



CONTACT INFORMATION

Mining Records Curator
Arizona Geological Survey
1520 West Adams St.
Phoenix, AZ 85007
602-771-1601
<http://www.azgs.az.gov>
inquiries@azgs.az.gov

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Arizona Department of Mines and Mineral Resources Mining Collection

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ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: PUMP

ALTERNATE NAMES:

PROGRESS
FORTUNATE FILEDS
ALICE
PYRAMID GROUP

MARICOPA COUNTY MILS NUMBER: 156B

LOCATION: TOWNSHIP 5 N RANGE 8 W SECTION 31 QUARTER NW
LATITUDE: N 33DEG 44MIN 18SEC LONGITUDE: W 113DEG 08MIN 07SEC
TOPO MAP NAME: BIG HORN MTS - 15 MIN

CURRENT STATUS: DEVEL DEPOSIT

COMMODITY:

GOLD LODE
IRON SULFIDE
LEAD SULFIDE
ZINC SULFIDE
COPPER SULFIDE

BIBLIOGRAPHY:

USGS BIG HORN MTS QUAD
METZGER O USBM IC 6991 P 60-61
ADMMR PUMP MINE FILE
ADMMR "U" FILE
ADDITIONAL WORKINGS SEC 30-T5N-R8W
WELL LOCATED IN SEC 3-T5N-R9W

PUMP MINE

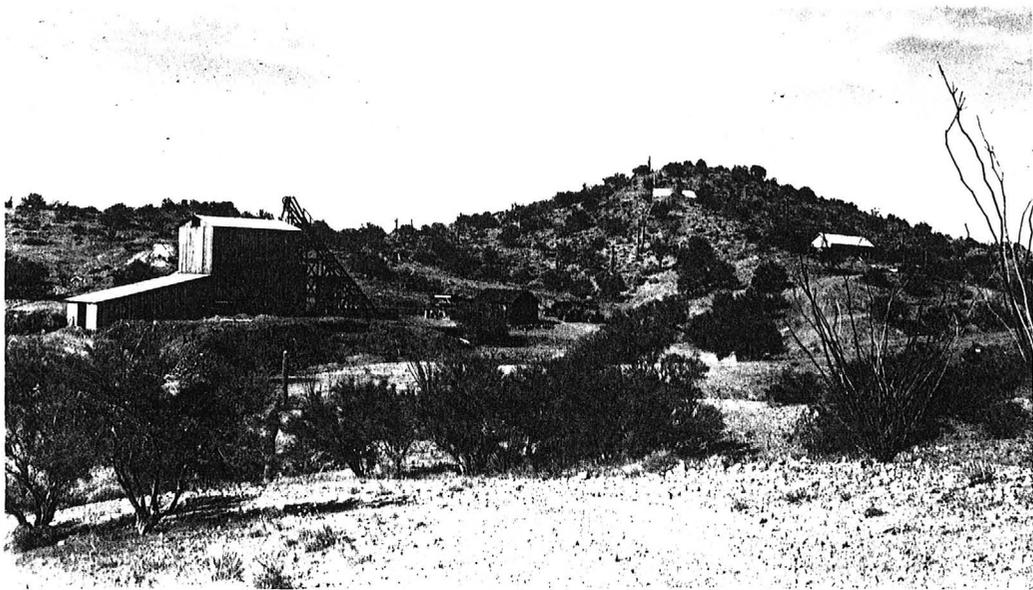
MARICOPA COUNTY

Fortunate Fields Mine (file)

IC 6991 p. 60

1939 & 1940 Minerals Yearbook
Big Horn District - Maricopa County

AGS OFR-85-17 P. 15-40



A-151-1

C-1950





Rump (b)
CAN-EX RESOURCES LTD.
BOX 12542, OCEANIC PLAZA
2580 - 1066 W. HASTINGS ST.
VANCOUVER, B.C. V6E 3X2
TEL: (604) 682-2269

PRESIDENT'S LETTER TO SHAREHOLDERS

1987 proved a significant year for the company. Five of Can-Ex's gold properties in S.W. Arizona have been optioned to Billiton Minerals (U.S.A.), Inc., who are currently active in the exploration of these properties. In addition, the company has secured an option to purchase the Socorro Reef Gold Mine and surrounding area. Initial sampling and geologic results have indicated the presence of a large and rich gold and silver bearing formation. Exploration of this area is continuing.

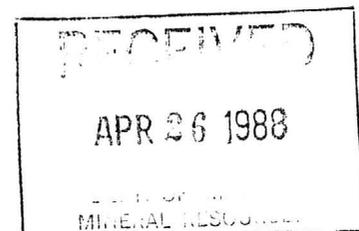
The company has ample funds to conduct its programs. 1988 promises to be an exciting and rewarding year for Can-Ex.

On Behalf of the Board
CAN-EX RESOURCES LTD.

A handwritten signature in cursive script, appearing to read "G.L. Anselmo".

G.L. Anselmo, B.A.
President

April 12, 1988



CAN-EX RESOURCES LTD.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

3. CAPITAL STOCK

(a) Authorized share capital
10,000,000 common shares of no par value

(b) Issued and outstanding
The issued capital stock is as follows:

	<u>Number of shares</u>	<u>Amount</u>
Balance at November 30, 1986	4,099,000	\$1,430,932
Year ended November 30, 1987		
Shares issued		
As option payments for mineral claims (note 3(d))	154,638	86,597
For cash on exercise of share purchase options (note 3(e))	187,100	46,775
For settlement of accounts payable (note 3(f))	200,000	70,000
For cash (note 3(g))	990,000	393,300*
For cash (note 3(h))	<u>600,000</u>	<u>270,000**</u>
Balance at November 30, 1987	<u>6,230,738</u>	<u>\$2,297,604</u>

*Net of commissions of \$18,000

**Net of commissions of 30,000

\$48,000

(c) Escrowed shares
750,000 common shares issued in 1982 for mineral properties (note 1(b)) are subject to an escrow agreement and cannot be released without the consent of regulatory authorities.

(d) Shares issued as option payments
Pursuant to agreements of December 19, 1986, the Company issued 123,611 shares to the optionors of the Gold Hill West, Overshot, Gold Crown and Pump prospects in settlement of option payments owing to December 31, 1986, which total \$49,800 U.S. The Company also issued 31,027 shares in settlement of the January 1, 1987 Knabe parcel property payment of \$12,500 U.S.

PUMP MINE

MARICOPA COUNTY

JHJ VERBAL CONVERSATION 3/24/83: Mr. K. K. Randall, Box 145, Salome, Arizona, phone 859-3320 reported he has the Pump Mine leased. He has worked the mine in the past, but it is idle at this time.

CAN-EX RESOURCES LTD.

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS (Continued)

1. MINERAL PROPERTIES AND DEVELOPMENT (Continued)

(a) Mineral claims and options (Continued)

	Annual fixed payment <u>U.S. \$</u>	Annual contingent payment <u>U.S. \$</u>	Aggregate payment <u>U.S. \$</u>
Arizona properties			
Gold Crown prospect	\$ 3,600	7.5% of net	\$ 50,000
Pump prospect	3,600	smelter returns in excess of \$3,600	50,000
Overshot prospect	12,000	7.5% of net smelter	1,000,000
Gold Hill West prospect	12,000	returns in excess of \$12,000	1,000,000
Big Horn property			
Mollie D parcel	6,000	7% of net smelter returns in excess of \$6,000	500,000
El Tigre parcel	-	15% of net profits	3,000,000
		Royalty of 2% of net profits subsequent to payment of aggregate amount	
Knabe parcel	-	15% of net profits	2,000,000
		Royalty of 2% of net profits subsequent to payment of aggregate amount	
Socorro Reef property	42,000	5% of net smelter returns	5,500,000
	<u>\$79,200</u>		

The Company has also agreed to issue up to 75,000 shares of the Company to the optionors of the Knabe parcel (see note 3(i)).

1. MINERAL PROPERTIES AND DEVELOPMENT

(a) Mineral claims and options

The Company's mineral claims and options consist of the following Arizona and British Columbia properties. Substantially all of the costs incurred to date relate to the Arizona properties.

Arizona properties

Gold Crown prospect

This gold prospect, consists of 10 contiguous mining claims, located in the Big Horn District, Maricopa County, Arizona, U.S.A., and comprises the Gold Crown and Gold Crown Nos. 1 - 9 claims. The property is situated some 20 kilometres south of Aguila, a small village approximately 100 kilometres west of Phoenix on Highway 60.

Pump prospect

This gold prospect consisting of 18 contiguous mining claims is located in the Big Horn District, Maricopa County, Arizona, U.S.A., and comprises the Pump Mine, Pump Mine 1 - 6, and Pump 1 - 11 claims. The property is situated 24 kilometres south of Aguila, Arizona.

Overshot prospect

This property consists of 8 contiguous mining claims located in the Ellsworth Mining Division, La Paz County, Arizona, U.S.A., known as the Overshot and Overshot 2 - 8 claims. The property is a gold prospect situated approximately 15 kilometres south of Salome adjacent to the old Harquahala Mine.

Gold Hill West prospect

This gold prospect consists of 30 mining claims located in the Ellsworth Mining District, La Paz County, Arizona, U.S.A., comprising the Gold Hill West 1 - 8, Gold Hill West 18A through 28A and 30A to 40A. The property is situated some 12 kilometres southeast of Salome, Arizona.

Big Horn property

This gold property consists of 107 full sized and fractional federal lode mining claims and one federal placer mining claim in the Big Horn District, Maricopa County, Arizona, U.S.A. The property was acquired in three separate parcels known as the Mollie D which comprises 71 claims, the Knabe which comprises 23 claims, and the El Tigre which comprises 14 claims. The property is situated approximately 24 kilometres south of Aguila, Arizona.

March 21, 1968

Mine: Pump Mine (Progress Mine Co.)

District: Big Horn, Maricopa

Engineer: C.L. Hoyt

Subject: Interview and phone call with Mrs. Grace Almstead and Mr. E.C. MacVeagh.

On the morning of March 20, 1968 I took a call from Mrs. Grace (Mrs. F.A.) Almstead of 1246 E. Willetta St., Phoenix, (Phone 254-1445) regarding her Progress Mine which she said she owns and which was once called the Pump Mine. She said she had a buyer and wanted historical data and production records. She also wanted information on the old R.F.C. loan on the property.

Data on the Pump Mine from the office files and an article on the mine from U.S.B.M. Information Circular 6991 "Gold Mining and Milling in the Wickenburg Area, Maricopa and Yavapai Counties, Arizona" were read to her on the phone.

The following morning she came to the office with Mr. E. C. MacVeagh, 3025 W. ⁴⁴Caminito Drive, Phoenix. (Phones Res. 944-5479, Bus. 277-9863 & 276-4321). They were shown the file and the article in question. Mr. MacVeagh was particularly anxious to find out something on the R.F.C. loan. It was explained to him that when the Phoenix R.F.C. office was closed the files were transferred to Los Angeles and later to Washington, D.C.

2/46 Purchased from Tom Atkins, Aguila
12 miles S. of Aguila, located in
1860's.
365' shaft & 600' lateral workings.
Stamp mill on property.

Present Operatio

DEPARTMENT OF MINING

OVER HAULING MILL.

WILL COARSE GRIND IN 10 STAMP

MILL - AMALGAMATE & THEN

REGRIND & FLOAT.

New Work Planned HAVE 3 GIBSON FLOT

CELL & HAVE JUST INSTALLED

1 - NEW DENKER SUB.A. UNIT

CELL.

EXPECT TO MILL 60 TONS A DAY

Misc. Notes SHAFT IN MINE 325'

deep - ON 3 TO 5 ft. VEIN

WITH DRIFTS ON VARIOUS

LEVELS.

FORMER RECOVERY 50% &

LESS - NOW EXPECT 85 TO 90%

IN OPERATION IN 2 WEEKS.

WRITE ATKINS ON

VERMICULITE CLAIMS -

6-16-40

Tom Atkins
called & said he
would send report
information on program

as well as more information
as found on it.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Alice & Pyramid Group+ (Pump Mine)

Date Sept. 20, 1954

District Big Horn - Maricopa Co.

Engineer Mark Gemmill

Subject: Present Status

The property has been closed down for at least ten years. I examined the mine in 1938 and reported a small tonnage of low grade gold ore in sight. However the owners later built a mill with an RFC loan and extracted and milled the available ore which did not even pay operating expense. So far as I can learn little development was carried on and no more ore found. The property has been stripped of all equipment but I believe assessment work is still being to hold the property

DEPARTMENT OF MINERAL RESOURCES

News Items _____ Date 5/30/50

Mine PUMP MINE

Location 12 MI. S OF AGUILA.

Owner A.T. ATKINS.

Address AGUILA.

Operating Co. LEASE A. & J. MINING CO

Address ALFRED SCHMID - PRES

R. DETLOFF - VP & G.M.

Pres. TIM ROSS - SEC. & TREAS.

Genl. Mgr. ALL OF AGUILA.

Mine Supt. _____

Mill Supt. _____

Principal Metals GOLD-

Men Employed 6 MEN.

Production Rate HAVE INSTALLED DIESEL ENG.

Mill, Type & Capacity FOR PUMP AT WELL 4"

LINE - 4 1/2 MILES TO MINE.

Power, Amt. & Type HAVE INSTALLED 30 TON

ROD MILL & ENG DIESEL ENG. AT MINE

Signed JSE

Date: 2/46

OPERATOR AND ADDRESS

Jack Thomas, Rte. 9, Box 464,
Phx.

NAME OF MINE: PUMP

OWNER: Jack Thomas

Date: 2/46

MINING STATUS

Developing

COUNTY: Maricopa

DISTRICT: _____

METALS: Au

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
OWNERS MINE REPORT

Date Oct. 1, 1939 (8-30-40)

- MA-20
1. Mine Alice & Pyramid Group
 2. Mining District & County Big Horn Mining
 3. Former name Pump Mine
 5. Owner T. B. Atkins
 7. Operator
 9. President
 11. Mine Supt.
 13. Principal Metals Gold
 15. Production Rate 50 tons per day
 17. Power: Amt. & Type 60 HP Westinghouse Gas
 18. Operations: Present None
4. Location 13 miles south of Aguilá
 6. Address (Owner) Aguilá, Arizona
 8. Address (Operator)
 10. Gen. Mgr.
 12. Mill Supt.
 14. Men Employed
 16. Mill: Type & Cap. 50 ton stamp

19. Operations Planned

MA-20

Dec. 19, 1939

GOLD - 8 claims unpatented; good road, 13 miles to paved highway and railroad; 3 shafts 300', 165', 85'; 300' drifts, accessible; claim 20,000 tons positive ore, 1,200 tons tailings; 10-ton stamp mill; need flotation; ample water; for sale (royalty basis), for royalty terms apply to owner; Big Horn Mining District, Yavapai County?

MA-20 OR

20. Number Claims, Title, etc. 8 - clear title, but not patented

21. Description: Topography & Geography

22. Mine Workings: Amt. & Condition 3 shafts - 1 - 300 feet, 165 feet and 85 feet
300 or more drifts - condition very good

23. Geology & Mineralization

24. Ore: Positive & Probable, Ore Dumps, Tailings Positive 20,000 tons - 1200 tons tailings dumps

24-A Vein Width, Length, Value, etc.

25. Mine, Mill Equipment & Flow Sheet 10 ton stamp mill - 2 concentrating tables

26. Road Conditions, Route Very good - via Aguila, Arizona.

27. Water Supply Very good

28. Brief History 1200 tons milled, 50% recovery made - by amalgamation only

29. Special Problems, Reports Filed Ball mill and flotation required

30. Remarks Flow sheets have been made showing 95% recovery - by grinding to 60 mesh and flotation

31. If property for sale: Price, terms and address to negotiate. Royalty basis

32. Signed T. B. Atkins,
Aguila, Arizona.

33. Use additional sheets if necessary.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
OWNERS MINE REPORT

Date *Oct. 1st 1939*

Mine *Alice + Pyramid Group*

District *Big Horn Mining*

Former name *Pump mine*

Owner *J. B. Atkins*

Operator

President

Mine Supt.

Principal Metals *Gold*

Production Rate *50 tons per day*

Power: Amt. & Type *60 H.P. Western Horse Gas*

Operations: Present *None*

Location *13 miles south of aquila*

Address *Aquila, Arizona*

Address

Gen. Mgr.

Mill Supt.

Men Employed

Mill: Type & Cap. *50 Ton Stamp*

Operations Planned

Number Claims, Title, etc. *8 - clear title, but not patented*

Description: Topog. & Geog.

Mine Workings: Amt. & Condition *3 shafts - 1 - 300 feet, 165 feet and 85 ft.
300 ft more drifts - Condition very good*

Geology & Mineralization

Ore: Positive & Probable, Ore Dumps, Tailings - *Position 20,000 tons - 1200 tons Tailings Dumps -*

Mine, Mill Equipment & Flow Sheet - *10 ton Stamp mill - 2 concentrating tables*

Road Conditions, Route - *Very good - via Aquila, Arizona -*

Water Supply *Very good -*

Brief History - *1200 tons milled, 50% recovery made - by amalgamation only -*

Special Problems, Reports Filed - *Ball mill and flotation equipment -*

Remarks *Flow sheets have been made showing 95% recovery - by grinding to 60 mesh and flotation.*

If property for sale: Price, terms and address to negotiate. - *Royalty Basis -*

Signed *J. B. Atkins*

Use additional sheets if necessary. *Aquila, Arizona -*

Aguila, Arizona

June 8, 1940

Department of Mineral Resources,
Phoenix, Arizona

Dear Sir:-

I noticed in Pay Dirt of May 7th
where you advertised for a "Gypsum
Deposit".

I have located a deposit near
the W. Road, which I believe to be
of fair quality.

This can be handled with steam
shovel or similar equipment
Am sending a small sample
same.

I shall expect an early reply if
you are interested.

Yours very truly,
G. J. B. Atkins, 1

Box 40 -

Aguila, Arizona

Aguila, Arizona

June 28, 1940.

Department of Mineral Resources,
Phoenix, Arizona

Dear Mr. Chapal:-

Your letter of June 24th received.
Also copy of report on the Pump Mine.
I turned this property several
months ago.

It is now in operation.

Nevertheless, I wish to thank you for
your interest shown in this matter.

You will please find enclosed
a brief report of the Gypsum report,
which is about all I know about
it. It is located with in 5 miles
of the main line of the Santa Fe Railroad.
It has been proven to be high
grade Gypsum.

I have on hand more and much
better representative samples, and the
small piece I sent you some time ago.

If you wish I will send you some,
no doubt, but what this is a very large deposit.
I can be had on cars very low figure. Yonstrey
J. B. Atkins, Aguila, Ariz.

ARIZONA DEPARTMENT OF MINERAL RESOURCES
MINERAL BUILDING, FAIRGROUNDS
PHOENIX, ARIZONA

July 10, 1958

To the Owner or Operator of the Arizona Mining Property named below:

Pump Mine (Maricopa County)
(Property)

Gold
(ore)

property which we would like to have

's Report form with as complete detail
, maps, assay returns, shipment returns
s before and which might interest a
perty.

NO SUCH ADDRESS
Rural Route Discontinued

Mr. Jack Thomas
Rte. 9
Box 464
Phoenix, Arizona

Frank P. Knight

FRANK P. KNIGHT,
Director.

Enc: Mine Owner's Report



11 June 1940

Mr. T. B. Atkins,
Box 40,
Aguila, Arizona.

Dear Mr. Atkins:

Your letter of June 8, and the sample of gypsum has been received.

The party looking for gypsum will be in the office within a few days, and I shall submit your sample to him.

The information contained in your letter is rather vague, and in order to interest parties looking for gypsum properties, it will be necessary to have more detailed data.

I am enclosing herewith a blank Mine Owners Report, which I should suggest that you fill out in detail and return at your earliest convenience so that we may have information available regarding your property.

Thanking you in advance, and assuring you of my desire to be helpful, I am

Yours very truly,

J. S. Coupal
Director

JSC-jrf

11 Condy claims unincor. lands ± 14 mi from
agula
Junit 109' X cont 200' lev.
limited survey of 7 mi west structure 6000 ft explored
strip survey to reasonable depth

NY. Testing Lab. June 80 West St
N.Y. 6. 1/19/56

Random sample along 600' - 1498
500' on 112' ag.

600' 2 cont

Mount rail "within 30 mi"

Stack of 60 mi ch #1

Progress Mines, Inc.

Copied from ZC 6981-6991 Feb 1956

Pump Mine 399

Extract from "All About Mining" W. H. Whitcombe 1937

Excerpts from Review of Mining Tech. by USDM NY 1953

Shaft 30', 35', 158', 408' (main), 6420',
2 wells 625', 645'

Staking area - no scale - perhaps 40' x 40' ?
width not shown
12 in at 20' head = $\pm 4'$
had 10' stand mill. in 1936.
60' x 40' 11"
1600'
6100'

Frank Alvestead standard

Junit Big Horn West 14 mi S of Agula
17 claims 9 located & leased (now 11 located)
50 Trill 10 1250th stamps
Milled left to Jan Lowman & stuffed
Heads 1200 amalgam & tubes

1/16/67

950
220

14% x 100

Fortunate Fields Mine (aka Pump Mine) (aka Progress Mine)
approx. 12-13 miles S SE of Aguila
Maricopa County

reference: Arizona Dept. of Mineral Resources
Fortunate Fields Mine (file) + Pump Mine (file)
and Gold Mining and Milling in the Wickenburg area, Maricopa + Yavapai Counties, Az
present owner: by O.H. Metzger Bureau of Mines
I.C. 6991. Dept. of the Interior 1938

minerals: gold; sulfides of iron, copper, lead
and zinc

history of the area:

the property was worked by Mexicans
in the mid to late 1800's. Later, Mr. Pump
milled the ores extracted from the
surface workings in the Arrastras. In
1929 Thos. B. Atkins worked the mine.
Up until 1936 very little systematic mining
had been done, milling operations began
late in 1936. Recovery was so low that by
early 1937 operations began. The table
concentrates ran from \$80 to \$100 a ton in gold.
In 1968 the property was owned by
Grace Almstead and E.C. MacVeagh and
called the Progress Mine.

property consists of 8 unpatented claims

J. J. MURRAY
Mining and Metallurgical Engineer

Reference:
Pump Mine (file)
IC 6991

REPORT

on

✓ FORTUNATE FIELDS MINE -----

The property of the Fortunate Fields Mining Company is located in the Big Horn Mining District, Maricopa County, Arizona, approximately thirteen miles, by fair automobile road, south from the settlement of Aguila, the nearest post office and railroad point. The camp is located at an elevation of about 2800 feet among a series of small rolling hills of east-west trend, between the Big Horn Mountains on the east and the Harquahala Mountains on the west.

The property consists of seventeen mining claims, or approximately 330 acres, covering a mineralized zone in an east-west direction for an extreme length of 7500 feet. These mining claims, as shown on the accompanying sketch map, are unpatented, being held by mineral locations of various locators and dates of location.

The property, being in an arid desert country, is devoid of any timber growth for mine purposes, and the vegetation consists of the usual desert growth of greasewood, mesquite, and various varieties of cactus, including the "giant cactus", or sahuara. No water is available on the surface of the property, but two bored wells show enough water for camp use.

HISTORY

This mine is reputed to have been worked by Mexicans over fifty years ago and, later, by a Mr. Pump, who milled the ores extracted from the surface workings in Arrastras.

Later, in October, 1929, the present owner, Thos. B. Atkins, located the ground showing the principal mine development, and worked the mine by high-grading but, on account of the lack of water for milling practices, the product was shipped to a smelter.

Some two years ago, this ground was leased to the present holding Company, who bored a well for water south of the main working shaft, and then, believing that the well would produce the necessary water for milling purposes, proceeded in the erection of a ten-stamp mill. This No. 1 well, however, did not furnish the water necessary for the mill, and other wells were drilled towards the north of the camp, until water in sufficient quantity was encountered in a well about $4\frac{1}{2}$ miles to the north-west of the main working shaft. This well appears to maintain a capacity of about 45 gallons of water per minute.

GEOLOGY

The mineralization on this property occurs along a fractured zone in a gneissic schist formation, and having a strike of, approximately, N. 65° E. with an average dip of 45° towards the north. Interbedded in this schist, and showing principally to the north of the mineralized zone, are

lenses of more basic amphibolite schist while, to the south, are a series of more acid dikes cutting into the mineralized zone at an acute angle (about 20°). These dikes vary from felsitic to porphyritic in character, and are generally narrow and show as long irregular lenses.

Cutting across the gneissic schist formation in a north-south direction on both the east and west boundaries of the property, are a series of more basic eruptive rocks which outcrop prominently to form the hills and ridges toward the east. These eruptives appear to have acted as a dam to the subsequent mineralizing solutions, so that the mineralized zone appears to be confined to the space between these eruptives, or about one mile in length in the east and west direction.

The ore formation consists of a series of thin silicious overlapping lenses in a gouge of more clayey material. These quartz lenses show a pitch of several degrees steeper than that of the "vein", so that they gradually cross the formation from hanging to footwall as one descends into the workings.

The ore is composed of quartz base and, as the present workings are all within the oxidation zone, the ore varies in color from yellow to red, due to the oxidized iron bearing minerals, hematite, and limonite, with which the quartz is associated.

As will be noted from the distribution of gold and silver values, on the accompanying assay map, the pay-shoot, showing at No. 1 shaft, has a rake of about 70° towards the east, and continues below the 175-ft. level. There is considerable evidence that a number of such pay-shoots can be developed on the property along the main fractured zone, and there are indications that ore will also be found in the fractures branching off from the main fracture zone, though such branch veins will be narrower in width.

DEVELOPMENT AND ASSAYS.

Practically all of the mine development work has been confined to the Alice and Alice No. 1 locations, with the principal workings on the Alice claim.

The principal, or No. 1 Shaft, is located 513 feet west of the end center of the Alice - Alice No. 1 monument. This shaft is 320 feet deep on an average pitch of 45°. Below the 175-ft. level, the shaft is flatter than the "ledge", so that it is necessary to crosscut into the footwall at the bottom of the shaft to cut the ore. Judging from the assay map data, the pay-shoot developed at this shaft will be found to the east of the shaft. From this shaft the following levels have been driven:

At 18 feet depth from the surface a level 92 ft. long			
from center of the shaft towards the west.			
At 34 ft. depth a level	50 ft.	towards the west	
at 75 "	26 "	" "	west
" 100 "	69 "	" "	east
" 100 "	101 "	" "	west
" 155 "	50 "	" "	west
" 155 "	10 "	" "	east
" 175 "	58 "	" "	east
" 175 "	27 "	" "	west

This development at present indicates a pay-shoot 120 feet in length along the strike of the ledge, and shows a depth of over 175 feet as the pay valued still show at that level. Omitting sample No. 38 as high grade, and omitting samples taken of the gouge from slips in the walls, an average of twenty-five samples taken from this development work shows on average sample width of 46.7 inches, with an average assay of .326 oz. gold and .60 oz. silver which, with gold figured at \$35.00 per oz. and silver at 70¢ per oz., gives an average gold and silver value of \$11.83 per ton.

About 200 feet to the west of the main shaft are several shallow pits, up to 8 feet in depth, sunk along the outcrop of the ledge, and which show commercial ore values.

At a distance of about 325 feet west from the main shaft, a shaft 125 feet deep has been sunk on a branch-vein which cuts into the main ledge from the north at an acute angle. This 125 ft. shaft shows ore, the samples from which show an average width of 30 inches, and an average assay of .214 oz. gold and .65 oz. silver per ton.

About 70 feet towards the west from the 125-ft. shaft, and on the main ledge, is a shallow pit designated as the Peggy shaft, and showing 52 inches of ore assaying .14 oz. gold with .86 oz. silver.

At a distance of 250 feet east of the main shaft, a shaft 85 feet deep has been sunk on the main ledge, and the samples taken from this shaft show an average thickness of 52 inches, with an average assay of .24 oz. gold and .44 oz. silver.

Further to the east for a distance of 2000 feet from the No. 1 Shaft, are a number of shallow shafts and trench pits which show the ledge matter with fair assay values.

The accompanying assay map, showing a longitudinal section along the mine development, shows the various samples taken, the samples being designated by the sample number within a circle, and a line from the circle shows the location of the sample.

The following list gives the record of these samples, which were taken so as to include both ore and gouge matter as it would be broken down in the course of regular mining operations.

These samples were broken so as to have not less than five pounds of sample per foot of width, and were later crushed down to 3/8" size material which, in turn, was quartered down in a Jones sampler, and then bucked through 100-mesh screen for assay pulp.

METALLURGY

The ores from this property, developed and treated to date, have been confined to the oxidised zone and thus show much of the gold in the free state. This free metallic gold accounts for much of the variation in the assays obtained from the mine samples. Several small laboratory tests have been made of these ores, besides a series of mill runs through the 10-stamp milling plant on the ground.

233 tons run through this plant gave total mint credits of \$1452.53 for the gold content and \$13.13 for the silver content in the amalgam produced. This bullion showed an average fineness of 621 gold and 351 silver, and represented an amalgamation recovery of \$6.29 per ton of ore. A 350# sample of tailings from this mill run showed an assay value of \$4.20, thus indicating a total value of mill heads of \$10.49. This tailings sample was concentrated over a standard table, and showed a recovery of \$2.98 leaving \$1.22 as final table tailings. This would indicate a total recovery of \$9.27 per ton by amalgamation and table concentration, or 60% by amalgamation and 27.9% by concentration of the gold and silver content of the ore which was mined as representative of the mine run ore.

Other general samples representing the run of mine ore, as developed in the workings of the No. 1 Shaft, were tested by the Southwestern Engineering Company of Los Angeles, the Pan American Engineering Company of San Francisco, and the Denver Equipment Company of Denver, Colorado.

On the samples submitted to the Denver Engineering Company, a recovery by amalgamation of 75.7% of the gold and 31% of the silver was obtained by grinding the ore to pass 65 mesh. On the same mill heads that Company obtained a recovery of 89.1% of the gold and 45.8% of the silver values by straight flotation on the ore ground to pass 95% through 65 mesh. By using a unit cell flotation and pilot table, that Company obtained a recovery of 95.4% of the gold and 44.7% of the silver with the ore ground 95% to pass 200 mesh.

On the same ore, the Pan American Engineering Company obtained an extraction of 65.6% of the gold and 8.9% of the silver by amalgamation and an additional 22.3% of the gold and 23.1% of the silver by flotation of the tailings after amalgamation, or a total extraction of 87.9% of the gold and 32% of the silver, with the ore ground to pass 28 mesh, equal to #30 screen as used in stamp milling.

The Southwestern Engineering tests on the ore showed a recovery by amalgamation of 62.83% of the gold, with a recovery of 11.6% by gravity concentration, or a total recovery of 74.4%. By following the gravity concentration with flotation, they obtained an additional recovery of 21.8%.

These various tests and mill runs would indicate that on stamp mill product an average of 62% of the gold can be recovered by simple amalgamation, and an additional average of 18% can be recovered by gravity concentration.

A gravity concentration test was made on Sample No. 51. and showed a recovery of 60% of the values.

EQUIPMENT

The property is equipped with tent houses, sufficient to house and feed all employees required for normal operations.

The property is also equipped with gasoline hoist, belt driven compressor of two Jackhammer capacity, Jackhammers and mountings, drill steel, mine cars, skip, and small mining tools, such as picks and shovels.

A well-housed ten-stamp mill, 1200# stamp, is complete with power crusher, ore bin, feeder, and amalgamating plates, as well as concrete water supply tanks.

The blacksmith shop is equipped with the necessary tools for small mine requirements.

At the well, $4\frac{1}{2}$ miles northwest of the camp, is a gasoline driven pumping plant of sufficient power for all operating requirements.

RECOMMENDATIONS

The mineralization, and values showing on the surface for a distance of about 2000 feet along the outcrop, amply warrants the investment of the capital necessary to put the property on a producing basis.

To this end, I would recommend that the following changes and improvements be made, so as to economise in operating labor.

The hoisting speed of the present hoisting plant is very slow, and should be speeded up to twice the present rope speed by changing the gear ratio from the gasoline engine to the drum.

As at present installed, the ore is received into the mill by being dumped on to a platform, from which it is shovelled into the crusher.

I would advise that the headframe structure be extended not less than twelve feet, so as to permit the erection of a small receiving bin into which the skip would dump the ore. This bin should be provided with grizzly to drop out the fines, and the coarser, over-size, ore would feed by gravit to the crusher.

To the milling plant should be added a trap at the lower end of the amalgamating plates to catch amalgam, mercury, etc., and a No. 6 Wilfley, or a Plato table, should be installed in the mill below the amalgamating plates.

An automatic wet tailings sampler should be installed at the tailings discharge from the mill. Such a sampler would give a continuous check on the tailings losses, and would furnish reliable samples on which to figure the savings and economies to be had by the installation of additional equipment at a later date.

These mill changes and additions would cost about \$1000.

To pipe the water from the well to the N.W. of the mine to the storage tank, will require $4\frac{1}{2}$ miles of main line pipe. At present quotations the most economical line, as regards operating cost, would be a welded 4" boiler tube line. This size of line would permit sufficient water to be pumped with the present engine in one shift to keep operations going at the mine throughout the 24-hour day. A smaller engine should be provided to pump from the well to the well storage tank.

Such a pipeline installed and buried would, with the necessary storage and additional power at the well, require an estimated expenditure of \$6000. An additional \$500. should be provided for storage capacity and distributing pipes at the mine.

Work of drifting on the 175-foot level, especially towards the east, should be immediately started, and inclined raises should be started at regular intervals, of say 30-foot centers, to provide chutes for stoping operations at a later date.

Under this program of development, whereby the 175-foot level would be the first main working level, there would be quite a tonnage of muck coming from both east and west of the shaft and, in order to prevent delays - of the muckers waiting for the skip, and the hoistman waiting for the muckers to load the skip directly from the mine cars underground - a small loading picket should be made in the hanging wall below the 175-foot level. This would permit the muckers to work steadily, and would permit the hoistman to do other duties than the hoisting when the ore pocket was filled.

In this way, with a crew of two machine miners and two muckers, with one hoistman-mechanic, and a superintendent who would act as foreman and assayer, a development progress of not less than 200 feet per month can be made (working one shift per day). This development would produce fifteen tons of muck per day, at a total estimated cost of \$3.20 per ton of muck. After one month's drifting and raises have been started, one shift in the mine, as above, should produce enough muck (20 tons) to keep the mill operating two eight-hour shifts as an amalgamating and gravity concentrating plant, the tailings from which should be impounded for further treatment. Under this program, the mill would employ one man per shift, and the cost of milling, including power, would be \$1.30 per ton, or a total development operation cost of \$4.50 per ton. After the development work shall have been sufficiently advanced, so as to connect with the 85-ft. shaft and 125-ft. shaft, the production can be increased to the capacity of the milling plant by stoping, and the costs can be reduced below \$4.00 per ton.

To more easily, and economically, make the upraises for chutes and for stoping, a light stoper drill should be provided.

Under this development program, the payroll would amount to about \$800. per month and, with one month's development ahead of the starting of milling, the mine would be in a position to keep the mill going two shifts per day as a sampling plant for the development muck. With the average grade of ore showing in the property, and with the mill extraction which has been obtained, there is no reason why the project should not immediately become self-sustaining, and gradually pay back the capital of, say, \$10,000. necessary to start the above operations.

CONCLUSIONS

The property shows sufficient mineralization over an extended distance, and shows sufficient gold and silver values, to amply warrant the expenditure of additional capital to put the property on an operating basis. For this purpose, not less than \$10,000. should be provided.

The block of ore at present available between the 175-ft. level and the 34-ft. level, shows sufficient values to give a recovery of \$9.00 per ton under the proposed initial milling program, and there is more profit in that block than would be required to repay the new capital. As the 85-ft. shaft and the 125-ft. shaft both show pay ore, it would only require a few months of development work to connect them, and then the mine would easily maintain the milling plant running at capacity.

Later, the present stamps can be utilized as a secondary crusher and a ball mill installed for the finer grinding necessary to make better metallurgical recoveries by flotation methods.

Part of the profits from the initial milling could be utilized for such plant improvements.

I, therefore, recommend the property as well worthy of the investment of the additional capital required to put it into production, and feel confident that, with good management, it will prove very profitable to the investors.

Respectfully submitted,

(signed) J. J. Murray

E. M. Michigan College of Mines, 1898