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PRINTED: 04/17/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: NELLIE

ALTERNATE NAMES:

VICTORIA GOLD MINE GROUP  
ARATABA SHAFT  
VICTORIA GOLD MINES  
ARATABA GROUP

MOHAVE COUNTY MILS NUMBER: 5B

LOCATION: TOWNSHIP 18 N RANGE 20 W SECTION 9 QUARTER NE  
LATITUDE: N 34DEG 57MIN 56SEC LONGITUDE: W 114DEG 24MIN 16SEC  
TOPO MAP NAME: BOUNDARY CONE - 7.5 MIN

CURRENT STATUS: DEVEL DEPOSIT

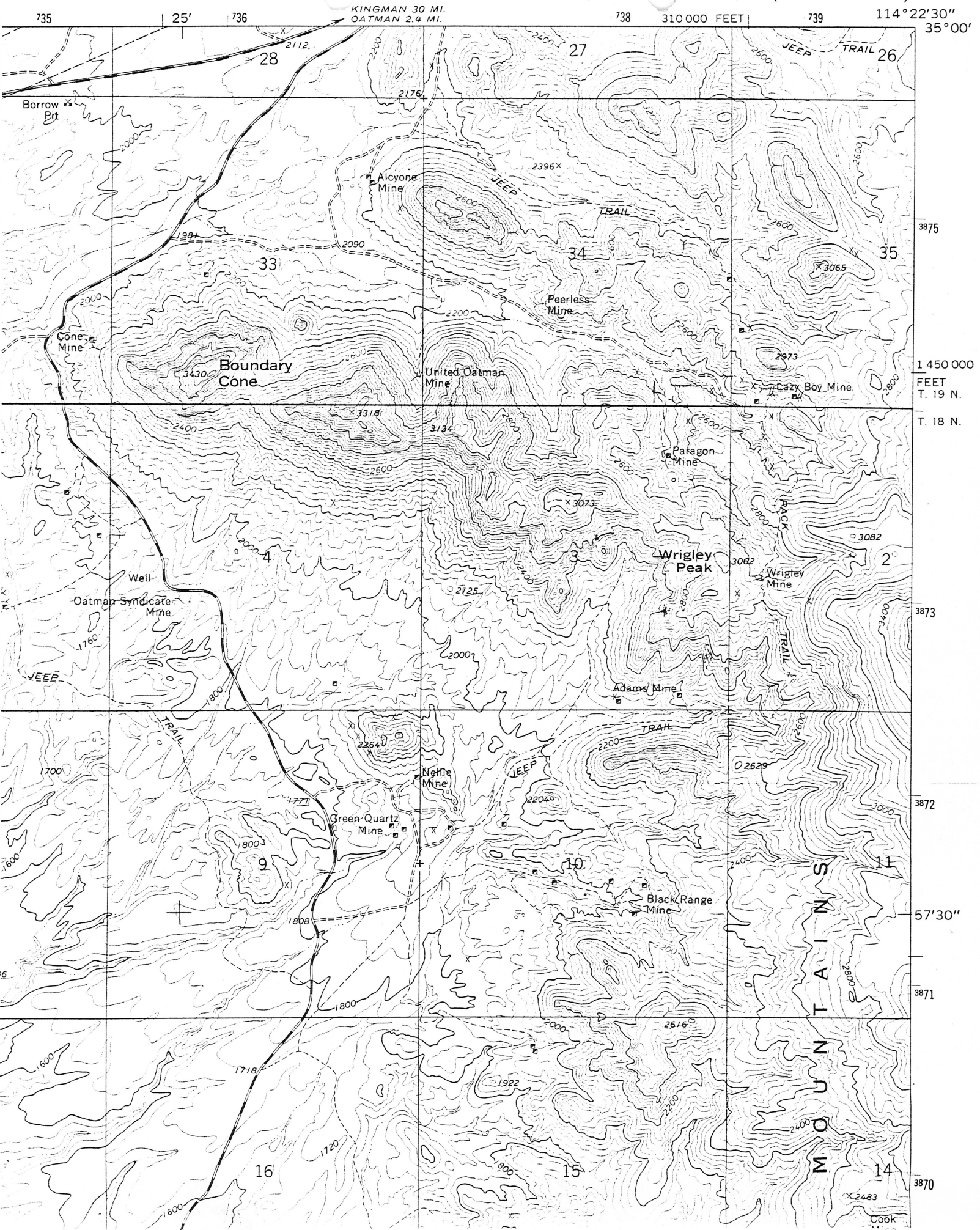
COMMODITY:

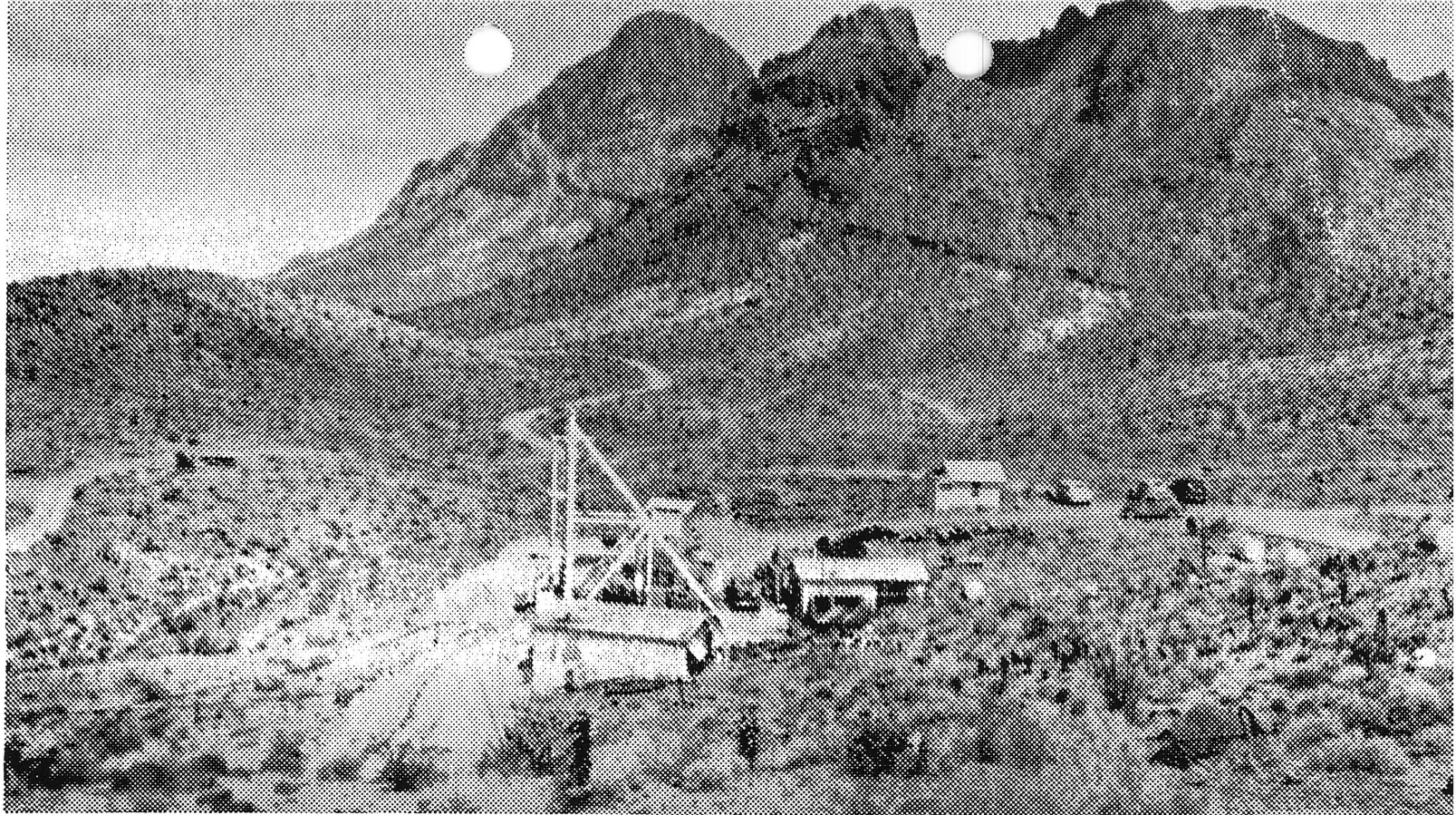
GOLD LODE  
SILVER

BIBLIOGRAPHY:

USGS BOUNDARY CONE QUAD  
ADMMR HOUSEHOLDER MAP  
ADMMR MOHAVE CARD FILE  
ADMMR NELLIE FILE  
WEED, W.H., THE MINES HANDBOOK VOL. XVI, 1925  
P. 393  
AZ. MNG. JRNL. VOL. II, NO. 11,4-19, P. 27  
ADDITIONAL WORKINGS SEC. 10, NE  
AZ. MINING JOURNAL, 6-19, P. 81  
BOLIN, G.H., 5TH ANNUAL REPORT OF AZ. STATE  
MINE INSPECTOR, P. 12, 20 & 30







A-131-5

NELLIE

(VICTORIA SAAET)

(E. ROSS HOUSEHOLD)

1948



A-131-6

NELLIE

1948

Arizona Department of Mines and Mineral Resources

INFORMATION FROM MINE CARDS IN MUSEUM

ARIZONA

MM-K173 Gold ore

Mohave County

Nellie Mine

MILS # 5B

4-AKA's

Nellie (file)



See: Arizona Mining Journal June 1919 p. 81  
(Nellie Mine)  
March, 1919, p. 33

#### References to publications

The following list of publications and sources of information is here included for the information of those who may be interested.

Geology of the Oatman Gold District, F.L. Ransome, U. S. Geological Survey Bulletin 743, 1923.

Mineral Deposits of the Cerbat Range, Black Mountains, and Grand Wash Cliffs, Mohave County, Arizona; U. S. Geological Survey Bulletin 297, 1909. F. C. Schrader.

The Climate of Arizona: H. V. Smith: Bulletin 130, University of Arizona, Agri. Exp. Station. 1930

The data of geochemistry: F. W. Clarke: Bulletin 770, U. S. Geol. Sur. 1924.

Successive Banding Around Rock Fragments In Veins: J. E. Spurr: Econ. Geology, vol. 21, pp. 519-537, 1926.

Mining Methods and Records at the United Eastern Mine: Roy W. Moore: Trans. A.I.M.E. vol. 76, p. 56, 1928.

The Enrichment Of. Ore Deposits: W. H. Emmons: U. S. Geol. Surv. Bull. 625, pp. 305-349, 1917.

The superficial alteration of ore deposits: R. A. F. Fenrose Jr.; Jour. Geology, vol. 2, pp. 314-316, 1924.

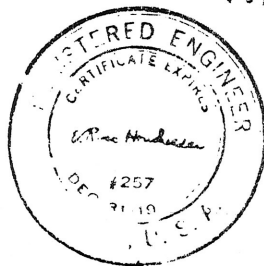
Mineral Deposits, W. Lingren, 3rd Ed. 1928.

Reconnaissance of Parts of Northwestern New Mexico and Northern Arizona: N. H. Darton; U. S. Geol. Surv. Bulletin 435, 1910;

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40 of 40

89 Bonny Bonny  
DEPARTMENT OF MINERAL RESOURCES

News Items

S 10  
T 18 M  
Date

R 20 W

Mine

Victoria Goldmine

Location

Owner

James J. J. J.

Address

Wellie

Operating Co.

Address

James J. J.

Pres.

Genl. Mgr.

Mine Supt.

Mill Supt.

Principal Metals

Men Employed

Production Rate

Mill, Type & Capacity

Power, Amt. & Type

Signed

(Over)

Present Operations

11 of traction  
claims

An occurs in Oct

New Work Planned

Bull Rush

95

400 HW

35

Misc. Notes

200 F.W. 30'

Content of F.W.

Search Van

SAMPLES NOT KEPT OVER 30  
DAYS EXCEPT BY REQUEST

SAMPLES SENT US BY MAIL WILL  
RECEIVE PROMPT ATTENTION

CERTIFICATE OF ASSAY FROM LABORATORY OF

**R. V. McALLISTER**  
ASSAYERS, CHEMISTS, METALLURGISTS

FRONT STREET  
KINGMAN, ARIZONA

FLOTATION TESTS

CYANIDE TESTS

PHONE BLUE 252

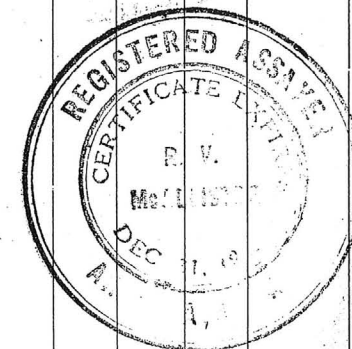
Victoria Gold Mines Inc.

Feb, 28, 1948

194

MOHAVE MINER PRINT

OFFICE NUMBER	OWNER'S MARK	GOLD, PER TON		SILVER, PER TON		TOTAL VALUE GOLD & SILVER	COPPER PER CENT	LEAD PER CENT	ZINC PER CENT	PER CENT
		OUNCES	VALUE	OUNCES	VALUE					
258	Open Pit } NORMAL FAULT	0.03	1.05	0.40	0.36	1.41				
16259	Quartz } MANGANESE OXIDE	0.44	15.40	0.40	0.36	15.76				



GOLD \$35 PER OUNCE

SILVER 90 CENTS PER OUNCE

*R. V. McAllister*

REGISTERED ASSAYER

See: Arizona Mining Journal June 1919 p. 81  
(Nellie Mine)  
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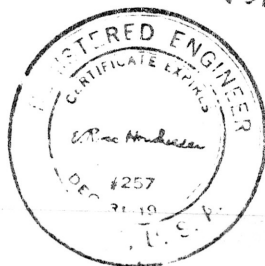
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87 Bondy Barley  
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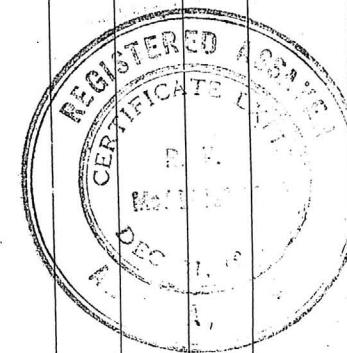
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*R. V. McAllister*

REGISTERED ASSAYER

VICTORIA GOLD MINES

Mohave County  
Oatman District

---

CJH WR 5/1/80: Drove seven miles to the Victoria Mine. Talked with Mr. Leonard Maser, former purchasing agent, now watchman. He said that Monopco is shutting the operation down. They had driven a 300 ft incline and intercepted a target structure. It was not of ore grade.

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CJH WR 7/29/80: Field interview with Leonard Maser, agent and security guard for Monopco Inc. at the Victoria Mine five miles south of Oatman. The property has been shut down for several months. Plans are to contract a diamond drilling program.

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CJH WR 9/17/80: Field interview with Leonard Maser at the Victoria Mine south of Oatman, Mohave County. The mine is still shut down and equipment is being sold.

---

CJH WR 12/19/80: Drove to the MINOPCO Inc operation at the Victoria Mine south of Oatman. Leonard Maser reported that Minopco has divorced themselves from the property and equipment is still being sold.

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RRB WR 9/3/82: Sent information on the Victoria Gold Mines, San Francisco District, Mohave County to Hellen Shavonia, 2700-239 E. Valley Parkway, Escondito, California 92027.

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RR

Tom Anderson, Phoenix mining engineer, came into the office and said he was anticipating opening the Victoria Au mine at Oatman. GW WR 2/19/76

*Kingman Mining Project.  
5 claim maps, 26 section v/g maps,  
1 v/g assay map, 2 misc. maps*

WR GW 9-16-77 - Mr. O. J. Harwood came in for information on the old Victoria mine near Oatman. He was shown the file and copies of parts of it were made. He is an "old time" promoter and says he has \$1 million in a local bank to commence an operation. First things first: a mill. This mine was promoted after WWII by Mr. McCarthy, a longtime resident of Oatman, now deceased.  
9-21-77 bh

WR/GW 1/13/78 - Mr. O.J. Harwood came in with two of his investors in the Victoria mine near Oatman. 2/23/78 a.p.

GM CH / WR 4/3/79 - Drove two miles south on old Route 66 to a side road (marked by a wrecked white car body) and proceeded east on it for approximately one-fourth mile to the Old Victoria Mine. The mine office is in a trailer on the property. Met with Mrs. Pearl Craig (Mine Owner), P.O. Box 3154, Kingman, Az. 86433, and Dr. Rene S. Steensma, Mining Engineer and Vice-President, Mining and Milling Operation, MINOPCO, 1303 Brown Drive, NW, Socorro, New Mexico 87801, phone (505) 835-3153. They are pumping out the shaft preparatory to reopening the mine. Considerable new (or newly painted) equipment is on the ground -- i. e. float cells, compressor and pumps. 5/1/79 a.p.

CH/Report 11/8/79 - Met with Larry Bennett who is an analyst for Minopco at the Victoria Gold Mine seven miles south of Oatman and 1/4 mile east of old Hwy. 66 on the west flank of the Black Mtns. They have driven an incline 160 ft. to date. The operation will eventually hole pre-existing workings (not the Victoria). The operation will be a standard cyanide leach. The holding pond is 50 ft. x 50 ft. and plastic lined. A pH of 11.2 will be maintained, however, some sulphides are now being encountered in the incline. The water supply is contained in the Victoria Mine shaft. They have not started production yet. An atomic absorption assaying device is on order for the operation. Mr. Bennett mentioned that the Golconda Mine might be reopening. The employees of Minopco go on a four day break starting every other Thursday. They were off on Nov. 8, 1979.

**DEPARTMENT OF MINERAL RESOURCES**  
STATE OF ARIZONA  
**FIELD ENGINEERS REPORT**

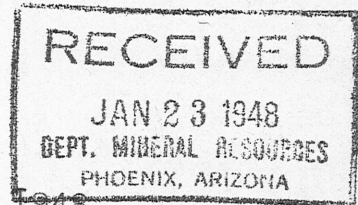
Mine Arataba Group  
Victoria Gold Mines Inc.  
District 7 m. south of Oatman  
Subject: Present status

Date May 10, 1952  
Engineer Mark Gemmill

Gold mine - idle - no activity in sight. No information available as to the present ownership



DEPARTMENT OF MINERAL RESOURCES  
STATE OF ARIZONA  
FIELD ENGINEERS REPORT



Mine Victoria Gold Mines Inc.

Date Jan. 21st, 1948.

District Oatman, Ariz.

Engineer A.C. Nebeker

Subject: News Item.

The Victoria Gold Mines Inc. is the results of Mr. J.H. McCarthy efforts.

Just after the termination of L 208, the gold mine closing order, Mr McCarthy got the idea that it was a good time to get control of some of the dormant gold mining claims in and around Oatman, with this idea in mind, he takes his pick and pan and proceeds to sample many of the old properties having works exposing quartz veins, after completing his exploration work, the most promising properties were acquired by purchase and locating open ground.

The Victoria Gold Mines Inc. was then incorporated. The officers are J.H. McCarthy, Pres, and Mgr. R.P. Jones, Sec'y and Gilbert Phillips a director, all of Oatman.

The property comprises approximately of 300 acres, located 6 miles southwest of Oatman, Arizona, and is in the Andesite formation which is cut by fault fissures filled with crushed greenish and white quartz carrying the gold values.

Mr McCarthy has had an independent mining engineer take a great many samples from the old works along the fissure, and assays from these samples indicate an average value of \$10.00 to \$12.00 per ton and some much higher values were found.

The Victoria mines is being developed by a new vertical two compartment shaft which is now down approx. 60 feet. The old shafts put down by previous operators were in bad repair, so the present company decided a new shaft would be more economical than revamping the old.

One old shaft was cleaned out to the water level where an electric pump is installed to furnish water for mining operations.

The property is newly equipped with a 40 foot headframe, 25H.P. Fairbanks Morse gasoline hoist, a 315 Le Roi diesel drive air compressor a diesel drive electric generator which furnishes juice for the pump, the mine fan and surface buildings.

The surface buildings consists of a large work shop, hoisthouse a good changehouse with hot and cold water, all closed in with corrugated iron. There is on the dump framed shaft sets, laggings and wedges enough for another 300 foot of shaft

The company is working two shifts and 20 men employed.

Plans are made for a cyanide mill which will treat both company and custom ores.

The Victoria mine has all the appearance of becoming the first producer in the Oatman district since the shutdown of the gold mine operations.

JCN

## REPORT

### VICTORIA GOLD MINES, INC., OATMAN, ARIZONA

#### 1. -LOCATION OF PROPERTY:

The Victoria Gold Mines, Incorporated, owns the Arataba Group of Lode Mining Claims, an area of more than 150 acres, in Sections 9, 10, and 15, Tp 18 N, R 20 W., about 4 miles southeast of the Town of Oatman, Mohave County, Arizona. The names of the Claims are the Arataba, Arataba 1, Arataba 2, Arataba 3, Arataba Extension, Good Gold, Gold Knob, Cherym, and the Bull Rush Fraction. Two claims are patented, the Good Gold and the Bull Rush Fraction, and the others are locations. They are about 1,000 feet east of U. S. Highway 66. Two short dirt roads afford access to the main workings.

#### 2. \*HISTORY:

Originally discovered by Louis Armil, who worked the surface ores with an arastra in 1913-14. In 1915 Long and McIver secured an option on the property, and, together with Al. Harpending, incorporated the Green Quartz Mining Company. They sunk the 45-ft. vertical shaft, then sunk the 110-ft. incline shaft, drifted 210 ft. southeast and 230 feet northwest. They milled the ore out of the drifts and shaft and this averaged \$18.00, with gold at \$20.67 per ounce. In the bottom of the 110-ft. shaft, they had 4 inches of ore that ran \$285.00 per ton. They had developed more water in the shaft than they could handle with a gasoline engine. A small Chilian Mill was installed and around 1,000 tons were put through, but the extraction was less than 50 per cent, as the tailings ran \$11.00 per ton. Dissention among the Company officers shut down operations, and when the stock market broke in 1930, the Company abandoned the property. James H. McCarthy relocated the Arataba Group, and in 1946 he purchased the patented Good Gold and Bull Rush Fraction, which were originally part of the Nellie Group. In the same year the Victoria Gold Mines Company was incorporated and purchased all of these claims.

#### 3. - DEVELOPMENT:

The Company has cleaned out and sampled all the important workings on the Arataba Claims, also a 45 ft. incline on the Good Gold Claim and the 125-ft. shaft on the Arataba 3 Claim. The latter two shafts are 5200 feet apart and are both on the Green Quartz vein. The workings on the Arataba Claim are the old 110 ft. inclined shaft, with drifts 210 ft. southeast and 230 ft. northwest at the 65-ft. level; a vertical shaft, 45 ft. deep, is connected with the 65-ft. level of the incline and a 50-ft. tunnel south of the shaft workings. The vertical shaft has been retimbered and a 25 H.P. hoist installed. This shaft will reach the hanging wall of the vein around 200 feet.



#### 4. - ORES AND VALUES:

The main vein, known as the "Green Quartz Vein", is covered by the Arataba Group of claims for more than 6,000 feet of its length. Wherever it has been opened at the surface, it shows at least 2 ft. wide of \$6.00 ore with gold at \$35.00 per ounce. The two inclines and tunnel on the Arataba Claim show the presence of an ore shoot 500 feet long, from 4 feet to 8 feet wide, that will average better than \$8.00 per ton. The following assays, taken by Edward F. Cruskie, Mining Engineer, show an average of \$12.99 per ton, and these were all taken at least 50 feet below ground:

	<u>Ounces</u>	<u>GOLD PER TON</u>		<u>Ounces</u>	<u>SILVER PER TON</u>		<u>TOTAL VALUE</u> <u>GOLD &amp; SILVER</u>
			<u>Value</u>			<u>Value</u>	
1 -	0.09		\$ 3.15	0.40	0.36	\$ 3.51	
2 -	0.17		5.95	0.20	0.18	6.13	
3 -	0.78		27.30	0.50	0.45	27.75	
4 -	0.25		8.75	0.80	0.72	9.47	
6 -	0.04		1.40	0.20	0.18	1.58	
6 -	0.10		3.50	1.10	1.09	4.59	
9 -	0.08		2.80	0.18	0.20	2.98	
10 -	0.14		4.90	0.60	0.54	5.44	
11 -	0.06	W. Face Drft.	2.10	0.60	0.54	2.64	
12 -	0.19		6.65	0.80	0.72	7.37	
14 -	0.71		24.85	2.00	1.80	26.65	
-- -	0.15		5.25	0.50	0.45	5.70	
-- -	0.02		0.70	0.40	0.36	1.06	
As = 0.21							
		Adularia					
		Streak	0.80	28.00	1.80	29.62	
	0.10		3.50	0.40	0.36	3.86	
	0.29		10.15	1.61	1.44	11.59	
	0.51		17.85	1.10	0.99	18.84	

Total production from the workings on the surface, and from the incline shaft and the 65-ft. level, was estimated by Al Harpending at \$35,000.00, with gold at \$20.67 per ounce, and came from less than 2,000 tons, mostly from the shaft.

#### 5. - GEOLOGY:

The Green Quartz Vein is a fault vein of the same type as the other veins of the Oatman District. It strikes North 18 degrees West to North 25 Degrees West, and dips 45 Degrees to the North East. The gangue minerals are quartz, adularia and calcite, with much silicified wall rock. There are seams of clay and talc and a small amount of pyrite. Native gold occurs both in the quartz and in the pyrite in a very fine state of subdivision. It is an ideal cyaniding ore. This vein is traceable for over two miles in length and is a double vein at surface, this being from 25 to 35 feet in width, having a hanging wall vein and a foot wall vein from 2 to 18 feet wide and crushed country rock between the two veins. Everywhere it has been opened each vein widens with depth and the value increases. Water was struck in the 110-ft. shaft in fair quantity but no sulphides were found. The sulphide zone will probably be reached at 200 feet, and better conditions for large ore bodies will be encountered. The country rock on these claims was mapped by the U. S. Geological survey as Alcyone Trachyte, but it more

closely resembles the Oatman andesite. Since the trachyte is really a potash rich andesite, the classification does not matter. The veins were formed after the intrusion of the rhyolite plug known as Boundary Cone, a mile northwest, and have all the characteristics of the Oatman veins. Therefore it is reasonable to predict the same conditions at depth as are found in the successful mines to the North. The surface outcrop indicates an ore shoot at least a mile long on this property, but it may be two separate ore shoots as a large interval is covered with soil and wash.

#### 5. -WATER:

Water was struck at a depth of 65 feet in fair quantity and is undoubtedly the same water found in the Nellie and Black Range mines to the East. These mines were literally drowned out by a heavy flow of water, enough to run any large mill. The Nellie vein should intersect the Green Quartz vein near the north end line and may be the source of this water. In any event plenty of water is available for all purposes.

#### 6. - CUSTOM MILL:

The Oatman District is without any milling facilities at present, but there is ore enough in sight to warrant a custom mill of at least 150 tons capacity. The Victoria Gold Mines have an ideal location for such a plant. Its mine could be used to supply such a plant when other shipments fail, thus insuring a continuous run for the mill. The Western Star mine, 10 miles northwest could supply 25 tons per day, Leasors on the Pioneer could ship 25 tons per day and the Gold Dust, Vivian, Lexington, Sunnyside, Lazy Boy and others would ship some ore, perhaps in the aggregate, enough to take the whole capacity of the mill.

Without doubt, it would be better to mill at least 75 tons out of Victoria Companies' mine, and take as much more from the outside.

The cyanide process will make a high recovery with known methods and no experiments are necessary. Only  $3\frac{1}{2}$  miles of power line and one mile of road will be necessary and water, tailing ponds and a good mill site are at hand.

#### 7. - RECOMMENDATIONS.

The plans of the company should be carried out at once, as a good mill can be obtained for less than half price, complete with all accessory materials. The shaft should be sunk to the 200 foot level and station cut, and as soon as drifts, north and south, are out of the way the shaft should be continued to the three hundred and the station there arranged to continue the shaft. With two new levels the mine can easily produce 150 tons per day. It is probably that much better ore will lie below the three hundred foot level and in better widths.

A well designed cyanide mill should mill this type of ore for about \$2.25 per ton, with an extraction of 95% plus. A milling charge of \$3.50 per ton and a guaranteed extraction should be charged at first, on custom ore. This will give the company a revenue of \$1.25 per ton on custom ore and 75 tons per day of mine ore averaging \$6.00 will give a company revenue of \$3.75 per ton or a total of \$93.00 on the custom ore and \$281.26 on mines ore per day. This amounts to \$11,250 per month to be used on the mine. \$6,000 per month will pay all the mine expense with a crew of 30 men. Competent management will make a small beginning like this grow into a large mining company.

Respectfully submitted,

(signed) J. Carlton Bray

Mining Engineer

Report On  
**Victoria Gold Mines**

**Oatman Gold District**

**ARIZONA**

By

E. ROSS HOUSHOLDER, E. M.

Registered Mining Engineer  
KINGMAN, ARIZONA

1948



*Original on file in office*

E. ROSS HOUSHOLDER, E. M.

Registered Engineer  
and Mohave County Engineer

KINGMAN, ARIZONA

Civil and Mining Engineering  
Examinations, Surveys, Assays  
Confidential Reports, Mine Management

February 7, 1948

Residence - Office  
429 E. Spring Street  
Telephone Green 87

Mr. R. P. Jones, President  
Victoria Gold Mines, Inc.  
Oatman, Arizona

Dear Mr. Jones:

At your request I have made a preliminary examination of the Victoria Gold Mine group in the Oatman section of the San Francisco Mining District, in Township 18 North, Range 20 West, Gila and Salt River Base Meridian, about five miles southwest of the mining town of Oatman, Mohave County, Arizona, and I herewith submit my preliminary report which consists of a total of the following 40 pages, all of which have been individually signed, and are to be used collectively and in their entirety only.

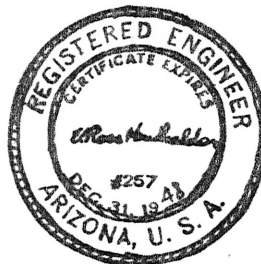
As you have suggested I have included considerable detail data concerning both the mine property and the district in an endeavor to make the entire subject as clear to you as possible, not only as the results of analyzing the sampling and the geological conditions, but to aid you in getting a good general idea of the entire situation. The discussion about ore identification and milling methods, as well as the subject of costs has been briefly covered, as you suggested, so that a true idea of the set up can be grasped. Liberal use has been made of photographs and reference to data found in your mine files to complete the record.

The group of 10 lode mining claims includes the:- Arataba, Arataba No. 1, Arataba No. 2, Arataba No. 3, Good Gold No. 1, Gold Nob, Bill Rush Fraction, Nellie, Nellie No. 2, and Nellie No. 3. A group claim map and a district group map is included.

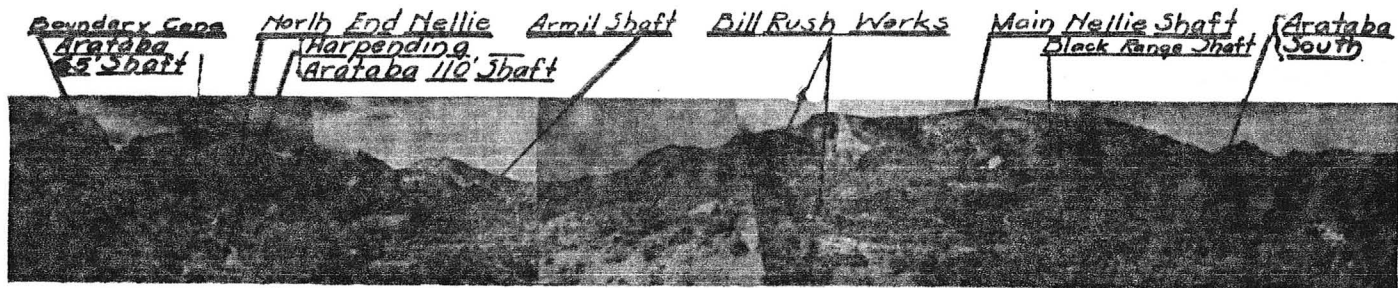
Respectfully Submitted

*E. Ross Housholder*

E. Ross Housholder, E. M.  
Registered Mining Engineer #257  
Kingman, Arizona



MAPS - BLUE PRINTS - BLACK AND WHITE PRINTS - DRAFTING SUPPLIES



Victoria Main Shaft

Panoramic View Showing Relative Location & Topography of The

## Victoria Gold Mines

Oatman Gold District

To Accompany Report By E. Ross Housholder E.M. Reg. Mining En

Feb. 1948

E. ROSS HOUSHOLDER, E. M.  
Registered Professional Engineer  
CONSULTING ENGINEER  
MINES & SMELTING

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## TOPOGRAPHY AND TRANSPORTATION

The topography of the Victoria Group for the most part is rugged like the surrounding country. The accompanying photographs show the characteristic topography of the bisected Tertiary flows, especially the Esperanza trachyte with the talus slopes of hard clinking rock flakes in the central background, and the detritus covered hills and slopes in the foreground.

Good solid dirt roads of easy grade lead from the oil cake pavement of the Federal U. S. 66 transcontinental highway to all the main workings of the property. The highway is less than one half mile west of the present main working Aratoba shaft. From the junction with the highway it is 5 miles to the town of Oatman. Kingman, the county seat of Mohave County, Arizona, on the mainline of the A. T. & S. F. Railroad, and also a trucking terminal where mining and machinery supplies are available, is 28 miles east of Oatman, via oil cake paved U. S. 66 Highway.

## CLIMATE

The district has a healthful climate with mild winters, although the summers are hot, which permits good working conditions the year round. The rainfall is between 6 and 9 inches a year. The vegetation is typically semi-arid, characteristic of the Oatman district.

## GENERAL GEOLOGY OF MOHAVE COUNTY

This county stands peculiarly alone in the geological areas of the state, and for that matter, the whole southwest.

Col. Pat Donan, widely known explorer, geologist and mine operator over forty years ago, said: "The greatest mines of the earth are yet to be opened in the great American West. ---- From Alaska to Nicaragua, the whole vast system of Rocky Mountains and Cordilleras is an unbroken ore and mineral bed. Not one ten-thousandth part of it has ever felt the tap of a prospector's hammer."

Since then, several rich districts have been opened up, including those in Mohave County, Arizona. The San Francisco Mining District in this county, centering around the Oatman section has since then produced over \$35,000,000 in gold and silver alone.

But getting down to the geology of Mohave County is really not putting up to the reader the geology that obtains throughout the Cordilleran plateau. While in the main the geology of the plateau country has a sameness, Mohave County is out of the ordinary, carrying a line of geological classifications all its own. This is created possibly because of the fact that part of it was included in both the Tertiary lavas and the Quarternary sediments. The country is bisected

*E. Ross Howlander*

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TABLE II.—GOLD AND SILVER PRODUCTION OF THE SAN FRANCISCO DISTRICT, ARIZONA

COMPILED BY J. R. TENNEY

Year	TOM REED MINE		UNITED EASTERN		GOLD ROAD		TOTAL PRODUCTION <sup>a</sup>			
	Tons Ore	Bullion Value	Tons Ore	Bullion Value	Tons Ore	Bullion Value	Total Tons Ore Treated	Total Gold in dollars	Total Silver in ounces	Total Value in dollars
1897 to 1907					1904 to 1907 incl.	\$ 2,250,000				\$2,522,000
1908						739,400	72,757	266,254	6,522	269,711
1909		\$1,087,911					18,106	300,036	7,118	303,737
1910						676,809	89,284	1,103,221	26,254	1,117,394
1911	43,324	835,043				665,783	110,699	1,458,639	33,834	1,476,571
1912	55,663	1,154,553			109,070	676,515	174,319	1,794,847	41,456	1,820,743
1913	48,111	1,141,907			163,658	843,991	159,348			1,818,522
1914	44,995	1,002,407			197,546	651,761	160,469			1,346,398
1915	29,916	661,871	Discovered		95,273		132,579			1,499,033
1916	46,170	486,678	Developed				95,245	892,681	23,512	908,349
1917	81,384	620,179	34,548	\$1,337,670			167,258	2,310,270	57,353	2,357,529
1918	83,525	794,333	93,339	2,072,359	Mine closed		182,824	2,772,091	70,432	2,843,423
1919	89,537	679,896	97,323	1,970,509			184,490	2,556,197	71,833	2,636,650
1920	93,970	706,667	102,920	2,333,519			197,629	2,830,731	82,806	2,918,890
1921	69,333	377,992	97,413	1,910,054	Mine reopened		179,013			2,388,050
1922	43,072	463,119	117,637	1,543,909	31,108		169,240			2,138,646
1923	42,814	538,366	104,506	2,035,076	Closed Oct.		186,686	2,796,830	68,551	2,853,042
1924	14,556	181,936	Closed June	1,000,000			98,788	1,617,196	39,097	1,643,391
1925	35,448	494,839	Dump ore treated	80,000			89,391			968,131
1926	21,361	283,696					102,979			847,172
1927	17,289	161,461					43,500			536,868
1928	7,679	118,278								296,926
Total	876,336	311,740,158	697,038	\$14,755,338	447,937	\$ 8,504,000	2,859,643			\$35,411,926

a. Includes production from small mines.  
b. From 1921 to 1928 includes ore from leases.

TABLE IV.

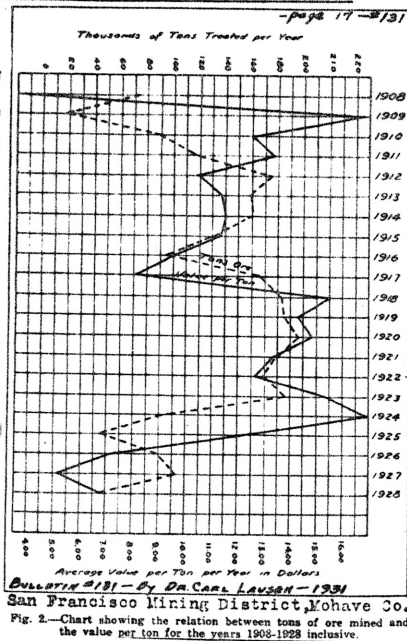
PRODUCTION AND METAL CONTENT OF ORE FROM THE SAN FRANCISCO DISTRICT, ARIZONA, 1908 TO 1928, INCLUSIVE.

Year	Tons treated	Av. value per ton	Ounces gold	Ounces silver	Ratio gold to silver
1908	72,737	\$ 3.71	12,891	6,522	1.976
1909	18,106	16.78	14,515	7,118	2.041
1910	89,284	12.52	63,373	26,254	2.033
1911	110,699	13.34	70,565	33,834	2.096
1912	174,319	10.44	86,283	41,456	2.065
1913	159,948	11.35			
1914	160,469	11.51			
1915	132,579	11.31			
1916	95,245	9.54	43,181	33,512	1.818
1917	167,258	8.13	111,709	87,353	1.949
1918	182,824	15.55	124,155	70,432	1.905
1919	184,490	14.29	123,667	71,833	1.721
1920	197,629	14.84	136,943	72,306	1.476
1921	179,013	13.34			
1922	169,240	12.64			
1923	186,686	15.28	135,309	68,551	1.974
1924	98,788	16.98	78,239	39,097	2.001
1925	46,638	12.15			
1926	89,391	7.34			
1927	102,979	5.16			
1928	43,500	6.86			

Av. value 1908-1928—\$12.568 per ton.

This page arranged to accompany report by  
E. Ross Housholder  
REGISTERED PROFESSIONAL ENGINEER  
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Phoenix, Arizona

Tables shown here were published in Arizona Bureau of Mines Bull. #131



*E. Ross Housholder*





by many ranges of mountains. The Chemehuevis, Blue Ridge, Black Range, Ute Mountains, River Range, and the Black Canyon Range, are in reality names applied to different parts of what is in reality one and the same range of mountains. Although the Chemehuevis is composed of granite, gneiss and schist, while the others are composed largely of basalt caps, below which extend the andesites, latites, trachites and rhyolites, with the exception of that part of the Black Canyon range lying in and around the big bend of the Colorado, which is in the main pre-Cambrian. The Blue Ridge range, a portion of which is often called the Black Range, is with a slight exception, composed of lava flows.

#### GENERAL GEOLOGY OF OATMAN SECTION

The extensive andesitic flows which overlay the pre-Cambrian granitic rocks to an estimated depth of two to three thousand feet over a portion of the district are intruded with great rhyolitic dykes and persistent gold bearing veins of quartz and adularia. There is every reason to believe that the gold values will continue to greater depth in the veins that cut the andesitic flows and even into the underlying granite formation.

The rocks of the Oatman district comprise a closely related series of Tertiary volcanic flows, with associated tuffs and some subordinated beds of conglomerate or breccia, sandstone, shale, and limestone. The volcanic flows rest as a whole on the pre-Cambrian crystalline rocks; chiefly granitic, and have been invaded and displaced in part by masses of porphyry that are closely related in composition to some of the flows and probably come from the same bodies of molten magma. They are also cut by numerous dikes and small irregular intrusive bodies of rhyolite and other rocks.

The igneous rocks have a wide range of composition, from siliceous potassic rhyolite to olivine basalt, but the preponderent members of the series belong within the compositional range represented on the one hand by latitic andesite and passing through latite, on the other hand by latitic-trachyte. The discrimination and classification of rocks which are so closely akin and between which there are no definite distinctions, present considerable difficulty, particularly, as lavas of practically identical composition were erupted at different times. Classification and nomenclature will be fully discussed regarding the rocks of the Victoria mine group.

At a time which cannot be clearly fixed but which from our general knowledge of the geology of Arizona may be considered as probably middle or late Tertiary, volcanic eruptions broke through the pre-Cambrian rocks. This event must have been accomplished and perhaps immediately preceded changes in the surface configuration of the country, and consequently in erosion, and in the transportation and deposition of detritus. At some places there is a coarse breccia, consisting of blocks of pre-Cambrian rock in a greenish matrix which appears to have been originally a mud of fine volcanic detritus.

*E. Ross Housholder*  
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Overlying the breccia and in places resting directly upon the pre-Cambrian rocks is a series of flows with probably some intrusive masses, which have been designated as the Alcyone trachyte. This formation includes what F. C. Schrader, U. S. Geological Survey Bulletin #397, called the "basal andesite" or, in some parts of his report, the "older andesite". The thickness of the formation is not known. It is roughly estimated from 2,500 to 2,800 feet.

The eruption of the Alcyone trachyte was followed by a brief interval of erosion, during which there was local accumulation of some sandy beds whose materials apparently were derived from the trachyte.

These sedimentary beds are overlain by a flow or flows of a very compact ringing lava, designated as the Esperanza trachyte. It is mainly a series of flows, but in a number of places is clearly intrusive in the Alcyone trachyte.

A part of the Alcyone trachyte, particularly in the extreme western part of the district, may be intrusive into flows of essentially the same composition. If so, it is highly probable that at more than one place in the district the trachyte, instead of merely resting on the pre-Cambrian, may extend indefinitely downward to what was originally its magmatic source.

The general structure of a simple earth block tilted gently to the east is modified to some extent by faulting and by the displacement that accompanied the intrusion of two large masses of porphyry.

#### MATERIAL AND STRUCTURE OF THE VEINS

During the early development of the Oatman section it was generally felt that when the mine workings penetrated through the area represented by the younger Tertiary volcanic flows, that the values would materially decrease, thus limiting the economic mining life of the Oatman section to these younger flows. When, however, actual workings entered the older flow it was found that the values did not cease. A more careful study resulted in the geological determination so that it is even suggested that perhaps the values might continue into the underlying pre-Cambrian rocks. This has not been determined as the deepest workings in the district have not yet reached the granite, but it is geologically reasonable to contend that the veins will continue to great depth and that the mineral content will likewise remain with them. This contention is somewhat verified in the northern part of the district, known as the Katherine, and Union Pass sections, where the Andesites have been worn away and gold bearing veins occur in the pre-Cambrian granites.

Waldemar Lindgren, widely known geologist, in speaking of the ores of the Oatman District, said the "original gangue material consisted of calcite and fluorite and the 'pseudomorphic' ore consists of quartz and large amounts of adularia." The ores from openings

*E. Ross Housholder*

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on the various claims comprising the Victoria mine group are typical of the district. They frequently show a banded structure and have a peculiar coloring that makes them recognizable to the mining man familiar with the district, no matter where he may be shown them.

The Oatman section veins, including those on the Victoria group, are mineralogically of simple character, consisting mainly of quartz, calcite and adularia, occurs generally in microscopic crystals, and the gold is visible only in unusually rich ore. Fluorite occurs in some of the veins, but apparently is not particularly significant as to the presence of gold. The proportion of quartz and calcite in the vein varies widely. A wide range may also be found in different parts of the same vein. As a rule the gold is found where both minerals are present. Much of the quartz that deposited nearly or contemporaneously with the gold has clearly replaced older calcite. Some of it, moreover, appears to have crystallized simultaneously with calcite. The conclusion reached is that during the middle stage of vein formation quartz and calcite were repeatedly deposited alternately and that during this period also they were at times deposited simultaneously and calcite was replaced with quartz. Deposition of calcite has probably continued up to the present time. The cause of the tint and lustre accompanying the gold bearing quartz has not yet been ascertained. The ore mined on a large scale in the Oatman district has ranged in tenor from \$7 to \$35 per ton.

The rock of the particular area about the Victoria gold mine has been greatly altered, much of it beyond identification, by the introduction of finely disseminated pyrite and the subsequent oxidation of the sulphide with the generation of sulphuric acid. The iron of the original ferromagnesian minerals has been deposited as hydrous oxide, and the aluminous minerals have also been decomposed with the production of alum and other less soluble sulphates.

Locally the veins contain much angular crushed rock, latitic in structure, and other rock. The dike rock apparently is a quartz andesitic phase. It weathers a reddish brown.

Although the largest, the Nellie, Bullrush and Arataba (Green Quartz) veins, are by no means the only promising veins on the estate. In fact there are several likely veins having the same general strike as the major veins, and others that are evidently feeders, occurring in the same formations, and under the conditions recognized as favorable, in which to expect ore bodies of remunerative value. On the veins mentioned the most exploration work has thus far been done, where samples of ore have returned assay results showing above the usual amount of gold and silver contained in surface ores in the Oatman district. In this report the value and extent of these veins will not be taken up as the development of the main veins mentioned will in itself prove to be an undertaking worthy of every effort of the operators at this time, leaving the development of the additional veins for future exploration and consideration.

*E. Ross Housholder*

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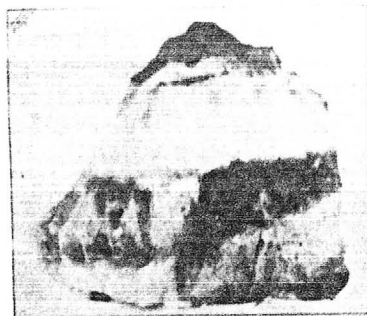


Fig. 11.—The first stage of quartz deposition. The dark band is the amethystine variety.

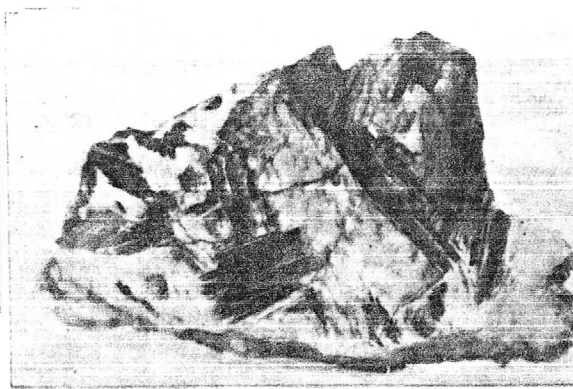


Fig. 12.—Platy quartz as a pseudomorphic replacement of calcite. Unreplaced calcite leached out.

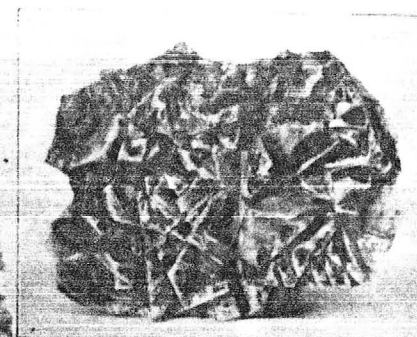


Fig. 13.—Quartz of the second stage of deposition, showing a pseudomorphic replacement of calcite plates.

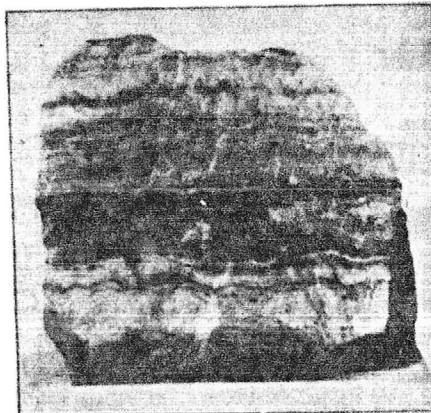


Fig. 14.—Banded quartz of the third stage of deposition. A variety commonly found at the Gold Road vein.



Fig. 15.—Quartz of the fourth stage of deposition. The platy structure is due to a replacement of calcite.

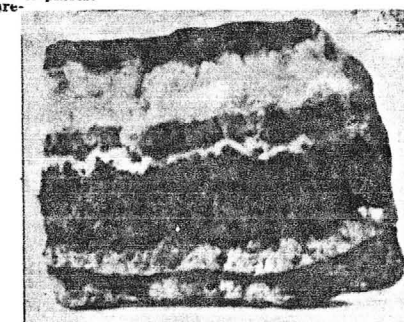


Fig. 16.—Dark greenish quartz of the fifth stage of deposition. The white bands are adularia.

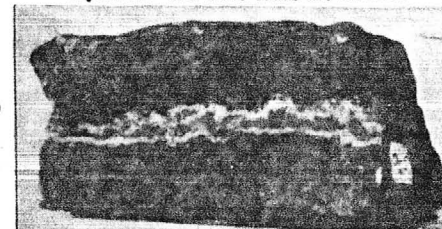


Fig. 17.—A specimen of the fifth stage of deposition. This quartz is of a dark greenish color. The white band is adularia.

CHARACTERISTIC FEATURES OF THE VARIOUS STAGES OF MINERAL FILLING IN THE VEINS

BY CARL LAUSEN

ARIZONA BUREAU OF MINES

Notes for Bulletin 131

*This page of photographs from Arizona Bureau of Mines Bulletin 131, were compiled as here shown to accompany reports by E. Ross Housholder, E.M. Registered Professional Engineer Kinsman, Arizona 4-5*

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### STAGES OF THE VEIN AND MINERAL DEPOSITION

There is no question but that the gold ore samples secured in sampling the Victoria gold mine group indicates the first and second stages of mineral filling throughout this vein. The quartz of the first stage of deposition shows the most variation in texture, and for that reason it is often difficult to identify it with certainty. It was found in the different vein outcrops. It was difficult to differentiate such quartz from quartz deposited during the next stage when the latter was found to be free from such textural features as pseudomorphic replacements after calcite. The ratio of gold to silver is usually found to be one to six by weight in this first stage of vein deposition.

Following, possibly very closely, the deposition of the calcite accompanying the above, the solution again began to deposit quartz. From specimens studied, it was concluded that the quartz was first deposited between the thin plates of calcite, and, as deposition continued, some calcite was dissolved and carried away by these same solutions. Such calcite as remained was later dissolved, perhaps by surface waters, leaving thin plates of quartz standing in relief. Sometimes the thin plates of quartz took place as deposition of these plates. Later, when the calcite was leached out, the characteristic textures showing quartz of the second stage of deposition developed, showing a pseudomorphic replacement of calcite plates. In this second stage of vein deposition, silver, although low, exceeds gold by weight. Throughout the main Victoria veins there is much evidence of this second stage of vein deposition.

There are only several places that indicate the possible existence to me of the banded quartz of the third stage of deposition, a variety commonly found, however, at the Cold Road vein near the head of Silver Creek. Faulting followed the deposition of the second stage of quartz and calcite, so the first mineral of the third stage was deposited upon this crushed material. This variety of quartz is extremely fine grained, often chalcedonic, and consists of alternate layers of slightly different color. The quartz is rather opaque, creamy white with thin bands of pale brown, sometimes the broader bands are a delicate lavender between layers of white and yellow, and lacks the oily lustre. The average ratio of gold to silver is 2 to 3. Time did not permit me to make an exhaustive study to definitely determine the existence of this third stage of vein deposition, even in the several places on the vein outcrops or underground surface workings where I was impressed by the similarity of the ore characteristics. It is mentioned here to complete the record.

So far as we are concerned, I now believe that the quartz of the fourth stage of deposition, with the platy structure due to replacement of calcite, has been definitely determined in ore specimens from the workings of the known ore shoot in the Arataba, Billrush and Nellie veins. There has been an extensive deposition of the quartz that constitutes the commercial ore bodies. The quartz again shows

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casts of platy calcite. The color is invariably yellow or greenish, but the oily lustre is absent except in such specimens as have a banded structure. The banded structure is best seen where the earlier stages of mineral filling have been shattered and this latter quartz introduced into the fractures. The calcite has a pearly lustre and is the most distinctive variety of this mineral in all the stages of mineral deposition in the vein.

In the Oatman section this variety of quartz occurs at practically all the mines that have produced gold. This period of mineralization represents the first introduction of commercial values. Assays of such quartz range from 0.20 to 1.00 ounces of gold and 0.24 to 2.34 ounces in silver per ton. The ratio of gold to silver is approximately 1 to 2 in the entire district. The samples assayed at the time this report was being prepared shows the ratio of the Victoria gold mine group to be 1 to 2.4.

Although further development, especially at depth, will likely show more fifth stage deposition, I did definitely determine that this final stage was in evidence, especially in the area from the Nellie shaft and the Arataba workings. In order to complete the record of the district's data on the vein formation, these paragraphs here included, it is hoped, will be explanatory to the more technical man as well as the layman who will be interested in reading this report.

This fifth stage of deposition brings to close the active filling of the fissures by the mineral-bearing solutions which arose through the fractures. The vein filling of this stage of mineralization was deposited in open fissures upon the earlier stages of vein filling or upon rock fragments. Banding as well developed and crenulation are frequently referred to as cockade ore, and represents the repeated deposition of alternate layers of somewhat different composition. The quartz of this last stage of mineralization is yellow and often olive-green in color. Such quartz invariably shows an oily lustre, and well-developed banded structure. Layers of quartz are often separated by bands of snow-white adularia, and these partings of adularia vary in width from a small fraction of an inch to two inches. It is clearly indicated that, during this phase of mineralization at least, the process of vein formation was due to simple deposition of minerals in open fissures, and replacement was negligible.

The calcite that followed the deposition of the fifth-stage quartz was transparent and colorless and presents no features of unusual interest. Such calcite is usually well crystallized and represents the last mineral deposition by ascending solutions.

The following table, compiled by Carl Lausen, in Arizona Bureau of Mines Geological Series No. 6 bulletin, page 72, shows the characteristic features of the various stages of quartz deposition in the Oatman ores:

*E. Ross Householder*

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Stage	Texture	Color	Range of values per ton	Ratio of gold to silver	Relative distribution in the veins
1st.	Coarse to fine grained	colorless white, amethystine	Up to \$1.20	Up to 1 to 6	Abundant
2nd.	Fine grained Often shows	White, rarely	Up to \$1.70	1 to 6	Abundant
3rd.	Fine grained Banded	Various colors	\$1.20 to \$8.00	2 to 3	Relatively scarce.
4th.	Fine grained Often shows casts of platy calcite.	Pale green to yellow	\$4.00 to \$20.00	1 to 2	Abundant only in ore shoots.
5th.	Fine to medium grained Usually banded	Pale to deep honey-yellow	\$20.00 up	4 to 1	Abundant only in ore shoots.

Ransome proposed the term hypogene for minerals deposited by ascending hot solutions, and supergene for minerals deposited by downward moving cold solutions. Hypogene enrichment, therefore, is enrichment brought about by ascending solutions, and the term has been broadened to cover all such enrichments no matter whether they were deposited from hot or cold solutions. Although in the ores of this district the gold was deposited in the later part of the period of vein formation, it appears to be of hypogene origin; there is no evidence, so far as could be determined, of downward enrichment, except at or near the surface. Outcrops in which the fourth and fifth stages of quartz have been deposited may be leached of the precious metals near the surface. Gypsum bearing outcrops, resulting from the action of sulphuric acid derived from pyrite in the vein or wall rock upon the calcite in the vein, has no bearing on the deposition of gold. It does indicate mineralization, for the pyrite was certainly deposited by mineral bearing solutions in the walls of the fissure prior to the deposition of quartz and calcite. Such outcrops are always worth prospecting.

In this district, the ores are believed to have been deposited by hot ascending solutions which originated at considerable depth below the surface, derived from a cooling magma.

*E. Ross Householder*

11-6-4



### Interesting Data Concerning Vein Filling

The interesting characteristic of the ores of the Oatman section is the rhythmic alternation of quartz and calcite. In each vein, deposition begins with quartz and closes with calcite. Five stages have been recognized, each of which has its distinctive type of quartz, and they can usually, although not always, be distinguished from each other. The calcite shows no such distinctive features, although coarse-grained, gray calcite occurs only in the veins following the first stage of quartz deposition.

Neither the color nor the texture of the quartz is alone a safe criterion in distinguishing the stage of mineralization to which it belongs. For example, yellow quartz with a greasy lustre is always looked upon as indicating high-grade ore, but assays of carefully selected samples of such quartz gave low value. Yellow quartz which shows a pseudomorphic texture after platy calcite is, however, always commercial ore, and such ore invariably contains microscopic crystals of adularia. Transparent crystals of quartz may belong to any stage of deposition, but only in the first stage are such crystals large.

It should be apparent from what has been told that the recognition of the different types of quartz may be of commercial importance. For instance, quartz of the fourth or fifth stage of mineralization taken from the outcrop of a vein, although carrying no gold, would be worth following to depth. Samples from the Nellie, Arataba and Billrush veins all show the fourth stage deposition quartz and in addition, there is a commercial amount of gold contained, so it would seem that further exploration to better open up the ore bodies is justified.

At no mine in the Oatman section were all stages observed, but, by piecing together evidence from different veins, a more complete story was obtained. There is an interesting relation between the stages of quartz deposition and the ratio of gold to silver. There is a progressive increase in the total value of the gold and silver from the earlier to the last phases of mineralization. The gold and silver ratio of the samples secured from the Victoria ore shoots checked the ratio to be expected from fourth stage veins.

### NELLIE VEIN

The geology of the Black Range area is unique, and of inexhaustible interest to the expert, to whom the gigantic outcroppings are a constant wonder and spur to further research. The Nellie lode is one of the largest and most interesting ledges in the Oatman section. This lode has a known length of over seven miles, and in places outcropping over one hundred feet wide, and carrying values in gold on the surface that promise satisfactory returns upon adequate development. The ledge material is composed principally of adularia quartz, similar to that found in the Tom Reed, Gold Road and United Eastern mines.

*E. Ross Householder*

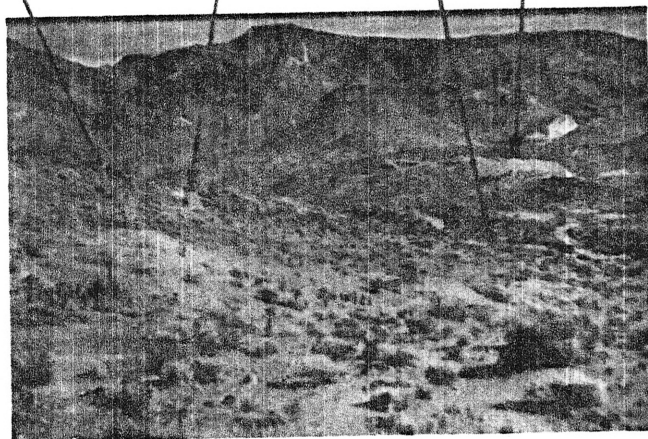


Outcrop of Nellie Vein on Victoria property.

Nellie vein

Bill. Rush Open Cut and Shaft

Nellie Main Shaft Dump



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*E Ross Housholder*  
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There is also considerable quartz replacement after calcite, and hematite and manganese oxides present. The country rock is for the most part one of the phases of andesite, but this formation varies, however, along the ledge, where the footwall is diorite, and the hanging wall rhyolite. Another variation appears in the Nellie where the footwall is andesite and the hanging wall is latite. The main fact to be noted, however, is that the vein is a true fissure with well defined walls.

L. Harpending, in charge of operations at the Green Quartz workings (now Arataba) and interested in the development of the Nellie mine, is now retired and lives in California. James McCarthy contacted Harpending to learn what he knew concerning the Nellie mine. In order to complete the record, a communication dated June 18, 1947, giving a synopsis of the workings of the Nellie mine, signed by L. Harpending, is here quoted:

"When the 300 foot shaft was sunk on the Nellie mining ground in 1914, the work was done on one of the 3 stringers that forked east of the big dry wash that runs from north to south thru the Nellie property. (See map) West of this dry wash lies the best mineralized zone on the Nellie holdings. The main true fissure vein is intact and will average better than 6 feet in width from a distance of 2,000 feet in length.

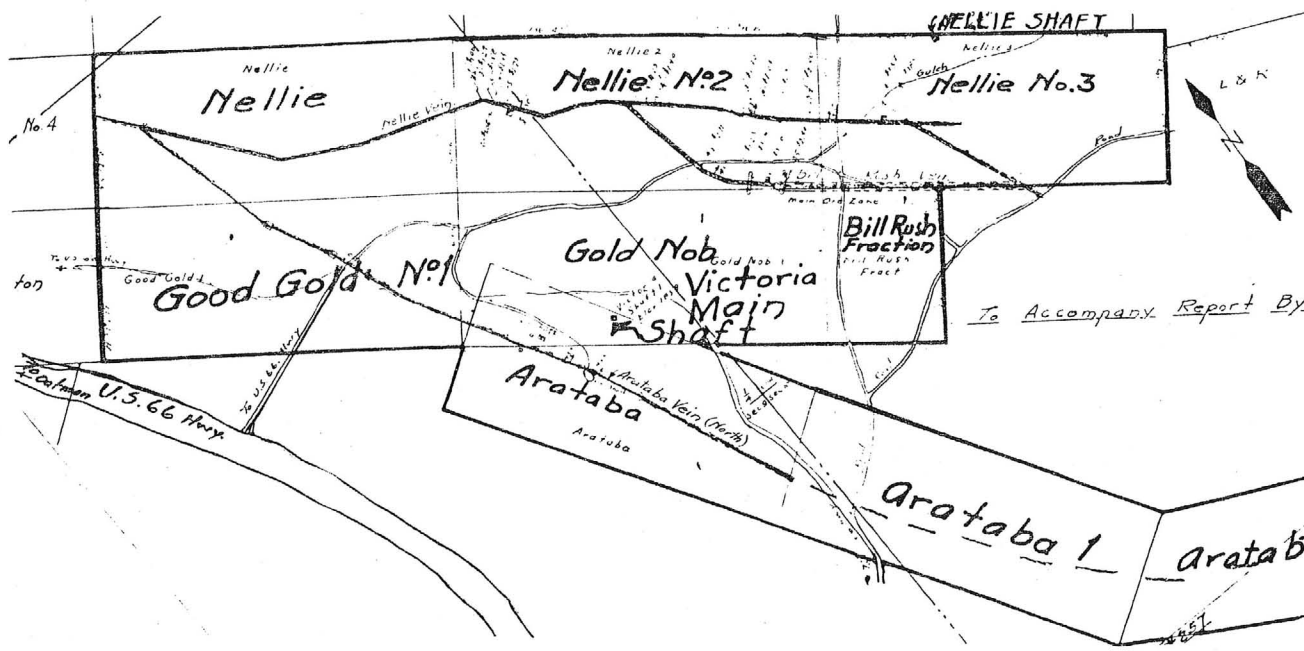
"The workings in the 300 foot shaft consisted of a drift run from the 300 level 800 feet east, and a drift west of only 20 feet. In the east level the vein was more or less broken up and the values were low, running not over \$5.00 per ton. In the west drift, the width of the vein averaged 6 feet wide and a general assay gave returns of \$10.00 gold per ton.

"On the preliminary map I have drawn, you will notice where the exploration work was done, giving width of veins and values.

"The 300 foot shaft (main Nellie 500' Shaft) is marked No. 1 and No. 2 shaft lies west of the dry wash and 300 feet south of the main Nellie Dike. This shaft is 40 feet deep and is all in quartz, sampling \$4.65. This is a different zone entirely and the quartz is of a reddish brown color, showing quite a percentage of hematite, calcite and manganese. A wide open cut 100 feet west of this shaft exposes a 3 foot vein of calcite that assayed \$7.50 per ton. This area will cover several hundred feet of practically all quartz.

"No. 3 (Arnil Shaft) shaft lies 1000 feet west of the big wash on the main dike of the Nellie vein and was sunk 40 feet deep by Louis Arnil in 1910 for the Vivian Mining Company before the Nellie Company acquired the ground. The vein here is well defined, showing 6 feet of quartz that the dump assayed \$17.50 per ton gold, and Mr. Arnil had picked samples from the vein that run \$40.00. East of the shaft, 100 feet, Mr. Arnil dug a trench 50 feet long in the foot wall section of the vein, and two feet deep, that assayed \$5.00 for its entire length.

*E. Ross Housholder*  
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Claim Map of  
VICTORIA GOLD MINES INC.

OATMAN, ARIZONA

NELLIE VEIN

ASSAY PLAN

Graphic Scale 1" = 100' 300' 600'

E. F. Cruskie Mining Engineer  
with Additions By E. F. Cruskie & W. H. Cruskie  
Jan 17 1947

To Accompany Report By E. F. Cruskie & W. H. Cruskie  
Registered Mining Engineers #257  
Kingman, Arizona

"No. 4 (Good Gold) shaft lies still farther west about 500 feet and is on an off shoot vein from the main Nellie dike, called the Green Quartz vein. The Nellie vein runs nearly easterly and westerly, but the Green Quartz vein runs 45 degrees south of east. This shaft is 45 feet deep, and the vein is better than 5 feet wide, and samples taken from the collar to the bottom of the shaft gave returns of \$8.00. This vein runs through the Green Quartz property and shows free gold where exposed. All of the values I have given were at the old price of gold at \$20.67 per ounce. The Nellie vein shows values along its entire course, is in the Older andesite with rhyolite and phonolite intrusions and is one of the best geological conditions for the making of large profitable bodies of ore.

(Signed) L. Harpending

(Dated) June 18, 1947."

According to a special edition of the Mohave County Miner, featuring mining, dated July, 1919, a special article states that development of the Nellie consists of a shaft 500 feet in depth, with crosscuts to the vein on the 350, 400 and 500 foot levels.

On these levels a small amount of development work has shown the existence of a strong promising vein with ore values running from \$8.00 to \$15.00 per ton. These values represent vein width of from nine to twenty feet. Smaller segments of the vein give values up to \$45.00, according to A. C. Keating, mining engineer and former superintendent of the Big Jim of United Eastern fame. Mr. Keating, at the time shaft work on the Nellie was being prosecuted, wrote: "Across the entire length of the Nellie claims the main lode outcrops for a width of from twenty to thirty feet and larger, the general strike being North 52° West. The rib is traceable in magnificent proportions for a distance of six or seven miles across the country, with the exception of a few places where the softer part of the lode has eroded or covered with detrital from the higher hills beyond. By the foregoing evidence, particularly the excellent showing of the vein, its surface values, its accessibility and consequent low working cost and proven value of the ground in the adjacent claims, the Nellie group is convincing as a property awaiting only efficient development to prove highly lucrative. With the work properly directed and executed, there is a signal assurance of handsome returns."

Some of the work near the surface uncovered ore of milling grade and some drifting was done. The vein at this point carried seven or eight feet of ore averaging \$9 to \$12 per ton. The vein lies rather flat, dipping toward the north. At about 360 feet the shaft entered the vein and passed out at about 385 feet. On the 500 foot level a crosscut was driven to the vein, from the bottom of the shaft, and conditions similar to those on the 350 level were encountered, only the values were reported to be slightly higher.

*E. Ross Housholder*

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Practically no development work was done on the 500 foot level. To the southeast of the Nellie shaft there is a rather high hill which is crossed by the outcrop of the vein. At the top of this hill is one of the best surface showings on the property, showing a shoot of ore with unusually good values for a surface outcrop.

#### SUGGEST CROSSCUT ON 500

Considering the observed conditions it is suggested that a crosscut be run on the 500 foot level of the Nellie shaft southwest about 100 feet and cut the footwall portion of the southwest fork of the Nellie ledge, which forms a junction about 200 feet from the southeast end line of the Nellie. It was on this portion of the ledge in a 70 foot shaft that some of the best gold ore was found.

#### FURTHER REMARKS ON THE NELLIE

In a letter report, dated July 15, 1947, Edward F. Cruskie, mining engineer for the Victoria Gold Mines Inc., wrote in part concerning the Nellie mine: "I find that the main Nellie shaft is in fair condition, and at a modest capital outlay, can be repaired so as to supply water if needed for your mill, and for eventual connection with the 200 foot level of the No. 1 shaft.

"The results of sampling of available exposures are very encouraging, and in one case of which I will speak later, phenomenal. All the samples are of mineable vein widths, and the average width of the Nellie vein underground should approximate seven feet. The average values of the surface samples are at least twice that of the surface samples values found in this district in the veins of some of the most noted producing properties. In addition, the vein widths are much greater, and the conditions for migration of the gold and silver values to water level due to leaching action are more favorable.

"In the large cut you have made across the vein, where on the map you will find the notation "Main Ore Zone", I find that you have a vein width of 45 feet which averages \$2.40 per ton in gold and silver. This is phenomenal exposure for the district, and should be exploited at the earliest opportunity, as it will assure you of a ready mill feed while other developments are going on. I would recommend stripping of this zone with a view to open pit operation in this area. Subsequent crosscutting to this area from your No. 1 shaft may convert this operation to glory hole work.

"I am of the opinion that your acquisition of this property will add ten years to the life of your operations, and will be a fruitful source of profitable mill ore at all times if properly developed.

(Signed) Edward F. Cruskie  
Mining Engineer."

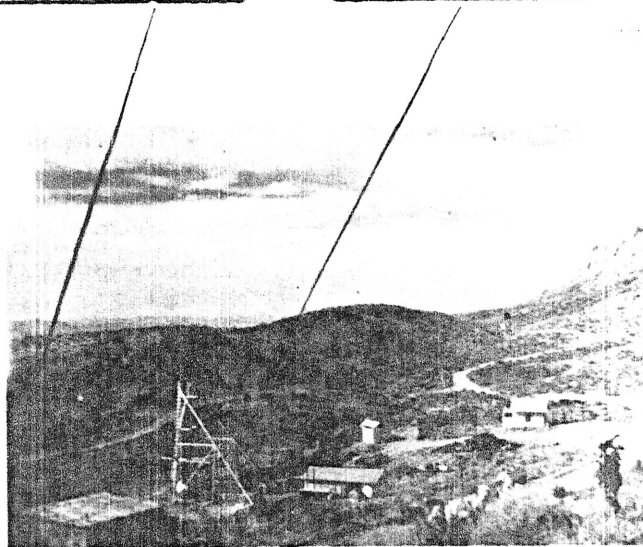
*E. F. Cruskie*

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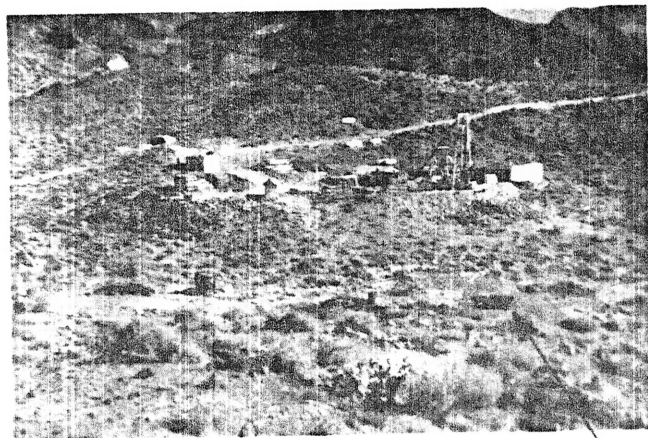
Arataba 110' Incline

Arataba 65' Shaft



(Looking toward U. S. 66 Highway)  
VICTORIA MAIN SHAFT

(Looking toward Nellie Shaft)



Arataba Vein dips toward Main Shaft

Arataba 65' Shaft

E. ROSS HOUSEHOLDER, E. M.  
Registered Professional Engineer  
CONSULTING ENGINEER  
Kingman, Arizona

*E. Ross Householder*  
1940

#### ARATABA VEIN

Reference is made to accompanying maps and photographs to better appreciate the relative position of the items discussed in this report. On the Arataba claim, containing what formerly was called the Green Quartz workings, the present main Victoria development shaft is being sunk to cut the easterly dipping Arata vein at the 280 foot level.

Louis Armil was the original discoverer and he worked the surface ores with an arastra in 1913 and 1914. Long and Melver, well known Oatman operators of that period, secured an option on the property, and, together with L. Harpending, incorporated the Green Quartz Mining Company. A vertical shaft was sunk 45 feet. Then the 110 foot incline shaft was sunk from the bottom of which drifting was done 210 feet southeast and 230 feet northwest. Ore from the shaft and drifting is reported to have averaged \$8.50 per ton (\$20.67 an ounce for gold). Records show that at the 110 foot level in the inclined shaft a 4 inch width of the vein gave assay returns of \$285.00 per ton. More water was encountered in the shaft than the operators could pump with their gasoline engine. A small Chilean type mill was installed and approximately one thousand tons was processed with about 50% recovery, which is but slightly lower than usually recovered by the amalgamation process in the river range ores. Remnants of the mill dump assay \$11.00 per ton. Dissention among the company officers is said to have caused the shut-down of the operations. Then the stock market broke in 1929, after which the company abandoned the property.

James H. McCarthy relocated the claims as the Arataba group, and in 1946 he purchased the patented Good Gold and Bill Rush Fraction, adjoining the original Green Quartz group on the north and east. The Victoria Gold Mines Company was incorporated in the same year and purchased all these claims.

This Arataba vein is part of the Nellie vein system and this northerly portion is usually known as the Green Quartz fault vein. It is generally of the same type as other veins of the Oatman section. The strike is North 18 to 25 degrees West, with a 43 to 45 degree dip to the northeast. The gangue minerals are quartz, adularia and calcite, with silicified wall rock. Seams of clayey talc carry good gold values. There are small amounts of pyrite and near the surface particles of gypsum were observed. Finely divided particles of native gold occur in the quartz and pyrite. There is a footwall vein and a hanging wall vein with a combined width from 15 to 30 feet. Either vein has a width of 2 to 18 feet, with crushed country rock between the two veins.

*E. Ross Housholder*

ANOTHER ENGINEER COMMENTS ON ARATABA ORES

J. C. Bray, a mining engineer, who in 1933 operated the mill at the Pilgrim Mine, about 22 miles north of Oatman, in 1946 in writing about this Arataba vein, commented: "The country rock is named Esperanza trachyte by the U. S. Geological survey. It is really a potash rich andesite, very fine grained and dense with small crystals of feldspar, visible in a stony ground mass. It is overlain by the Oatman andesite on the east and underlain by the early andesite on the west. The early andesite is estimated to be 3,000 feet thick under the area. Both rocks are cut by dikes and stocks of rhyolite and dikes of andesite which closely resembles the Esperanza trachyte."

Mr. Bray further said: "The Oatman district is without any milling facilities at present, but there is ore enough in sight to warrant a custom mill of at least 150 tons capacity. The Victoria Gold Mines have an ideal location for such a plant. Its mine could be used to supply such a plant when other shipments fail, thus insuring a continuous run for the mill. The Western Star Mine, 10 miles northwest, could supply 25 tons per day. Leasors on the Pioneer could ship 25 tons per day, and the Gold Dust, Vivian, Lexington, Sunnyside, Lazy Boy and others would ship some ore, perhaps in the aggregate enough to take the whole capacity of the mill.

"Without doubt, it would be better to mill at least 75 tons out of Victoria Company's mine, and take as much more from the outside.

"The cyanide process will make a high recovery with known methods and no experiments are necessary. Only  $3\frac{1}{2}$  miles of power line and one mile of road will be necessary, and water, tailing ponds, and a good mill site are at hand.

"The plans of the company should be carried out at once, as a good mill can be obtained for less than half price, complete with all accessory materials. The shaft should be sunk to the 200 foot level and station out, and as soon as drifts, north and south, are out of the way, the shaft should be continued to the three hundred, and the station there arranged to continue the shaft. With two new levels the mine can easily produce 150 tons per day. It is probable that much better ore will lie below the three hundred foot level and in better widths.

"A well designed cyanide mill should mill this type of ore for about \$2.25 per ton, with an extraction of 95% plus. A milling charge of \$3.50 per ton and a guaranteed extraction should be charged at first, on custom ore. This will give the company a revenue of \$1.25 per ton on custom ore and 75 tons per day of mine ore averaging \$6.00 will give a company revenue of \$3.75 per ton, or a total of \$93.00 on the custom ore and \$281.26 on mines ore per day. This amounts to \$11,250 per month, to be used on the mine. \$6,000.00 per month will pay all the mine expense with a crew of 30 men.

Competent management will make a small beginning like this grow into a large mining company.

Respectfully submitted,

(Signed) J. Carlton Bray, Mining Engineer."

*Thos. Housholder*

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The following tabulation was also reported by Mr. J. C. Bray to have been taken from at least 50 feet below the ground: Quote:

	GOLD PER TON		SILVER PER TON		TOTAL VALUE GOLD & SILVER
	Ounces	Value	Ounces	Value	
1 -	0.09	\$ 3.15	0.40	0.36	\$ 3.51
2 -	0.17	5.95	0.20	0.18	6.13
3 -	0.78	27.30	0.50	0.45	27.75
4 -	0.25	8.75	0.80	0.72	9.47
6 -	0.04	1.40	0.20	0.18	1.58
6 -	0.10	3.50	1.10	1.09	4.59
9 -	0.08	2.80	0.18	0.20	2.98
10 -	0.14	4.90	0.60	0.54	5.44
11 -	0.06 W.Face Drift	2.10	0.60	0.54	2.64
12 -	0.19	6.65	0.80	0.72	7.37
14 -	0.71	24.85	2.00	1.80	26.65
--	0.15	5.25	0.50	0.45	5.70
--	0.02	0.70	0.40	0.36	1.06
Adularia Streak					
		0.80	28.00	1.80	29.62
	0.10	3.50	0.40	0.36	3.86
	0.29	10.15	1.61	1.44	11.59
	0.51	17.85	1.10	0.99	18.84 "

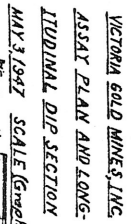
Under date of May 3, 1947, Edward F. Cruskie, mining engineer for the Victoria Gold Mines, Inc., in a letter report, wrote: "enclose, herewith, plan and section assay maps of the major portion of your mine workings where your most immediate plans for development are projected. - - - - A remarkable feature of the ore-disposition noted on your property is the occurrence of coarse, primary gold in association with hematite. This feature, together with the occurrence of the type of late stage quartz carrying excellent gold values, is analogous to the ore-disposition that has made the famous bonanza mines of the Oatman District, such as the Tom Reed, United Eastern and Gold Road. - - - - I can premise you, as a result of my examination and sampling of your property, the following possible ore development to the 200 ft. level between Tunnel No. 1 and Shaft No. 4 -- A minimum tonnage of 25,000 tons of ore at an average value of \$11.00 per ton, or a gross value of \$275,000. With the mill that you contemplate on the ground, properly designed, you should realize a profit of at least \$5.00 per ton, allowing for all contingencies, or a net of \$125,000. Ore extensions to depths below 200 feet seem very probable. - - - - Good ore of a similar nature is found several thousand feet easterly at the bottom of your 100 ft. deep shaft on the Arataba No. 3 claim. Inasmuch, however, as the intervening area is largely covered by overburden, positive vein extension that distance cannot be made, but from the strike, dip, and nature of the vein there, it is very likely. This intervening area should be explored with the purpose of developing a large tonnage mine as soon as possible.

Respectfully yours,  
(Signed) Edward F. Cruskie, Mining Engineer

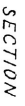
*Thos. Hunsicker*

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ORE AVERAGED \$14.87 UNDER 1948 PRICES

Under date of March 9, 1947, Mr. L. Harpending of Long Beach, California, former operator of the Green Quartz workings on the Arataba (North), wrote to James H. McCarthy, president of the Victoria Gold Mines, Inc., concerning results obtained during his activity there. In part, he said: "The inclined shaft averaged \$8.50 (old price)," (This would be about \$14.87 under 1948 prices of gold and silver.) "down to the bottom. I found two pockets in sinking, that was in the center of the vein, in the shape of a wash basin that was real high grade, and most of it in nugget form. When I hit the pocket of water at 110 feet, three inches of sugar quartz on the hanging wall assayed either \$386.00 or \$286.00. I know its one or the other.

"The water level came up to 50 feet in the shaft, and I drove a drift both north and south when I put in that Gibson mill. The south drift did not show up much, but the north drift had good milling ore in it for quite a distance. The ores would not plate as none of the Oatman ores ever did. And my tailings ran \$11.00 per ton. Heads were as high as \$26.00 and the average value at \$18.00.

"The 65 foot shaft sunk in 1916 is not connected with the incline shaft. According to our survey the shaft would have to be sunk 325 feet to hit the Green Quartz vein. The Long and McIver shaft 2 or 3 hundred feet to the north is connected with the drift I drove. Knowing the ground as I do, if I was you and I intended to diamond drill it, I would drill one hole about half way between the incline shaft and the Long and McIver shaft, and another hole about 100 feet north of this same shaft, besides one hole at the collar of the incline shaft.

"I would get a depth of at least 300 feet. - - - - -  
Truly yours, (signed) L. Harpending."

ARATABA VEIN (South)

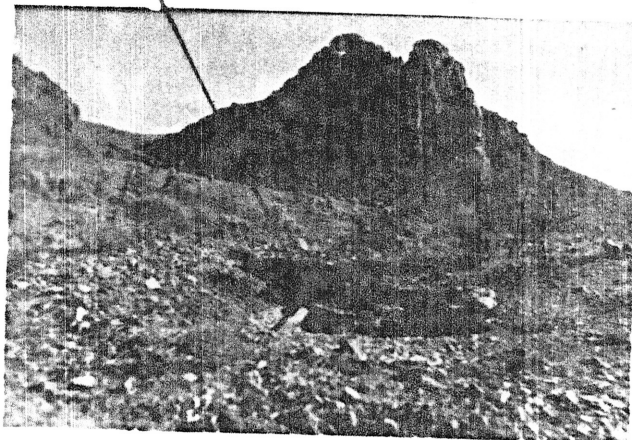
The distance from where the Arataba vein branches off from or contacts the Nellie vein on its northerly end to its exposure as the Arataba vein (south) on the Arataba No. 3, which includes the former Green Quartz Extension lode claim of the former Thiacourt group is around 7,000 feet.

In 1924 when I first made an examination of this portion of the presently known Arataba vein (south) of the Victoria group, the development work, for the most part, consisted of a 25 foot shaft exposing the vein, supplemented by two other shafts of lesser depth, from which samples were taken. In this 25 foot shaft, known as the Thiacourt shaft, the outcrop of the vein was covered by 12 feet of talus, and in the small gulley to the northwest.

*Elmer Housholder*

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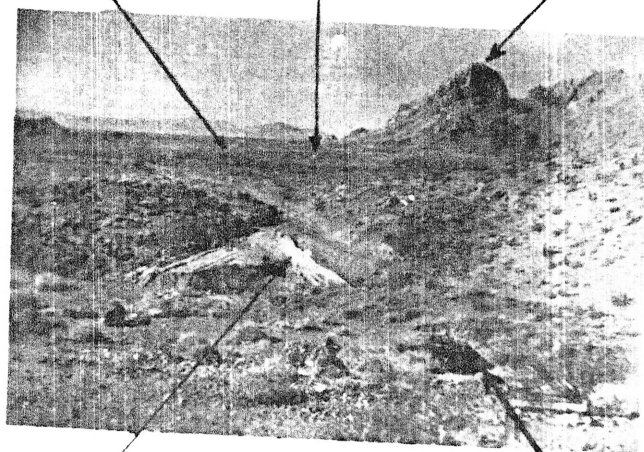
Devine Shaft on Arataba (South) Vein



U. S. 66 Highway

Main Victoria Shaft

Boundary Cone



Bulldozed Arataba (South) Pit

Thiacourt 100' Shaft

140 Ton shipment from this shaft assayed \$21.00  
in 1929 - would be worth \$36.75 in 1948.

E. ROSS HOUSHOLDER, E. M.  
Registered Professional Engineer  
CONSULTING ENGINEER  
Kingman, Arizona

*E. Ross Housholder*

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There has been considerable fault movement as is evidenced by the distinctive slickensiding along especially the hanging wall of the vein where particles of the country rock are intermingled with the talcy material and other vein filling.

The strike of the vein is North 40 degrees West and it dips 46 degrees to the Northeast. The vein is of the true fissure type in which there has been movement after the vein had been formed. The vein material contains considerable quartz, calcite, and the rock is not fresh, having been highly altered, so that the determination of its exact lithographic character is perhaps not possible. In many respects, however, it resembles the altered vein filling observed in other parts of the district.

The vein as exposed in the old 25 foot Main shaft and in the Devine Shaft No. 2, which is 65 feet deep (only 15 feet in 1924) and about 100 feet northwest of the former, is from 6 to 8 feet wide. As indicated from the assay results of samples taken, the values are in gold and silver and distributed across the vein. The vein is exposed by the different shafts and prospecting for over 300 feet northwest along the lode line of the Arataba No. 3 claim.

#### DESCRIPTION OF HIGH GRADE ORE

In July, 1924, I again examined specimens of high grade ore taken from the surface workings of the Arataba vein (south), then known as the Thiaccourt, which I examined and found to have the same general characteristics of other high grade ore found in the Oatman section. The free gold which could easily be seen with the naked eye was surrounded by minerals of iron and manganese. The rock material indicated a porphyritic texture, composed of glassy feldspar and some ferro-magnesium mineral embedded in a ground-mass of feldspar needles and glass. At the time, the study of this ore was made, I advised James Devine, then in charge of the Thiaccourt property, to further develop what I believed was a shoot of ore that would develop into an important body of ore. Mr. Devine did the best he could to open this Devine shaft, and later did ship the ore from this shaft development. Recently the present Victoria operators used a bulldozer to uncover the vein where Number 6 sample was taken, and Mr. Crookie told me that his sample of this 1947 work (see photograph), after the surface overburden was bulldozed off, checked.

In January, 1924, I cut six samples, as follows:

Number 1 sample was taken across 8 feet of the vein at the bottom of the 25 foot Thiaccourt shaft, but possibly 40 feet above the exposures of the vein in the Devine No. 2 shaft (which in 1924 was only 15 feet deep) to the northwest. This sample, when assayed, gave results of 0.06 ounces gold and 0.34 ounces silver. (\$2.44 under 1948 prices of gold and silver.)

*J. Ross Houshader*

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Number 2 sample was taken across 7 feet of the vein on the east side of the Thiaccourt shaft opening, and contained 0.10 ounces gold and 0.35 ounces silver per ton. (\$3.85 in 1948.)

Number 3 sample was taken on the west side of the shaft opening in the Devine No. 2 shaft across 7 feet of the vein and gave assay returns of 0.18 ounces gold and 0.72 ounces silver per ton. (\$17.02 in 1948.)

Number 4 sample was a selected sample taken along the south side of the Devine No. 2 shaft and contained considerably more quartz than the previous samples. It assayed 1.46 ounces gold and 1.46 ounces silver per ton. (\$52.56 in 1948.)

Directly below Sample No. 4 another sample was taken in slightly softer material as Number 5, which assayed 0.20 ounces gold and 0.40 ounces silver per ton. (\$7.40 in 1948.)

Number 6 sample was taken across 14 inches of the vein, about 200 feet northwest of the Devine shaft No. 2, and assayed 0.10 ounces gold and 0.60 ounces silver per ton. (\$4.10 in 1948.)

#### AVERAGE \$7.20 PER TON

In calculating the value of the above samples by the "width-value" method, they average \$7.20 per ton. The 140 tons shipped from the Devine No. 2 shaft in 1929 by Harpending, McCarthy and Tildon, leasers, averaged \$21.00 then, or about \$36.75 according to 1948 prices. Number 4 and 5 samples, taken in 1924, averaged \$29.98 per ton under 1948 prices.

With an equal amount of underground development centering around this Devine No. 2 shaft, I expect the ores to equal or better the indicated \$14.87 value per ton reported by Mr. Harpending for the 110 foot incline shaft area in the Arataba (north) vein.

#### ATTEMPT MADE TO AVERAGE SAMPLING

In order to arrive at an average value of Victoria ores, together with their average width, the following chart was made.

All samples noted in your mine records and reports were multiplied by the footage indicated for the persons taking them, including Mr. Harpending, Mr. Crosbie, Mr. Bray, Mr. Keating, et al, and myself. The products so obtained were divided by the total number of feet for the sampling by each person, to get the average value per ton. The average width was obtained by dividing this total sampling width in each case by the number of samples shown. Using this same method, the average results for each individual vein were averaged to get the averages shown on the chart. Then all were again so averaged to get the Victoria average. Samples ranged in value from \$1.06 to \$52.56

*E. Ross Housholder*  
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and in width from 1 foot to 9 feet. The results here shown are presented simply and only as a guide to indicate the value that can be expected, and as a basis for conservative calculations and purposes of estimation only.

#### CALCULATED AVERAGES FOR ESTIMATING

<u>Name of vein</u>	<u>Average Assay Value (1948)</u>	<u>Average Width</u>
Arataba (North)	\$10.77	4.00
Arataba (South)	\$ 6.37	5.15
Arataba (North & South)	\$ 8.29	4.57
Nellie	\$16.38	4.1
Bill Rush	\$ 6.53	5.0
<u>ALL VICTORIA VEINS</u>	<u>\$10.07</u>	<u>4.56</u>

#### FUTURE OPERATING COSTS

The question of the future operating costs of any mine are usually interesting. Such contemplated costs can best be obtained by comparison with other operating companies in the same locality, where similar ores have been mined and milled. The gold ores of the Black or River Range of mountains, especially in the Oatman section of the San Francisco Mining District, Mohave County, Arizona, are practically the same throughout; the gold is extremely fine and disseminated through the quartz, so that very fine grinding is required, especially where the ores are to be treated by the cyanide process.

The ores of the Victoria gold mine would readily respond to treatment by the cyanide process as practiced in the gold bearing Oatman section, which has been worked out to a nicety by the years of practical experience in this locality. The present costs will correspond to those shown in the following tabulations, altho freight can be delivered from Arizona and California supply points over paved highways direct to the mine at lower than the delivered cost was at the time these costs were tabulated; and altho electric power from Boulder Dam can today be delivered under the cost of power in former years; supplemented by the availability of man-power saving machines for underground use; there has also been an increase in the cost of other essential supplies besides labor, so that, the costs today will be practically the same as shown.

E. ROSS HOUSHOLDER, E. M.  
Registered Professional Engineer  
CONSULTING ENGINEER  
Kingman, Arizona

*E. Ross Housholder*

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The treatment by cyaniding has been standardized. It might be well to review the costs of a producing mine, in order that an intelligent comparison can be made.

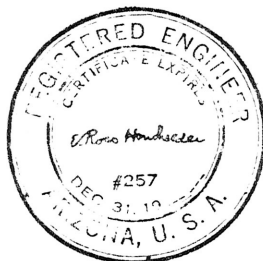
The following data has been obtained from the comprehensive report of the management of the United Eastern Mining Co., who operated and owned valuable mining property in the Oatman section a few miles to the northeast of the Victoria gold mine group. The characteristics of the ore so far as the milling is concerned are practically the same. Operating costs are practically the same and this presents the best comparison for a similar ore in this section.

COST PER TON OF ORE TREATED

Direct Labor	Timber	Explosives	Power Mine	Power Mill	Operating
\$1.749	0.313	0.429	0.203	0.89	0.0619
	Marketing	Indirect	Administration		
	0.127	1.177	0.156		

The distribution of all mining and milling costs, which are here tabulated, have been carefully analyzed. These are costs of the United Eastern mine. The costs of the well known Tom Reed gold mines in the same district are reported to be somewhat lower than these given here.

*E. Ross Housholder*



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### MINING COSTS

	<u>Cost per ton</u>	
Foreman & Shifters	\$0.091	
Stoping	1.72	
Filling	0.519	
Development	0.267	
Deadwork	0.01	
Hoisting	0.247	
Dewatering	0.067	
Assorting ores	0.015	
Sampling	0.021	
Assaying	0.033	
Engineering	0.031	
Ventilation	0.022	
Miscellaneous	<u>0.292</u>	
Total mining costs	\$3.335	per ton

### MILLING COSTS

General	\$0.156	
Lighting expense	0.004	
Water supply	0.121	
Coarse crushing	0.047	
Coarse grinding	0.36	
Fine grinding	0.469	
Cyaniding	0.48	
Tailing disposal	0.019	
Clarification	0.024	
Precipitation	0.096	
Refining	0.057	
Sampling	0.003	
Assaying	0.033	
Retreating tailings	0.009	
Mill heating	0.029	
Solution recovery	0.007	
Experimental work	<u>0.001</u>	
Total milling costs	\$1.915	per ton
Total mining costs	<u>3.335</u>	per ton
TOTAL MINING & MILLING	\$5.25	per ton

The recovery averaged 96%.



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## TERMINOLOGY DEFINED

In order to clarify certain terminology and avoid any misunderstanding in using them in this report, I have on the following signed pages quoted definitions of standard terms relating to the metal mining industry, obtained from "A Glossary of The Mining And Mineral Industry" by Albert H. Fay, published 1920, by the U. S. Bureau of Mines.

- "Ore"  
Page 475 1. A natural mineral compound, of the elements of which  
Bull. 95 one at least is a metal. The term is applied more loosely  
Bur. of to all metalliferous rock, though it contain the metal  
Mines Dept. in a free state, and occasionally to the compounds of  
Int. non-metallic substances, as sulphur ore (Raymond).  
is an ore of sulphur (Webster).  
Also, material mined and worked for nonmetals, as pyrite  
A mineral of sufficient value as to quality and quantity  
which may be mined with profit. (Ihlseng).  
A mineral, or mineral aggregate, containing precious  
or useful metals or metalloids, and which occurs in such  
quantity, grade, and chemical combination as to make  
extraction commercially profitable. (Robert Peele, Min.  
& Met. Soc. of America, Bull. 65, p. 257)  
A metalliferous mineral, or an aggregate of metalliferous minerals, more or less mixed with gangue, which from the standpoint of the miner, can be won at a profit, or from the standpoint of a metallurgist can be treated at a profit. The test of yielding a metal or metals at a profit seems to me; in the last analysis, to be the only feasible one to employ. (J. F. Kemp, Trans., Canadian Min. Inst., 1909, p. 367)
- "Ore blocked out"  
P. 476 Ore exposed on three sides within a reasonable distance of each other. (H.C. Hoover, p. 17)
- "Ore developing"  
P. 476 Ore exposed on two sides. See Probable ore. (H.C. Hoover, p. 17) First class, blocks with one side hidden; second class, blocks with two sides hidden; third class, blocks with three sides hidden. (Phillip Argall, Min. and Met. Soc. of Am., Bull. 64, p. 260)
- "Probable ore"  
P. 540 Any blocked ore not certain enough to be "in sight" and all ore that is exposed for sampling, but of which the limits and continuity have not been proved by blocking. Also, it includes any undiscovered ore of which there is a strong probability of existence. Ore that is exposed on either two or three sides. Whether two or three sides be taken as a basis will depend on the character of the deposit. (Min. and Met. Soc. of Am., Bull. 64, pp. 258 and 262)

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"Ore developed"

P. 476 Ore exposed on four sides in blocks variously prescribed.

"Positive ore"

P. 531 Ore exposed on four sides in blocks of a size variously prescribed. See "Ore developed", also "Proved ore". (H.C.Hoover, p. 17)

P. 530 Ore which is exposed and properly sampled on four sides, in blocks of reasonable size, having in view the nature of the deposit as regards uniformity of value per ton and of the third dimension, of thickness. (Min. and Met. Soc. of Am., Bull. 64, p. 262)

"Proved ore"

P. 541 Ore where there is practically no risk of failure of continuity. (H.C.Hoover, p. 19) See also Positive ore.

"Possible ore"

P. 531 Ore which may exist below the lowest workings, or beyond the range of actual vision. (Min. and Met. Soc. of Am., Bull. 64, p. 262)

"Ore expectant"

P. 476 The whole or any part of the ore below the lowest level or beyond the range of vision. See Possible ore, also Prospective ore. (H.C.Hoover, p. 17)  
The prospective value of a mine beyond or below the last visible ore, based on the fullest possible data from the mine being examined, and from the characteristics of the mining district. (Phillip Argall, Min. and Met. Soc. of Am., Bull. 64, p. 260)

"Prospective ore"

P. 540 Ore that can not be included as proved or probable, nor definitely known or stated in terms of tonnage. See Possible ore, also Ore expectant. (H.C.Hoover, p. 19)

"Low Grade"

P. 409 A term applied to ores relatively poor in the metal for which they are mined; lean ore.

"Ore faces"

P. 476 Those ore bodies that are exposed on one side, or show only one face, and of which the values can be determined only in a prospective manner, as deduced from the general condition of the mine or prospect. (Min. and Met. Soc. of Am., Bull. 64, p. 259)

"Ore partly blocked"

P. 477 Those ore bodies that are only partly developed, and the values of which can be only approximately determined. (See Probable ore.)

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"Ore in sight"

A term frequently used to indicate two separate factors in an estimate, namely  
(a) ore blocked out, that is, ore exposed on at least three sides within reasonable distance of each other;  
(b) ore which may be reasonably assumed to exist, though not actually blocked out;  
these two factors should in all cases be kept distinct, because

(a) is governed by fixed rules, while  
(b) is dependent upon individual judgment and local experience.

P.477  
Bull.95

The expression "ore in sight" as commonly used in the past appears to possess so indefinite a meaning as to discredit its use completely. The terms Positive ore, Probable ore, and Possible ore are suggested. (Min. and Met. Soc. of Am., Bull.64, pp.256 and 261)

"Deposit"

P.211

The term mineral deposit or ore deposit, is arbitrarily used to designate a natural occurrence of a useful mineral ore in sufficient extent and degree of concentration to invite exploitation. (Raymond)

"Exploitation"

P.255

The extraction and utilization of ore. Often confused with "exploration". (Richard)

"Exploration"

P.255

The work involved in looking for ore. Often confused with "exploitation". (Richard)

"Exploring mine"

P.255

(Scott.) A working place driven ahead of the others to explore the field. (Barrowman) Prospect.

"Prospect"

P.540

To examine land for the possible occurrence of coal or valuable minerals by drilling holes, ditching, or other work. (Steel)

"Prospect Hole"

P.540

Any shaft, pit, drift, or drill hole made for the purpose of prospecting the mineral-bearing ground.

"Prospecting"

P.540

Searching for new deposits; also, preliminary exploration to test the value of lodes or placers already known to exist.

"Development"

P.214

Work done in a mine to open up ore bodies, as sinking shafts and driving levels, etc. (Skinner)

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