CONTACT INFORMATION
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Arizona Department of Mines and Mineral Resources Mining Collection

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PRINTED: 11/21/2002

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES AZMILS DATA

PRIMARY NAME: ALTO GROUP

ALTERNATE NAMES:
- GOLD TREE
- EL PLOMO
- B AND R
- LONG CONTACT
- BUENA VISTA
- EXCELSIOR

SANTA CRUZ COUNTY MILS NUMBER: 8

LOCATION: TOWNSHIP 21 S RANGE 14 E SECTION 21 QUARTER S2
LATITUDE: N 31DEG 36MIN 41SEC LONGITUDE: W 110DEG 51MIN 39SEC
TOPO MAP NAME: MOUNT WRIGHTSON - 15 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
- LEAD
- SILVER
- COPPER
- ZINC
- GOLD
- STONE

BIBLIOGRAPHY:

- KEITH, S.B., 1975, INDEX OF MINING PROP. IN SANTA CRUZ CO., AZBM, P. 83
- AZBM CLIPPING FILE
- AZBM CARD FILE SANTA CRUZ CO.
- USBM FIELD NOTES PB20
- ADMMR ALTO GROUP (NORTH PART) FILE
- ADMMR ALTO GROUP (SOUTH PART) FILE
- ADMMR MAPS UPSTAIRS-FLAT FILE-DRAWER 4
- USGS BULL. 582, P. 197-203
- COPPER HANDBOOK, 1903
- USAEC PRELIM. RECONN. RPT. A-P-360, 1955, P. 28 & 37

MEMORANDUM OF THE SHIPMENTS FROM ALTO SECTION

By RAMON LAGUNA to MILLER'S ASSAY OFFICE

Date	Dry Tons	ASSAYS, Ozs Gold	Ozs Silver	Copper	Lead	90% of the Total Value	
Oct. 22, '28.	0.494	0.05	245.0	8.2%	18.7%	$67.00	
Jan. 4, '29.	0.5125	0.07	84.0	4.8%	26.5%	21	
Jan. 19, '29.	0.897	0.15	22.5	6.2	27.5	2	
Jan. '29.	0.534	0.04	30.0	3.0	22.5	12.[illegible]	
Feb. 12, '29.	1.162	0.10	40.0	10.2	33.5	64.75	
Feb. 16, '29.	1.010	0.10	37.0	10.5	26.5	48.80	
Feb. 25, '29.	1.475	0.16	34.9	8.0	29.6	65.75	
Mar. 4, '29.	1.158	0.06	29.0	5.4	40.5	56.25	
Mar. 13, '29.	2.449	0.10	32.0	8.0	36.0	128.50	
Apr. 9, '29.	0.490	0.10	32.5	15.1	10.6	26.10	
Apr. 24, '29.	0.7105	0.30	32.7	10.1	19.0	31.40	
May 3, '29.	1.293	0.05	32.5	6.04	30.4	[illegible]1	
June 10, '29.	0.9925	0.05	22.0	10.4	----	26.[illegible]	
June 27, '29.	0.712	0.10	20.0	15.8	----	27.[illegible]	
May 20, '29.	0.725	0.10	16.5	11.5	----	20.2	
July 29, '29.	1.109	0.10	29.5	8.5	19.5	42.60	
Aug. 16, '29.	0.492	0.04	15.5	4.6	29.4	12.50	
Aug. 23, '29.	1.9775	0.15	30.5	9.4	30.5	91.60	
Sept.12, '29.	4.000	0.10	32.0	11.1	24.0	178.40	
Sept 25, '29.	2.574	0.10	17.0	8.1	20.0	72.25	
Oct. 7, '29.	3.807	0.05	22.0	5.5	34.0	141.50	
Nov. 2, '29.	1.9915	0.05	29.5	10.2	28.5	87.25	
(Gar) Nov. 26, '29.	22.207	0.053	17.4	3.45	12.8	319.63	(Sm. rets
Nov. , '29.	0.943	0.10	24.6	12.6	----	32.50	
Dec. 27, '29.	0.975	0.05	10.2	15.2	29.2	38.50	
Dec. 22, '30.	0.787	0.05	29.0	10.4	36.0	20.10	
Totals..	55.477	2.37	936.70	230.29	595.20	$1713.23	
Approx. Assay ave. 26 lots.		0.091	36.0	8.85	22.5		

Net value per ton of 55.477 tons worth $1713.23..... $31.06

Feb. 16, 1937. Smelter Schedule:

Au. 0.091 @ $32.30.....		$ 2.94
Ag. 36.0 @ 95% of 77¢ - 1.6¢		25.80
Cu. 8.85% - 0.5% @ 95% of 12.0¢ @ 5.0¢		11.85
Pb. 22.5% - 1.5% @ 95% of 6.0¢ - 1.5¢		18.35
	Total.	$58.94
Treat. $8.90, Freight $4.00,		
Haul.. $2.00, Burro Pk 1.00,----------		15.90
	Net value per ton..	$43.04
Estimated mining & sorting " " ..		13.00
	Net...	$30.04

ALTO MINE

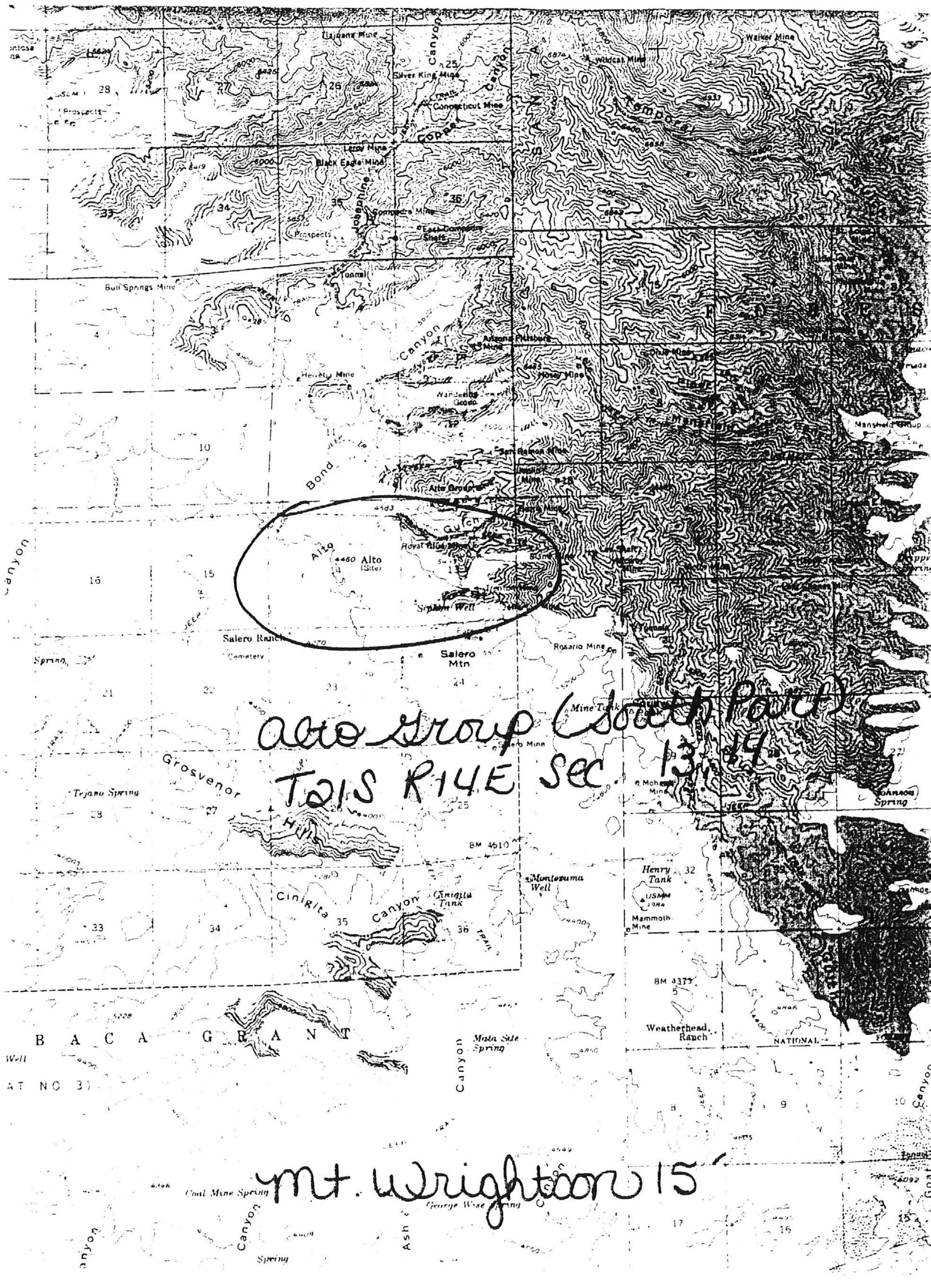
SANTA CRUZ COUNTY
T21S R14E Sec. 13,14

Baca Float Mine (file)

USGS Bull. 582 p. 197
See Alto Group (North Part)

Santa Cruz MILS Index #8

Mt. Wrightson 15' Topo (included in file)


Alto Group (South Part)
T21S R14E Sec. 13, 24
Mt. Wrightson 15'
Alto
Alto (Site)
Royal Blue Mine
Siphon Well
Bond Gulch
Alto Group
San Ramon Mine
Salero Ranch
Cemetery
Salero Mtn
Rosario Mine
Mine Tank
Salero Mine
Mohave Mine
Grosvenor Hill
Tejano Spring
Montezuma Well
Henry Tank
Mammoth Mine
Cinigita Canyon
Cinigita Tank
Weatherhead Ranch
BACA GRANT
Mota Site Spring
Coal Mine Spring
George Wise Spring
Bull Springs Mine
Helvetia Mine
Tonnal
Black Eagle Mine
Leroy Mine
Prospects
Silver King Mine
Connecticut Mine
Wildcat Mine
Walker Mine
Temporal
Mansfield Group
Johnson Spring
Arizona Pittsburg Mine
Hosey Mine
Canyon

Nogales, Arizona
June 20, '44

Department of Mineral Resources
Phoenix, Arizona

Dear sirs:

I'm looking for a little enlightment on a condition that I might run into in the next couple of months, and I'm wondering if you can help me out. I'm managing a RFC project for Long Contact Mining Co., who have leased the Alto group of claims in Santa Cruz County from E D Morton of Tuscon. The Alto Mine is an old mine with extensive workings on the crest of the mountain. These old workings contain considerable water that have a high sulphuric acid content. We have gone some 500 feet below the crest of the mountain and driven in a 1200 foot X-Cut to contact the vein and then driven 200 feet along it to a point where we are raising up under the old workings. In all we have about 350 feet to go to reach the bottom and have already gone 160 feet. When we make this contact we are going to tap this reservoir of acid water which we might not be able to contral.

Our X-Cut portal is located on the side of a canyon. A quarter of a mile down the canyon is a concrete dam which is always full of water and was put there to water cattle that range in this district. Now what's going to happen if this water gets out of control and pollutes this dam so that the cattle can't drink it or it even might poison them? We are in the Coronado National Forest and I don't know whether the cattle men own this grazing right or lease from the Government.

I thought maybe you might know of a similar case and how it was handled. Or if you don't feel like committing yourself, you might tell me with whom I should get in contact with.

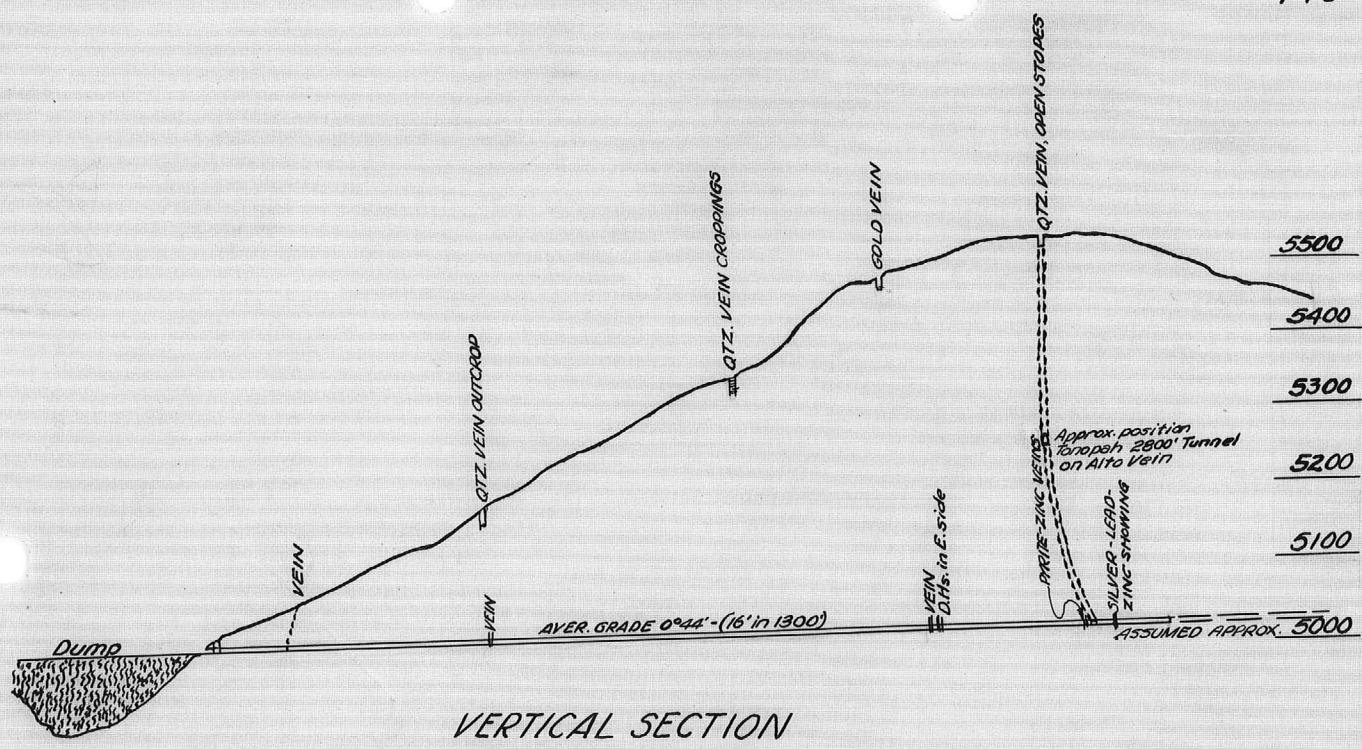
Thanking you in advance I remain

Sincerely yours,

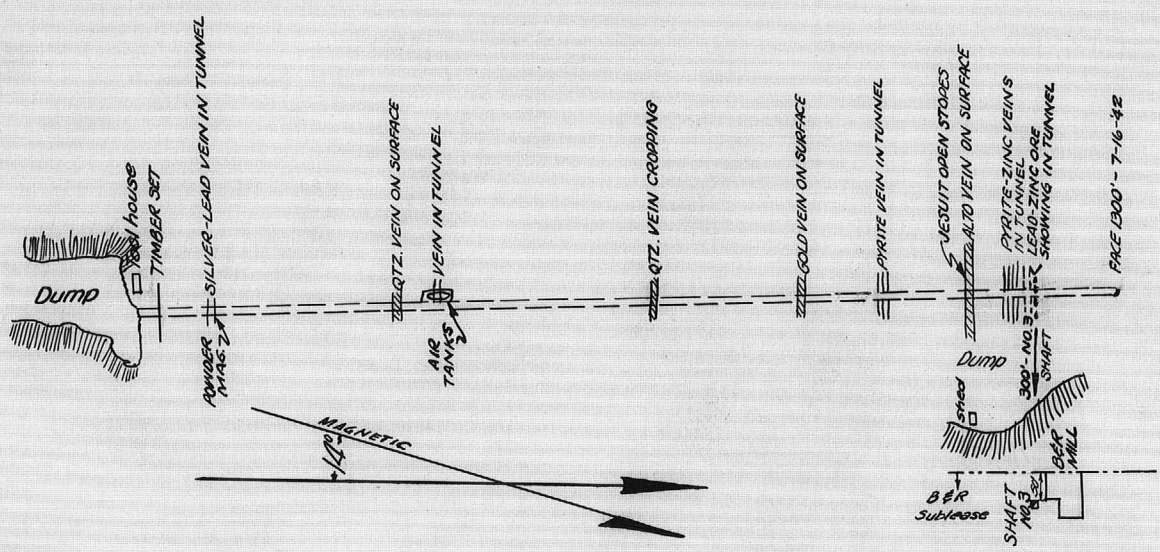
H J Brunswicker

H J Brunswicker
Long Contact Mining Co.
Box 892
Nogales, Arizona

FIG. 4



VERTICAL SECTION



PLAN

LONG CONTACT - CROSSCUT TUNNEL

250' 0 250' 500'
(APPROX.)

15025

Alto

June 30, 1944

Mr. H. J. Brunswicker
Long Contact Mining Co.
Box 892
Nogales, Arizona

Dear Mr. Brunswicker:

Your letter of June 20 is very interesting and presents a problem that has no precedent that we know of.

You have to bear in mind that all laws are against you if you pollute any stream. You can, of course, do most anything as long as you retain the poisonous matter on your own property and protect it by a legal fence.

Just as a suggestion you might have a sample of the water from that existing pond analyzed at the University and also a sample of the water you propose to add to it. If the analyses show that the latter is no more obnoxious than the former (which might well be the case), you would have excellent evidence to forestall any trouble.

On the other hand if the mine water shows up to be much worse, it looks as if you might have trouble unless you can hold it under fence on your own property.

Trusting this suggestion may be of help to you, I am

Yours sincerely,

Chas. H. Dunning
Director

CHD:LP

ALTO MINE (South Part) SANTA CRUZ COUNTY

Visited the Alto Mine (South Part) No Activity.

GWI WR 7/17/65

Visited the Alto Mine (south part) and found no activity.

GWI WR 3/11/67

Trust Office of Northern Trust Company is a 25% trustee of the Alto Mines, Mt. Wrightsen Quad., Santa Cruz (Secs. 11, 12, 14 and 21). Owners of the trust are Mrs. Ruse DeCeanne and Nadda Nazur. We discussed Ownership and Leasing with the Company. KAP/ WR 2/14/78 a.p.

MG WR 11/9/84: While in the Wrightson mining district, I stopped below the Alto Mine Group (Santa Cruz County). This property appears to have had no recent activity. The Arizona Conference of Seventh Day Adventists, 13405 N. Scottsdale Road, Scottsdale, Arizona, phone (602) 991-6777, transferred surface rights of the patented claims to the United States (Coronado National Forest) on April 5, 1966. Mineral rights have been retained by the church organization in these claims listed as follows: Albert, Albert No. 2, Albion, Alto, Alto East, Mineral West, Oak, Record, Steinfeld and Steinfeld West.

NAME OF MINE: ✓ ALTO		COUNTY: S. Cruz S DISTRICT: METALS: Pb ✓	
OPERATOR AND ADDRESS:		MINE STATUS	
DATE:		DATE:	
5/1/44	✓ H. J. Brunswicker Box 892, Nogales, Ariz. ✓ (Long Contact Mg. Co.)	5/1/44 3/45 3/47	Developing Operations suspended Shipping

[redacted]

ALTO

Cu, Pb, Au, Ag

Santa Cruz . 12 - 1S/3E/4T 21 S, R 14 E

H. J. Brunswicker, Nogales, Box 892 '44

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Alto Mine (South Part) Date May 10. 1956

District Tyndall District, Santa Cruz Co. Engineer Axel L. Johnson

Subject: Field Engineer's Report. Personal Visit & information from D. F. Morris, Oper.

Location Sections ~~11 & 12~~ 13 -- T 21 S -- R 14 E. Drive SW from Patagonia on the Patagonia-Nogales road for a distance of 3 miles. Turn left (NNW) and drive about 11 miles on a county road to the mine. Road is graded and in fair shape.

Number of Claims 13 claims, unpatented. A survey for a patent is reported to have been made, but no patent was issued.

Owners Sal De Ceanne, 3220 So. Woolcott Ave., Chicago, Ill. Baca Float
& Naddo N. Mazer, Chicago, Ill.

Lessees and Operators D. F. Morris, Box 891, Nogales, Ariz., and David DuBois, Nogales, Ariz. doing business as the Fortune Mining Co., Box 891, Nogales, Ariz. Lease provides for a 10 % royalty with option to purchase. Lease is for a term of 5 years, with the privilege of renewal for an additional 5 years.

Principal Minerals Lead, Copper, and Silver.

Number of Men Employed 7 men (incl. the 2 operators). 2 shifts--6 days per week.

Production Rate Production was carried on for 6 weeks in Feb.-March, 1956, and 4 cars with a total ~~of~~ 168 tons were shipped to the El Paso smelter. Since then, the operators have been engaged in shaft sinking and cutting levels. However, an additional car of 40 tons of ore, from development, is being shipped today.

Geology See my report of this property under date of April 3, 1952. (See Sketch of Veins @ Shaft)

Ore Values The ore shipments made ran from 14.5 % to 19.2 % in Lead, from 3.8 % to 5.6 % in copper, and from 18.5 oz to 27.4 oz in silver. Zinc aver. about 3.5 %. Samples on the vein have run from 7 % to 11.5 % in copper, with from 32.5 to 55.0 oz. of silver. This ore, when mined will be shipped as copper ore, to the El Paso smelter.

Old Mine Workings
1 vert. shaft -- 300 ft. deep, called # 1 shaft. Caved & inaccess.
1 adit, about 2800 ft. long, connecting with the #1 shaft.
1 vert. shaft -- depth not known, called # 2 shaft. Caved.
1 vert. shaft -- 175 ft. deep, called # 3 shaft. Caved & very B. O.
1 adit about 1400 ft. long, with a 200 ft. raise, connecting this adit with the # 3 shaft.
Several additional shorter adits and cross cuts
1 inclined shaft -- 90 ft. deep on incline (incl. 42 deg)/ This is called the inclined shaft by the operators, and has been repaired for the original 90 ft. depth and extended to a depth of 170 ft. by the operators. Total depth of 300 ft. planned

Past History and Production See report of April 3, 1952.

Present Operations Shaft sinking---2 shifts-- 6 days per week. Shaft is 5' x 8'. The old part from 0' to 90' is incl. 42 deg., and the new part, from 90' to 170' is incl, about 60 deg. Aver. progress shaft sinking has been 2 ft. per shift, or about 4 ft. per day.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Alto Mine (South Part) Date May 10, 1956

District Continued Engineer

Subject:

Present Operations (Continued) Since leasing the property about Dec. 1, 1955, the operators have done the following amount of work on the property:

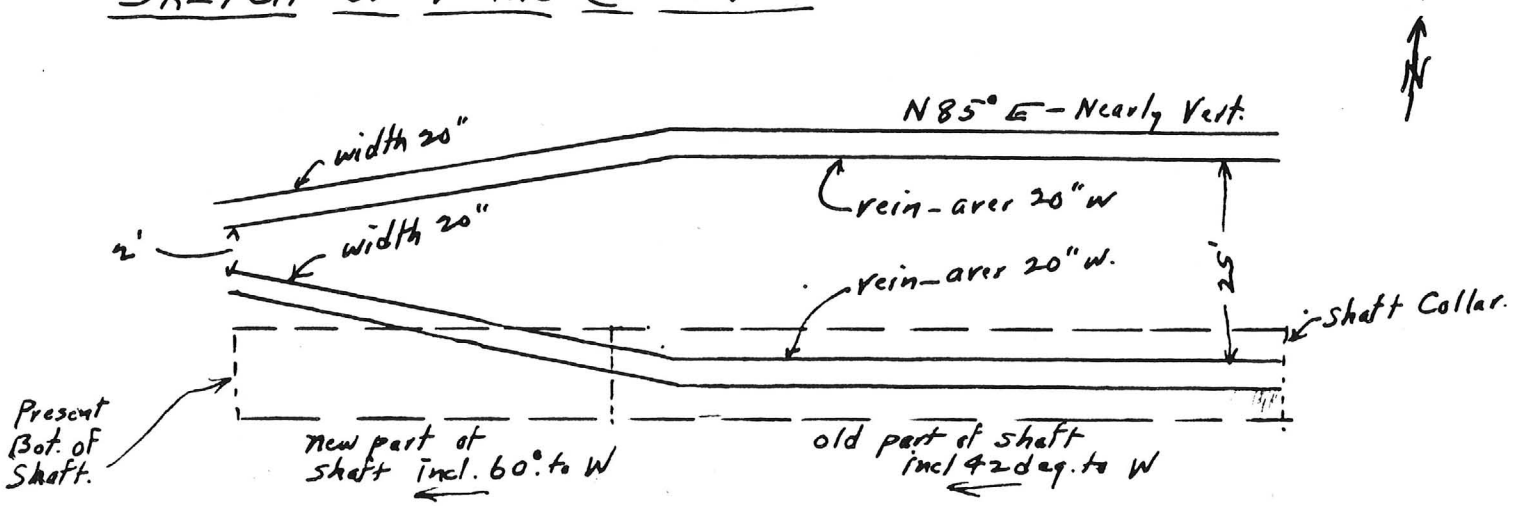
(1) Built 1.1 miles of mountain road into the property.
(2) Constructed a gallows frame and an ore bin.
(3) Cleaned out the old 90 ft. inclined shaft, and retimbered 60 ft. of same.
(4) Cleaned out and repaired about 100 ft. of old drift on the old 90 ft. level, and put in track.
(5) Stoped out 168 tons of ore above the old 90 ft. level, shipping same to the El Paso smelter. The balance of the ore above this level is reported by the operators to have been stoped out.
(6) Sank the shaft an additional 80 ft., from 90' to 170' depth.
(7) About 40 ft. of drifting and cross cutting on the 120 and 170 ft. levels, to intersect the vein, was also done.

Ore and rock from the shaft sinking operations are hoisted in a 1400 # inclined skip, and dumped into a chute at the top of the shaft. From the chute, the ore or rock is drawn into a 1 ton ore car. The rock is dumped on the rock dump, while the ore is dumped into a 40 ton ore bin, from where it is loaded into trucks for shipment to the smelter.

Proposed Plans

(1) Operators expect, soon, to start drilling 6 ft. rounds and putting in a 3rd shift. In this way, they expect to make 6 ft. per day in their shaft sinking operations, instead of 4 ft. present rate.
(2) Operators expect to sink the shaft to a total depth of 300 ft., and to finish this work in about 6 weeks.
(3) After finishing the shaft sinking, they expect to drift on the vein on the 300 ft. level and intersect the old raise going up to the # 3 shaft.

SKETCH OF VEINS @ SHAFT



PLAN VIEW

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA

~~FIELD ENGINEERS REPORT~~
NEWS ITEM

Mine Alto Group (South Part) Date April 3, 1952.

District Tyndall Mining Dist., Santa Cruz. Co. Engineer Axel L. Johnson

Subject: News Item --- Source of Information --- Hugo W. Miller

Location 12 miles northwest of Patagonia. Go 2 1/2 miles on road to Nogales, then turn right and go 9 or 10 miles on good county road.

Number of Claims About 13 claims, unpatented. A patent survey was made, but no patent was issued.

Owners ~~Ed Burgess~~ Ed Burgess, Superintendent of operations. Baca Float
Sal De Ceanne, 3220 So. Woolcott Ave., Chicago, Ill. putting up the money.
This was known formerly as the Long Contact Mining Co.

Leasers None at present. Roy Bell and Dr. Smith had the lease in 1950, but dropped the lease some time ago.

Operators Not in operation.

Metals Present Lead and Zinc with some Silver values.

Men Employed None. Mine is idle.

U.S.G.S. Bulletin. 582

Geology See Schrader Report--- pages 197 to 202.
6 veins in latite and granite porphyry. Veins 3 to 7 ft. wide. Ores are sulphides --- galena, argentite, chalcopyrite, and sphalerite.

Old Workings 1-- 1400 ft. cross cut tunnel, tapping vein at 500 ft. depth.
1-- 2685 ft. tunnel.
Several other shafts and drifts.

Past Production No information available as to the tonnage mined. The mine was worked occassionally prior to 1902. Mine was purchased in 1902 by Alto Consolidated Mines Smelting and Transportation Co. of New York. This company operated the mine from 1905 to 1907, built roads, installed machinery, drove a long tunnel, and sank several shafts. Intermittent work was done from 1907 to 1940.

Proposed Work No information regarding same.

Tucson 2/21?/28

[redacted]

Phoenix
4-30-37

[redacted]

10-15-38

8-4-39

[redacted]

11/9/40 Phoenix Republic

Phoenix Republic
11/9/40

[redacted]

Tucson 5/20(?)/28(?)

Alto mine group
Tyndall district
Santa Cruz Co.

Ariz. Repub.
3-8-41 (?)

Ariz. Republic
2-8-41 (?)

Phoenix 3-30-45

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

See: ALTO GROUP (NORTH PART) file

Mine Alto Mine (South Part) Date May 10. 1956

District Tyndall District, Santa Cruz Co. Engineer Axel L. Johnson

Subject: Field Engineer's Report. Personal visit & information from D. F. Morris, Oper.

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Past History and Production See report of April 3, 1952.

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DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

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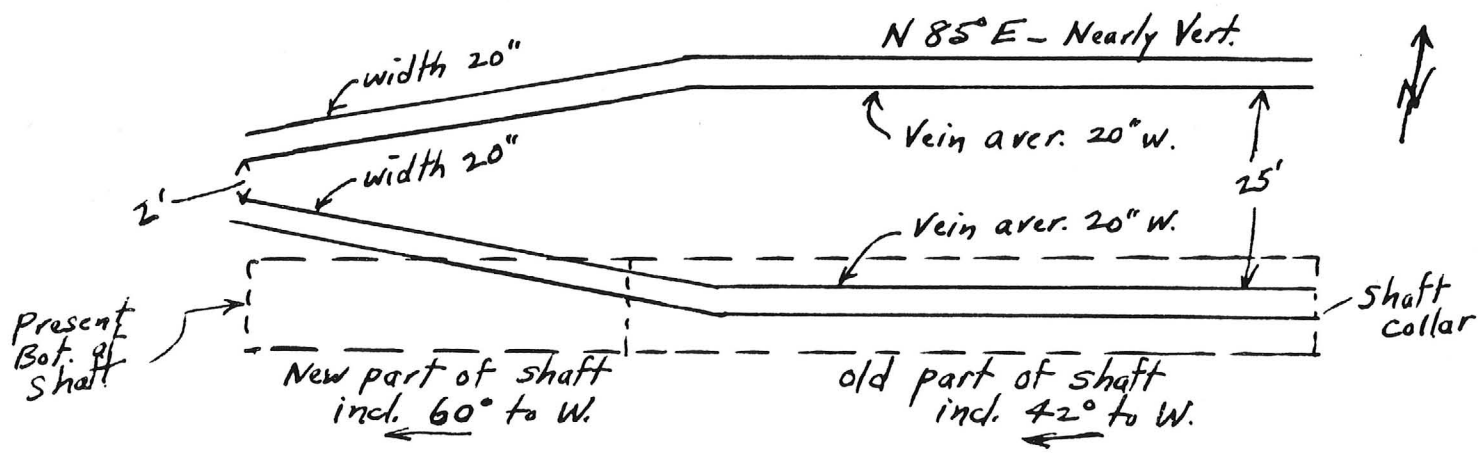

PLAN VIEW

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

~~FIELD ENGINEERS REPORT~~

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District Tyndall Mining Dist., Santa Cruz. Co. Engineer Axel L. Johnson

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Sal De Ceanne, 3220 So. Woolcott Ave., Chicago, Ill. putting up the money.
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Leasers None at present. Roy Bell and Dr. Smith had the lease in 1950, but dropped the lease some time ago.

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Proposed Work No information regarding same.

Alto Mine Edwin A. Stone 6-8-38

This property was examined by Fischer and Higdon in detail. The writer went over the property with Higdon.

The veins are very narrow but at the surface apparently carried high grade silver associated with tetrahedrite. With depth the grade becomes low judging from the assay map of the long tunnel; ore probably lead-silver.

Higdon estimates 3000 tons of developed ore that would average 4.26 oz Ag, and 12.4 % lead. He also estimates a possible production of 2000 tons per month of low grade ore. He indicates 10,000 tons of low grade averaging 4.53 oz Ag, 3.64% Pb, and 2.5% Zn, in a block at 6500 E., 2450 tons of low grade averaging 4.13 oz Ag, and 5.53% Pb (zinc unknown) in a block at 6100 E, and 1250 tons of low grade ore averaging 3.75 oz Ag, 3.72% Pb, (zinc unknown) in a block at 5600E.

Higdon believes that a lead-zinc zone may exist below the adit level and recommends sinking at the intersection of the Gold vein and Alto vein which has a showing of lead-silver ore at the surface. This winze would with drifting settle the problem of what is below the adit level. Higdon estimates that $400 would be adequate to clear the [redacted] tunnel but this does not include the laying of track, or removal of mud near the portal.

Higdon's conclusion is that metallization near the Alto end at the Alto is weak, and that little ore of economic grade can be developed in economic amount.

The writer agrees with this conclusion. The veins are small and while probably rich at the surface, they are low grade at the adit level from Tonopah's assay map. Tonopah spent in the neighborhood of $30,000 in driving the tunnel further on the Alto vein and in development work above this level. The high grade ore is in all probability stoped out though high silver ore could be obtained by sorting of the silver bearing lead ore. The tonnages of possible low grade ore given above are too small for the large scale operation necessary to make them profitable. It appears that this property would be best utilized by turning it over to lessers. The adit tunnel would require opening before this could be done.

The property may be reached by driving toward Nogales from Patagonia just past the CCC camp and turning sharply to the right and following the main road past the old Salero mine. The distance from the Nogales highway is /2 miles

MEMORANDUM OF THE SHIPMENTS FROM ALTO SECTION

By RAMON LAGUNA to MILLER'S ASSAY OFFICE

Date	Dry Tons	ASSAYS. Ozs Gold	Ozs Silver	Copper	Lead	90% of the Total Value
Oct. 22, '28.	0.494	0.4[illegible]	[illegible]45.0	8.5%	18.7%	$67.00
Jan. 4, '29.	0.5125	0.07	[illegible].0	4.8%	26.5%	21
Jan. 19, '29.	0.997	0.15	[illegible]	6.2	27.5	8
Jan. '29.	0.534	0.04	[illegible]	5.0	22.5	12.5[illegible]
Feb. 12, '29.	1.162	0.10	[illegible]	10.2	55.5	64.75
Feb. 16, '29.	1.010	0.10	[illegible]	10.5	26.5	48.80
Feb. 25, '29.	1.475	0.16	[illegible]	8.0	29.6	65.75
Mar. 4, '29.	1.158	0.06	29.[illegible]	[illegible].4	40.5	56.25
Mar. 15, '29.	2.449	0.10	32.0	[illegible]	36.0	128.50
Apr. 9, '29.	0.490	0.10	38.5	[illegible]	[illegible]	26.10
Apr. 24, '29.	0.7105	0.30	32.7	[illegible]	[illegible]	[illegible].40
May 3, '29.	1.293	0.05	32.5	6.04	[illegible]	[illegible]1
June 10, '29.	0.9925	0.05	22.0	10.4	-----	26.[illegible]
June 27, '29.	0.712	0.10	20.0	15.2	-----	27.[illegible]
May 20, '29.	0.725	0.10	16.5	11.5	-----	20.2
July 29, '29.	1.109	0.10	29.5	8.5	19.5	48.60
Aug. 16, '29.	0.492	0.04	15.5	4.6	29.4	12.50
Aug. 25, '29.	1.9775	0.15	30.5	9.4	30.5	91.60
Sept.12, '29.	4.000	0.10	32.0	11.1	34.9	178.40
Sept 25, '29.	2.574	0.10	17.0	8.1	30.0	72.25
Oct. 7, '29.	3.807	0.05	22.0	8.5	34.0	141.60
Nov. 2, '29.	1.9915	0.05	29.5	10.2	28.5	87.25
Nov. 26, '29.	22.807	0.035	17.4	3.45	12.8	319.63 (Smelter)
Nov. , '29.	0.945	0.10	24.6	12.6	-----	32.80
Dec. 27, '29.	0.975	0.05	10.2	13.2	29.2	38.80
Dec. 22, '30.	0.787	0.05	29.0	10.4	36.0	30.10
Totals..	55.477	[illegible].77	[illegible].70	[illegible].82	[illegible].20	$1715.23
Approx. Assay ave. 26 lots.		0.091	36.0	[illegible].85	22.5	
Net value per ton of 55.477 tons worth $1715.23.....						$31.06

Feb. 16, 1937. Smelter Schedule:

Au. 0.091 @ $32.30.....		$ 2.94
Ag. 36.0 @ 95% of 77¢ - 1.5¢		25.80
Cu. 8.85% - 0.5% @ 95% of 18.0¢ @ 6.0¢		11.96
Pb. 22.5% - 1.5% @ 95% of 6.0¢ - 1.5¢		16.35
	Total.	$58.04
Treat. $8.00, Freight $4.00,		
Haul.. $2.00, Burro Pk 1.00,-----------		15.00
	Net value per ton..	$43.04
Estimated mining & sorting " " ..		12.00
	Net...	$30.04

DEPARTMENT OF MINERAL RESOURCES

REPORT TO OPA ON ACTIVE MINING PROJECT

Date Oct. 5. 1944 Long Contact

Name of Mine Alto Mine - Tubing

Owner or Operator H. J. Brunswicker

Address Nogales, Ariz. Box 592

Mine Location Tyndall Mining Dist. S. C. County

Filing Information

File System.....

File No.....

This chart to be used for gallons of gasoline required per month.

PRESENT OPERATIONS: (check X)

Production ✓; Development ✓; Financing.....; Sale of mine.....;

Experimental (sampling).....; Owner's occasional trip.....;

Other (specify).....

PRODUCTION: Past and Future.

	Tons
Approx. tons last 3 months	60 Tons Shipped
Approx. present rate per 3 months	2 to 300 Tons
Anticipated rate next 3 months	Same
If in distant future check (X) here	

EQUIPMENT OPERATED:

Type	Quantity or Horse Power	Miles or Hours Per Month	Gallons Required Per Month
Personal Cars	None	None	none
Light or Service Trucks	1	960 miles	80 gal
Ore Hauling Trucks	none	None	none
Compressors	1	208 hrs.	832 gal
Other Mine or Mill Eqpt.	5 engines	as needed	1600 gal.

PRODUCT PRODUCED OR CONTEMPLATED: Name metals or minerals.

Copper: Lead, Gold + Silver.

REMARKS:

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ARIZONA DEPARTMENT OF MINERAL RESOURCES

By.....

REPORT

ON

THE ALTO MINE

Santa Cruz County Patagonia Arizona

This property shows very little ore of economic grade in economic quantity. It can produce two classes of ore, a high silver base metal ore from sorting and a low grade mixed sulphide ore with about four ounces of silver. Possible monthly production of the low grade ore would be 2000 tons. THere is approximately 3000 tons of ore that will assay 4.26 silver, 12.4 per cent lead, developed in the mine.

Estimated production cost ______, estimated hauling cost __________, estimated trucking cost ___________, to Ruby.

Some indications exist that an unexploited lead zinc zone may exist beneath the rather thoroughly exploited gray-copper silver horizon.

To test out this possibility I believe the long established rule to follow the ore is valid. At 5960 co-ordinate there is a rather strong showing of siliceous lead-silver ore at the intersection of the Gold vein with the Alto Vein. If much of a mine lies below, the adit level on this ore would seem the logical point to sink. After sinking approximately 100 feet the full length of ore should be opened up, and if finding it unprofitable, the development would be limited to raising at any hopeful spots.

I estimate the entire adit level could be made accessible for about $400. This amount would not include any rail or the removal of the mud from the west end of the adit level.

The metallization in the vicinity of the Alto Mine has been small and is mostly confined to vein with an east-west strike and a steep dip.

No producing mines are located nearby and the production of the Tyndall Mining District has been small.

CLAIMS AND TITLE:

The Alto group of claims is composed of some 16 patented claims and fractional claims aggregating roughly a little less than 300 acres. The Alto vein, on which most of the work has been done, is well defined for about two claim lengths, chiefly on the Alto and Alto East claims. The Alto and Alto East claims have the principal metal showings and on these two claims a great deal of work has been done. The other claims of the group do not give much promise that any tonnage of commercial ore exists on them.

The Alto claims were acquired by purchase of tax title ownership by the Eagle-Picher Mining and Smelting Company in March, 1937.

The Albert group, which immediately adjoins the Alto Group on the North and is under other ownership, consists of five full sized patented claims. The claims are owned by Mr. G.W. Henderson of Patagonia, who acquired them by tax title. The Albion claim lies on the north side of the Baca Float fence and may be part of this group. Most all the work done on the Albert vein, which is nearly parallel to the Alto vein and 400 feet to the north, is on the Albion claim.

The northern boundary of Baca Float No. 3, an old Government grant, runs through the middle of the Alto Group, in an east-west direction, and is shown on the accompanying map. In the past years there has been a division of the property along this line. The metallized part of the Alto Vein lies entirely south of this line, and this portion is owned by the Eagle-Picher Mining & Smelting Company.

HISTORY:

In January, 1928, the Tonopah Mining Company, of Philadelphia, Penn., acquired title to the property. After reopening the old adit tunnel to its

breast at co-ordinate 5940 east, the Tonopah Mining Company drifted 680 feet to the east toward No. 3 shaft. The company spent approximately $30,000 reopening the old Alto workings and development on the Alto vein. At the Alto tunnel level the vein showed a marked impoverishment, and very little commercial ore was found. No stoping was done and the work was discontinued after October, 1928.

PRODUCTION:

Jesuits.

Prior 1899 - 1705 tons shipped, net smelter $59,773 or $35 per ton after deducting freight and treatment charges.

1899 - 1905. No records of production available.

1906- $14,000 extracted. Silver 24 oz, lead 32%, Cu 5%, Zn 9%, and a little gold.

146 tons from the Main tunnel near shaft no. 1, Au. 40¢; silver 26.1 oz; lead 38.5%; Cu 2.3%.

1924 - $14,000 from vicinity of No. 3 shaft on the 73 foot level.

Average assays from drift: A. 16.4 oz; Pb 14.4: Cu. 6.6; Width 1.65 feet.

VEINS AND FAULTS:

Post latite faulting produced a series of east-west fissures cutting the latite and older rocks. Much of the striation in the fault planes is nearly horizontal and it is inferred that the principal movement was in this direction. These fissures are vertical or nearly so, dips generally ranging from 75 to 90 degrees north or south. In the main the Alto and Albert veins dip steeply to the north.

Throughout most of their course these faults are accompanied by from

1 to 5 feet of sheared, crushed and more or less decomposed rock, and it is in these zones that the veins and ores are developed. Stringers and lenses of quartz up to 2 or 3 feet come and go either singly or in multiple parallel series. In the latter case there is commonly a net like development of minute diagonal stringers connecting the larger veins.

The Alto group of claims includes 2 prominent vein systems which occur in fracture zones in the latite flow and the old granite porphyry mass. The main Alto vein can be traced for 3000 feet on the surface. The vein may pinch and swell abruptly. In expansions the filling is usually quartz and at the ends or contractions the quartz filling becomes more an admixture of latite or granite, and finally pinches down to a gouge filled fissure. The ore which occurs in shoots generally short, usually extends short distances.beyond the point of concentration along the localizing veins or fissures.

The quartz vein, even the most barren, commonly carry a sprinkling of sulphides, commonly pyrite; but in the richer veins there also occur one or more of the following minerals: chalcopyrite, tetrahedrite, galena, and blende silver and lead prevail in the westerly portions of the Alto vein, while the dominantly cupriferous metallization is characteristic of the east end of the vein system.

Veinlets of sulphides, in places in important amount, fill the joints and fissure planes here and there in the vein rock and to a smaller extent permeate the rock itself.

In the early days of the mine, extremely rich silver ores were mined in places close to the surface. Tetrahedrite with a high silver content occurs in branching stri gers of quartz. The vertical projection shows an ore bearing zone parallel to the surface and for the most part within 100 feet of the surface.

Two distinct and separate metallizations are manifest. The first consisted of micro-crystalline quartz and pyrite filling fractures in and replacing country rock. This is not always distinguished but is shown in green on the map. At some time, certainly after much faulting, there was a second metallization. Galena was the principal metal introduced along with pyrite, sphalerite and chalcopyrite. At some later stage tetrahedrite was introduced.

Sketch shows high grade tetrahedrite stringers in Alto vein west of No. 1 shaft near stope. About 20 feet west No. 1 shaft, where the vein is crossed by N 65 W cross faults there is formed narrow inconspicuous fault zone or seams resembling planes of movement. These cross slips are filled with quartz and tetrahedrite. The cross slips continue without interruption from the vein through the contact into the wall rock, but at the contact they are deflected as shown by the presence of quartz and slickensiding, andfault drag material, indicating movement between the wall and the vein in approximately a horizontal direction between the time the seams were formed and the time of their filling by quartz and the ore. The continuation of the seams from the vein into the wall rock is generally less difficult to determine on the south side than on the north side. Faulting in dip plane of the fault seems to be normal.

CHARACTER AND GRADE OF ORE:

The ore is an extremely fine grained iron-lead zinc sulphide, with dense finely crystalline quartz. The ore shipped was practically all mined from the vicinity of No. 1 and No. 3 shaft.

The average of the 146 tons of ore shipped near No. 1 shaft was:

Pb.-38.5%; Cu. 2.29%; Ag. 26.1 oz; Au. $o.40

The Tonopah Mining Company sampled the ore showing in the adit level before they suspended operations, plotting the width of the samples and the result on the map of the workings. The ore and the stopes above the drift could not be examined as the adit tunnel is inaccessible to the east of coordinate 5530.

The assay map shows the following:

Block No.	Av width Ore	Av. Grade Silver	Av. Grade Lead	Av. Grade Zinc	Av. Grade Copper	Ton. Est. on block
5570 to 5610	2.6 ft	3.75 oz	3.7 %			1250 tons (Above adit)
5920 to 6000	3.16 ft	4.26 oz	12.4 %			2800 tons (above adit level)
6145 to 6215	3.52 ft	4.13 oz	5.52 %			2450 tons (block)
6490 to 6610	4.37 ft	4.53 oz	3.64 %	2.5	0.5	10,000 tons

Block 5570 to 5610

Co-ord. East	Wth	Au.	Ag.	Pb.	Cu.	Wth	Ft. Au.	Ft. Ag.	Ft. Pb.
5570	2.5	Tr	2.0	1.3				5.0	3.25
5580	1.5	.01	6.4	3.1				9.6	4.65
5590	1.5	.Tr	3.2	3.3				4.8	4.95
5600 Av	6.0(?)	Tr	2.5	4.4				15.0	26.40
5610	1.33	.02	10.2	6.3				13.6	8.40
						12.8		48.0	47.65
						2.6	.01	3.75	3.72

$$\frac{40 \times 150 \times 2.5}{12} = 1250 \text{ tons}$$

BLOCK 5900 EAST

Co-ord.East	Wth	Au.	Ag.	Pb.	Cu.	Wth Ft. Au.	Ft. Ag.	Ft. Pb
5920 N	:3.33	.01	5.2	14.8			17.32	49.28
5920 S	:2.1	tr	0.6	0.5			1.26	1.0
5930	3.0	.01	2.8	7.4			8.40	22.20
5940	2.6	.01	1.6	7.2			4.16	18.70
5950	1.0	tr	0.2	0.5			0.20	0.50
5960 S	:3.5	.02	10.4	29.7			36.40	103.95
5960 N	:1.45	tr	0.8	3.1			1.16	4.50
5970	3.6	.01	5.4	16.8			19.44	60.48
5980	3.0	tr	2.8	8.6			8.40	25.80
5990	2.5	tr	1.0	2.5			2.50	6.25
6000 N	:1.75	.01	12.6	34.5			22.05	60.38
6000 S	:0.66	tr	0.2	tr			0.13	0
				353.104				
9	28.49	0.2128	121.418				121.42	353.04
	(3.16)							
Assay per ft wth	0.007		4.26	12.39		.007	4.26	12.39
6010	3.67	.03	1.3	4.3			4.77	15.78
6020	2.2	.04	2.2	5.1	0.1		4.84	11.22
6025	1.25	tr	0.2	0.5			0.25	0.62
6035	2.5	.01	2.0	3.6	0.2		5.0	9.0
6040	2.2	.02	5.6	15.2	1.0		12.32	33.44
	11.82	.2671	27.181	70.066			27.18	70.07
Flash Assay 6080 Ft wth	(2.36)	.02	2.30	5.93		0.02	2.30	5.93

6040 end of ore shoot

$$\frac{80 \times 140 \times 3}{12} = 2800 \text{ tons}$$

BLOCK 6100 East

Co-ordinate East	Width	Au.	Ag.	Pb.	Cu.	Zn
6145	5.33	0.15	1.3	2.6		
6155 N	:1.5	0.26	23.0	34.6	1.4	
6155 N	:4.9	0.01	0.6	0.5		
6165	5.0	0.01	3.8	3.1		
6175	4.67	0.02	3.8	4.2		
6185	4.25	0.02	4.2	6.0		
6195	4.2	tr	1.4	0.5		
6205 N	1.75	.04	12.8	15.5		
6205	3.75	.02	5.6	6.2		
6215	:3.2	tr	0.2	0.5		
6215 C	:2.1	.01	14.4	19.7		
	40.65	1.6329	167.9955	224.267		
Assay per ft width	3.52	0.04	4.13	5.52		

6220 End of ore shoot.

$$\frac{120 \times 70 \times 35}{12} = \frac{29400}{12}$$ or 2450 tons

BLOCK 6500 EAST

Co-ord E.	Wth	Au	Ag	Pb	Cu	Zn		Au	Ag	Pb	Cu	Zn
6490	5.0	tr	1.6	2.5	0.1				8.0	12.5	.5	
6490 N	1.0	.01	4.4	4.5	0.2			.01	4.4	4.5	.2	
6500C	4.2	tr	1.4	3.1	tr				5.88	13.02		
6500 S	1.9	tr	tr	0.2	tr					0.38		
6500 N	1.3	.01	4.2	10.4	0.1			.013	5.46	13.52	.13	
6515	3.9	tr	3.2	5.5	0.1				9.28	15.95	.29	
6515 N	1.1	.02	15.6	8.4	2.4			.022	17.16	9.24	2.64	
6525	4.0	tr	3.2	1.0	tr				12.80	4.00		
6525 N	1.25	.05	31.2	8.8	5.1			.063	39.00	11.00	6.38	
6530	1.67	.01	9.2	5.2	1.6			.017	15.36	8.68	2.67	
6540	1.5	.01	8.0	9.1	1.3			.015	12.00	13.65	1.95	
6550	3.9	tr	2.8	0.5	tr	2.5			10.92	1.95		9.75
6555	4.33	tr	3.4	2.7	tr	3.3			14.72	11.69		14.29
6560	4.0	tr	2.0	1.5	tr	2.5			8.00	6.00		10.00
6560 S	0.9	.02	6.0	11.3	0.1	5.5		.018	5.40	10.17	0.09	4.95
6570	4.5	tr	2.2	0.6	tr	3.5			9.90	2.70		15.75
6580	4.7	tr	3.6	3.0	0.5	5.4			16.92	14.10	2.35	25.38
6585	4.33	tr	3.9	6.5	0.8	3.6			16.89	28.15	3.46	15.59
6595	3.5	tr	5.2	3.5	0.9	3.0			18.20	12.25	3.15	10.50
6595	0.9	.06	21.0	16.8	2.4	7.5		.036	18.90	15.12	2.16	6.75
6610	3.33	tr	1.2	0.1	0.1	1.2			4.00	0.33	0.33	4.00
6610 S	1.0	.04	24.4	13.8	3.0	3.6		.040	24.40	13.80	3.00	3.60
6610 Spec.		.04	44.4	29.3	6.6	7.5						
14	61.21							.234	277.59	222.70	29.30	120.56
	4.37						4.37	.004	4.53	3.64	0.50	2.5 *

* Estimated for block

6610 breast of drift

$\frac{120 \times 250 \times 4}{12}$ = 10,000 tons

The assay map shows that the ore continues below to adit level; also that the grade of the ore is decreasing with depth. If the broken zone at the small acute angle with the vein were stro ger at the junction, this fact would make of little importance the impoverishment of the said adit level, and favorable metallization might be found at these junctions of the vein at depth.

It is possible that 8000 tons of ore could be recovered in the ground to the east of the present workings and above the adit level, but there is nothing to indicate that any larger bodies of ore can be expected in that ground than already developed between the No. 1 shaft and the breast at co-ordinate 6610.

Apparently the best grade of ore was produced in 5970 - 6000 block because of the intersection of the Alto vein with the Gold vein. While the Gold vein did not carry commercial ore, it showed good dense to porous quartz with cavities filled with limonite and a few scattered sulphides of iron, lead, and copper.

The following samples were taken by Mr. H.H. Garrey along the Gold vein:

Co-ord. East	Wth.	Gold	Silver	Copper	Lead
6630	6.6	0.04	2.0	1.6	tr
6560	4.0	0.02	2.2	0.2	6.9
6490		0.02	0.8	7.5	tr

The Alto vein is nearly vertical but the concave bends with respect to the footwall may possibly be localizers of ore. The horizontal faulting movements may have opened these bends.

It is very probable that the ore lenses could be followed down the dip to a depth of 200 feet below the adit level.

It appears the Alto vein comes to a tight pinch about 150 feet to

the east of No. 3 shaft, probably because of the block of hard unsheared latite agglomerate and this has caused a pinching out of metallization to the east.

The East tunnel, about 360 feet in length, is run upon a shear zone and small poorly metallized pyrite and quartz vein lead which strikes N 62 W and which represents a branch of the Albert vein.

This same branch continues to the east to the 20 foot shaft at co-ordinate 7500 East. The vein shows a width of 1.5 feet and is quartz heavy pyrite. A few fine grained sulphides of lead are present. This branch of the Albert vein passes without interruption between the latite agglomerate and the quartz diorite. The vein is a little narrower in the quartz diorite but it is well defined.

There is an ore shoot partly mined to the east of No. 1 shaft on the adit level of the Alto mine that also extends about 45 feet below the adit level and raking somewhat to the east. A most liberal estimate of the ore left in this block would fall below 4,000 tons.

C. HIGDON

C O P Y
12-21-37

June , 1937

GEORGE H. GARREY
Geological and Mining Engineer
Bullitt Building, Philadelphia

THE ALTO MINE

Patagonia District, Arizona

LOCATION AND ACCESSIBILITY:

The Alto group of claims is located near the south end of the Santa Rita Mountains in Santa Cruz County, Arizona, about thirteen miles by auto road (half good and half poor) northwest of the town of Patagonia, Arizona, and about ten miles by new, but poor road, east of Tubac, Arizona, both of which towns are on branches of the Southern Pacific Railroad. There is an ore loading siding located two miles west of Patagonia, and eleven miles from the Alto Mine. Tri-weekly mails are brought to Alto Postoffice, which is located one mile north of the camp.

ELEVATION AND TOPOGRAPHY:

The main Alto tunnel is considered to have an elevation of fifty-one hundred feet, while the rather rugged topography on the group show elevations of between forty-five hundred and fifty-five hundred feet above sea level.

WATER AND TIMBER:

While between ten and twenty gallons a minute of rather acid water, heavy with sulphates flows from the main Alto tunnel, the supplies of water sufficient for domestic and boiler purposes only come from shallow wells sunk in nearby gulches. According to the reports of Jno. W. Prout Jr., and Francis J. Hobson, engineers, some 20,000 gallons of good water a day for milling purposes could be obtained from Josephine Canyon, by a gravity pipe line two and a half to three miles long, and a similar twenty thousand gallon supply could be obtained from the Joseph Wise well by pumping through a pipe line some 8,000 feet long and raising the water 450 feet. The Sonita River, located some seven and nine tenths miles in an air line from the Alto camp has an ample supply of water for all purposes.

Scattering scrub oak and some mesquite timber is found near the top and on portions of the upper slopes of Alto Hill, but this limited supply is of little value for mining timber or fuel.

CLAIMS AND TITLES:

The Alto group is comprised of some 16 patented claims and fractional claims aggregating roughly a little less than 300 acres.

The Albert group which immediately adjoins the Alto group on the north and is under other ownership and consists of five full sized patented claims, is at present under option to the owners of the Alto group.

The Alto claims were acquired by purchase of tax title ownership in which title was confirmed to the present owners by a Supreme Court decision after some 7½ years of litigation which only completely ended about two years ago.

THE WORKINGS ON THE ALTO VEIN:

The Alto vein itself was formerly developed by some seven shafts varying from about 50 to 267 feet in depth, and by one main tunnel at a depth of some 250 to 300 feet below surface and also by two small tunnels located between shaft No. 3 and the old Jesuit shaft. Another tunnel called the East tunnel which was originally started to develop the eastern extension of the Alto vein, instead develops the minor branch of the Albert vein.

The No. 1 shaft, 267 feet, in depth, was the only one that ran all the way from surface to the main tunnel level. This shaft is considerably caved near the top and inaccessible at present. Shafts 2 and 3 as well as the lower parts of all the other deep shafts, with the exception of No. 1, are at present filled with water, and accordingly are also inaccessible. Water stands at about 15 feet below the collar of No.3

shaft. This acid water is considered to contain considerable copper in solution in it.

The main Alto tunnel, some 1800 feet in length, which starts on the west side of the mountain, connects with the No. 1 shaft at a distance of about 1155 feet from the portal. This tunnel is now closed at a point some 1215 feet from its mouth by the caving of the stopes above. At about 110 feet from the mouth, the tunnel cuts through a one and a half to two foot yellow stained, crushed rock, vein lead showing veinlets of good galena ore from one-half to three inches in width (G-20, -Au Trade; Ag-5.0 ozs.; Pb-40.8%; Cu 0.4%). I consider this the main Alto vein, but no development work has been done along this vein either to the east or west from this point.

The main Alto vein was again encountered at a point some 1090 feet in from the portal or some sixty-five feet west of No. 1 shaft, and was then drifted upon to the westward for approximately 130 feet, and is said to have been followed by the tunnel level to the eastward of the No. 1 shaft for a distance variously given as 477 to 645 feet, at an elevation 200 to 300 feet below surface.

The so-called East tunnel, some 370 feet in length, is run upon a shear zone and small poorly mineralized pyrite and quartz vein lead which strikes about No. 60 W. and which probably represents a branch of the Albert vein.

The No. 1 shaft which runs from surface to connect with the main tunnel level, and is 267 feet deep, is the deepest shaft on the property.

Shafts Nos. 2 and 3 are each said to be 150 feet deep, while the old Jesuit shaft is claimed to be 140 feet deep.

Practically all the pay vein material in the vicinity of the old Jesuit surface workings and the old Jesuit shaft to a depth of 140 feet has been stoped out and the workings mainly filled or caved.

A considerable but unknown amount of stoping has undoubtedly also been done in the vicinity of the No. 1 shaft and also adjacent to the upper part of the No. 2 and other shallower shafts.

The ore adjacent to the 73 foot level of the No. 3 shaft is also said to have been stoped out only three or four years ago by a Mr. Menzer (?) and produced net smelter returns of over $14,000.

OTHER WORKINGS:

Numerous small shafts from a few feet deep to 100 feet deep occur upon the "Albert","Mineral", "Oak", "Albion", "Gold", "Excelsior", "Bland", and "Buena Vista" - Royal Blue" veins in addition to numerous cuts, pits and several tunnels 20 to 300 feet or more in length.

EQUIPMENT:

There is no machinery or equipment of any value whatever upon the properties, and the two old rambling buildings now used as residences by Mexican families are in very poor condition.

ROCK FORMATIONS:

According to Prof. J. Volney Lewis, of Rutgers College (who spent some time in 1916 upon the Alto surface geology at the writer's suggestion), the geological formations in the immediate vicinity of the Alto group are all igneous with the exception of the gravel and alluvium on the lower slopes and the stream beds.

Granite forms a sort of core in the east central part of the property and extends southeastward, outcropping chiefly in the "Alto East" claim and parts of the adjacent claims. In the "Salero" and the eastern part of the Hillside claim, andesite is the surface rock. The rest of the area is practically all quartz latite, part of which is porphyritic, but much of which is agglomeratic and contains numerous pebbles and bowlders of earlier granite and diorite, some of these included bowlders being up to several feet in diameter. The agglomeratic facies of the latite cover most of the higher ground in the vicinity of the mine workings and prospects.

The granite is the oldest rock of the area. The rock formations in the order of their age are as follows:

Tertiary

4. Andesite, - dense to medium grained.
3. Quartz latite, - porphyritic and agglomeratic.

Mesozoic

2. Quartz diorite, - dark green and granular.
1. Granite (granite porphyry of U.S.G.S. Bull, 582) medium to coarse graines. Syenite and aplite occur as facies and dikes in the granite.

THE VEINS:

At least six strong, more or less parallel, approximately east-west vein fissures occur upon the Alto-Albert group of claims.

These veins probably represent original fault fractures and shear zones, which were formed later than and cut through all of the various igneous rock formations, showing upon the area, and were still later impregnated by, and the crushed rock composing them partially replaced by, the ore-bearing solutions or magmas.

The Alto vein, which can be easily followed in surface outcrop for 3500 to 4000 feet and is the most highly developed vein of the group. has a strike of N. 85 W. to E±W and a dip of nearly vertical to 80 to 85 degrees to the north. The Albert vein which runs approximately parallel to the Alto vein and lies some 250 to 300 feet north of it and shows strongly in outcrop for 2500 to 3000 feet, also has a dip of about 80 to 85 degrees to the northward. The Oak and Mineral veins still farthar northward have dips of 75 to 90 to the northward while the Gold, Excelsior-Bland and Buena Vista-Royal Blue veins lying to the south have dips of 65 to 90 degrees to the southward.

These fault veins throughout most of their course are associated with from one to five or more feet of crushed, sheared and friable to dense partially or wholly decomposed rock. The pay ore occurs as stringers and lenses of quartz, carbonates, or solid sulphides from a fraction of an inch up to 2 or 3 feet in width, which form an interesting network or occur in a multiple parallel series. The larger bunches of solid ore come and go, but occasionally rather continuous seams of ore a few inches to a foot or more in width occur upon the hanging and foot walls and minute diagonal stringers ramify through the 2 to 8 feet of crushed rock vein filling, and connect the hanging and footwall streaks. In other rarer instances minute sulphide specks occur as impregnations scattered thorughout the crushed rock comprising the vein zone.

The crushed or sheared rock vein filling which usually has a width of 2 to 5 feet but in the Alto vein occasionally attains a width of 10 to even 15 feet, is quite generally a dense ash gray, highly altered material regardless of the character of the wall rocks and usually is considerably silicified and in places replaced in varying degrees by ore minerals or quartz.

Portions of the vein, especially near surface are stained reddish brown or black by iron and manganese oxides which accumulate especially along fissures and joint fractures. These stainings often give the vein a banded or grated appearance. The black manganese stained bands are often easily mistaken for solid sulphide ore streaks.

The vein locally has a coarsely brecciated appearance, but in other places the crushed rock filling is friable in nature or so thoroughly kaolinized and sericitized that it forms a talc-like or soft clay-like mass or gouge.

Several branch veins, including the so-called "Gold Vein" join the Alto vein from the southeast or east southeast along the central and eastern part of its course.

The Albert vein also seems to split up into several branches to the east.

THE ORE AND GANGUE MINERALS:

The chief sulphide ore minerals are: Galena, Chalcopyrite, tetrahedrite or gray copper, pyrite, and some zinc blende and marcasite. The ores are chiefly silver-lead or silver copper ores.

The lead-silver ores characterized by galena and small amounts of gray copper predominate in the western part of the vein in the vicinity of shafts Nos. 1 and 2,

while copper values come in and take the place of the lead toward the east and as a result copper-silver ores characterized by chalco-pyrite and copper pyrite and some gray copper predominate in the vicinity of shaft No. 3 which is the easternmost shaft on the Alto vein. Between the eastern and the western portions of the vein the copper-silver ore minerals are often blended or intermixed with the lead-silver ore minerals.

The sulphide ore minerals are usually assoicated with quartz in the form of veinlets or lenses. Some calcite is also occasionally present especially near the center of the vein.

In the eastern part of the vein seams of massive low grade pyrite occur in the vein zone but from what information is obtainable the good lead-silver and good copper-silver pay ore streaks occur separate from the massive pyrite seams.

Oxide and carbonate ore occurs locally near surface, but in general the sulphide ore extends to or almost to surface. In other parts of the vein some pyrite and occasionally marcasite is found associated with galena, gray copper, chalcopyrite and zinc blends.

THE ORE OCCURRENCE:

The pay ore consists of quartz associated with varying amounts of the various sulphide ore minerals, or of solid sulphides or mixtures of sulphides occurring as an irregular network of veinlets or as lenses of pay ore from a fraction of an inch in width to a 3 or even 5 foot width of solid ore in rare instances. Very few of these high grade ore stringers and seams are now visible as they were practically all extracted and "high graded" by Mexican "Gambocinos" during the several years the owners failed to keep a watchman upon the property.

I took samples of portions of ten of these higher grade stringers, varying from one inch to one foot in width, that were still exposed in the workings and I obtained assay returns from them varying from $42 to $104 per ton, with an average value of $74.09 per ton.

Studies of the accessible vein exposures lead me to believe that in places these high grade stringers and lenses are sufficiently abundant to make the full width of the vein zone run good pay values, while in other parts of the vein the stringers are so narrow or else so sparsely distributed that the vein will consist chiefly of altered and stained crushed rock or gouge vein material carrying too low values to be ore.

The indications are that there are a number of tabular more or less parallel ore shoots or zones in the vein probably pitching to the eastward and that when one is drifting through these short ore shoots there will be enough of these rich stringers and lenses to make a minable width of pay ore, but that more or less "dead" work will have to be done in the way of drifting in the only slightly mineralized crushed rock and gouge between these short ore shoots.

Unfortunately I was unable to examine any of the underground workings in the more highly mineralized portion of the Alto vein that extends for nearly 1400 feet between No. 1 shaft and No. 3 shaft. The best section of this more highly mineralized portion of the vein in my opinion is the section that extends from No. 3 shaft westward for 400 or 500 feet and passes beneath the old Jesuit surface opencut and shaft. As nearly as can be determined no stoping has been done in this more highly mineralized section deeper than 100 to 150 feet from surface.

According to the reports of Messrs. Jno. W. Prout Jr., and Francis J. Hobson, engineers, (formerly acting as managers of the property), dated June 1910, pay ore averaging 2½ feet wide was continuous from a point 100 feet west of No. 1 shaft to a point 700 feet east of No. 1 shaft. The pay ore in places was said to narrow down to 1½ or 2 feet, but in others it widened out to 5 and 6 feet and in one place to 10 feet of pay ore. These two engineers claimed that the grade of the ore on the Main tunnel level was of very even tenure and carried an average value of $15 per ton in lead, silver and copper (figuring lead at 5 cents per lb., silver at 50 cents an oz. and copper at 12 cents per lb., which would be about $18 ore at present metal prices of lead at 6¼ cents, silver at 57 cents and copper at 14 cents.

Several branch veins, including the very strong and promising looking "Gold Vein", join the Alto vein from the E.S.E. in the area between the No. 3 and No. 1 shafts, and since vein junctions are probably more favorable places for ore occurrence it is likely that these branch veins coming into the Alto vein is responsible for the area between these two shafts being the more highly mineralized section of the vein.

PRODUCTION:

The Jesuits are said to have mined and smelted from the Alto group much high grade native silver and chloride ore, prior to 1857, when they were either driven from the country or killed by the Indians. In the late 70's Mark Tully, of Nogales, worked the properties and shipped some 12 tons of lead-silver bullion by the Jesuits who paid no attention to the lead. Mr. J. N. Curtis, manager, in a report in 1905 claimed to have obtained a partial record of ore shipped by some of the owners prior to 1899 which showed some 1705 tons shipped, that gave net smelter returns of $59,773.20, or $35 per ton after deducting freight and treatment charges.

No records of production are available from 1899 to 1905. In 1906 and 1907 the Consolidated Mines, Smelter and Transportation Co. shipped some $14,000 worth of ore which was extracted and sorted out during the development of the property. This ore is said to have averaged about: Silver - 24 ozs., lead - 32%, copper 5%, zinc - 9%, and a little gold, (From Bulletin 582, U.S.G.S.).

A record of some 146 tons of ore shipped to the El Paso Smelter from the stope above the Main Tunnel near shaft No. 1, gave the smelter returns of: - 40¢, silver - 26.1 ozs., lead - 38.5%, copper - 2.29%. (From report of Jno. W. Prout Jr., Manager). As a result of the financial stringency in 1907 stoping was discontinued in the Alto mine until 1910. Since the present owners acquired their titles through tax title sales, and a Supreme Court decision, they have no smelter records. Moreover, I was unable to obtain these records from the El Paso Smelter because all of this smelter's records prior to 1912 were destroyed by a fire.

The mine, as a result of the extensive litigation has not been worked from 1916 to date, except by a Mr. Menzer (?) of Phoenix and by Mexican "Gambocinos" who mined out and stole all the high grade ore showing in workings not under water.

This Mr. Menzer (?) of Phoenix, according to Mr. Jack Garden, unwatered No.3 shaft only 3 or 4 years ago and shipped some $14,000 worth of $50 to $100 ore from a 3 to 6 foot vein of good ore in the vicinity of the 73 foot level of the No. 3 shaft. Mr. Garden states he himself shipped for Mr. Menzer (?) some 2½ tons of copper precipitated in cement lined cedar boxes or sluices by scrap iron from the copper impregnated acid waters during the process of unwatering the 150 feet deep No. 3 shaft.

ORE VALUES:

Some ten samples of picked sulphide ore taken by the writer from residual stringers and small lenses exposed in the extreme east and west workings, gave assay returns varying from $42.12 to $104.07 per ton (on the basis of silver at 55 cents, lead at 6 cents and copper at 14 cents). This picked ore varied greatly in metal content as the ten samples varied from -

1.1% to 62.5% lead
5.1 ozs. to 74 ozs. silver
0.3% to 20.2% copper
20¢ to $2 gold per ton, with average of:

Silver - 25.9 ozs., lead - 28.04%, copper - 6.09% and gold - 86¢. This type of ore corresponds in a general way to the $14,000 worth of sorted ore said to have been shipped to the El Paso Smelter in 1906 and 1907, which is said to have averaged: Silver - 24. ozs., lead - 32%, copper - 5%, and a little gold, and also to the 146 tons from the stopes adjacent to No. 1 shaft which are said to have averaged: Silver - 26.1 ozs., lead - 38.5%, copper - 2.29%, and gold 40¢.

Alto Shaft No. 3 - The following is a list of assays accompanying report of Jno. W. Prout Jr., June 29, 1910, from samples taken from the drift 132 foot long run at the 73 foot level from Shaft No. 3:

Pb%	Cu%	Ag oz.	Au $	Width
21.02	5.44	24.7	2.80	2.5
33.88	9.31	35.7	2.00	2.5
20.20	6.19	21.6	2.00	.33
4.00	1.36	2.4		3.00
	28.59	180	4.00	.33
23.47	7.55	31.6	2.00	.50
34.9	4.38	16.0	tr.	.50
Assays from 132 ft. drift, 73 ft. below surface in No. 3 shaft continued -				
25.13	10.27	24.2	tr.	.50
5.18	4.83	9.4	"	4.00
39.6	8.46	6.2	"	.5
1.93	1.36	21.0	"	4.00
21.63	4.83	11.4	"	4.00
9.18	4.8	9.4	"	1.33
Averages 14.4	6.62	16.4	.62	1.65

Average value per ton $38.79.

At present metal prices the gross value of the above average ore would approximate $46.30 instead of $38.79. The samples above undoubtedly represent ore from the ore body which Mr. Jack Garden says a Mr. Menzer (?) mined out from the 73 foot level of the No. 3 shaft only 3 or 4 years ago.

The reports of Messrs. Jno. W. Prout Jr., and Francis J. Hobson in 1910, indicate that the ore values exposed in No. 1 shaft and adjacent workings as well as on the Main Tunnel level averaged approximately $15 ton entirely in lead and silver, The ore values in the vicinity of No. 2 shaft had an average value of over $15 per ton almost entirely in lead and silver, while the ores in and around No. 3 shaft are higher grade than tose in the tunnel and the vein is much wider. Moreover near No. 3 shaft the silver values increase, lead decreases and copper increases and predominates in value.

Since Messrs. Prout and Hobson in thei reports in 1910 figured metal values on the basis of 50 cents an oz. for silver, 4½ cents a lb. for lead and 12 cents per lb. for copper, ore averaging $15 in gross value then would be equivalent to about $17 to $18 ore at present metal prices with silver 57 cents per oz., lead - 6 cents per lb. and copper - 14 cents per lb.

The writer took grab samples from cuts into the dump material from four of the shafts and obtained values as follows:

	Au	Ag	Cu	Pb	Gross Value
No. 3 Shaft Dump - N.E. Spur -	0.01	2.6	0.5%	2.0%	$5.61
" 3 " " S.E. "	0.10	6.6	1.1	1.2	10.35
Shaft 285 Ft. E. of No. 2	0.01	5.4	0.5	5.2	10.97
No. 2 Shaft Dump	tr.	4.6	0.3	6.8	11.67
No. 1 " "	0.03	14.2	0.8	8.2	20.91

There are probably some ten thousand tons or more of dump material represented by the above dump samples, consisting of soft usually yellowish earthy material in which the heavy sulphide ores have all been oxidized to sulphates.

Several piles of 2nd class ore rejects from a few tons to 40 or more tons each upon the various dumps, gave assay returns of $10.28 to $31.94.

It is doubtful if one would be able to recover the values from these dumps even if a mill was installed. Nevertheless, the fact that this material comprising the various dumps carries as high metal values as it does encourages one to believe that considerable ore of better than $15 grade could be developed by opening up new sections of the Alto vein in undeveloped protions of the mine.

The few samples taken indicate that somewhat similar ore could be produced from the Albert, Gold, Excelsior and other veins on the various claims, although it is probable that the ore from the Albert vein would run a little higher in gold than that from the Alto vein, and that the various metal contents might vary considerably in the different veins.

(For further information regarding values see the appended list of assay returns on samples taken by the writer oh the Alto group).

INDICATED ORE:

Mr. J. N. Curtis, who was general manager of the Alto Copper Company which owned the Alto group in 1905, recently told me he considered it by far the best unworked property in Arizona and showed me a sketch map and ore estimate he had made in which he estimated there were over 200,000 tons of $20 ore in the vicinity of the present workings from a line 100 feet west of the No. 1 shaft to a line 800 feet east of No. 1 shaft and above the tunnel level. Mr. Curtis said the pay vein would average 10 feet wide.

Mr. F. J. Hobson, a mining engineer and metallurgist, in his report dated June 27, 1910, stated: "A reasonable estimate of the ore in sight in the Alto group, in the mines, would be 100,000 tons containing an average value of $15 per ton. This will be largely increased by the continuation of the main Tunnel eastward to below No. 3 shaft and does not include the ore below the tunnel and undeveloped in the other veins".

Mr. Jno. W. Prout Jr., a graduate mining engineer, and general manager of the Alto Mines, in his report of June 29, 1910, states, "We have 50,000 tons of ore developed on the Alto vein, including only 800 feet of the vein which is opened by the Main Tunnel from No. 1 and No. 2 shafts, and all above the tunnel level." "The average width of the Alto vein is 2½ feet." - "The vein narrows in places to 1½ feet and widens in other places to 5 and 6 feet and near the old Jesuit workings is 16 to 25 feet in width. The number of tons blocked out on all the veins of the Alto and Albert groups approximate 100,000 tons. The grade of ore as developed in the Main Tunnel, including shafts No. 1 and 2, is from $15 to $16 per ton in gold, silver, lead and copper. Near No. 3 shaft the ore is wider and higher grade."

Since the workings adjacent to which the ore is claimed to be blocked out, are at present inaccessible through caving and because of water filled shafts and workings, you will have to form your own opinion as to what value to attach to the foregoing estimates of these three engineers.

From the nature of the ore occurrence as noted by me on the margins of this ore bearing area, I believe that all three of these estimates are overly optimistic.

The fact, however, that no mill ever operated upon the ores from the Alto mine and that the above engineers all claim a large tonnage of better than $15 ore blocked out in the vicinity of the old working, would lead one to believe that at least a considerable tonnage of fair grade sulphide concentrating ore still exists along the Alto vein and might be made available by draining the water out of and reopening the more easily accessible of these old workings and also by developing the as yet extensive unexplored portions of the Alto vein and other veins of the group.

On account of the probable activity of leasers and Mexican "Gambocinos" it is doubtful if much of any minable widths of higher grade shipping ores exist in the workings adjacent to No. 1 shaft or in the No. 2 and other shafts above the water level.

It is possible, however, that some shipping ore is exposed in the workings now filled with water, especially in the lower workings from No. 2 and No. 3 shafts.

Mr. Jack Garden stated that 3 to 4 feet of $60 to $70 ore was going down below the 73 foot level off from and just east of No. 3 shaft and that 3 feet of high grade ore showed along the east side of the No. 3 shaft opposite to where a 150 foot drift to the west leaves the No. 3 shaft at an elevation of about 125 feet below its collar, while 4 to 12 inches of high grade sulphide ore is continuous for over 100 feet to the west of No. 3 shaft on the 125 foot level.

VEINS OTHER THAN THE ALTO:

The Albert vein while not quite as strong insurface outcrop as the Alto vein appears to carry just as good or better values where exposed in the vicinity of the Alber No. 4 - 100 foot shaft, and the numerous shallow pits and shafts along the outcrop.

The Albert vein could be best developed by cross cutting northward for 275 to 300 feet from the Alto Main Tunnel level.

In case upon reopening the Alto mine sufficient ore is found or opened up to justify the installation of a concentrating mill, the Albert vein if crosscut and opened up in depth at the level of the Alto Main Tunnel could probably supply valuable additional tonnages of ore. However, the Albert vein is not essential to the group and the purchase of the "Albert-Mineral" group of claims prior to the reopening and proving up of the Alto vein itself would be very unwise.

The so-called "Gold Vein" at a point 240 to 250 feet due south of the old Jesuit shaft has a width of 6.5 to 7 feet, strikes N. 78 W, and dips 85 to 88 degrees south. Some 175 to 200 feet farther W.N.W. this same strong vein strikes N.68 W. and dips 67 to 80 degrees southward and gives every indication of heading toward a junction with the main Alto vein at some point still farther west.

This Gold Vein showed especially strong in surface outcrop where for a stretch of 200 to 300 feet some 4 to 7 feet of exceptionally good looking sulphide specked dense to porous quartz and green to reddish brown gossan-like vein material showed in shallow prospect shafts or in surface outcrop.

The three samples taken along the Gold vein outcrop only yielded assays of $6.44 to $21.86, but the writer believes this vein warrants thorough development by a crosscut and drifts at the elevation of the main Alto Tunnel.

The west end of the "Excelsior and "Buena Vista" veins probably also warrant development at some future time.

While they are known to have merit no attempt was made to study the "Oak" and Mineral veins which lie to the north of the Albert vein.

CONCLUSIONS AND RECOMMENDATIONS:

Owing to the fact that the Alto property long lay idle, because of some 7½ years of litigation, the Alto property was long ago stripped of all of its equipment and even all but two of its buildings, and the Main Tunnel was allowed to cave at the point where the stopes and the best mineralization on the Alto vein begin. Moreover, the No. 1 shaft was allowed to cave near its collar while the other deeper shafts all filled with water in depth, and are inaccessible in thei upper portions also, through lack of ladders.

Glowing and possibly extravagant statements are made in reports by three different engineers formerly connected with the property about the large tonnages of good grade milling ore and some smelting ore which were in the mine just before it closed down. Mr. Schrader, geologist of the U.S. Geological Survey, also gives a favorable description of the Alto mine in Bulletin 582. Unfortunately, it is impossible to enter any of these old workings where the ore is said to be blocked out to confirm or disprove the existence of these large tonnages of pay ore, and it is only possible to study the surface exposures of the veins and to examine the character of the main Alto vein outside of the margins of the main mineralized area.

The strength of the Alto vein where studied along its 3500 to 4000 feet of outcrop on surface, together with the assay returns I obtained from the material composing and on the various mine dumps, as well as the good values found in samples of higher grade sulphide stringers and lenses taken by me along the vein outside of where the main ore shoots are claimed to exist, lead ne to conclude that the Alto property merits the expenditure of at least $15,000 to $30,000 to develop the Alto vein at greater depth in the area between shafts No. 3 and No. 2, especially in the section below the old Jesuit Opencut workings and to drain the water out of and reopen the old workings to investigate the value of, and (if present) to make available, the large tonnage of $15 to $18 mill ore claimed to be blocked out and also to try to develop enough higher grade shipping ore to repay part or possibly all the development costs.

Since most of the best ore in the vicinity of Nos. 1 and 2 shafts has probably been stoped out and since the Main Tunnel level follows the vein and the tunnel is probably caved shut for several hundred of the six hundred or more feet of its length

to the east of No. 1 shaft, and as it would be very expensive to clean out and put rails in the 1800 foot tunnel and to spile through the caved ground, instead of trying to reopen the Main Tunnel, or of crosscutting from the so-called "East Tunnel" which crosscut would cut No. 3 shaft at a depth of only about 125 from surface, or unwatering, repairing and deepening either No. 2 or No. 3 shaft, I strongly recommend running a new crosscut tunnel from the south slope of the Alto Hill to intersect the Alto vein some 300 feet below surface at the same elevation as the east breast of the Main tunnel, from the most favorable site south-southwest of the old Jesuit shaft.

Pending the making of an accurate transit survey, I estimate this crosscut tunnel would be in the neighborhood of 800 feet in length.

The reason for opening the mine through a crosscut tunnel at this point is not only because it would develop the main Alto vein in depth beneath the old Jesuit workings in what is believed to be the most highly mineralized section of the Alto vein, but because at about 500 feet from its mouth the tunnel would also crosscut and develop the so-called "Gold Vein" which lies to the south of the Alto vein. This Gold Vein which for 300 feet or more in length show from 4 to 7 feet width of fine looking sulphide impregnated quartz and also iron and copper stained "Gossan" carrying fairly good values and looking just as good or better than the Alto vein in outcrop, has not been developed at all in depth, and therefore may offer just as good possibilities for ore development as the Alto vein itself.

This new tunnel should be run about N. 22 E until the Gold Vein is encountered and then run due north to intersect the Alto vein.

After the "Gold Vein" is encountered it should be drifted upon for several hundred feet, especially towards the west northwest in the direction of the probable junction with the Alto vein.

After the Alto vein is cut it should also be developed by drifting along it first to the east and then to the west for several hundred feet and if sufficiently good ore to warrant it is opened up, this drift off the new tunnel should ultimately be connected by raise with the bottom of No. 3 shaft and by drift with the east breast of the present Main Tunnel and also ultimately by raise with the bottom of No. 2 shaft.

To complete all the foregoing suggestions for development work would cost in the neighborhood of $28,000 or $30,000.

An alternate method, but a less preferable one, in my opinion, for draining the old workings and doing the work in new ground beneath the old Jesuit opencut is to clean out and reopen the old Main Tunnel to its east breast and then extend the tunnel to the east to connect with No. 3 shaft extended.

In my opinion to clean out and to put new rails and pipe line in and to reopen the old Main Tunnel to its breast at a point 1800 feet east of its portal and to do no new work except to put a raise up for 100 feet from the tunnel level to connect with the bottom of No. 2 shaft in order to drain the water out of the old workings, would cost approximately $12,000. This work would open no new ore, but would simply make available the ore claimed to exist and be blocked out in the vicinity of the old workings. After reopening the old tunnel to its breast it would cost an additional $13,000 to $18,000 to extend the Main Tunnel drift eastward for 850 feet along the vein and to raise up to a connection with the bottom of the No. 3 shaft.

The two methods of opening up the Alto mine and doing the merited development work suggested either (A) through the old Main Tunnel from the west or through the new suggested tunnel from the south side of the hill would cost about the same amount, $28,000 to $30,000, but I recommend the latter (B) method in preference to the former (A) method because the New Tunnel from the south side of the hill would develop the good looking "Gold Vein" in addition to the Alto vein and because it would be easier to build a good road to the mouth of this suggested tunnel than it would to the portal of the old Main Tunnel.

The Alto property has decided merit and justifies the expenditure of up to $30,000 upon reopening the old Alto workings and development of the "Alto" and "Gold Veins" as suggested, for this work would probably make considerable bodies of high grade and milling ore accessible to cheap stoping.

While several of the other veins on the group also merit and warrant development in future, yet I suggest that for the present work be confined to that recommended herein, for the "Alto" and "Gold" veins.

In my opinion the veins on the Alto group of claims offer good chances for the development of fair sized tonnages of shipping ore and also of large tonnages of $15 to $18 milling grade silver, lead and copper ore sufficient to make a moderately large paying mine of the Alto property. I strongly recommend that up to $30,000 be spent upon development as above suggested in order to determine whether enough ore is in sight or can be developed to justify the installation of a flotation or other form of concentration mill.

Respectfully submitted,
/s/ Geo. H. Garrey.

January 1928

ALTO MINE SANTA CRUZ COUNTY, ARIZONA

Sample Number	Width Ft.	Gross Value	Gold Ozs.	Silver Ozs	Copper %	Lead %	Zinc %	Location	Description
1		Ag 57½¢ Cu 14¢ Pb 6¢							
1.		$ 10.25	0.05	4.9	2.3			No.3 Sh. Dump	Massive Pyrite &Cu-pyr.
2.	6.6'	6.42	0.04	2.0	1.6	Tr		Gold Vein 10 ft. Sh.250 ft S. of old Jesuit Sh.	5.6 ft. of Fe Ox & banded qz.& 1 ft. Sh Rk.
3.	3.0'-4.0'	10.50	0.02	2.2	0.2	6.9		Gold Vein-sur face 65 ft. N. & 78 W. of #2 Sample	3-4 ft. Oz., Pbs & iron oxide
4.		21.85	0.02	0.8	7.5	Tr.		Gold Vein pit 125 ft. N68W of G-3.	Copper stained gossan and por-our banded Qz.
5.		5.60	0.01	2.6	0.5	2.0		No. 3 Sh. Dump N.E. spur	Grab from sev-eral cuts into dump.
6.		12.05	0.06	9.5	1.9	Tr.		No.3 Sh.Dump	Grab from 3 small piles on dump
7.		10.32	0.10	6.6	1.1	1.2		No. 3 Sh.Dump S.E. Spur	Sample of dump material
8.	0.1-0.3	89.32	0.08	69.5	9.0	18.8		Surface Tun W. of No.1 Sh 10 ft. below surface	High Grade sul-phide stringers 1 to 3 inches wide
9.		14.49	0.02	2.6	0.1	10.5	Tr.	Excelsior Vein W. end on surface	Best ore from sur-face shallow cuts
10.		31.90	0.05	7.0	8.7	2.1	0.5	Dump 140 ft. W. of No.3	Gray & Black speckled bornite or pyrohotite & Cu Pyr
11.		21.30	0.04	12.8	2.5	2.5	4.5	Dump of Sh. 280 ft. E. of No. 2	in pile. Grab from 2 small black piles ore.
12.		10.94	0.01	5.4	0.5	5.2		Same as #11	Grab of dump mat'l from 2 cuts & 1 cut into Jack Garden Sh. dump.
13.		13.88	0.04	10.5	1.4	2.5		Same as #11	Grab of 40 ton pile on dump.
14.		11.67	Tr.	4.6	0.3	6.8		No. 2 Sh.Dump	Grab of dump mat'l & piles on dump.
15.		20.84	0.03	14.2	0.08	8.2		No. 1 Sh.Dump	Grab of dump mat'l in cuts and pits
16.		36.51	0.04	22.0	1.1	17.5		140 ft. E. of No. 1 sh.	Small pile oxide ore from surface Alto vein
17.	.2	41.97	0.05	30.0	8.0	1.1		50 ft.E. of No. 2 Sh. drift 10 ft. below surface	High grade Chal-copyrite & Cu Pyr. stringer

Sample Number	Width Ft.	Gross Value	Gold Ozs.	Silver Ozs.	Copper %	Lead %	Zinc %	Location	Description
18.	.2"-.4	101.62	0.08	74.0	9.6	18.2	12.5	Alto Main Tun. W.Br. of W.Drift on Alto vein, 10 ft. above level.	2"-3" high grade sulphide stringer
19.	.7-.9	100.54	0.02	41.5	0.8	61.7		Alto Main Tun. 40 ft. W. of No. 1 Sh. & above winze.	8"-10" lense of high grade sulphide.
20.	.2-.3	52.95	Tr.	5.0	0.4	40.8		Alto Vein 110 ft.E.of mouth of Main Tun.	1"-4" lead stringers picked from 1½ to 2 ft. vein.
21.	.1-.5	104.07	0.10	50.5	6.3	37.9	13.8	Main Alto Tun. 20 ft. N.W. of No. 1 Shaft.	1"-5" seams of high grade sulphide ore.
22.	1.0	15.46	0.04	8.6	1.5	4.6		Same as 21.	Low grade qz. & sulphide adjacent to No. 21.
23.		15.06	0.02	6.4	2.1	2.5	3.0	Albert No. 4 Dump	Grab from 50 Ton pile reject ore.
24.		30.72	0.06	15.8	5.3	3.0		Albert No. 4 Tunnel	.5 ft. copper stained vein mat'l in floor, 16 ft. W of Sh.
25.		49.87	0.20	16.4	4.7	19.4		Albert No. 4 Shaft	1 ft. residual ore bunch 10 ft. below tunnel.
26.		54.01	0.02	30.0	1.5	26.8		Excelsior vein dump of E. 300 ft. tunnel.	Picked specimen of best ore on dump & at small winze.
27.		78.77	Tr.	5.1	0.3	62.5		Excelsior vein, W. end from Jack Garden pit.	Nodule of galena ore.

06/20/96

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: ALTO GROUP

ALTERNATE NAMES:
GOLD TREE
EL PLOMO
B AND R
LONG CONTACT
BUENA VISTA
EXCELSIOR

SANTA CRUZ COUNTY MILS NUMBER: 8

LOCATION: TOWNSHIP 21 S RANGE 14 E SECTION 21 QUARTER S2
LATITUDE: N 31DEG 36MIN 41SEC LONGITUDE: W 110DEG 51MIN 39SEC
TOPO MAP NAME: MOUNT WRIGHTSON - 15 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
LEAD
SILVER
COPPER
ZINC
GOLD
STONE

BIBLIOGRAPHY:
KEITH, S.B., 1975, INDEX OF MINING PROP. IN SANTA CRUZ CO., AZBM, P. 83
AZBM CLIPPING FILE
AZBM CARD FILE SANTA CRUZ CO.
USBM FIELD NOTES PB20
ADMMR ALTO GROUP (NORTH PART) FILE
ADMMR ALTO GROUP (SOUTH PART) FILE
ADMMR MAPS UPSTAIRS-FLAT FILE-DRAWER 4
USGS BULL. 582, P. 197-203
COPPER HANDBOOK, 1903
USAEC PRELIM. RECONN. RPT. A-P-360, 1955, P. 28 & 37

ALTO GROUP (NORTH PART)

SANTA CRUZ COUNTY
T21S R14E Sec. 11, 12

USBM Bull. 582 - 198

AEC 172-489 p. 28 & 37
Alto Mine and Mineral Vein No. 1.
U_3O_8 -.07%

ABM. BUL. 191, p. 83

USBM Field Notes PB20

Alto Group (south part) file

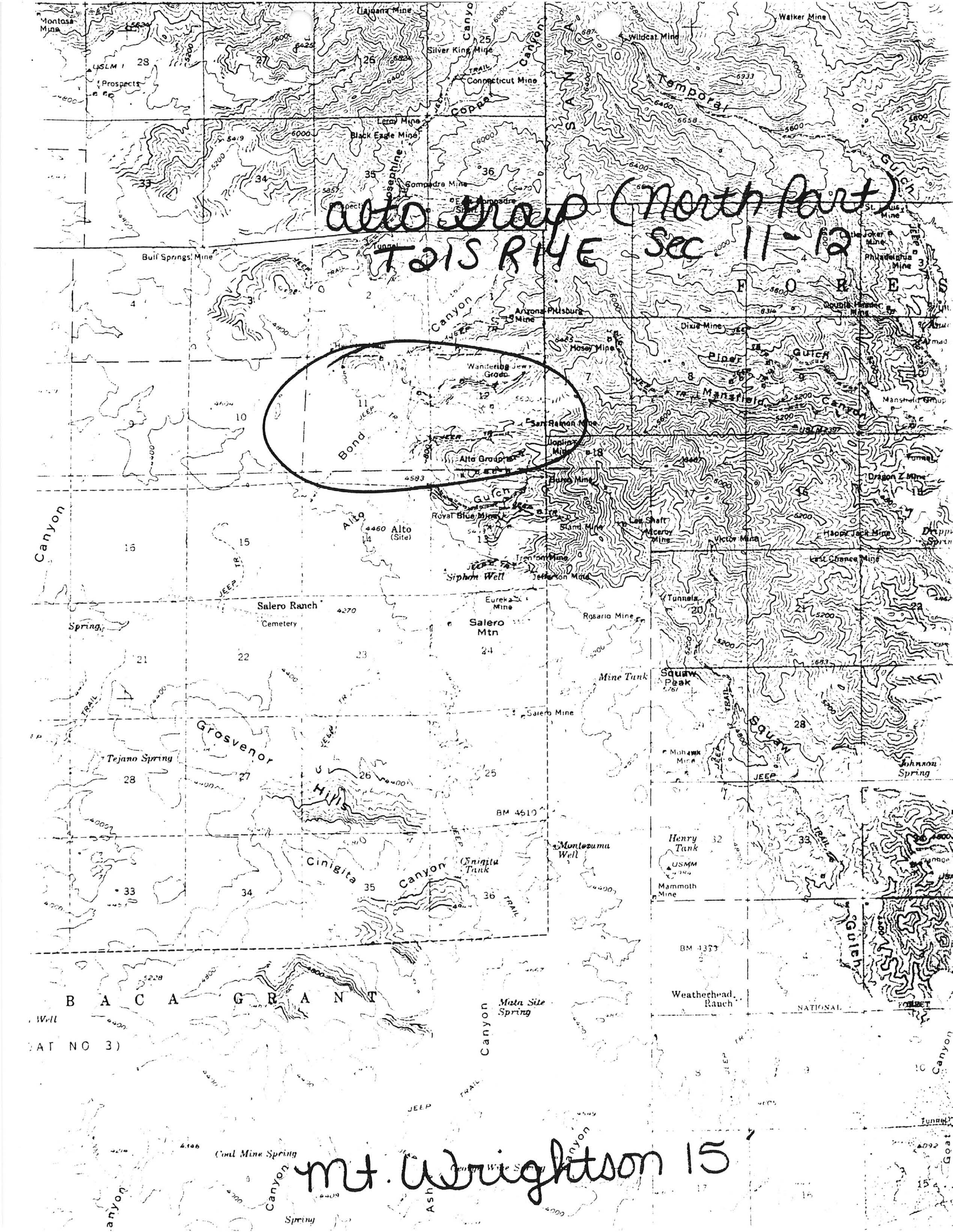
Copper Handbood 1903

Maps - Upstairs in the flat file, Drawer 4

MILS Sheet sequence number 0040230095

Santa Cruz Index #8

Mt. Wrightson 15' Topo (included in file)


alto Group (North Part)
T21S R14E Sec 11-12
Mt. Wrightson 15
Montosa Mine
Tiajuana Mine
Silver King Mine
Connecticut Mine
Wildcat Mine
Walker Mine
Temporal
Prospects
Leroy Mine
Black Eagle Mine
Compadre Mine
Josephine
Bull Springs Mine
Arizona Pittsburg Mine
Hosey Mine
Dixie Mine
Piper
Gulch
Mansfield
Canyon
Mansfield Group
Wandering Jew Group
San Ramon Mine
Joplin Mine
Alto Group
Bond
Royal Blue Mine
Alto
Alto (Site)
Trenton Mine
Siphon Well
Jefferson Mine
Happy Jack Mine
Victor Mine
Last Chance Mine
Dragon Z Mine
Salero Ranch
Cemetery
Eureka Mine
Salero Mtn
Rosario Mine
Mine Tank
Squaw Peak
Salero Mine
Grosvenor Hills
Tejano Spring
Mohawk Mine
Johnson Spring
BM 4610
Montezuma Well
Henry Tank
Mammoth Mine
Cinigita Canyon
Cinigita Tank
BM 4333
Weathehead Ranch
NATIONAL FOREST
B A C A G R A N T
Mata Site Spring
Coal Mine Spring
F O R E S

ALTO MINE (North Part) SANTA CRUZ COUNTY

Visited the Alto Mine, North Part, and found no Activity.

GWI WR 7/17/65

Visited Alto Mine, North part and found no activity.

GWI WR 3/11/67

ALTO MINE

Trust Office of Northern Trust Company is a 25% trustee of the Alto Mines, Mt. Wrightsen Quad., Santa Cruz (Secs. 11, 12, 14 and 21). Owners of the trust are Mrs. Ruse DeCeanne and Nadda Nazur. We discussed Ownership and Leasing with the Company. KAP/2/14/78 a.p.

ALTO GROUP (NORTH PART) SANTA CRUZ COUNTY

John F. Knipschild, field representative Arizona Conference of 7th Day Adventists, 2601 E. Thomas Road, Phoenix, Arizona, asked for information on the Alto Group (North Part) and the Morningstar Group of claims, 14 to 17 miles north of Patagonia, owned by Eve Henderson, Box 854, Patagonia. He stated that he has these properties in trust, and would like to sell or lease. ALJ WR 3-27-59

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
~~FIELD ENGINEER'S REPORT~~
NEWS ITEM

Mine Alto Group (North Part) Date April 3, 1952.

District Tyndall Mining Dist., Santa Cruz Co. Engineer Axel L. Johnson

Subject: News Item --- Source or Information --- Mrs Eva Henderson

Location 12 miles northwest of Patagonia. Go 2 1/2 miles on road to Nogales, then turn right and go 9 or 10 miles on good county road.

Number of Claims 7 or 8 patented claims, comprising the notth part of the Alto Group.

Owner Mrs. Eva Henderson, Box 27, Patagonia, Ariz. Bought in 1945 for taxes.

Leaser Ramon Moreno, Patagonia, Ariz.
Lease calls for 10 % royalty with option to buy at $20,000.
Operates mine at present.

Metals Mined Lead and Zinc, with some Silver values.

Men Employed Ramon Moreno works by himself only, using handsteel.

Production Rate No production. Mr. Moreno is doing development work driving tunnels.

Geology See Schrader Report-- pages 197 to 203. U.S.G.S. 582
6 veins in latite and granite porphyry. Veins 3 to 7 ft. wide. Ores are sulphides---galena, argentite, chalcopyrite, pyrite, and sphalerite.

Old Workings About 10,000 ft. of work, consisting of tunnels, drifts and shafts in the whole Alto Group. Probably about 1/3 of this is in the north part.

Past ~~Mx~~ Production No information available as to tonnage mined. The mine was worked ~~xx~~ occassionally prior to 1902. Mine purchased in 1902 by Alto Consolidated Mines Smelting and Transportaion Co. of New York. This company operated the mine from 1905 to 1907, built roads, installed machinery, drove a long tunnel, and sank several shafts. Intermittent work was done from 1907 to 1940.

Proposed Work No information regarding same.

This Part Outside Boca Tract

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Alto Group (North Part) Date Sept. 28, 1954.

District Tyndall District ----Santa Cruz Co. Engineer Axel L. Johnson

Subject: Field Engineers Report ---- Mine inspection with Ramon G. Moreno & C. W. Dorsey.

Location Sections 11 & 12 --- T 21 S -- R 14 E. Go SW from Patagonia on Patagonia--Nogales road for a distance of 3 miles. Turn left (NNW) and drive 11 miles on county road to the mine. Road is graded and in fairly good shape.

Number of Claims 10 claims, viz.
(a) 2 patented and 2 unpatented claims leased to Ramon G. Moreno, Box 853, Patagonia, Ariz.----Mineral West (patented), Mineral #1 (unpatented), Mineral # 2 (unpatented), and Record (patented)/
(b) 6 patented claims not leased ------- Albion, Oak, Albert #2, Albert, North part of Steinfeld, and North part of Alto

Owner Mrs. Eva Henderson, Box 854, Patagonia, Ariz.

Lessee and Operator Ramon G. Moreno, Box 853, Patagonia, Ariz. has lease on 4 claims, as shown above. Terms 10 % of net smelter returns, with option to buy.

Principal Metals and Minerals Lead, Zinc, and Silver, with some Copper in the Albion and Record Claims.

Number of Men Employed Mr. Moreno working alone, doing exploration and development work on the 4 claims leased from Mrs. Henderson.

Production Rate None.

Geology Country rock is granite porphyry and quartz latite porphyry. Minerals are sulphides of lead and zinc, with some copper shlphides-----galena, sphalerite, chalcopyrite, argentite, and pyrite. (See Schrader's Report ----Pages 197 to 203 for more details). U.S.G.S. Bulletin 582

Ore Values Lead from 4 1/2 to 18 % with a small amount running up to 30 %.
Zinc from 4 % to 9 %. Silver 6 oz. to 17 oz. Copper trace to 8 %.
Very little Gold. Ore generally requires sorting, as it is found in narrow stringers.

Ore in Sight and Probable Ore & Stockpiles
(1) Stockpiles
(a) 1--60 ton stockpile of milling grade ore, running 4 1/2 % lead, 9 % zinc, 6 oz. silver, and 0.5 % copper.
(b) 1--5 ton stockpile of direct shipping ore, running 18 % lead, 6 % zinc, 3 % copper, and 17 oz. silver.

(2) Ore in Sight ------None.

(3) Probable ore---shipping grade -----1,000 to 2,000 tons (requires sort)

(4) Probable ore---milling grade ----- 5,000 to 10,000 tons, but not enough to warrant the installation of a mill to treat the ore.

Milling and Marketing Facilities Nonmill on the property. Direct shipping ore can be shipped to A. S. & R. Co. smelter at El Paso, Texas.

Mine Alto Group (North Part) Date Sept. 28, 1954

District Tyndall District ----- Santa Cruz Co. Engineer Axel L. Johnson

Subject: Field Engineers Report -----Mine inspection with Ramon G. Moreno & C. W. Dorsey.

Description of Mine Workings and Ore Showings by Claims

(1) Mineral West (patented) ----Moreno Lease

(a) Vein size, strike & dip. The vein is 14 ft. wide by 300 ft. long with an E & W strike and a dip of 80 deg. south. Vein is in latite porphyry. It has a small amount of mineralization with sulphides of lead, zinc and silver.

Workings on vein. 1 -- 120 ft. adit along vein, with small amount of ore showings. Also 1 -- 30 ft. winze with 5 ft. of ore showing at the bottom of the winze.

Probable ore None.

(2) Mineral #1 (unpatented) ---- Moreno Lease

(a) 1st vein--size, strike and dip. The vein is 3 to 4 ft. wide, with mineralized part from 3 inches to 2 1/2 ft. wide. The vein is about 900 ft. long, strikes S80E and dips 80 degrees south. Vein is in granite porphyry.

1st vein--mine workings

1 -- 240 ft. adit along the vein, showing mineralization 3 in. w
1 -- 40 ft. raise to upper adit.
1 -- 40 ft. old shaft
1 -- 5 ft. deep winze
1 -- 42 ft. cross cut to south.
1 -- old stope --- 10 ft. long by 20 ft. high by 2 1/2 ft. wide.
1 -- 75 ft. adit, 40 ft. above previous adit, Mineralization 2 to 2 1/2 ft. w.
1 -- 10 ft. deep winze ---Ore showing 2 ft. at bottom of same.

Probable Ore 250 tons of shipping grade ore.

(b) 2nd vein--size, strike and dip. This vein is from 3 to 8 ft. wide, showing ore streaks about 2 ft. wide.. The vein is about 500 ft. long, strikes S 70 E, and dips 70 degrees to the south.

2nd vein--mine workings

1 -- 65 ft. adit, with vein widening out from 3 to 8 ft. at the breast, with breast showing two pay streaks of ore, 12 inches and 8 inches wide resp. 5 tons of shipping grade ore was mined and stockpiled from this pay streak (see below).

1 -- 12 ft. shaft just above this adit. The vein at this shaft is 6 ft. wide, and mineralized to a small extent. 3 tons of ore have been mined from a small ore shoot near the bottom of this shaft.

Probable Ore 150 tons of shipping grade ore.

(c) 3rd vein--size, strike and dip. This vein is from 3 to 4 ft. wide, showing a small amount of mineralization. The vein is about 500 ft. long, with strike and dip about the same as 2nd vein.

3rd vein--mine workings

1 shaft about 10 ft. deep and 1 adit about 15 ft. long.

Probalbe Ore None.

(d) 4th vein--size, strike and dip. This vein is 3 ft. to 6 ft. in width, with from 4 inches up to 3 ft. of same mineralized. Vein is about 300 ft. long, with a strike of S 70 E and a dip of 70 degrees south.

4th vein--mine workings

1 shaft -- 50 ft. deep, inclined 70 degrees south. Ore is reported to have been shipped from this shaft from 1901 to 1905.

1 adit -- 225 ft. long, showing 40 inch wide vein, with a pay streak about 4 inches wide.

Mine Alto Group (North Part) (continued) Date Sept. 28, 1954.

District Tyndall District ---- Santa Cruz County. Engineer Axel L. Johnson

Subject: Field Engineers Report ------Mine inspection with Ramon G. Moreno & C. W. Dorsey.

(2) Mineral #1 (continued)

(d) 4th vein (continued)

Probable Ore --- 200 tons of shipping grade ore.

(e) Stockpiles on Mineral #1 Claim.

2 stockpiles of 30 tons each ---milling grade. Reported to assay 4 1/2 % lead, 9 % zinc, 6 oz. of silver, and o.5 % copper.

1 stockpile of 5 tons ---shipping grade. Reported to assay 18 % lead, 6 % zinc, 3 % copper, and 17 oz silver.

(f) Total Probable Ore on Mineral #1 Claim -- 600 tons of shipping grade.

(3) Mineral #2 (unpatented) ----Moreno Lease.

(a) 1st vein--size, strike and dip Vein is about 3 ft. wide, with pay streak from 6 to 8 inches wide. Length of vein about 300 ft.

(b) 1st vein--mine workings

2 shafts, each 15 ft. deep.

Probable Ore Negligible.

(b) 2nd vein--size, strike and dip Vein is about 3 ft. wide, with pay streak about 6 inches wide. Length of vein about 300 ft.

2nd vein-- mine workings

1 shaft, 15 ft. deep, and 1 small open cut.

Probable Ore Negligible.

(c) Total Probable Ore on Mineral #2 Claim -- Negligible.

(4) Record (patented) ----Moreno Lease.

(a) Vein--size, strike and dip. The vein is about 3 ft. wide and about 300 ft. long. The mineralized portion of the vein is about 150 ft. long, but has been all mined out to a depth of about 40 ft. below the surface. On account of some cavings from the sides of this stoped out area, no ore showings below the mined out area can be seen.. Moreno claims that the ore continues down, and is about 3 ft. wide at the bottom of the mined out area.

(b) Mine workings on vein

1 -- open cut 150 ft. long, 40 ft. deep, and 3 to 5 ft. wide. Ore all mined out to a depth of 40 ft. Moreno reports that 3 carloads of ore was shipped from this open cut, and assayed 7 1/2 % copper, 7 oz. silver, 1/2 oz. gold, with no lead or zinc.

1 -- 45 ft. adit along the vein about 3 ft. wide. No ore showings in adit.

1 -- 40 ft. vertical shaft---open and in good shape. Shaft sunk in the vein, about 3 ft. wide at this point. No ore showings.

1 -- 25 ft. adit along the vein about 18 in. wide. No ore.

Probable ore on Record Claim None above 40 ft. depth.

Below 40 ft. depth ----Uncertain.

Mine Alto Group (North Part) (Continued) Date Sept. 28, 1954.

District Tyndall District ----Santa Cruz Co. Engineer Axel L. Johnson

Subject: Field Engineers Report -----Mine inspection with Ramon G. Moreno & C. W. Dorsey.

(5) Albion Claim (patented)

(a) 1st vein--size, strike and dip. The vein is from 2 1/2 to 4 ft. wide and 300 ft. long, and is mineralized in spots.

1st vein--mine workings

1 -- 45 ft. deep vertical shaft ---open but inaccessible. Shaft sunk in 1931 by Moreno. Vein about 2 1/2 ft. wide at the surface.

1 -- 10 ft. drift west at bottom of shaft. Moreno reports that ore stoped from this drift averaged 6 1/2 % copper, 6 % lead, and 17 oz. silver, and that mining operations were discontinued when copper dropped to 11 cents in 1931.

1st vein--probable ore. Negligible. Workings are inaccessible, and very little ore shows up on surface. Ore in drift mentioned by Moreno might be all stoped out, or perhaps only a small quantity remaining.

(b) 2nd vein --size, strike and dip. The vein is 3 ft. wide with a pay streakabout 6 inches wide. It is about 300 ft. long, strikes S 80 W, & verticaldip.

2nd vein-- mine workings

1 -- prospect hole about 100 ft. up the hill from shaft on 1st vein. This shows a 3 ft. wide vein, with a small amount of copper oxides.

1 -- 45 adit along a 3 ft. wide vein, with a pay streak about 6 inches wide. Not much ore showings.

2nd vein -- probable ore Negligible.

(c) 3rd vein--size, strike and dip----Main Albion Vein Vein is from 3 to 8 ft. wide, with pay streaks from 18 inches to 3 ft. wide. Vein strikes E & W, and is vertical. 3rd vein--mine workings. Vein is about 1000 ft. long.

1 -- 25 ft. vertical shaft sunk in the vein. Shaft is nearly filled with water and is inaccesible, but is reported by Moreno to be in good shape. Vein appears to be about 3 ft. wide at the surface. Pay streak in shaft reported by Moreno to be about 18 inches wide, containing good grade shipping ore.

1 -- 145 ft. shaft vertical---the Main Albion Shaft. Shaft is filled with water to within 15 ft. of the surface, and can not be examined, but is reported by Moreno to be in good shape. Vein appears to be about 8 ft. wide at the top of the shaft. Moreno reports a 4 ft. pay streak near the bottom of the shaft, assaying 8 % copper, 14 oz. silver, 1/2 oz. gold. and 6 1/2 % lead.

1 -- 65 ft. adit just east of Main Albion ?Shaft, sunk in the vein, which is about 3 ft. wide at this point. The ore is all stoped out between this adit and the surface. Moreno reports shipping grade ore shipped from this adit. Not much additional ore in sight.

1 -- 40 ft. vertical shaft on the vein, with water standing within 20 ft. of the surface. Moreno reports shipping grade ore removed from this shaft, and that the bottom of the shaft may be caved in.

1 -- 65 ft. vertical shaft sunk in the vein, with water standing within 12 ft. of the surface. Bottom of the shaft may be filled in.

1 -- 100 ft. drift between last 2 shafts on 40 ft. level reported by Moreno, with a stope above this drift 30 ft. x 50 ft. x 2 1/2 ft. Inaccesible.

1 -- 15 ft. vertical shaft. Open and in good shape, with no water. Vein about 3 ft. wide, but not much ore showing.

3rd vein ---Probable Ore ---400 tons of shipping grade copper ore. Much of the ore in this vein has already been mined out.

Mine Alto Group (North Part) (continued) Date Sept. 28, 1954.

District Tyndall District ---Santa Cruz Co. Engineer Axel L. Johnson

Subject: Field Engineers Report ----Mine inspection with Ramon & G. Moreno & C. W. Dorsey

(d) 4th vein--size, strike and dip. Vein is about 4 ft. wide, with a pay streak of 6 to 8 inches. Vein about 400 ft. long.

4th vein--mine workings

1 -- 30 ft. vertical shaft.

1-15 ft. drift at the bottom of this shaft in 4 ft. wide vein with a pay streak of about 8 inches, as reported by Moreno. Moreno reports 12 % copper with high silver values taken out from above this drift.

1 -- 40 ft. vertical shaft on vein 4 ft. wide.

1 -- 8 ft. vertical shaft on vein about 4 ft. wide.

4th vein -Probable Ore Negligible.

(e) Total Probable Ore on Albion Claim -- 400 tons of shipping grade copper ore. Much of the ore in Main Albion vein has already been mined out, but as it is a large strong vein, it is reasonable to assume it will continue for some distance in depth.

(6) Oak Claim (patented)

(a) Vein--size, strike and dip The vein is 2 to 4 ft. wide, with ore streak about 18 inches wide in spots. Vein is 300 ft. long.

Vein--mine workings

1 -- 65 ft. vertical shaft. Filled in and inaccesible. Vein appears to be about 4 ft. wide at this point. Not much ore showing at the surface.

1 -- drift about 100 ft. long, incline 15 degrees down. Vein is from 2 to 3 ft. wide, with about 18 inch ore showings in spots. Water in the end of the drift. Moreno reports some ore shipped from this drift in 1936 ran 30 % lead, 11 oz. silver, and 4 % zinc, with no copper. Most of the ore may possibly have been mined out, with a small amount remaining.

Probable Ore Would consider it negligible.

(7) Albert # 2 Claim (patented).

Veins 2 ore veins each about 4 ft. wide of indeterminate length. Ore reported by Moreno to be too low a grade for direct shipping.

Mine Workings 1 adit about 25 ft. long.

Probable Ore None.

(8) Albert Claim (patented).

Vein 1 ore vein about 2 ft. wide of indeterminate length. Ore reported by Moreno to be too low a grade for direct shipping.

Mine Workings 1 -- 25 ft. vertical shaft, and 1 -- 15 ft. vertical shaft.

Probable Ore None.

Proposed Plans Ramon G. Moreno wishes to sub-lease the 4 claims that he has a lease on. Terms---- A small down payment and 15 % of net smelter returns with option to buy (Mr. Moreno to pay Mrs Henderson her 10 %.

Mrs. Eva Henderson wishes to lease the 6 remaining claims, not now leased. Terms 10 % of net smelter returns, with option to buy.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

~~FIELD ENGINEERS REPORT~~

NEWS ITEM

Mine Alto Group (North Part) Date April 3, 1952.

District Tyndall Mining Dist., Santa Cruz Co. Engineer Axel L. Johnson

Subject: News Item --- Source of Information --- Mrs Eva Henderson

Location 12 miles northwest of Patagonia. Go 2 1/2 miles on road to Nogales, then turn right and go 9 or 10 miles on good county road.

Number of Claims 7 or 8 patented claims, comprising the notth part of the Alto Group.

Owner Mrs. Eva Henderson, Box 27, Patagonia, Ariz. Bought in 1945 for taxes.

Leaser Ramon Moreno, Patagonia, Ariz.
Lease calls for 10 % royalty with option to buy at $20,000.
Operates mine at present.

Metals Mined Lead and Zinc, with some Silver values.

Men Employed Ramon Moreno works by himself only, using handsteel.

Production Rate No production. Mr. Moreno is doing development work driving tunnels.

Geology See Schrader Report-- pages 197 to 203. USGS Bull 582,
6 veins in latite and granite porphyry. Veins 3 to 7 ft. wide.
Ores are sulphides--- galena, argentite, chalcopyrite, pyrite, and sphalerite.

Old Workings About 10,000 ft. of work, consisting of tunnels, drifts and shafts in the whole Alto Group. Probably about 1/3 of this is in the north part.

Past ~~Mm~~ Production No information available as to tonnage mined. The mine was worked ~~mm~~ occassionally prior to 1902. Mine purchased in 1902 by Alto Consolidated Mines Smelting and Transportaion Co. of New York. This company operated the mine from 1905 to 1907, built roads, installed machinery, drove a long tunnel, and sank several shafts. Intermittent work was done from 1907 to 1940.

Proposed Work No information regarding same.

THE ALTO MINE

Santa Cruz, County, Arizona

Report on a preliminary examination in May, 1916.

By J. VOLNEY LEWIS

LOCATION:

The Alto Mine group, including 21 patented claims, is located in the southern part of the Santa Rita Mountains, Santa Cruz County, Arizona, about 30 miles north of the international boundary.

TOPOGRAPHY:

The property lies in a rugged region between elevations of 4,500 and 5,500 feet. The open valley of Josephine Canyon, however, leads westward into the broad Santa Cruz valley and offers possibilities of a road with moderate grades. A road also traverses a more hilly country southeastward into the Soncita valley, a tributary of the Santa Cruz. This is now the better road and is used by neighboring properties for hauling ore and supplies.

RAILROADS:

Branches of the Southern Pacific Railroad to Nogales and Benson and Tucson, respectively, follow the Soncita and the Santa Cruz. The nearest stations, Patagonia to the southeast and Tubac to the west, are approximately the same distance from the camp, about 13 miles. Patagonia has a station agent and telegraph station, not yet provided at Tubac, and from this point the tri-weekly mails are brought by state to Alto postoffice, one mile north of the camp.

CLIMATE AND WATER SUPPLY:

During the greater part of the year the rainfall is said to be sufficient to keep the streams flowing, but for two or three months in spring and early summer they are usually dry. Shallow wells in the gulches are said to supply enough for boiler purposes during this season. The water is quite hard and that in the canyon adjacent to the Alto is also somewhat acid. Some water flows from the Alto main tunnel, but this is acid and heavy with sulphides.

TIMBER:

Scattering oak timber covers the mountain slopes generally and there is a smaller amount of mesquite. Both of these are used locally to a limited extent for mine purposes, both for timbering and for fuel. Altogether apart from the limited supply, however, neither of these uses is considered economical by those familiar with the local situation. For mine timbering and all construction purposes, sawed lumber from the Pacific Coast is considered preferable.

GEOLOGY:

At the Alto and in the immediate vicinity the formations are all igneous with the exception of the gravels and alluvium on the lower slopes and along the stream courses. At the Alabama Queen, 1½ miles north, is found an outcrop of limestone about 20 by 40 feet, but this is apparently only an inclusion in the quartz latite. From 3 to 8 miles northwest there are considerable bodies of limestone in places, but none are known nearer.

In the immediate vicinity of the Alto mine the following igneous rocks occur:

Tertiary,

Andesite, dense to medium grain. Quartz latite, porphyritic in part; much of it agglomeratic, full of granite and diorite pebbles and boulders.

Mesozoic,

Quartz diorite, granular, dark green. Granite, medium to coarse grain ("granite porphyry" of Bull. 582, U.S.G.S.) Syenite and aplite occur as facies and dikes.

The granite forms a sort of core in the east central part of the property and extends southeastward, outcropping chiefly in Alto east and part of adjacent claims. In Salero and the eastern part of Hillside andesite is the surface rock. The rest of the area is practically all quartz latite. These volcanics lie in sheets that are still practically horizontal, with various slight dips in different parts of the area. The agglomeratic faces of the latite covers most of the higher ground in the vicinity of the mine workings and prospecting, some of it extremely coarse, with included granite bowlders up to several feet in diameter.

VEINS AND FAULTS:

Post-latite faulting produced a series of east-west fissures cutting the latite and older rocks. Much of the striation in the fault planes is nearly horizontal, and hence it is inferred that the principal movement was in this direction. These fissures are vertical or nearly so, dips generally ranging from 75 to 90 degrees north or south. In the main the Alto and Albert veins dip steeply to the north. This is also generally true of veins to the north of these, while some of these southward are characterized by similar southerly dips.

Throughout most of their recognizable course these faults are accompanied by from 1 to 5 feet of sheared, crushed, and more or less decomposed rock, and it is in these zones that the veins and ores are developed. Stringers and lenses of quartz up to 2 or 3 feet come and go, either singly or in a multiple parallel series. In the latter case there is commonly a net-like development of minute diagonal stringers connecting the larger veins.

The sheared vein rock, quite universally a dense ash-gray, altered material throughout the district, regardless of the nature of the adjacent formation, is itself silicified and replaced in various degrees by quartz and ore minerals. At the surface and in the upper workings it is generally much stained with iron and manganese oxides, which accumulate particularly along the joints and fissures. In parts of the main Alto tunnel much iron rust of this character is still found at depths of 250 to 300 feet below the surface. Physically the vein rock varies from a hard tough sheeted or coarsely brecciated condition to a soft clay-like mass. In many places it is thoroughly sericitized or kaolonized, and is then commonly known to the miners as "talc".

MINERALIZATION:

The quartz veins, even the most barren, commonly carry a sprinkling of sulphides, commonly pyrites; but in the richer veins there also occur one or more of the following minerals, in all propoortions; Chalcopyrite, tetraherite, galena, and blende. In general silver and lead (characterized by galena and smaller amounts of gray copper) prevail in the westerly portions of the Alto vein and copper (with much chalcopyrite) dominates toward the east. Other veins have not been so fully explored, but there is a notable tendency for one or the other of these combinations to predominate in any particular opening, although there is also much ore in which all these constituents are important.

Veinlets of these materials, in places apparently in important amount, fill the joints and fissures planes here and there in the vein rock and to a smaller extent permeate this rock itself. In the latter case the particles are commonly very minute and easily overlooked on the light grayish fracture of the rock.

MINING:

The discovery of the Alto vein dated back to the establishment of the neighboring missions by the Jesuits in the 17th century. It is said to have been worked almost continuously by the priests until 1857, when the whites were either driven from the regions or killed by the Yaquis. In the later seventies, when safetly was

once more established, it was worked by Mark Lully, of Nogales; in the eighties by Albert Steinfeld & Co., of Tucson. In 1905 to 1907 the Alto Consolidated Mines, Smelting & Transportation Co. built roads, installed machinery, drove a long tunnel, sunk most of the shafts, including one 217 feet deep, and did most of the modern development work, principally on the Alto vein. (U.S. Bull. 582, p.198)

There has been little work done in later years. The property has been held successively by the Alto Copper Company and the Alto Mines Company and has now been divided into almost equal parts by an east-west line known as the north boundary of the Baca Float #3. This situation is further considered under "title" Beyond.

DEVELOPMENT:

Tunnels, drifts, shafts and stopes are estimated to aggregate 10,000 feet or more of work. These are on top and on both the east and west slopes of Alto Hill. The tunnels are said to be spaced mostly 200 feet apart vertically, the longest or "main" tunnel being more than 1800 feet long. It is driven about 300 feet below the summit of Alto Hill and a little less than half its length follows the Alto vein, which was intersected about the 1,090 foot point. "The develcpments on the Alto vein alone, which constitutes most of the modern work, aggregate about 6,000 feet, as follows: Shafts 1,050 feet, drifts 900 feet, tunnels 2,000 feet, stopes 2,000 feet." (U.S.G.S. Bull.582) The main tunnel connects with shaft #1, and was designed to connect with a number of other shafts along the Alto vein.

All these workings are now filled with water and inaccessible except the main tunnel, and that is closed by caving at the 1300 foot point. About 200 feet of stopes connected with this tunnel about shaft #1 are also in part accessible and have been examines as far as possible.

Besides numerous cuts, pits and short tunnels, a shaft probably more than 100 feet deep has been sunk on the Albert vein, and several smaller shafts from 40 to 80 feet deep have been sunk on Mineral #1, Oak and Albion claims on veins that give promise of production.

ORE VALUES:

The ores mined by the Jesuits are said to have been very rich in silver. They were treated in small, crude smelters for the silver alone, no attention being paid to the lead. Mr. Lully is said to have shipped 12 tons of lead-silver bullion. The production from February 1906 to July 1907, was $14,000 in copper, lead, silver and a little gold. "The ore was shipped to El Paso smelter and averaged about 5% copper, 32% lead, 9% in zinc and 24 ounces to the ton in silver. About 12,000 tons of low grade ores said to range from 1 to 3% in copper, 7 to 10% in lead and 4 to 6 ounces to the ton in silver, lie on the dumps." (Bulletin 582.)

The following values are abstracted from published reports of the former owners:

Alto shaft #1: Average of 146 tons of ore shipped to El Paso smelter from stope below shaft #1:

Pb 38.5% Cu 2.29% Ag 26.1 oz. Au $ .40

Sample of 1,000 tons on dump at shaft #1:

Pb 14.5% Cu 3.6% Ag 21. oz.

Alto Shaft #2: Five assays of high grade streak in shaft #2:

	Pb %	Cu %	Ag oz	Au $	Width
	46.6		10.4	Trace	.5
	73.75	3.1	46.13	"	.5
	11.33		4.8	"	.66
	69.4		30.65	"	.6
	57.02	———	36.0		.5
Average	50.00		32.2		.55

Average content of stope 5' wide, 15' long, in winze from drift in shaft #2:

Pb 13.46% Ag 6.84 oz.

Alto Shaft #3--Assays from 132 foot drift 73' below the surface in Shaft #3:

	Pb %	Cu%	Ag oz.	Au $	Width
	21.02	55.44	24.7	2.80	2.5
	33.88	8.31	35.7	2.00	2.5
	20.20	6.19	21.6	2.00	.33
	4.00	1.36	2.4		3.
		28.59	180.	4.00	.33
	23.47	7.55	31.6	2.00	.5
	34.9	4.38	16.0	trace	.5
	25.13	10.27	24.2	"	.5
	5.18	4.83	9.4	"	4.0
	39.6	8.46	6.2	"	.5
	1.93	1.36	21.0	"	4.0
	21.63	4.83	11.4	"	4.0
	9.18	4.8	9.4	"	1.33
Average	14.4	6.62	16.4	.62	1.65

Albert Vein. 100 foot shaft. -- From 8-inch streak at 30 feet:
Pb 11.8% Cu 9.47% Ag 21.9 oz., Au $8.30

Albert Vein. shaft No. 2. -- From 20 tons of ore at the mount of shaft:
Pb 11.27% Cu 15.56% Ag 37.7 oz. Au $0.50
This assay is also quoted in one report as from Albert Shaft #4.

Oak Vein. Shaft Average of ore on the dump:
Pb 16.2% Cu 0.19% Ag 4.7 oz. Au $3.20

Mineral Vein. tunnel: Average of four samples taken across an average width of 1.5 feet:
Pb 14.8% Cu 2.38% Ag 19.16 oz. Au $1.42
From "new cross ledge" in Mineral tunnel:
Pb 21.1% Cu 3.6% Ag 17.0 oz. Au $1.20

Concentrating Ore. - J. N. Curtis, general manager, estimated in 1905 that ther were 200,000 tons of low grade ore on the dumps that would net not less than $5.00 a ton on treatment.

CLAIMS AND TITLE:

There are 21 patented claims in the Alto group, as shown on the accompanying map, grouped in an approximately uniform east-west belt five claims long. The principal mineral interest attaches to a group of claims near the center of the area. The Alto vein, which has been the object of most of the work in the past, is well defined for about two claims lengths, chiefly in Alto and Alto East. The Albert vein, lying approximately parallel to the Alto and 300 feet to the north, is best known on the Albion claim. Shorter veins of promise are also known on the Albion, the Oak and Mineral #1. Several other veins are equally well defined, particularly on the claims along the south border of the group; but this far less evidence of mineral values has been found in them.

The Division.-- According to recent survey of "Baca Float #3" an old government grant, the northern boundary of this tract runs almost exactly through the middle of the Alto group in an east-west direction, as shown approximately on the accompanying map. The mineralized portion of the Alto vein lies entirely south of this line, and therefore within the area of the "float", the owners of which are claiming all mineral rights. This situation, according to the best information I have been able to obtain, has lead to a division of the property along this line, the southern portion being claimed by the Alto Mines Company, represented by D. G. Curtis of Erie, Pennsylvania.

The northern part of the Alto group is owned by other Pennsylvania interests.

CONCLUSIONS:

The following conclusions are tentative and subject to modification by the assay retunrs (see accompanying list and map) and by the results of examination of the records of former Alto operations.

1. The whole group of Alto claims, particularly those covering the Alto and and Albert veins (Alto, Alto East and Albion), would constitute a promising and attractive property, which I believe would well repay systematic development for shipping ore by the extention of the main Alto tunnel and crosscutting to the Albert vein, 300 feet north. Owing to divided ownership, however, this plan scarcely seems feasible.

2. The Alto vein alone would probably also make a successful small mine under skillful and economical management. Much of the later work done here has not conformed to either of these conditions. The extension of the tunnel to unwater the various shafts and stopes would probably make a considerable body of high grade ore accessible to cheap stoping. The unfortunate situation here is the present uncertainty as to who owns the Baca Float and the further question as to whether the owners of the Float also own the mineral within its boundaries. For these reasons, nothing can safely be done with the Alto vein now.

3. The Albert vein in most of its course through the Albion claim would doubtless also make a good little mine, but it is not so well developed and, apart from the Alto, could not be worked economically. The several minor veins in the northern division could be counted on, however, to supplement the output with important amounts of good ore, and some of them might develop into the first importance. This property, however, seems not to be included in the offer, unless the Alto Mines Company claims title to it also, in which case there would be a contest with the other people claiming it.

4. All of the foregoing propositions seem to be barred, for one reason or another at present, unless (a) a safe title to the southern part (Alto vein) can be assured, or (b) a favorable offer can be had from the owners of the northern portion, or (c) most desirable of all, a combination of these two can be effected.

5. In case either (b) or (c) of the last paragraph can be realized, a consideration of certain promising adjacent claims along the north-eastern border of the Alto group, which could be conveniently and economically worked in connection with the latter, is recommended.

Respectfully submitted,
(signed) J. VOLNEY LEWIS.

Copy
Alto, Arizona, May 30, 1916.

ASSAY SAMPLES FROM THE ALTO MINE AND ASSOCIATED CLAIMS. ALTO, ARIZ. May 30,1916.

The location of these samples is indicated by red numbers on the accompanying map.

1. Alto vein. Pit next east of East End Tunnel. Ore on dump: quartz heavy with pyrite. Pieces representing a thickness of vein of at least six inches. Some galena (?) Au, Ag, Pb, Cu.
2. Alto Vein, East End Tunnel. Ore on dump; similar in character to No. 1. Blocks showing a vein thickness up to 12 inches. Au, Ag, Pb, Cu.
3. Alto Shaft #3. Ore on dump; large pyritic quartz. Blocks show a vein thickness of at least 12 inches. Some galena, chalcopyrite, and copper carbonates. Some mineralized vein rock in the ore piles also included in the sample. Au, Ag, Pb, Cu.
4. Drift on Alto Vein Westward from top of shaft #3. Across the roof of tunnel 3½ feet wide, 25 feet from portal. All grayish vein rock except two streaks of sulphides, chiefly pyrite, 3 inches on the south side and 4 inches in the center. These units on the south side 4 feet beyond the sample. The rock is streaked with iron rust, which also darkens the sulphide streaks. The one on the south side

carries considerable fine granular galena. Au, Ag, Pb, Cu.

5. Shaft next East of Alto #2. Ore on dump; Pyritiferous quartz with smaller amounts of galena and blend. Blocks show vein thickness up to 8 inches. Order of disposition appears to be (1) galena, (2) quartz and Pyrite, (3) blende (?). Au, Ag, Pb, Cu, Zn.

6. Alto Shaft #2. Ore on dump; vein rock with stringers of quartz up to 6 inches shown on fragments. Much pyrite with considerable galena and blende. Au, Ag, Pb, Cu, Zn.

7. Alto Shaft #2. low-grade dump. Large pyritiferous dump, mostly finely pulverized material and small fragments. Firm crust cemented with sulphates (and lime?). Au, Ag, Pb, Cu, Zn.

8. Tunnel near summit, above main Alto tunnel. Rusty quartz stringers 0-8 inches in the roof, 3 to 10 feet below the surface of the ground. Au, Ag.

9. Same place. Pyritiferous quartz on the dump showing vein thickness up to 13 inches from winze about 10 feet deep, 20 feet from the portal of the tunnel. Au, Ag, Cu.

10. Mineral #1. Tunnel 130 feet near the west end. Stringers of quartz with galena, 0-8 inches, in the roof, Fragments from the first 30 feet of its course on the vein (in sheared rock). Rest of the tunnel inaccessible on account of water. Au, Ag, Pb,

11. Mineral #1. Discovery cut. Rusty and somewhat cellular quartz stringers in sheared rock, constituting a vein 56 inches wide. Sample from quartz stringers- 4 principal ones in the face of the cut. Au, Ag.

12. Mineral #1; shaft 80 feet near northeastern corner. Strong outcrops east-west, with numerous quartz stringers and veins up to 18 inches. Sample from the quartzose ore on the dump of the shaft carries galena, pyrite, chalcopyrite and blende, Au, Ag, Pb, Cu, Zn.

13. Mineral #1; tunnel in the northeastern corner of the claim, in the gulch immediately east of the preceding locality. Sample of ore on the dump from winze 15 or 20 feet deep (full of water; clear but difficult to estimate depth) in tunnel. Galena abundant. Au, Ag, Pb, Cu, Zn.

14. Oak claim; shaft northeast of the middle of the claim. Sample of considerable piles of ore on the dump. Much galena with barite gangue; rusty quartz from the upper workings. Au, Ag, Pb, Cu, Zn.

15. Albert vein; shaft near southeast corner Albion claim. Sample of quartz vein on the dump, showing a thickness up to 9 inches. Considerable piles or ore carrying galena, chalcopyrite, pyrite, and blende. Au, Ag, Cu, Pb, Zn.

16. Same place; rusty vein rock without quartz. Impregnated with galena, pyrite and chalcopyrite, with abundant copper carbonate stains and crusts. Ore pile on the west side of the dump. Au, Ag, Cu, Pb, Zn.

17. Same place; cut and short tunnel (about 50 feet) running east from the cellar of the shaft. Sample of sheared and decayed rock from the face of the tunnel, about 3½ feet wide. No carbonates, sulphides or other ores visible. Grayish rock streaked with iron rust. In the roof of the tunnel 25 feet west of the face sulphate and carbonates of copper are prominent, in the same shear zone. Au, Ag, Cu.

18. Albion claim pit (2); about 400 feet east of the last. Ore on the dump; chalcopyrite and galena chiefly, in quartz stringers in a sheared rusty vein rock. Au, Ag, Cu, Pb.

19. Albion claim, pit (6). Rusty, honeycombed and copper stained quartz vein up to 5 or 6 inches on the hanging wall (N.) side of a sheared rock vein, which here curves southeastward to a diagonal branch vein connecting the Albert and the Alto veins. Au, Ag, Cu.

20. Alto main tunnel. Sample of ore pile on the north side of the dump, with abundant galena and pyrite. Au, Ag, Cu, Pb, Zn.

21. Alto main tunnel. Sample of vein in the roof where the waste drift branches off the main tunnel, about the 1090-foot point. Quartz vein 8 inches thick with galena, pyrite and chalcopyrite. Au, Ag, Cu, Pb, Zn.

22. Face of west drift, Alto main tunnel. Sample of vein 7 inches thick, 6 feet from the floor - thins down to 2 inches at the bottom. Apparently almost barren. Between this and the last point (sample 21) the vein varies in the intervening stopes from 0 to 12 or 15 inches, and in places it is full of sulphides, pyrite and galena chiefly. The sample here has a scattering of pyrite and blende visible. Au, Ag, Cu, Pb, Zn.

23. Stope in Alto main tunnel, 10 feet west of shaft #1 and about 40 feet above the tunnel level. The quartz vein is 8 inches thick, with little that is visible except a 2-inch streak of galena. Au, Ag, Pb, Cu.

24. Stope 40 feet east of shaft #1, about 40 feet above the tunnel level. Galena vein varying from 1 to 5 inches, average about 3 inches. Fragments taken for a horizontal distance of 10 feet, extending about equal distances on each side of an open rusty water channel in the roof. Au, Ag, Pb, Cu.

25. Ladderway at point (about) 1250. Sample from roof of stope 25 feet west and about 30 feet above tunnel level. Whole vein is crushed rock, about 2½ feet wide. No pay streak. Au, Ag, Cu, Pb.

26. Fifteen feet east of ladderway, in roof of stope about 40 feet above the tunnel. Vein 8 inches, consisting of several streaks of galena with quartz and vein rock. In other places very near by the vein becomes practically solid galena, and it pinches out within 10 feet each way. Fifteen feet further east it is strong again, however, and quickly increases to a thickness of 12 inches, apparently solid galena. Au, Ag, Cu, Pb, Zn.

27. Thirty feet east of ladderway; pay streak 8 inches, apparently solid galena. Three feet from this point the vein is 12 inches thick. Au, Ag, Cu, Pb, Zn.