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NUCLEAR DYNAMICS

P. O. BOX 20766 PHOENIX, ARIZONA 85036 2871 SKY HARBOR BLVD. 602/267-0581

May 2, 1977

Mr. Hayworth Jones
Chairman of the Board
Minex Corp., New Mexico
1020 Georgia N.E.
Albuquerque, New Mexico 87110

Dear Mr. Jones:

In accordance with our conversation of Friday, April 21, I am returning the information re Arizona-Indiana and Silver Hill properties near Silver Bell, Arizona.

Very truly yours,

Francis X. Cannaday

Francis X. Cannaday
Manager, Base & Precious Metals

FXC:sem
Enclosures

April 21st 1:00 PM to 2:30 PM with

Mine 324-5485 - (or ask for Jim Bell)
Home Albuquerque (Hayworth Jones, Chairman of the Board.
505-265-2994) Minex Corp. New Mex, 1970 Owner
— Happy Jack Mines Inc. in ARIZ. wholly owned

1020 Georgia NE
Albq. N. Mex.
87110

Jones ~~had it~~ involved for 22 years as an individual.

→ 3 men currently at property.
ARIZONA-INDIANA shft — and Silver Hill

~~History~~
Located Pima Co as shown on map. Waterman Mts
~~SSW~~ of Silver Bell Asarco.
20 patd lode claim Some in Reservation surf. & min. (1906)
~~Pat~~ 39 unpat. lodes outside of Papago Res.

Titan Silo - bottom of opening in "copper"
Power at site
Some water 80gpm.

$~~500,000~~ to build mill (Gold mill ~~$~~).
get paid back off the top
earn a 25% equity.

L & H investments - -
Leonard Bastian partner - - in Real Estate only.

Jim Aircraft (~~jet~~ aircraft sales)
as United Aircraft Retaining Corp. (Leasing)
out of Albuq. Controls $60,000,000 ~~gross~~ net a % leases ou

H. L. Howes — SILVER HILL MINE — "Happy Jack"

Lot -297 3/4 IY of Assay Certificate, Arizona Testing Laboratories
Phoenix, Ariz. August 10, 1942

To Supervising Engineer (Name and organization on record)

"We have assayed the samples received from you and find the results as follows" Submitted by Claude L. McLean,

Lab. No. 44063 to 44093 inclusive.

Sample #		Gold Oz.	Silver Oz.	Copper %	Lead %	Zinc %
9	7 ft.	Tr.	6.20	3.50	3.74	
12A	80 in.	Tr.	5.80	2.25	1.97	
12B	15 ft. 5 in.	Tr.	5.20	4.00	2.24	
13	[illegible] in.	Tr.	10.80	5.40	6.73	12.10
13	13 ft. 6 in.	Tr.	0.80	8.00	0.47	
13	9 ft.	Tr.	2.40	2.40	0.61	
13C	99 in.	Tr.	6.40	1.00	1.70	23.10
13D	5 ft.	Tr.	5.70	2.00	0.81	
13	54 in.	Tr.	3.60	1.80	nil	
13	[illegible] in.	Tr.	1.40	3.80	0.34	
14	99 in.	Tr.	2.80	4.05	0.54	
14C	22 ft.	Tr.	3.80	1.30	0.88	0.72
14D	16 ft. 5 in.	0.01	4.00	1.85	1.90	
15A	99 in.	0.01	14.80	1.85	6.86	6.55
15B	9 ft.	0.01	18.40	1.75	9.52	4.13
16	12 ft.	0.01	19.60	4.20	12.78	1.82
17	34 in.	0.01	15.80	3.80	7.55	3.74
18	9 ft.	Tr.	2.40	3.40	0.88	
20	10 ft.	Tr.	9.00	2.00	3.94	
21	5 ft.	Tr.	8.60	4.85	4.23	5.50
22	42 in.	Tr.	6.80	4.15	3.53	1.26
23	18 ft. 6 in.	Tr.	7.60	5.00	2.24	0.66
24	5 ft.	Tr.	4.20	3.25	1.02	0.55
25	5 ft.	Tr.	6.60	1.25	2.65	0.60
26	90 in.	Tr.	3.20	11.90	0.68	
27	5 ft.	Tr.	nil	4.10	0.75	20.79
28	40 in.	Tr.	1.20	4.85	0.61	29.70
29	18 in.	Tr.	1.50	27.00	0.63	
31	8 ft.	Tr.	1.00	7.60	1.50	9.35
32	5 ft.	Tr.	6.20	9.90	2.65	3.68
33	6 ft.	Tr.	14.40	4.65	3.74	7.32

Above samples Plotted. Lower 1-11 samples tabulated on assay map.

*1	84 in.	0.01	10.5	4.57	11.21	2.57
*2	48 in.	0.01	18.3	.70	17.18	1.83
3	24 in.	Tr.	1.7	1.30	Tr.	1.68
4	48 in.	0.01	5.5	3.47	.21	2.28
5	72 in.	Tr.	3.7	4.02	Tr.	1.19
6	24 in.	Tr.	Tr.	.75	.21	46.13
7	96 in.	0.01	5.7	3.27	Tr.	.79
8	muck	Tr.	5.1	4.22	.15	3.57
9	20 ft.	0.01	3.3	3.62	.10	.49
10	18 ft.	Tr.	3.4	3.02	.10	.29
11	24 in.	0.02	21.9	.20	9.28	.20

Samples 1-11 certified June 27, 1942.

*20' from surface.

H. L. Noves
602 297-3411

Shipments of record from the SILVER HILL MINE during 1943 and 1944.
Not a complete record, however representative of mine run values.

To El Paso Smelter. Texas.

Lb's or Tons. Dry.	Oz.Gold	Oz. Silver	% Lead	% Cppper	Silica
108,294 #	.007	14.1	9.4	3.97	
115,404	.005	14.69	7.8	3.06	
137,057		10.8	6.7	2.16	
99,054	.002	6.4	3.0	2.85	
191,954	.005	11.4	6.0	2.13	
113,586		4.35	4.40	1.10	
96,801	.005	5.00	5.92	1.90	
115117	.005	5.50	4.63	1.70	

October, 1942 Communication, " Took 42 samples Ave. 6 Oz Silver and 4 % Copper.
Ore to 300 foot level oxidized, to 400 foot level in sulphides.

Further shipments. To Hayden Smelter, Ariz. Mine Run.

48.4	Ton	.005	5.00	1.9	5.92
57.5		.005	5.50	1.7	4.63
56.7		.003	4.35	1.4	4.40
47.6			3.25		4.41
45.8		.003	4.13		5.28
53.2		.003	2.98		4.73
54.3		.003	2.98		4.14
57.3		.002	2.92		4.31
62.0		.005	3.31	.9	2.12
52.9		.003	3.86	.95	2.94
65.9		.002	3.24	.80	2.98
52.8		.003	3.39	1.05	3.00
59.5		.003	2.74	1.05	2.96
51.2		.003	2.94	.70	2.89
62.5			3.75	1.4	2.70
41.9			3.45	1.2	3.11
105.9			2.35		2.64
57.0			2.09		2.76
106.0			3.49		3.33
95.9			3.32		3.93
100.5			3.34		4.00
50.9			1.84		3.01
57.1			2.84		3.04 73.0
45.9			2.93		3.40 77.3
52.3			3.94		3.24 74.2
49.2			2.90		3.12 77.5
53.6			3.70		3.60 76.3
47.0			2.59		3.35 77.0
62.4			3.07		2.47 78.0
54.7			7.13	2.5	6.05 57.9
108.2			6.13	2.7	4.35 60.1
111.8			7.31	2.8	7.80 53.6
49.9			4.83		3.11 64.0
42.2			4.36		6.17 46.9
55.3			7.89	3.3	3.78 49.7

Homestake

INDIANA MINE

Samples to accompany map
Submitted by A. R. Byrd, Jr.

Samples taken by Bob Burney for Company, Sept. 1944. FROM U.S. BUREAU OF MINES FILES

Sample No.	Width	Location of sample	Silver oz.	Copper %	Lead %
		No. 2 Shaft			
1	5'5"	West, near bottom of shaft	6.2		3.0
2	5'	East, " " " "	8.3		5.2
3	4'	East, drift - floor	11.2		7.9
4	5'3"	West, " "	7.0		2.8
5	0'6"	" " back	4.5		2.9
6	4'2"	" " floor	5.0		3.5
7	4'4"	" stope face	3.1		7.4
8	5'	" top of stope	28.3		12.6
9	4'	East, drift, back	4.0		3.3
10	3'	" " floor	5.4		3.2
11	3'	" " back	7.5		3.4
12	4-5'	" " face	5.5		4.1
13	3'	" " floor	2.4		3.0
14	5'5"	West shaft, 25' up	16.2		20.9
15	4'5"	East shaft, 25' up	15.2		15.6
		Main Shaft - North Stope - 200' Level			
16	2'4"	Crosscut at bottom of stope	2.1		4.2
17	2'5"	" up 10' from bottom	2.6		8.1
18	2'8"	" up 20' from bottom	1.8		4.7
19	2'4"	" 10' from face	6.5		10.0
20	2'8"	" East wall	2.4		9.1
21	3'10"	Winze - bottom	8.6		3.4
22	2'8"	" floor of drift	5.1		1.9
23	3'10"	" face of drift	15.0		6.3
24	3'6"	" bottom in drift	5.2		6.8
25	6'9"	" 15' down	7.4		5.0
26	3'5"	" 18' down	4.1		7.5
		East Stope 20' above Drift			
27	3'6"	Top of stope, at winze	54.4		18.8
28	3'2"	" " " 5' east of winze	33.8		7.8
29	4'	East end of Stope	8.2		4.6
30	Grab	Broken ore	13.7		10.0
		200' Level - East			
31	2'3"	50' east of shaft - floor	13.8		9.6
32	2'	70' " " " "	4.2		4.1
33	3'9"	100' east of shaft, floor	12.4		3.5
		200' Level - West			
34	2'10"	Stope - bottom	6.7		4.8
35	3'5"	" - right wall	17.8		2.2
36	2'6"	Stope - at top	14.6	9.7	0.0
37	3'	Special ?	12.5		4.3
		300' Level			
38	3'	West of Shaft	12.2	4.6	16.6
39	5'	East of Shaft at face	5.0	1.1	
40	Grab	East of broken ore in Drift	7.8	1.0	
41	4'	East of grab from cave	3.6	2.3	

Location not known

			Au oz	Ag oz	Cu %	Pb %	Zn %
		Grand Junction Lab.					
9/1/65	1877	1- Concentrate - Waterman	.18	58.2	1.6	55.7	
	1873	1- Open cut Conc. Waterman	.76	17.3	5.3	15.0	
	1874	2- Open cut Hds "	.00	.5	0.6	0.37	
	1875	3 Open cut Tails "	.00	.3	.13	0.50	
	1876	4 Dump "	.00	.3	.09	0.3	
		Jacobs Assay Office					
10/24/65	A1	Concentrate Flotation	.28	68.8	2.65	53.8	
	B	Mill Heads	.1	5.2	.18	7.2	
	C	Table	Tr	0.8	.15	3.7	
	D	Tail	Tr	0.6	.08	0.3	
12/24/65	15	Grab from Burro, Vargas	.01	5.0	.45	20.8	1.0
4/21/66	1	Composite 3 rounds 265' E of Shaft	.01	2.2	.56	3.0	8.0
4/27/66	2	" Grab sample 265' " "	.01	6.9	3.15	13.8	25.0
5/25/66	57681	Fines 265' " "	.03	14.5	3.75	43.1	17.0
"	"	Composite 100 Orecars " "	.01	6.7	3.60	9.0	6.9
6/23/66	57720	Waterman Tails		4.0	0.06	2.5	
	"	" Mids		3.7	0.13	4.8	
	"	" Conc		16.1	0.15	34.0	
	"	Homestake Mine run Tails		4.2	1.00	0.4	6.0
	"	" " " Mids		8.3	1.04	0.8	10.2
	"	" " " Conc		17.5	0.58	8.1	5.5
9/16/66	57714	1 Homestake - 11th level, NE	0.02	2.3	1.05	5.5	32.1
	"	2 drift 4½ ft = 1 & 3 / 100	0.03	3.4	0.11		
	"	3 No 2 - from ceiling	0.02	2.1	1.75	10.0	30.0
9/22/66	57801	1		0.8	14.45	44.5	
		2		1.1	13.10	43.0	
		3		1.2	16.7	46	
9/29/66	57812	4		2.2	0.03	4.2	
		5		.15	.02	0.2	
		6		.7	.02	1.5	
10/26/66	57839	1 Mine run	.01	4.7	.68	3.3	2.
		2 Coarse	.02	9.9	.92	2.8	
		3 Concentrate	.01	6.7	2.35	2	

Date			Au	Ag	Cu	Pb	Zn
11/3/66	57747	1 From Burro ?		2.0	5.05	1.4	
		2		1.6	7.13	1.1	
		3		4.7	4.04	1.4	
		4		47.2	.81	58.0	
		5		27.4	.72	26.5	
		6		6.9	1.15	3.4	
12/7/66	57885	1 90' Homestake Face		25.9	.85	16.0	
		2 200' Face West Heading		16.2	5.82	5.8	
		3 Burro Face 78"		5.8	.53	8.0	
12/10/66	57897	1 Burro	.03	10.5	.02	26.5	
		2 "	.01	4.8	.03	11.6	
		3 90' Homestake	Tr	0.7	1.66	0.7	
		4 " "	.01	4.5	.18	4.1	
12/13/66	57898	1		10.7	.44	20.1	
		2		12.0	.31	26.8	
		3		10.9	23.50	5.0	
		1 Burro Waste		33	.10	3.4	
		2 " "		17.5	.29	23.3	
		3 Homestake 90'		12.1	.34	8.2	
		4 " "		11.4	.38	11.0	
12/19/66	57907	101 Comp. Car 3 Burro.	.02	6.4	.19	10.5	
		102 3' Vein 45' Level T10+4'	.03	10.5	7.25	13.2	
12/29/66	57915	103 N.W Heading 400' Level	.01	.2	.03	2.0	0.1
		104 Composite. 90' Level N Heading	.03	26.8	.28	17.5	0.7
		105 " Waste 90' N Heading	.02	12.3	.32	7.4	5.3
		106 ~~Specimen Picture Rock 90' N. Heading~~	.01	0.2	.03	0.1	30.
1/8/67	57942	106A Comp. face 2 car sample N. 90'	.02	11.9	1.07	12.0	4.
		107 Comp. Waste 90' Level N Heading	.005	4.2	.98	7.5	6.
		Ore 90' Level	.02	11.5	.71	17.4	2
1/20/67	57941	111	.02	1.1	.04	3.8	
1/23/67	57946	111 Burro Winze	.02	4.0	.06	10.0	
		112	.005	.9	.03	1.9	
		113	.005	1.7	.29	8.4	
		114	~	1.4	.33	4.1	

			Au	Ag	Cu	Pb	Zn
1/27/67	57951	115	.03	12.4	.58	7.9	
		116	.02	2.9	.51	2.0	
		17	.01	1.6	.16	1.3	
		18	Tr	.4	.12	0.4	
		19	Tr	.9	.18	0.4	
		20	.01	2.7	.23	0.6	
		21	.01	3.0	.70	0.3	
		22	.02	135	4.90	10.4	
2/1/67	57959	123	.01	0.3	.11	.6	
		24	.02	.8	.28	5.8	
		25	.01	.2	.68	2.9	
		Notch 1	.03	7.5	.17	15.0	
		" 2	.02	2.7	.44	6.2	
2/22/67	57980	128	—	3.0	.24	1.2	0.5
		29		11.9	2.45	10.0	2.6
		30		10.5	1.50	9.8	2.8
		31		7.1	.55	4.8	0.3
		32		0.8	1.30	0.7	0.6
		33		0.4	.08	0.2	0.1
		34		9.1	.75	6.7	0.7
		35		9.7	2.28	19.0	2.2
		36		8.5	.92	13.7	1.6
		37		1.4	.21	14.0	0.3
		38		2.8	.63	5.6	.5
		39		5.0	.55	13.0	1.0
		40		.8	.70	2.9	1.8
		43	.005	.3	.02	0.1	1.5
		44		.2	.03	—	—
		45	.01	6.5	.81	10.0	—
2/26/67	57985	141	.03	7.3	2.1	7.6	
		42	.005	3.0	.50	2.5	
		46	.03	11.7	1.65	11.6	
		47	.01	6.3	.23	9.8	

(4)

				Au	Ag	Cu	Pb	Zn
2/26/67	57[illegible]							
		148		.02	4.7	1.82	7.5	
		149		.02	6.5	2.08	8.1	
3/8/67	58o.6	1		.01	5.9	.33	3.8	3.9
		2		.02	8.7	.13	1.1	1.2
		3		Tr	.4	.07	0.2	0.3
		4		.005	4.9	.34	3.0	3.2
		150		.01	6.1	1.70	10.0	3.4
		51		—	10.3	1.72	14.9	—
		52		.01	0.2	.06	2.3	
		53		.01	1.5	1.88	5.2	0.3
		54		.02	9.3	1.13	7.3	
		155		—	9.9	1.32		
4/10/67	5805x	157		.005	.3	.03	0.1	0.1
		58		.02	8.7	1.92	17.0	7.0
		59		.06	9.8	1.79	12.5	3.5
		160		.04	8.9	1.68	12.0	3.5
4/12/67	5805G	161	Below 400' level Home stake	.005	6.3	1.85	9.1	16.6
		62	Above 400 -	.02	5.5	1.74	14.2	18.8
		163	Raise 400	.005	1.7	.46	7.0	23.5
		Test-1-	Heads	.05	9.9	2.25	15.1	3.8
			Rerun Mids	.08	13.1	3.48	11.0	5.8
			Mids	.02	4.5	1.52	3.5	3.2
			Concentrate	.06	24.7	2.07	35.0	3.6
			Tails	.02	3.6	1.02	3.4	2.2

				Au	Ag	Cu	Pb	Zn
4/17/67	58065	Test 3						
		Heads		.03	9.3	1.68	7.6	5.0
		Mids		.02	3.2	.85	1.8	3.4
		Rerun Mids		.04	15.5	2.10	21.1	8.5
		Tails		.02	3.3	.90	2.4	2.3
		Conc		.04	30.0	3.55	32.2	7.3
		Test 4	Heads	.02	10.4	2.22	8.5	3.8
			Rerun Tails - Tailings	.01	3.3	1.23	2.3	2.3
			" . Mids	.02	4.2	1.61	3.0	3.2
			" . Conc	.04	19.8	3.17	30.6	5.8
			Straight Mids	.02	11.9	3.55	12.4	7.0
			Rerun Mids - conc	.03	23.7	3.13	37.7	6.1
			Concentrates	.04	28.8	2.00	62.3	3.5
4/28/67	58075	Test 5	Heads	.03	5.9	3.05	9.5	5.0
			Tailing	.02	3.7	2.95	7.2	5.0
			Mids	.02	4.5	2.50	4.6	5.5
			Re-run Mids - conc.	.04	10.8	1.82	19.0	3.3
			Re-run Tails	.02	3.8	3.03	4.4	5.0
			Concentrates	.18	21.1	1.15	40.0	1.5
		164		—	10.2	1.74	15.0	—
		165			9.0	1.76	15.2	
		166			2.6	2.25	3.0	
		167			9.5	1.51	10.9	
		168			9.3	1.68	15.5	
		169			9.1	1.70	14.0	
		170			14.5	2.25	27.2	
		159		—	—	.17	1.3	0.
5/3/67	58083	Test -6-	Tailings	.03	6.9	1.95	8.6	22.
			Mids	.01	3.0	1.43	2.5	19.
			Concentrates	.04	17.5	1.45	22.0	14.
			Rerun Tails	.02	5.6	1.87	8.1	23
			Rerun Mids	.04	14.1	1.43	17.2	1
		171			0.8	0.04	0.2	0

6/27/67	58/71				Au	Ag	Cu	PB	Zn
		A			.005	.2	.73		
~~1/30~~		B			.02	.5	.25	1.1	
12/3/68		A	Waste Slime		.01	5.1	2.52	3.1	
		B	First Table run off		.01	19.5	2.38	21.2	
1/4/68		1	Wm A Knox	Mo. Tr	.005	0.1	.103		0.0
		2		" —	.01	0.2	—	—	—
		3		" Tr	.005	0.1	.04		Tr
2/6/68		D 25					.03	0.1	Tr
		26					.05	0.1	0.1
		27					.10	0.1	0.1
		28			.01	0.1	.06	Tr	0.1
		29	291 - 294		.005	0.3	.05	0.2	0.2
		30	352 - 355		Tr	0.3	0.03	Tr	0.1
		31			Tr	0.2	0.03	0.1	0.1
		D 32			.005	0.3	0.02	Tr	Tr
2/15/68	58/63	D 33	5 - 10	5'	.01	3.6	.88	7.0	15.1
		34	10 - 20'	10' Dg	.02	3.2	1.71	8.1	14.1
		35	20 - 25'	5'	.005	2.0	.75	4.3	6.3
		36	25 - 35'	10'	.005	1.2	.34	2.8	7.1
		37	35 - 76'	38'	Tr	.2	.03	Tr	0.1
		38	76 - 83	7.0	.01	2.4	.53	1.2	1.3
		39	83 - 85.5	2.5'	Tr	0.8	.37	0.4	1.1
		40	85.5 - 106	= 20.5'	.02	4.1	.75	3.7	2.1
		41	106 - 111.5	5.5'	.005	1.2	.03	Tr	
		42	111.5 - 120	8.5'	.005	1.5	.11	0.4	4
		43	120 - 127	7.'	Tr	.4	.04	Tr	
		44	127 - 143	6'	Tr	.4	.04	Tr	
		45	143 - 152	9'	Tr	.2	.05	0.1	
		46	152 - 163	11'	Tr	.5	.03	Tr	
		47	163 - 175	12'	.005	.4	.04	0.1	
		48	175 - 177	2	.01	2.8	.32	2.3	1
		49	177 - 182	5	.02	4.5	1.41	4.1	5
		D 50	182	192 10	.01	2.0	.72	2.2	4

			Au	Ag	Cu	Pb	Zn
12/13/66	1			10.7	.44	20.1	
	2			17.0	.21	26.8	
	3			10.9	23.5	6.0	
"	1	Burro waste		3.3	.10	3.4	
	2	Burro		17.5	.29	23.3	
	3	Homestake 90'		12.1	.34	8.7	
	4	"		11.4	.38	11.0	
12/19/66	101	Comp. Car 3 Burro	.01	6.4	.19	12.5	
	102	5' vein, 45' T10 + 4'	.03	10.5	7.25	13.7	
12/23/66	3	N.W. Heading 400' Level	.01	.7	.03	2.0	.7
	4	Comp. Ore 90' N Heading	.03	26.8	.28	17.5	.7
	5	" Waste 90' N Heading	.02	12.3	.32	7.4	5.5
	106	Picture Rock 90' N Heading	.01	.7	.03	0.1	30.3
1/3/67	106A	Comp. face & car N Heading	.02	11.9	1.07	17.0	4.1
	7	Comp. Waste 90' " "	.005	4.2	.98	7.5	6.4
	Ore	File Sample Bin 90' "	.02	11.5	.71	17.4	2.5
	109	-1-13-67 Face 90' N Heading		5.17	0.44	4.19	
	110	1-18-67 " 90' " "	1048	6.29	—	1.83	
1/20/67	111	Burro Winze Carbonate	.02	1.1	.04	3.8	
1/23/67	111A	Burro Face Lower Addit	.02	4.0	.06	12.0	
	112	Burro dump " "	.005	.9	.03	1.9	
	113	Face 90' Level N Heading	.005	1.7	.28	8.4	
	114	Picture rock 90' " "		1.4	.88	4.1	
1/27/67	115	90' Heading West Shaft + 10'	.03	12.4	.58	7.9	
	6	" " " + 20	.02	2.9	.54	2.0	
	7	" " " + 30'	.01	1.6	.16	1.3	
	8	" " " + 40'	Tr	.4	.12	.4	
	9	" " " + 50	Tr	.9	.18	.4	
	120	" " " + 60	.01	2.7	.23	.6	
	1	Chute " " " + 65	.01	3.0	.70	.3	
	2	opposite " " " + 65	.02	13.5	4.40	10.4	
2/1/67	123	Lower Burro Addit Face	.01	.3	.11	.6	
	4	Burro Winze Copper Stringer	.02	.8	.25	5.8	
	5	Burro Winze Lower " "	.01	.2	.68	2.9	

			Au	Ag	CU	PB	Zn
2/4/67	126	Hatch Jig 1	.03	7.5	.17	15.0	
	27	" " 2	.07	2.7	.44	6.4	
2/21/67	28	Clay Caliche S.W. Stope 90'		3.0	.24	1.2	.5
	29	+1" West N.E. Stope 90'		11.9	2.45	10.0	2.6
	30	-1 " " " "		10.5	1.5	9.8	2.8
	31	Rt ch 16" S.W. Stope 90'		7.1	.55	4.8	.3
	32	18" face " " 90		1.8	1.3	.7	.6
	33	14" Rt side S.W. Stope 90		.4	.08	.2	.1
	34	Comp 35' cave S.W. Stope 90		9.1	.75	6.7	.2
	35	N.E. Stope Ore 90'		9.7	2.28	19.0	2.2
	36	East face 90'		8.5	.92	13.7	1.6
	37	East Quartz wallrock 90'		1.4	.31	14.0	.3
	38	Mill Tails coarse		2.8	.63	5.6	.5
	39	" " Cone		5.0	.55	13.0	1.0
	40	" Silt Lower Dam		.8	.70	2.9	1.8
2/26	41	East Top Face 90'	.03	7.3	2.1	7.6	
"	42	West Top Drift 90'	.005	3.0	.30	2.0	
2/22	43	Lane Special PJ	.005	.3	.1	.1	1.5
2/22	45	10' Stope N.E. Round	.01	6.5	.81	10.0	~
2/26	46	N.E. Stope 90' Ore	.03	11.7	1.65	11.6	
"	47	S.W Stope 90' "	.01	6.3	.23	3.8	
"	48	Ore 90' Level N.E Stope Face	.02	4.7	1.82	7.5	
"	149	General pile sample	.02	6.5	2.08	8.1	
3/8/67	50	Face Drift 90' E 90' & Face Car sample	.01	6.1	1.7	10.0	3.4
	51	90' N.E face Shear zone 24"	-	10.3	1.72	14.9	
	52	~~300 Face Drift N.E Heading 4'~~ 6'	.01	.2	.06	2.3	
	53	300' Face Drift N.E Heading 4'	.01	1.5	1.68	5.2	.3
	54	310 Stope S.W. Side 4'	.02	9.3	1.13	7.3	
	155	90' Stope N.E Heading Ore	-	9.9	1.32	-	-
4/10/67	151	East drift ?	.005	.3	.03	.4	.1
	58	90' E drift pile sample fines	.07	8.7	1.92	17.0	7.0
	59	90' E Drift pile coarse	.06	9.8	1.77	17.5	3.5
	60	90 Drift pile Gen. Sample	.04	8.9	1.68	17.0	3.5

9

7, no such zinc

			Hg	Cu	Pb.	Zn
4/17/67	161 Minus 1" Interior 1st 30 cars 90'	.005	6.3	1.55	9.1	16.6
	62 Grab sample " " 90'	.02	5.5	1.74	14.2	16.5
	63 Silver Hill 300' Level 3.5' stope	.005	1.7	.46	7.0	23.5
4-28-67	164 90 L Car sample		10.2	1.74	15.0	
	65 90 L " "		9.0	1.76	15.2	
	66 Pipe sample-screened pile		2.6	2.25	3.0	
	67 High grade sample pile		9.5	1.51	10.9	
	68 300' sample D. E.		9.3	1.65	13.5	
	69 300' " " " 5/8		9.1	1.70	14.0	
	70		14.5	2.25	27.2	
	171		.8	.04	.2	.1
4/29/68	Silver Hill Dump		17.56	2.04	13.60	
6/28/68	Homestake dump		15.76	1.00	22.8	
4/4/69	2 Surface exposed veins lying	Nil	Trace	.10	.03	
	3 Between Homestake & Waterman	"	"	.10	.01	
	4 1-ft next to office St	"	"	.10	.01	
	6	Tr	7.36	40.73	1.12	
	7	Nil	.26	.25	.03	

		Au	Ag.	Cu	Pb	Zn
19/11/65						
1877	1# Conc. Waterman Joe White	.18	58.2	1.6	55.7	
1873	Open cut Conc. Waterman	.26	17.3	5.3	45.0	
12/20/65	H-1- Conc Mill - Flotation	.28	68.8	2.65	53.8	
"	Heads	.01	5.2	.18	7.2	
12/14/66	1-B Grab from Burro-2nd Level Verges	.01	5.0	.45	20.8	1.0
4/11/66	1- Comp. 3rds E of shaft 265'	01	2.2	.56	3.0	8.0
4/27/66	2- 1st ore chute E of shaft 265'	01	6.9	3.15	13.8	25.0
5/25/66	Fines 265 - 1st ore chute	03	14.5	3.75	43.1	17.0
"	Comp. 100 Ore cars Nos 1 & 2 above	01	6.7	3.6	9.0	6.9
9/16/66	1- 4/r floor of NE drift 365'	02	2.3	1.05	5.5	32.2
	2- " " " " " "	02	2.1	1.75	10.0	30.0
	2 Rock from ceiling 30' back NE drift 365'	03	3.4	.11	--	--
9/22/66	1		.8	14.45		
	2		1.1	13.1		
	3		1.2	16.7		
9/29/66	4		2.2	0.03	4.2	
"	5		.5	0.02	0.2	
"	6		.7	0.02	1.5	
10/26/66	1 Mine run } 4th Level -365'	.01	4.7	0.68	3.3	2.2
	2 Coarse } washed -	.02	9.9	0.82	2.8	1.9
	3 Conc. }	.01	6.7	2.35	2.7	3.8
11/3/66	1 (Flotation Burro)		2.0	5.05	1.4	
	2 Note Copper		1.6	7.43	1.1	
	3		4.7	4.04	1.4	
	4		47.2	.81	53.0	
	5		32.4	.22	26.5	
	6		6.9	1.15	3.4	
12/2/66	1 90'		25.9	.85	16.0	
	2 200'		16.2	5.87	5.8	
	3		5.8	.53	8.0	
12/4/66	1	.03	10.5	0.02	26.5	
	2	.01	4.8	.03	11.6	
	3	Tr	0.2	1.66	0.2	
	4	.01	4.5	0.18	4.1	

[illegible] East 40th Street

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85713

SAMPLE SUBMITTED BY Western Minerals Corporation DATE Nov. 12, 19[illegible]

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PER CENT COPPER	PERCENT LEAD	PERCENT ZINC	PERCENT MOLYBDENUM	PERCENT IRON	
# 1		4.49	1.02	3.90				
# 2		6.30	1.50	6.10				
# 3		27.30	1.50	36.00				
# 4		10.00	3.40	9.25				
# 5		7.06	3.30	5.00				
# 6		17.92	2.82	12.00				
# 7		6.08	1.93	4.15				
# 8		10.00	3.02	7.10				
# 9		15.52	4.62	11.50				
# 10		2.14	0.64	1.30				
# 11		2.50	0.78	1.50				
# 12		3.48	1.06	2.15				
# 13		6.52	1.60	5.75				
# 14		25.70	2.02	20.30				
# 15		10.24	3.40	8.50				
# 16		9.14	2.48	6.60				
# 17		6.16	2.10	3.25				
# 18		24.60	5.70	19.20				
# 19		19.46	4.80	15.40				
# 20		3.10	1.35	1.05				
# 21		19.96	3.34	18.20				
	Cu 42.00							
	Ag 36.75							
	47.25							
	126.00							

Western

11/12/60

CHARGES $ 126.00

Peter S. Flores
ASSAYER-CHEMIST

Earth Science & Resources Inc.

P.O. Box 19099 • Phoenix, Arizona 85005 • Phone: (602) 269-8130

Please use the following address and telephone number on this account::: 911 South 32nd Avenue, Phoenix, Arizona 85009
602-269-0551, please allow telephone to ring at least 12 times or more.

February 25, 1977

Happy Jack Mines, Inc.
Box 6
Silver Bell, Arizona

GOLD - AU	SILVER - AG
2.52 oz	0.63 oz
1.25 oz	0.31 oz
16.1 oz	4.02 oz
2.78 oz	1.06 oz
7.76 oz	1.96 oz
3.02 oz	8.96 oz
20.51 oz	7.61 oz

The above analysis' are taken from ore that comprises approximately 95 tons of material received at 911 South 32nd Avenue, Phoenix, Arizona. Material was shipped from THE GOLD BIN MINE which belongs to the Happy Jack Mines, Inc.

Gold - Au averaged 7.705 oz per ton

Silver - Ag averaged 3.507 oz per ton

Jay Wilson
Analyst

UNIVERSITY OF ARIZONA
ARIZONA BUREAU OF MINES
ORE TESTING SERVICE

June 13, 1969

"Happy Jack"

Western Minerals Company
c/o M. Neil Vogel
1820 E. Hampton
Tucson, Arizona - 85719

Ore test 2028

Gentlemen:

The sample of ore from the Indiana mine delivered to the Arizona Bureau of Mines by Neil Vogel assayed as follows:

Lead	7.2 percent
Copper	1.45 percent
Zinc	10.5 percent
Silver	7.35 ozs per ton
Gold	0.02 ozs per ton

Three flotation tests were made on the ore to determine the reagents tocbe used. The results of the third test are reported and the reagents used are given in table 1 and the results in table 2.

The lead-copper-silver concentrate amounted to 12.3 tons from 100 tons ore and assayed 40.4 percent lead, 8.10 percent copper, 12.1 percent zinc, 51.6 ozs. silver and 0.05 oz. gold per ton. It contained 82.0, 71.6, 16.0, 81.8 and 50.1 percents of the lead, copper, zinc, silver and gold, respectively.

The lead-copper-zinc cleaner tailing assayed 14.8 percent lead, 2.75 percent copper, 20.0 percent zinc, 19.0 ozs silver and 0.03 oz. gold per ton. In plant operation some of the lead, copper, silver and gold will report in the lead concentrate.

The zinc concentrate amounted to 9.8 tons per 100 tons of ore. It assayed 0.5 percent lead, 1.87 percent copper, 56.1 percent zinc, 1.5 ozs. silver and 0.01 oz. gold per ton. The zinc recovery was 59.1 percent. This could be increased with more test work.

The zinc cleaner tailing assayed 3.6 percent lead, 0.88 percent oopper, 5.8 percent zinc and 1.0 oz silver per ton. The tailing assayed 0.4 percent lead, 0.11 percent copper, 1.8 percent zinc, 0.5 ozs. silver and 0.005 oz gold per ton.

SUMMARY

The recovery of lead, copper and silver by flotation was 82.0, 71.1, 81.8 percents, respectively. This might be increased in a mill. The zinc recovery was 59.1 percent and could be increased in good operating mill.

A comparison of the different settlements on 100 tons of ore shipped direct to the smelter and the concentrates shipped from 100 tons of ore to a lead and zinc smelter.

Shipping ore	assay	Quoted price	Gross Value 100 tons	Smelter return
lead	6.06	$ 0.145	1,757.00	1,025.00
copper	1.40	0.46	1,288.00	331.00
zinc	9.3	0.15	2,790.00	none
silver	7.75 oz	1.75	1,359.00	1,123.00
gold	.012 oz	40.00	48.00	none
Total			7,240.00	2,479.00
Freight and Treatment charge				1,400.00
				1,079.00

METALLURGICAL RESULTS OBTAINED ABOVE SHOULD BE CONSIDERED AS ONLY APPLICABLE TO MATERIAL CONFORMING TO THE CHARACTER OF THE SAMPLE UPON WHICH THE TESTS WERE MADE.

Concentrate lead-copper-silver	Assay	Quoted price	Smelter return
lead	40.6	$ 0.145	1,102.00
copper	8.10	0.46	631.00
zinc	12.1	0.15	none
silver	51.6	1.75	1,191.00
gold	0.05	40.00	24.00
			2,948.00
		Freight and Smelting charge	679.00
		Ore 100 Tons	2,269.00

Zinc Concentrate		
lead	0.5	none
copper	1.87	none
zinc	59.1 – 56.1	1,240.00
silver	1.5 oz	none
gold	0.01 oz	none
Total		1,240.00
Freight and Smelting		637.00
Net zinc smelter		603.00

Net return lead and zinc smelter on 100 tons of ore milled	2,982.00

The milling increased the net return from direct smelting by $1240 to $2982 or an increase $1742 per 100 tons of ore mined. This would be $17.42 per ton of ore. A good mill should increase the total net several dollars per ton.

The type of ore must be ground to about 100-mesh to mill.

Yours very truly,

George H. Roseveare

George H. Roseveare
Metallurgist

GHR/h

UNIVERSITY OF ARIZONA

ARIZONA BUREAU OF MINES

ORE TESTING SERVICE

Ore No. 2028 Test No. 3

Conditions and Reagents

Table 1

Point of Addition	Conditions			Reagents Pounds Per Ton								
	Time Mins.	% Solids	pH	B	Soda ash	Zn	404	MIBC	Cu SO_4	Lime	Z-11	
Ball Mill	15	60		0.5	0.2	0.8	0.05					
Conditioner	3	25	8.0					0.10				
Lead Rougher	6											
Lead Cleaner	3											
Conditioner	15		10.0						0.8	3.0	0.04	
Zinc Rougher	7											
Cleaner	3		10.0							1.0		

Remarks:
B - Aero Brand Cyanide
Z - Zinc Sulphate
404 - Reagent 404
MIBC - Methyl Isobutyl carbonal
Z-11 - Sodium Isopropyl Xanthate
Cu - Copper Sulphate

Metallurgical Products

Table 2

Product	Tons in 100 Tons Feed	Assays						% of Total				
		Pb	Cu	Zn	oz. Ag	oz. Au		Pb	Cu	Zn	Ag	Au
Heads		6.06*	1.40*	9.3*	7.76*	0.012*		100.0	100.0	100.0	100.0	100.0
Lead-copper Concentrate	12.3	40.4	8.10	12.1	51.6	0.05		82.0	71.1	16.0	81.8	50.1
Lead-copper Cleaner Tail.	4.7	14.8	2.75	20.0	19.0	0.03		11.5	9.2	10.1	11.5	11.5
Zinc Conct.	9.8	0.5	1.87	56.1	1.5	0.01		0.8	13.1	59.1	1.9	8.0
Zinc Cleaner Tail.	1.6	3.6	0.88	5.8	1.0	0.01		1.0	1.0	1.0	0.2	1.3
Tailing	71.6	0.4	0.11	1.8	0.5	0.005		4.7	5.6	13.8	4.6	29.1
Heads Assay		7.2	1.45	10.5	7.35	0.02						

Remarks: * Calculated

Indiana - Arizona Patented claims (15)

Original sampling November 1, 1963

		Gold	Silver	Lead	Copper	Zinc
Black vein rock	Burro	0.03	14.1	4.4	0,03	0.00
Cerusite from face	Burro	0.03	17.5	35.0	0.02	0.00
Composit main bin	At shaft	0.02	6.8	9.8	8.0	2.4
Ore chute	Burro	0.02	13.6	17.2	1.61	0.0
12" leached lump.	Burro	0.03	3.4	13.2		

From Indian Arizona shaft

Timmons composite report			11.5	8.0	1.10	
Shipments 3002 ton Ave.			8.3	7.3	1.49	
1967 Shipments	70 ton	.028	8.08	10.9	1.295	
"	26 "	.04	10.02	13.77	1.7	
"	61 "		9.16	11.87	1.16	
"	67 "		9.59	8.1	.68	
Average	224 ton		9.21	11.16	1.21	

From 250' level East side of shaft , same area and stope.

Grab sample from 3 rounds	.01	2.2	3.0	.56	8.0
Grab sample for high grade	.01	6.9	13.8	3.15	25.0
High grade crushed fines	.03	14.5	43.1	3.75	12.0
Shovel tip from 100 ore cars	.01	6.7	9.0	3.6	6.9

Sampling versus shipping Indian Arizona April 1966

Shovel tip from 185 ore cars	.02	4.45	6.0	2.23	
2 car loads shipped Ave	.03	4.88	5.6	2.13	

Sampling of Silver Hill Stope

Average of 37 samples		4.34	3.74	2.21	4.00
Waterman workings at 10' intervals 11 sampling stations		17.74	9.86	0.33	

Shoval tip composite sample 108 ore cars from 365 level 5-8-69

For mill test U of A.	.005	3.94	7.18	1.26	10.8

Various assays of Mine run Heads - Homestake

	1	2	3	4	5	6	7	
* 365' Level				Au Oz	Pb.	Cu	Zn	
* Mine run Heads				5.73	8.89	1.00	17.5	
Truck shipment returns				10.09	13.2	2.8	4.5	
* Shovel point samples	108 ore cars			7.36	7.2	1.45	10.5	U & H Tes
Average 8 Carload shipments				6.66	9.65	1.58		Mine ru
" 7 shipments - Conc				9.7	9.7	3.3	4.2	Milled
Sludge Drill Hole 9 - from 365'				Bearing N35°E		Dip 60°		304'
4 - 10'	@ 35'	35' to 76'		2.57	2.18	1.0	3.14	
5 10'	@ 55'			3.61	3.11	1.42	4.04	
9 10'	@ 85'	85' to 118'		1.48	3.08	1.29	3.97	
10 10'	@ 88'			3.97	3.12	1.39	3.92	
18 10'	@ 172'			2.04	1.87	.71	2.69	
Samples Silver Hill stope from walls and in place 1968								
37 Samples Ave				4.34	3.74	2.21	4.00	
Surface samples - 30 deppers from various points of mill waste dump, at dam, road, at 600 compressor								~~Assay~~ Jaw 4.
				3.90	1.2	1.44	4.1	

WILLARD D. PYE
Consulting Geologist
3418 North Forgeus Avenue
Tucson, Arizona 85716

Telephone 327-2956

WATERMAN MOUNTAINS PROPERTY

INDIANA-ARIZONA MINE

PIMA COUNTY, ARIZONA

April 17, 1971

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April 17, 1971

WATERMAN MOUNTAINS PROPERTY

INDIANA-ARIZONA MINE

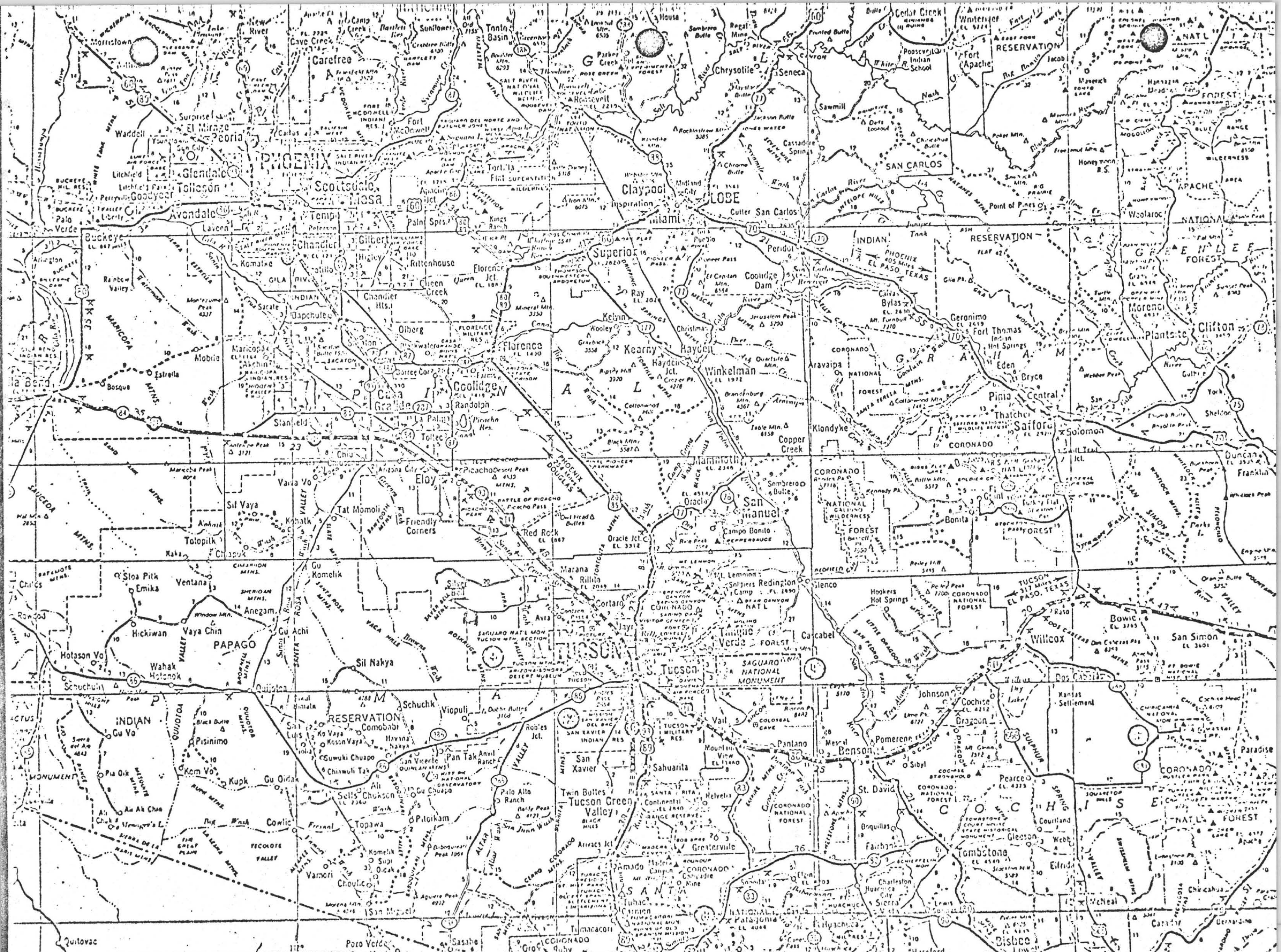
PIMA COUNTY, ARIZONA

SUMMARY REPORT

The Waterman Mountains Property is located in the northern part of the Waterman Mountains, about 30 miles northwest of Tucson, Pima County, Arizona. The property consists of 20 patented and 39 unpatented lode claims located in secs. 19, 29, 30, 31 and 32, T. 12 S., R. 9 E., and secs. 25 and 36, T. 12 S., R. 8 E. The property lies in mountainous terrain but mine roads connect it with a paved road less than a mile from the property and some 20 miles from the main line of the Southern Pacific Railroad. The elevation of the Indiana Mine is about 2800 feet.

No mining activity is underway at the present time on the property although several of the mines could be put into operation rather quickly. Four or five small mines have produced from the property from mineralized fault and shear zones in Lower Paleozoic sediments. Veins and fracture fillings range from an inch to over 20 feet wide. Ore bodies occur as lenses, pods, and shoots in the fracture filled veins and as irregular to regular replacements in the limestone wall-rock or as disseminations in the limestone and quartzite wall-rocks.

Primary mineralization consists of sulfides of copper, lead, zinc and iron with some molybdenum reported; silver occurs with the lead, although some silver sulfide may be present; native gold is sparcely present. The main gangue minerals are quartz, flourite and calcite. For 100 feet or more below the surface the sulfides are well oxidized and may be entirely leached out. Although evidence of oxidation may extend 400 or more feet below the ground surface, below 200 feet the sulfides become increasingly common. Two of the mines have shafts between 300 and 400 feet deep and in the lower levels of these mines sulfides predominate.



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Silver Bell Mountains
Silver Bell
Silver Bell Peak
Confidence Peak
North Butte
Copper Butte
Wild Hog Mtn
Tailings Pond
Sewage Disposal
Scrap Disposal
Cocio Wash
AVRA VALLEY ROAD
BM 2286
BM 2250
BM 2131
BM 2171
BM 2201
PIPELINE
Waterman Wash
Waterman Mts
Waterman Peak
BM 2310
BM 2490
BM 2447
BM 2426
BM 2425
BM 2371
Romero Ruin
Romero Ranch
Well
Squabble Mine
Penny Claim
Cocio Ranch
Paseo Quemado
Tucson Compres
TRAIL
JEEP

Although the type of metallic sulfide may vary from level to level and even from pod to pod, there is evidence that the copper content is increasing with depth at the expense of the lead and zinc sulfides.

Some 25,000 to 30,000 tons of proven ore are reportedly present in the Indiana Mine and an estimated 110,000 tons of probable ore. This is based upon drilling and development work of the owners of the property or their predecessors and their estimates of reserves appear to be reasonable. Metal content varies widely from mine to mine and level to level within a mine but an average over a period of time and of various assays for the Indiana Mine has been given as

Copper	1.5 %	Gold	0.01 oz./ton
Lead	7.0 %	Silver	5.0 " "
Zinc	9.0 %		

Shipments to the Douglas smelter from the Silver Hill Mine averaged 3.54 ounces of silver per ton and copper 3.40 percent. Lead was under one percent and zinc a like amount. Gold averaged better than 0.1 ounces per ton.

In the Silverbell Mountains which lie just north of the Waterman Mountains, ASARCO has developed in the old silver-lead-zinc-copper underground mining areas open pit mines. These are in Laramide intrusives and Paleozoic sediments and occur where pre-mineralization northwest and northeast fault and shear zones intersect. This pattern of mines, mineralization, rock types and fault patterns are present in the Waterman Mountains and the identical direction of fault trends control the Waterman Mountains mineralization.

The future potential of the Waterman Mountains property is

(a) The production of the known existing ore and the development of additional reserves in the mineralized vein system; such development will be both lateral and at depth;

(b) The discovery of the zone of secondary enrichment which must lie, if one exists, below any depth yet reached by shafts or drilling on the property;

(c) The exploration of the lower crystalline rocks for a disseminated porphyry copper type of deposit similar to the Oxide Pit or the El Tiro Pit or the new pits being developed in the Silverbell Mountains;

(d) To test the "barren" rock areas between the higher mineralized veins on the Waterman Mountains property to determine whether this "barren" rock may contain enough mineralization to be commercial if mass production, open pit mining techniques are applied as ASARCO found in the underground mining areas in their Silverbell Mountain holdings.

In summary, the property as it stands now is capable of rapidly being put into production to produce the relatively small ore that has been developed. While this is being done, additional ore reserves can be developed. However, the primary long-range potential of this property is that it can probably eventually be developed into a large mass-production type of operation whether as an open pit mine at the surface of the ground or an underground operation such as is being developed at Lakeshore where the disseminated copper body is in excess of 1000 feet below the ground surface. The copper potential will be found probably well below the 500 foot depth.

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April 17, 1971

WATERMAN MOUNTAINS PROPERTY

INDIANA-ARIZONA MINE

PIMA COUNTY, ARIZONA

INTRODUCTION

Location

The Waterman Mountains Property is located in the northern part of the Waterman Mountains, about 30 miles northwest of Tucson, Pima County, Arizona. The town of Silverbell lies about two miles northwest of the Indiana-Arizona Mine.

The Waterman Mountains lie southeast of the Silverbell Mountains from which they are separated by a valley about a mile wide. The Waterman Mountains appear to be off-set to the west of the Silverbell Mountains.

Avra Valley lies to the east of the Waterman Mountains and the valley of the Papago Indian Reservation lies to the west.

Property

The property consists of 20 patented claims and 39 unpatented lode claims located in secs. 19, 29, 30, 31 and 32, T. 12 S., R. 9 E., and secs. 25 and 36, T. 12 S., R. 8 E. The claims in T. 12 S., R. 8 E. are on the Papago Indian Reservation but are all patented. These Papago Indian Reservation claims constitute the major portion of the 15 patented claims known as the Homestake Group. Five patented claims largely off of the reservation constitute the Silver Hill Group.

Although the patented claims have been surveyed, a careful survey must be made to tie the various patented groups together and to determine their relationship to

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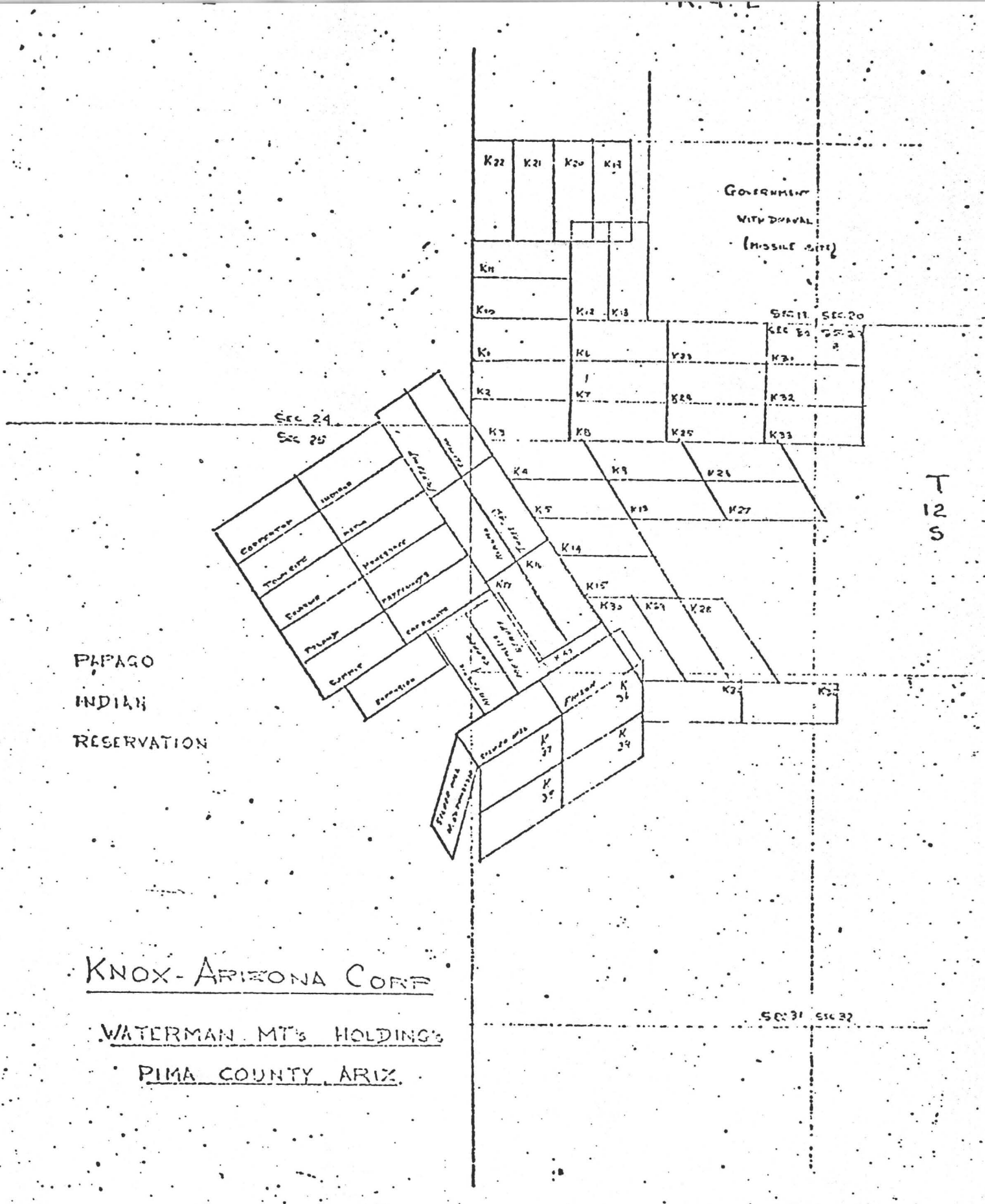
Union Hill
Confidence Peak
Silver Bell Peak
Silver Bell Mountains
North Butte
Copper Butte
Wild Hog Mtn.
Portland Ridge
Silver Bell
Silver Bell
Tailings Pond
Sewage Disposal
Sewage Disposal
Cocio
PIPELINE
BM 2171
BM 2201
BM 2250
Wash
AVRA VALLEY ROAD
BM 2286
Waterman Peak
Waterman Mtns.
Indiana-Arizona
BM 2310
BM 2371
Wash
BM 2426
BM 2425
BM 2490
BM 2447
BM 2123
Romero Ranch
Well
BM 2327
Romero Well
Squabble Mine
Penny Claim
Corum Ranch
Pan Quemado
Tucson Comp


K22
K21
K20
K19
GOVERNMENT
WITHDRAWAL
(MISSILE SITE)
K11
K10
K12
K18
SEC. 19
SEC. 20
K1
K6
K23
K31
K2
K7
K24
K32
K3
K8
K25
K33
SEC. 24
SEC. 25
K4
K9
K26
K5
K19
K27
K14
K16
K15
K30
K29
K28
K17
K21
K22
K37
K39
K35
T
12
S
PAPAGO
INDIAN
RESERVATION
KNOX-ARIZONA CORP
WATERMAN MT's HOLDINGS
PIMA COUNTY, ARIZ.
SEC. 31
SEC. 32
Scale 1"=20=5'
8-25-67

the unpatented claims. This is necessary to insure that there is no open ground between them. If any is found, it must be staked so that no outsiders acquire it.

Relief and Topography

The Waterman Mountains trend in a northwest-southeast direction. Elevation of the Indiana-Arizona Mine is about 2800 feet. Relief is over 1000 feet and topography is very rough; in places cliffs are present. The topography is shown on the attached map which is a combination of the U. S. Geological Survey Vaca Hills and Silverbell Peak 15 minute Quadrangles.

Climate

Climate is typically semi-arid. Summers are warm to hot; winters are mild with occasional freezing temperatures. Snow is rare and is usually only a few inches which may last for a few hours. Rains occur in the summer in the form of thunderstorms which can cause damage if structures are not engineered in anticipation of these storms. In general, climate is no problem.

Accessibility

The property is readily accessible since it lies only a fraction of a mile from the paved Rillito-Silverbell Avra Valley road. The dirt roads from the paving to the various mines would be the only roads that would have to be maintained. Cars can reach the mines on present roads, but for heavy mining traffic some improvements will be necessary. Rillito is about 20 miles east of the mine. Interstate 10 passes through Rillito as does the main line of the Southern Pacific Railroad. American Smelting and Refining Company have their concentrate loading dock from their Silverbell mines at Rillito.

Power and Water

Power is available within a mile of the property. Water is found in the mines and also can be secured from the valleys surrounding the Waterman Mountains.

Supplies, Labor and Accomodations

Supplies and man-power can be secured from Tucson. Accommodations are absent at the mine but are available at Tucson and various small settlements nearer the property.

Scope of Report

The scope of this report will be limited to the geological aspects of the Indiana-Arizona Mine area and the Waterman Mountains property. Data on engineering and mining aspects will not be discussed except incidentally since that will be covered by another report.

This summary is based upon various published and private reports that are available to the writer, upon conversations with people acquainted with the property, and personal geological studies of properties in the vicinity of the Waterman Mountains property as well as of the Waterman Mountain property itself.

GEOLOGY

Rock Types

The oldest rocks in the general area occupied by the claims is the Older Precambrian Pinal Schist. This has been intruded by granitic rocks and later by diabasic dikes which may be post-Younger Precambrian in age.

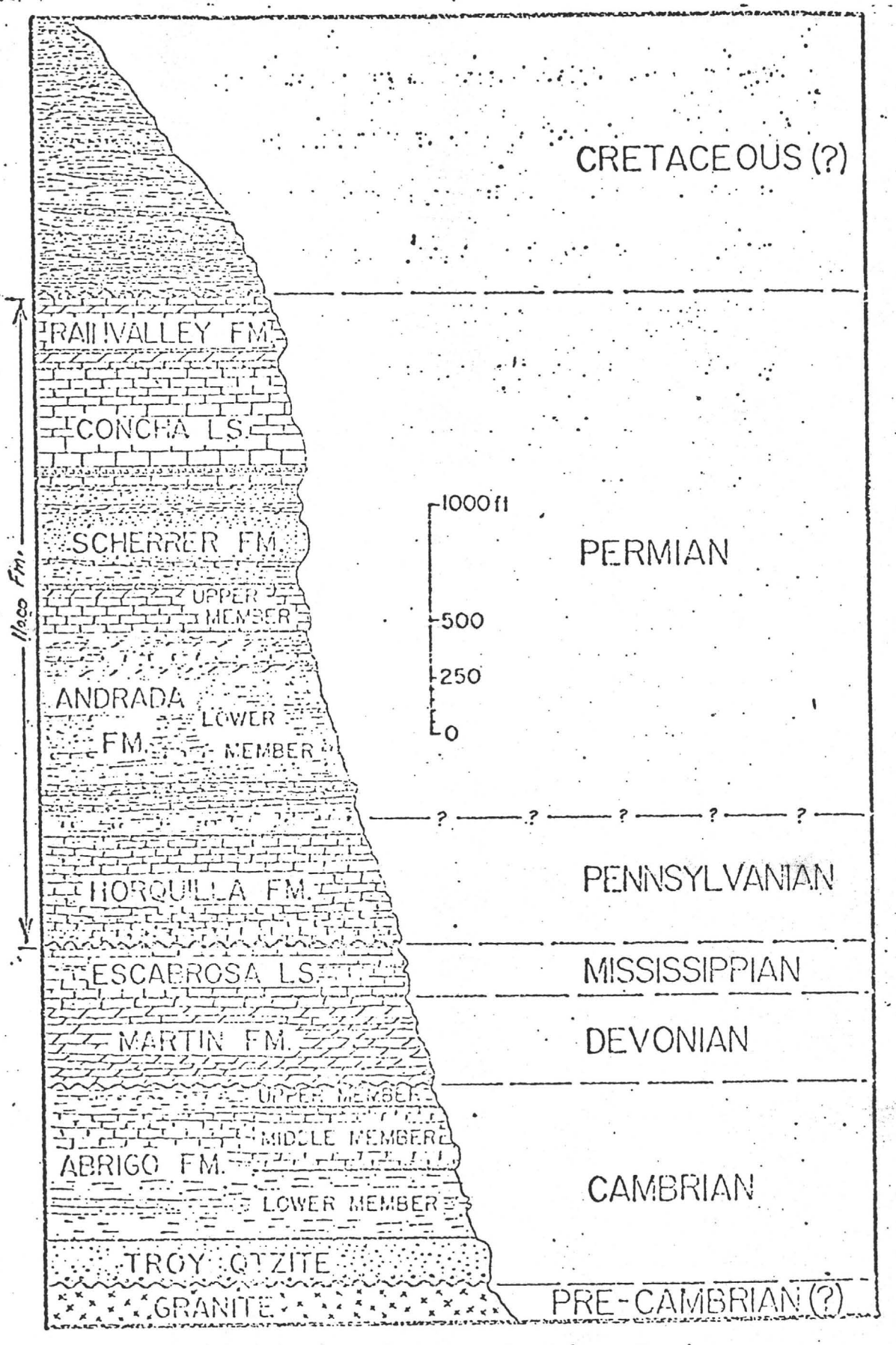
Nonconformably overlying the eroded surface of the Pinal Schist and granites is the Younger Precambrian sedimentary sequence which form the Apache Series and consist of quartzites, conglomerates, limestones and shales. The top of the Younger Precambrian is the Mescal Limestone.

Unconformably overlying the Younger Precambrian sequence is a well developed Paleozoic sequence which can be tabulated as follows:

	Permian	)
	Permo-Pennsylvanian	) Naco Group
	Pennsylvanian	Horquilla Formation
Lower	Mississippian	Escabrosa Limestone
Upper	Devonian	Martin Formation
Upper)	Cambrian	(Abrigo Formation
Middle)		(Troy Quartzite (Bolsa)

These Paleozoic beds are essentially all limestones and dolomites.

Unconformably overlying the Paleozoic sequence is a series of Cretaceous clastics generally of reddish color. These are unconformably followed by a series of Tertiary sediments and volcanics consisting of both intrusives and extrusives composed of rhyolites, porphyritic granites,



Generalized Geologic Column
at the Waterman Mountains

dacites, granites and other related types. All older rocks are unconformably overlain by Quaternary alluvium. Numerous disconformities and angular unconformities are present in the post-Paleozoic sequence of sediments.

On the Waterman Mountains property the Precambrian intrusives are exposed but have not been reached in the mine workings. Except for limited areas most of the claims are underlain by Paleozoic limestones. It is quite likely that the Younger Precambrian sequence is missing in the Waterman Mountains.

In the above sequence of "Tertiary" intrusives are included those intrusives of Laramide age which include the granites, alaskites, dacites and related rocks.

Structure

The structure of the Waterman Mountains is controlled by folding and complex faulting. A highly eroded synclinal structure to the north and anticlinal structure to the south are complicated by crumpling and minor folding; drag along faults and warping are present. The general trend of the rocks is in a northwest-southeast direction which is the direction of the axes of the major folds. The folds appear to plunge to the southeast.

Complex faulting is found throughout the Waterman Mountains. At least three major breaks occur. The faulting has been classified into (1) pre-mineral faults belonging to either (a) a steeply dipping northwest striking system of which the Indiana fracture is characteristic with its 1400 feet of vertical displacement, and (b) an east to northeast trending system of which the Waterman fault is the best example with its horizontal displacement of 900 feet, although in general faults in the above groups usually have about 100 foot displacements; and (2) post-mineral faults which are high angle, northerly striking with 10 to 50 feet of displacement. The first group of faults are probably Laramide in age and the second group probably Late Tertiary in age. The more easterly bearing faults, such as the Waterman fault, cut the northwesterly trending group of which the Indiana fracture is characteristic.

Some people who have worked in the area consider the Waterman Mountains to be largely the result of thrust faulting.

Minerals

The primary sulfide ore minerals are galena, sphalerite,

chalcopyrite, chalcocite, and pyrite. Silver is present but is probably mainly in the galena, although there may be some silver sulfides. Other sulfides and related minerals probably are present but are in lesser amounts and no thorough study of them has been made. Secondary minerals are present in the zone of oxidation and are largely the oxides of the above minerals. Included with the oxides are the carbonates and sulfates. Some of the near-surface chalcocite may be secondary. One report indicates the presence of molybdenum but no assays were found reporting it nor was any noted on the property by the writer but it could be present in areas which were not examined. Native gold is present in small amounts.

The main gangue minerals are quartz, fluorite, calcite and some barite together with residual material from the wall rocks of the veins and the host rock of the replaced areas.

Mineralization

Mineralization is largely found along the northeast striking steeply dipping faults. The east-northeast trending faults cut the northwest faults and offset the mineralization. The post-ore faults are of small displacement and offset any mineralized bodies they cut. These post-ore faults are usually high-angle and/or strike-slip types and are essentially barren.

The character of the mineralization suggests that it is of mesothermal, near-surface type.

Three main mineralized veins have been opened to varying degrees. The Indiana vein strikes N. 55°E. and dips 85° NW. It is about 1000 feet long and 2 - 15 feet wide. Mineralization is mainly galena chalcopyrite, chalcocite, pyrite, sphalerite and the various carbonates and oxides of the lead, copper, zinc and iron contained in those minerals. There is some high silver content in the galena but it is spotty. Some gold is present but in very small amounts. Concentrations of lead, copper and zinc vary markedly from area to area in the veins and at different levels. Wall rock ranges from granitic (Laramide?) to Cambrian quartzites and limestones to Devonian limestones. The limestones have not been greatly replaced. Most of the mineralization is associated with the Cambrian Troy (Bolsa) Quartzite and Cambrian Abrigo Formation which is mainly a limestone. This is probably because these are the formations in which most of the mine workings are located and this relationship may be more apparent than real.

The Waterman vein strikes N. 20° E., and dips 65° NW. It outcrops for 1500 feet along a shatter zone some 20 feet wide. The main minerals are galena, chalcopyrite and their carbonates. Some sphalerite, silver and a little native gold are present. There is high silver in spots and as with the Indiana vein the content of lead, copper and zinc may vary widely from place to place in the vein. Pyrite is present with the other ore minerals. The main gangue is quartz and fluorite although calcite and barite are also present. These are the same gangue minerals as are present in the Indiana vein. Carbonate is more common in the upper few hundred feet of the vein and fluorite in the lower portion. Wall rock is the same as in the Indiana vein with the addition of Mississippian limestone, Pennsylvanian limestone and Permian formations. There is some limestone alteration and replacement.

The Burro vein strikes N. 15° E., and dips 70° SE and is one to two feet wide. The main ore minerals are galena and its oxides and silver. Gangue is quartz, calcite, pyrite. Vein wall rock is Cambrian quartzite and limestone and Mississippian limestone. As usual, the Cambrian rocks are associated with most of the ore areas and there has been some replacement of the limestones.

In addition to the above main mineralized veins, there are numerous smaller veins and areas of mineralization which have not been explored except by pits or short tunnels. Most of these are associated with fractures.

Mineralization is typically a vein filling with some replacement. Deep wall-rock replacement is not common, but where it is present it is best developed in the Cambrian formations. Best vein filling also seems to occur in this age of wall-rock, but this may be more apparent than real. There is a tendency in some of the veins for best ore to develop adjacent to the carbonate rocks than opposite other types.

In the Silverbell Mountains just to the north of the Waterman Mountains, the same general pattern of intrusions and faulting are present. Sedimentary rocks of similar ages are also present. Old maps of the Silverbell Mountains show numerous mines scattered throughout them similar to the distribution in the Waterman Mountains. Many of these were initially silver mines with the silver associated with lead and zinc. At the present time these shallow mines are all abandoned and mining is now all open pit for copper. Two major pits are present with others being developed. The Oxide Pit is entirely in crystalline

Precambrian and Laramide? "granitic" types of rocks; the El Tiro Pit is partly in similar crystalline rocks and partly in Paleozoic sediments which range from Troy (Bolsa) Middle Cambrian through the Mississippian limestones. Vein and replacement types of bodies are present with the best replacement horizons being those which are relatively impure, thin-bedded and argillaceous. Specifically, these are the lower and upper portions of the Upper Cambrian Abrigo Formation and the lower part of the Upper Devonian Martin Formation. The Waterman Mountains property is very similar to these Silverbell Pits except that it involves a higher portion of the geological section.

The localization of the mineralization in the Silverbell pits is controlled not only by the intrusives but more importantly by the intersection of a northwest and an east-northeast sequence of faulting and fracturing. As in the Waterman Mountains, the northwest is the older and is intersected by the later east-northeast fracture system. These two systems are both pre-ore mineralization and have controlled the movement of the mineralizing solutions. The tectonic and mineralization pattern is very similar between the Silverbell areas that are now being opened or have been opened (Oxide and El Tiro Pits) as disseminated porphyry copper ore bodies and the Waterman Mountains property.

The El Tiro Pit is partly in sedimentary rocks similar to those in the Waterman Mountains and records indicate that the ore was confined to veins and fractures which had developed in northwesterly and easterly fracture systems. Ore bodies were narrow pods, lenses and shoots closely controlled by these vein systems but there was some replacement in the adjacent sedimentary wall rocks. The ore, which ran several percent of various metals, was eventually all mined out. Many years later American Smelting and Refining Company noted that the "barren" rock between the veins, which contained less than one percent of copper, was of high enough grade in many places to be an ore under present-day mining and milling techniques. Therefore, most of that old mining area has been included in their pit.

MINES AND DEVELOPMENT

Indiana or Homestake Mine

The Indiana or Homestake Mine has been mainly developed in the Cambrian Abrigo limestones and Troy quartzites with some mineralization found higher and lower. The mineralization is controlled by a shear zone which strikes in a northeast direction. In addition to the veins in the shear zone,

replacement of the limestone has occurred especially where bedding or other faults have enhanced the permeability of the wall rock. Dissemination of the sulfides is present in both the limestone and the quartzite. Mineralization is in the form of silver, gold, copper, lead, and zinc with some molybdenum being reported. These occur at all levels in the mine and in drill holes adjacent to the area. The minerals in the upper portion of the mine are oxidized but in the lower levels occur almost entirely as sulfides.

A vertical one compartment shaft has reached a depth of 355 feet plus an 11 foot sump. Levels have been extended in both directions from the shaft along the strike of the shear zone at 45, 92, 169, 244 and 355 foot depths. Reportedly the backs have been stoped out on all levels excepting the 355 foot level where three high grade shoots still exist. The mine is kept pumped out and is in working condition.but has not been in operation for about a year.

A pilot mill is present which handled all of the ore from the Waterman properties.

Waterman Mine

The Waterman Mine is located some 300 feet northeast of the Indiana Mine and is separated from it by a fault which has about 50 feet of vertical displacement. The mine is in the Cambrian limestones and has similar relationships of ore to wall-rock as in the Indiana Mine. The ore exposed at the surface, in the workings and in drilling is completely oxidized. Drilling shows this alteration and oxidation to continue to at least 400 feet of depth. No zone of secondary enrichment was encountered in the drill holes although they did penetrate an acidic crystalline intrusive.

This mine has been developed by an adit and cross-cut on the strike of the vein. A 90 foot winze has been sunk from the main cross-cut and stoping has reached from the main level to the surface.

Burro Mine

The Burro Mine has been developed in the Escabrosa Limestone of Mississippian age along shears which generally parallel those of the Indiana Mine.

The vein has been opened by an adit over 200 feet long with two additional haulage levels. It has been stoped to the surface from the main level. An underhand stope has been developed on the lower level.

Silver Hill Mine

The Silver Hill Mine is a large replacement ore body in the Mississippian Escabrosa Limestone. The mineralization at the surface is largely oxidized but on the lower levels sulfides are becoming common. Numerous faults and shear zones are present in the area. To the southwest of the Silver Hill Mine is a large area of alteration.

The mine has been opened by a 300 foot shaft with levels at the 20, 100, 200 and 300 foot depths. A cross-cut has been developed on the 200 foot level. There has been extensive stoping above the 200 foot level.

Other Mines and Developments

The Faison Mine, Powder Magazine Mine, with its 200 foot adit and stoping, and numerous other shafts, cuts and pits are present throughout the claim area. These have been developed on continuations of the main vein systems which are being worked, or have been developed on mineral shows in other vein systems.

Drilling

The following is quoted from a 1970 report by Lane summarizing the drilling:

"The immediate vicinity of the Homestake Mine and the Silver Hill Mine were drilled under an O.M.E. exploration program consisting of 8 drill holes with a total of 4,359 feet of which 2,880 feet was under O.M.E. participation.

"The drilling completed verifies the continuance of the mineralization on the Homestake Mine to a depth upwards of 200 feet below the 355 foot level and continuous low-grade mineralization throughout the Troy Quartzite segment to over 100 feet in depth below the 355 foot level. The Silver Hill vein system was exposed some 100 feet below the deepest workings which represent 400 feet below shaft collar elevation.

"An incline drill hole from the Homestake Mine to the Waterman Mine verifies the continuance of the Waterman vein system 700 feet below the existing Waterman workings.

"The most important factor exposed in this drilling program is the exposure of a quartz latite porphyry to the west of the Homestake Mine which underlays the Precambrian and Cambrian series."

RESERVES AND FUTURE POTENTIAL

As a result of the O.M.E. drilling and other data, it was estimated by Lane that some 30,000 tons of proven ore had been blocked out and some 110,000 tons of probable ore are present. Several thousand tons of the proven ore have been mined since that estimate, but the bulk of it still remains in place.

The veins range from a few inches to 20 or more feet wide; ore within them occurs as pods, lenses, shoots and irregular replacement bodies. The grade and mineral content may vary from level to level and sometimes within the ore shoot. Lane has given as an average for the Indiana Mine the following:

Gold	0.01 oz./ton	Copper	1.5 %
Silver	5.0 " "	Lead	7.0 %
		Zinc	9.0 %

Attached are some assay sheets and shipments to smelters from the Silver Hill Mine.

The future potential of the property centers around three main objectives:

1. The O.M.E. drilling has shown that additional ore exists both at depth and between the various explored areas; the development and production of this ore is the near term objective;

2. No zone of secondary enrichment has yet been reached although substantial leaching of minerals from the oxide zone has occurred; the discovery of this zone, if it exists, is an intermediate objective;

3. The major long term potential of the property is based upon certain similarities of the structures in the Waterman Mountains to those in the Silverbell Mountains, just across the valley to the north, and in which range open pit disseminated porphyry copper deposits have been developed where Waterman Mountains type of structures occur.

Although the high grade mineralization in the Waterman Mountains may be in the form of veins, a study of the "barren" rock between the main centers of mineralization should be made to determine whether this rock may contain sufficient low grade disseminated mineralization to be an ore if low-cost open pit type of mining techniques were applied to it.

CONCLUSIONS

In a summary report of a complex geological area it is difficult to cite all the variations and aspects of the geology and the mineralization. However, the main aspects have been presented. The more salient points are

1. The Waterman Mountain property is well mineralized;

2. Mineralization is controlled by fracture systems and to a lesser degree by the replceability of the wall-rock;

3. Mineral veins from which the mines have been producing are mainly in the lower Paleozoic rocks; the Precambrian rocks have not been reached by any of the shafts;

4. Mineralization consists of the sulfides of lead, copper, zinc, and iron; reportedly there is some molybdenum present; silver may be present as a sulfide but is also present in the lead and associated with other minerals; native gold is sparingly present;

5. The sulfides are largely oxidized to carbonates, sulfates and oxides and native metals in the upper several hundred feet in which most of the mines are operating; sulfides become increasingly common in the lower portions of the deeper mines;

6. All mines on the property are currently shut down but four or five small mines have operated on it with the maximum depth of shafts being between 300 and 400 feet;

7. The mineralization pattern in the Waterman Mountains property is similar to that in the mineralized portions of the Silverbell Mountains, just to the north, in which mineralized areas open pits have been developed and are producing copper ore;

8. Some 25,000 to 30,000 tons of proven ore have been developed and about 110,000 tons of probably ore are present on the Waterman Mountains property;

10. The future potential of the property lies

    (a) In production of the known existing ore and the development of additional reserves in the mineralized vein system; such development will be both lateral and at depth;

(b) Discovery of the zone of secondary enrichment which must lie, if one exists, below any depth yet reached by shafts or drilling on the property;

(c) Exploration of the lower crystalline rocks for a disseminated porphyry copper type of deposit similar to the Oxide Pit or El Tiro Pit of the Silverbell Mountains;

(d) Test the "barren" rock areas between the higher mineralized veins on the Waterman Mountains property to determine whether this "barren" rock may contain enough mineralization to be commercial if mass production, open pit mining techniques are applied; if it can be mass-produced, many of the problems of continuation of faulted veins and other problems of underground mining in complicated, steeply dipping structures may vanish.

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P. O. Box 1809

Jacobs Assay Office

Registered Assayers

PHONE Main 2-0813

DUPLICATE

Certificate No. 57447

Tucson, Arizona, Nov. 3 1966

Sample Submitted by Mr. [illegible]

SAMPLE MARKED	GOLD Ozs. per ton ore	GOLD Value per ton ore	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	..... Per cent Wet Assay	..... Per cent Wet Assay
		$					
#1	—	—	2 2/10	5.05	1 2/10		
2	—	—	1 6/10	7.43	1 1/10		
3	—	—	4 2/10	4.44	1 4/10		
4	—	—	44 2/10	0.81	56 0/10		
5	—	—	32 4/10	0.22	26 8/10		
6	—	—	6 2/10	1.15	3 1/10		

• Gold Figured $35.00 per oz. Troy.

Charges $ 30.00

Very respectfully,

Ben C. Jacobs

From Knox - Arizona Files

COPY of Assay Certificate, Arizona Testing Laboratories
Phoenix, Ariz. August 10, 1942

To Supervising Engineer (Name and organization on record)

"We have assayed the samples received from you and find the results as follows" Submitted by Claude E. McLean,

Lab. No. 44063 to 44093 inclusive.

Sample #		Gold Oz.	Silver Oz.	Copper %	Lead %	Zinc %
9	7 ft.	Tr.	6.20	3.50	3.74	
12A	80 in.	Tr.	5.80	2.25	1.97	
12B	15 ft. 5 in.	Tr.	5.20	4.00	2.24	
12C	54 in.	Tr.	10.80	5.40	6.73	12.10
13A	13 ft. 6 in.	Tr.	0.80	8.60	0.47	
13B	9 ft.	Tr.	2.40	2.40	0.61	
13C	90 in.	Tr.	6.40	1.00	1.70	23.10
13D	9 ft.	Tr.	5.70	2.80	0.81	
13E	54 in.	Tr.	3.60	1.80	nil	
14A	90 in.	Tr.	1.40	3.80	0.34	
14B	90 in.	Tr.	2.80	4.05	0.54	
14C	22 ft.	Tr.	3.80	1.30	0.88	0.72
14D	16 ft. 5 in.	0.01	4.00	1.85	1.90	
15A	90 in.	0.01	14.80	1.85	6.86	0.55
15B	9 ft.	0.01	18.40	1.75	9.52	4.18
16	12 in.	0.01	19.60	4.20	12.78	1.82
17	34 in.	0.01	15.80	3.80	7.55	3.74
18	9 ft.	Tr.	2.40	3.40	0.88	
20	10 ft.	Tr.	9.00	2.00	3.94	
21	5 ft.	Tr.	8.60	4.85	4.28	5.50
22	42 in.	Tr.	6.80	4.15	3.53	1.26
23	18 ft. 6 in.	Tr.	7.60	5.00	2.24	0.66
24	5 ft.	Tr.	4.20	3.25	1.02	0.55
25	5 ft.	Tr.	6.60	1.25	2.65	0.60
26	90 in.	Tr.	3.20	11.90	0.68	
27	5 ft.	Tr.	nil	4.10	0.75	20.79
28	40 in.	Tr.	1.20	4.85	0.61	29.70
30	18 in.	Tr.	1.50	27.00	0.68	
31	8 ft.	Tr.	1.00	7.60	1.50	9.35
32	5 ft.	Tr.	6.20	9.90	2.65	3.68
33	6 ft.	Tr.	14.40	4.65	3.74	7.32

Above samples Plotted. Lower 1-11 samples tabulated on assay map.

*1	84 in.	0.01	10.5	4.57	11.21	2.57
*2	48 in.	0.01	18.3	.70	17.18	1.88
3	24 in.	Tr.	1.7	1.30	Tr.	1.68
4	48 in.	0.01	5.5	3.47	.21	2.28
5	72 in.	Tr.	3.7	4.02	Tr.	1.19
6	24 in.	Tr.	Tr.	.75	.21	46.13
7	96 in.	0.01	5.7	3.27	Tr.	.79
8	muck	Tr.	5.1	4.22	.15	3.57
9	20 ft.	0.01	3.3	3.62	.10	.49
10	18 ft.	Tr.	3.4	3.02	.10	.29
11	24 in.	0.02	21.9	.20	9.28	.20

Samples 1-11 certified June 27, 1942.

*20' from surface.

From Knox-Arizona File

SHIPMENTS OF RECORD FROM THE SILVER HILL MINE

	Dry Weight	Silver Oz.	Lead %	Copper. %
TO EL PASO SMELTER	108.294	14.1	9.4	3.97
	115.404	14.69	7.8	3.06
	137.057	10.5	6.4	2.16
	99.054	6.4	3.0	2.85
	191.954	11.4	6.0	2.15
TO HAYDEN SMELTER	96.801	5.0	1.9	5.92
	115.117	5.50	1.7	4.63
	113.586	4.35	1.4	4.40
	95.237	3.25		4.41
	91.726	4.13		5.28
	116.584	2.93		4.73
	108.760	2.98		4.14
	115.776	2.92		4.31
	124.150	3.31		2.12
	105.876	3.86	.95	2.94
	131.800	3.24	.80	2.98
	105.739	3.29	1.05	3.00
	119.012	2.74	1.05	2.96
	102.452	2.14	.70	2.39
	125.112	3.75	1.40	2.10
	83.424	3.45	1.20	3.11
	105.942	2.05		2.64
	57.669	2.09		2.76
	106.803	3.56		3.33
	95.490	3.32		3.93
	100.585	3.34		4.00
	53.957	1.84		3.01
	57.152	2.84		3.04
	45.921	2.93		3.40
	52.538	3.94		3.24
	49.222	2.90		3.12
	53.699	3.70		3.60
	47.012	2.59		3.35
	57.332	1.77		2.99
	55.622	4.39		2.62
	56.735	2.17		2.35
	57.417	2.51		2.37
	54.354	3.33		2.86
	62.463	3.07		2.47
	118.907	1.87		2.26
	111.854	7.25	2.8	7.80
	49.987	4.83		3.11
	56.027	1.91		2.25
	54.240	7.13	2.50	6.05
	108.201	6.13	2.70	4.35
	48.190	4.89		2.94
	42.222	4.36		6.17
	55.350	7.89	3.30	3.78

SHIPMENTS OF RECORD FROM THE SILVER HILL MINE

	Dry Weight	Gold Oz.	Silver Oz.	Lead %	Copper %
TO DOUGLAS SMELTER	48.400	.242	2.42	.92	2.86
	57.558	.288	3.18	.99	2.66
	56.793	.170	2.97	.79	2.50
	47.619		1.55		2.10
	45.863	.138	1.89		2.42
	53.292	.160	1.56		2.52
	54.380	.163	1.62		2.25
	57.388	.115	1.67		2.47
	62.075	.310	2.06	.56	1.32
	52.938	.159	2.04	.50	1.55
	65.900	.132	2.13	.53	1.96
	52.870	.158	1.79	.55	1.58
	58.506	.179	1.63	.62	1.76
	51.226	.102	1.10	.35	1.25
	62.506		2.35	.88	1.31
	41.712		2.16	.75	1.32

NOTE To Douglas - 4051.4 Tons Silver Oz. 3.54 Copper 3.40 % Average

REPORT ON THE INDIANA ARIZONA COPPER COMPANY MINE
LEAD SILVER

SILVERBELL MINING DISTRICT
PIMA COUNTY, ARIZONA.

REPORT BY COLIN TIMMONS, M.E.

This company, an Arizona corporation, with main offices at Kokomo, Ind. is the owner of fourteen (now 15) patented claims, situated 40 miles northwest of Tucson, Ariz. (Now 35 miles due to re-located improved hard-top road.)

The railroad shipping station is Sasco- 20 miles by good auto road, or truck road from these mines.

The smelter of the Imperial Copper Co. is also at Sasco and is now in operation by the American Smelting & Refining Co. The distance in a straight line across the mountains to Silverbell, the terminus of the railroad, is only eight miles. The railroad at Silverbell and Sasco is connected with the main line of the Southern Pacific at Red Rock, Ariz. (Smelter and branch railroad no longer in operation)

FORMATIONS: THE Silverbell Area . This is the local name of the territory where these mines are found and is a part of an extensive, rich mining district, containing the Atlas, ImperialCopper Co. El Tirco, The Oxide Copper Co. and many other meritorious copper and lead-silver mines.

Round about is an extensive series of sedimentary rocks, limestones, quartzites and shales, which form the higher ridges and peaks, while a porphyritic granite is found in the gulches and underlying the sedimentari

The extensive deposits of the common, precious and rare metals of this district are due to the favorable conditions created in the sedimentary rocks by the intrusive granite. While the ores are found chiefly in the limestone, they are found in the immediatevicinity of the intrusives, where lines of weakness, open channelsand broken ground afforded opportunity for the flow of water carrying the metals in solution.

THE HOMESTAKE MINE: This is the most extensively developed of those I shall describe. It is a fissure, nearly vertical and independent of the stratification of the enclosing rocks. In places the outcrop is a dense silicious breccia, 15' to 20' thick; in other places the outcrop is softer than the enclosing rocks and can be traced with difficulty, since it is worn away by the elements and covered by debris. Underground, however, th vein is distinct, well defined and continuous, so far as developments have been carried, without the slightest sign of weakness in any direction.

The first level is near the surface, and towards the eastern part shows the presence of a second vein or bfanch leading out into the enclosing rocks. This same condition is shown on the third level, where the union of the two veins has caused an enrichment of copper-lead-silver ores, mor than 12 feet in thickness. Much of the development has followed the rich- streak in the vein and very rarely does it disclose the whole thickness o the vein.

CHARACTER OF VEIN: The vein material is silica, limestone and iron oxide in places banded with distinct separation from the wall rock, in other places the whole fissure is filled with ore, chiefly iron and copper, extending from wall to wall. There is usually one control streak of high grade lead ore, both carbonate and sulphide. Sometimes the lead ore is

replaced with copper ore. There is one shoot in the mine 50 feet in length, which is entirely iron pyrites, carrying 3 % copper. The area of the third level have decidedly increased in copper content, and the vein has the appearance of widening, and at the eastern end, of becoming richer in all metals .

HOMESTAKE WORKINGS : The main shaft is 300 feet deep; the new shaft 75 feet. The levels are at 45 feet, 91 feet, 166 feet and 240 feet. The developments are shown on Map 2 accompaning this report. (No MAPS)

FIRST LEVEL:
The first level is 45 feet from the surface:
The length of the vein samples is 147 feet;
The average thickness of samples is 4½ feet;
The average ground to be stoped is 20 feet;
This is equal to 1,017 tons.
The average silver contents, 17.8 oz.
Value per ton ----------$ 10.68
The average lead contents, 12%
Value per ton ----------$ 12.00 #1.360
Value of the 1,017 tons -- $ 23,065.56 — today

(Recent 1963 sampling by major mining company geologist @ 45 foot level a 5 foot cut)

Gold	0.03	oz
Silver	10.6	oz
Lead	14.2	%
Copper	1.2	%

SECOND LEVEL:
This level was sampled in the ground opened in the two shafts. The ground is not connected on this level, but the distance is very short between the workings of the two shafts and the vein is exposed in the level above and the level below. (now connected)

The total length sampled is 170 feet
The average thickness sampled is 3.75 feet
Height to be stoped is 40 feet, this gives 1,961 tons.
The average silver contents, 15.6 oz
Value per ton ----------$ 9.36
The average lead content, 10.8 %
Value per ton ----------$ 10.80
Value of the 1,961 ton ----$ 39,553.16

(Recent 1963 sampling by major mining company geologist, 90 foot level, a 3 foot cut)

Gold	0.03	Oz
Silver	11.8	oz
Lead	7.1	%

THIRD LEVEL:
Length sampled, 200 feet
Average thickness sampled, 4½ feet
Average height to be stoped, 75 feet
This gives 5,192 tons

Average silver content	11.5 oz.	Value	$ 6.90
Average lead content,	10.0 %	Value	10.00
Average copper content	2.5 %	Value	7.50

Value of the 5,192 tons -- $ 126,684.80

I used the following values,

silver	$ 0.60	per oz	— 1.29 — 4.00
lead	0.05	per pound	.16 — .26
copper	0.15	per pound	.36 — .56

This gives Values --	1st level	$ 23,065.56
	2nd level	39,553.16
	3rd level	126,684.80
	TOTAL	$ 189,303.52

(Based on February 1964 prices, Value $ 439,469.00.)

This I consider ore which is in sight, beyond a reasonable doubt. In many places the total thickness of the ore is not exposed, and in actual mining the lean and barren places will be compensated by greater thickness than has been used in this estimation.

There is a cross cut of of 75 feet below the third level.(240 ft) I sampled this crosscut. At the place where the crosscut is run, the dip of the vein has carried it 15 feet north of the shaft; the crosscut, after passing through the vein continued 30 feet further into the hanging wall. Where cut at this level, the vein is 20 feet thick, the vein matter being chiefly iron pyrites. However, 25 feet from the shaft, the crosscut discloses 20 inches of heavy galena ore, the drift is driven 15 feet on this streak. This ore assays 13.25 % lead, 14.8 oz silver, and 2.2 % copper. There is also a winze at this intersection, but as it is full of water, I was unable to determine its depth. From this level down the shaft is also full of water. It is reported to be 75 feet deeper.

As the level above is in good ore and gives evidence of great strength, I think it is safe to say that the bottom level contains as much ore as the level above, but of course this is only probable ore.

The third level (160) is especially strong towards the east, but I believe when the fourth level is extended under the heavy ore bodies shown towards * the east end of the third level, it willprove to be the most valuable part of the mine.

On both the second and third levels there are short shoots of ore, high grade copper, and it seems probable that in depth the mine will prove to be a copper rather than a lead mine.

The mine is without machinery, the leasors hoisting everything with windless. They have shipped to the smelter since January 1916, over $ 10,000 * worth of ore and several car loads are in course of liquidation. There are on the dump 2,000 tons of good concentrating ore, assaying $ 15.00 per ton.

THE PADDY WOODS MINE: This was a well known silver-lead mine many years ago, when it was known and worked as the " Abbi Waterman" mine. The outcrop is a silicious breccia in some places, and in others soft limonite ore It is probably the same vein as the CARBONATE shown on map No.1. but it cannot be traced continuously across the gulch, since the soft outcrop has worn down below the level of the surface, or else it is covered by the slid rock from the higher hills.

DEVELOPMENT: near the top of the hill where a large shoot of ore comes to the surface, are found the earliest workings on this vein. Under this outcrop there is a short crosscut, 20 feet long, exposing a vein of ore 6 feet thick, largely lead carbonate. Then to the south, No.1. level extends for 90 feet in length. The greater part of the ground above the level is stoped. I sampled the parts remaining andfound an average of 8oz silver and 6 % lead. Fifty feet lower is a second crosscut, 86 feet long

and a level extending 50 feet to the north and 150 feet to the south, together with an upraise to the level above, and winze 88 feet deep. That part of the level extending towards the south, the upraise and the winze are all in low grade silver-lead ore. The ore will average 5 feet in thickness. The values I found exceedingly changeable, so that it will be difficult to mine the ore seperately.

My assays of the ore, taken usually every ten feet, gave an average of 5 % lead and 9.5 oz silver. The average thickness sampled was 5 feet. I made a concentration test of the ore - four into one. Results are silver 26 oz lead 15 %. There are several hundred tons of ore upon the dumps assaying somewhat higher than the samples taken from the mine.

The vein is strong, well defined, with distictive vein matter composed of spongy, friable, leached white quartz, calcite, some oxide of iron and occasionally manganese. I think the vein has a splendid future, and as soon as a level is reached beyond the leached zone, there will undoubtedly be much richer ore bodies than those now exposed. However, the present grade can be handled at a profit.

About 500 feet north of these developments, there is a crosscut tunnel, 270 feet long, which has cut through the PADDY WOODS vein, (now known as WATERMAN) and into the granite porphyry, which here forms the footwall of the vein. The material passed through is leached quartz and iron oxides more than 10 feet thick, but the silver and lead ore is not commercial.

Before this vein is reached, the tunnel passed through 75 feet of limestone all altered, and with caves and water worn channels, with bunches of copper stained rock and streaks of lead carbonate. This point is near the place where the Homestake and Paddy Woods vein would cross, if projected. From this crosscut a level ought to be run south, under the various shoots of ore which outcrop, to the original developments first mentioned.

THE CARBONATE MINE: This mine lies south of the Paddy Woods mine about 1000 feet. The ore occurence follows a fault and a profound disturbance in the limestone, causing several parallel outcrops of ore.

The vein has been attacked by two adits, the lower of which is 250 long. The first 200 feet follow a small vein from a few inches to two feet in thickness, then opens suddenly into a vein of ore 20 x 20 feet in extent. This chimney contains limestone boulders, lead, manganese, silver and some excellent copper ore in immense detached pieces weighing several hundred pounds. Fifty tons of ore were shipped to the smelter from this opening and fifty tons still remain on the dump ready for shipment.

A shaft sunk nearby to develop this chimney of ore would undoubtedly pay well. Some 50 feet higher and a little to the west, a second adit follows the same vein for 100 feet, where an ore body is encountered having a pitch in the opposite direction or into the hill. This adit continues, following this ore 45 feet, where a water channel was encountered which lead into the large chamber above mentioned. The ore body encountered in this adit, for 45 feet in length averages 5 feet in thickness and assays, lead 15 % and silver 9.5 oz.

(This is now known as the Burro vein, two men have been working this on lease during the past 3 months of 1964, six car loads shipped, returns from 4 loads average 22% lead and 4 oz silver. Menwork under adverse conditions.)

Sampling in 1963 from old ore chutes within the burro assayed as follows-

Silver	10.8 oz	13.6 oz
Lead	6.1 %	7.2 %
Copper	1.5 %	1.6 %

While there are no measurable ore bodies on the Carbonate ground, I think the ore occurence will appeal to all as an extremely favorable field for development.

I made a series of concentration tests on ores from the different shoots snd different levels, to determine the fineness of crushing necessary and the per cent of saving likely to be made by water concentration. By crushing the ore through a 20 mesh screen, a satisfactory saving of both silver and lead can be made. The light oxidized ores are the least satisfactory as is expected.

I made an attempt to make a composite sample composed of ore from all levels and shoots of ore found in the HOMESTAKE, This sample assayed

Silver 11.5 oz. Lead 8 % Copper 1.1 %

(Average of 3002 tons shipped during 1942 - 48 which included dump ore)

Silver 8.3 oz. Lead 7.3 %. Copper 1.49 %.

(A grab sample taken from ore left in main ore bin on HOMESTAKE) 1963

Silver 6.8 oz Lead 9.8 % Copper 8.0 %.

This ore was concentrated, 4.5 tons into 1 ton with following results;

Silver, 75% saved - Assay 38.8 oz.	Value per ton		$ 23.28
Lead, 80% saved - Assay 576 #	Value per ton		28.80
Copper 70% saved - Assay 69.2#	Value per ton		10.38
	Total Value per ton		$ 62.46

Expense of making one ton of concentrates

Mining 4.5 tons	$ 9.00		
Milling	4.50		
Frt. to R.R. on Conc.	3.00		
Frt to El Paso	2.50	Total expense	19.00 -
		Net Value per ton	$ 43.46

From this I deduct 10 % to cover the smelter expense, though I have used a low price for all the metals, Charge 4.35 -

Net $ 39.11

A mill having a capacity of 50 tons per day, treating ore of the class above mentioned, will produce 11.1 tons of concentrates, or $ 434.12, or a monthly production, 25 days, of $ 10,853.00, or a yearly production of $ 130,236.00.

The water for a mill will be obtained from a permaneht supply 2 miles from the mine and will have to be elevated about 200 feet. There is water in the shaft now (reported to make 8 to 10 gallon per minute) but whether sufficient to meet the demandsof the concentration plant is not known, and can be determined only by dewatering the shaft and measuring the inflow.

The Homestake shaft ought to be equipped with a gasoline hoist and the second, third and fourth levels extended in both directions, inasmuch as the faces are now all in ore.

The new levels can be very quickly and economically developed, which will give a sufficient amount of ore for the mill while new ground is being developed.

The Paddy Woods ore can also be made available by extending the level to the south from the lowest tunnel, and large quantities of ore from this source can be quickly and cheaply extracted.

Signed Colin Timmons, E.M.

It is estimated that this report was made not later than 1917.

Comments in parenthesis () and later assay data has been added to compare later information with previous findings.

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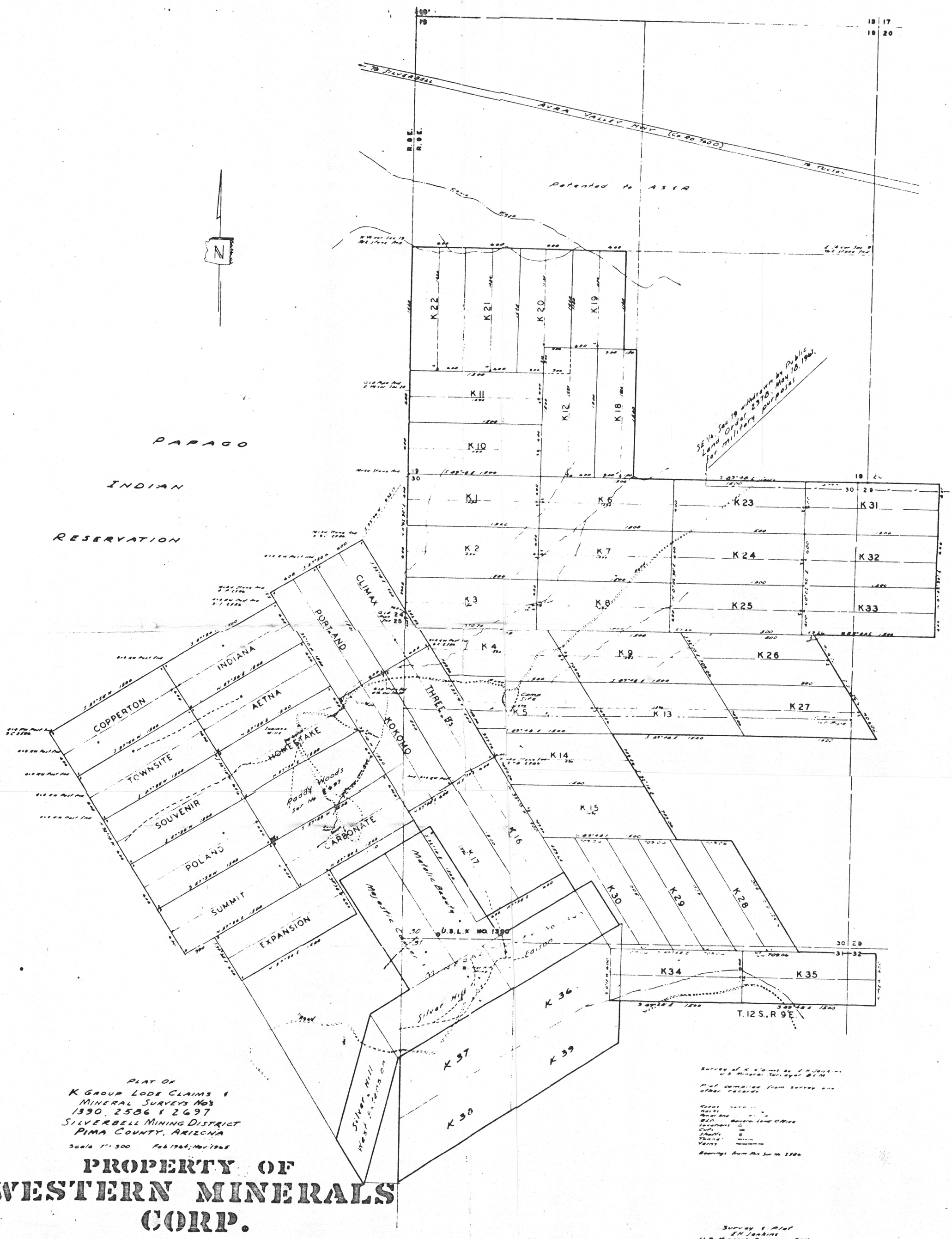


PLAT OF
K GROUP LODE CLAIMS
MINERAL SURVEYS NOS
1390, 2586 & 2697
SILVERBELL MINING DISTRICT
PIMA COUNTY, ARIZONA

Scale 1" = 300' Feb 1964; Nov 1965

Survey of K claims by F N Jenkins
U.S. Mineral Surveyor BLM

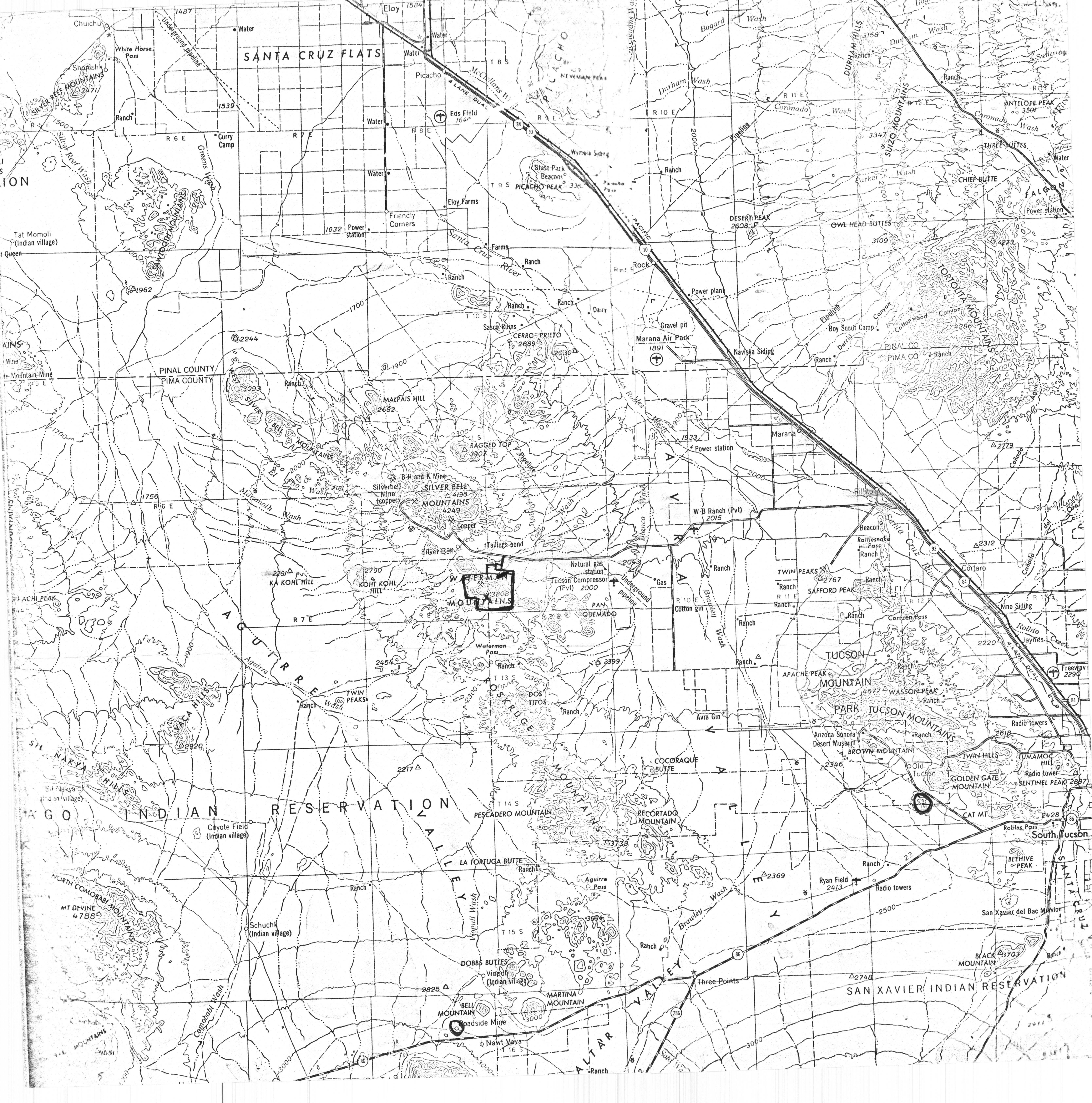
Plat compiled from survey and other records

Roads
Rails
Power line
BLM Bonanza Land Office
Locations
Cuts
Shafts
Tramway
Veins

Bearings from Min Sur No 2586

Survey & Plat
F N Jenkins
U.S. Mineral Surveyor BLM

PROPERTY OF
WESTERN MINERALS CORP.



SANTA CRUZ FLATS
Chuichu
White Horse Pass
SILVER REEF MOUNTAINS
Eloy
Picacho
Eds Field
Curry Camp
Water
Ranch
Underground pipeline
PICACHO PEAK
State Park Beacons
Wymola Siding
Eloy Farms
Friendly Corners
Power station
Tat Momoli (Indian village)
SAWTOOTH MOUNTAINS
Santa Cruz River
Farms
Power plant
Gravel pit
Marana Air Park
Naviska Siding
Sasco Ruins
CERRO PRIETO
PINAL COUNTY
PIMA COUNTY
MALPAIS HILL
WEST SILVER BELL MOUNTAINS
RAGGED TOP
B-H and K Mine
Silverbell Mine (copper)
SILVER BELL MOUNTAINS
Copper
Tailings pond
Silver Bell
Marana
Power station
Rillito
W-B Ranch (Pvt)
Natural gas station
Tucson Compressor (Pvt)
Gas
Cotton gin
KA KOHL HILL
KOHI KOHL HILL
WATERMAN MOUNTAINS
PAN QUEMADO
Waterman Pass
AGUIRRE
Aguirre Wash
TWIN PEAKS
DOS TITOS
ROSKRUGE MOUNTAINS
VACA HILLS
Avra Gin
COCORAQUE BUTTE
PESCADERO MOUNTAIN
RECORTADO MOUNTAIN
INDIAN RESERVATION
Coyote Field (Indian village)
LA TORTUGA BUTTE
Aguirre Pass
NORTH COMOBABI MOUNTAINS
MT DEVINE
Schuchk (Indian village)
Brawley Wash
DOBBS BUTTES
Vicquli (Indian village)
BELL MOUNTAIN
Roadside Mine
MARTINA MOUNTAIN
Nawt Vaya
Three Points
ALTAR VALLEY
AVRA VALLEY
SAN XAVIER INDIAN RESERVATION
San Xavier del Bac Mission
BLACK MOUNTAIN
Ryan Field
Radio towers
South Tucson
BEEHIVE PEAK
Robles Pass
CAT MT
GOLDEN GATE MOUNTAIN
Old Tucson
TWIN HILLS
TUMAMOC HILL
SENTINEL PEAK
BROWN MOUNTAIN
Arizona Sonora Desert Museum
TUCSON MOUNTAIN PARK
TUCSON MOUNTAINS
WASSON PEAK
APACHE PEAK
SAFFORD PEAK
TWIN PEAKS
Rattlesnake Pass
Contzen Pass
Kino Siding
Cortaro
Jaynes
Freeway
TORTOLITA MOUNTAINS
Boy Scout Camp
Cottonwood Canyon
OWL HEAD BUTTES
DESERT PEAK
CHIEF BUTTE
FALCON
THREE BUTTES
ANTELOPE PEAK
SUIZO MOUNTAINS
DURHAM HILLS
Durham Wash
Bogard Wash
Coronado Wash
Pipeline