest. (see financial comparisons summary sheet). Rawhide thus, has rather the likelyhood of becoming a moderately profitable small operation than a substantially profitable large one.

Consideration had recently been given to the possibility of securing joint-venture participation in the Rawhide Project it is construed to look promising. However, with the picture as it has now developed, we have no attractive situation here in which to invite joint-venture capital.

Due to the reduced tonnage potential primarily, and the consequent limited profit potential, decision was reached by management and the field staff late in May, 1960, to terminate the Rawhide investigation and close out the project. All necessary steps to close out the project have been accomplished. The required sample maps and drill logs have been delivered to the property owners and all necessary assessment work has either been recorded or is in the process of being completed.

June 1960

J. B. Canada