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Arizona Geological Survey
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03/20/90

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: TILLIE STARBUCK GROUP

ALTERNATE NAMES:
PATENTED CLAIMS MS 3347
ARTIC TUNNEL
SLATE CREEK TUNNEL

YAVAPAI COUNTY MILS NUMBER: 1166A

LOCATION: TOWNSHIP 12 N RANGE 2 W SECTION 2 QUARTER SW
LATITUDE: N 34DEG 24MIN 23SEC LONGITUDE: W 112DEG 26MIN 45SEC
TOPO MAP NAME: GROOM CREEK - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
SILVER
GOLD

BIBLIOGRAPHY:
USGS GROOM CREEK QUAD
BLM MINING DISTRICT SHEET 241
YAVAPAI MAGAZINE JUNE 1921 P 10, JULY 1918 P6
ADMMR TILLIE STARBUCK MINE FILE & COLVO FILE
LINDGREN, W. ORE DEPTS JEROME & BRADSHAW MTN QUADS USGS BULL 782 1926 P 119-120
WILSON, E.D. ETAL. AZ LODE GOLD MINES AZBM BULL 137 1967 P 45

TILLIE STARBUCK MINE YAVAPAI COUNTY

Maps in Brown Map Cabinet, [illegible]. 5

SEE: ABM Bull # 137 p. 45-46 (8-15-34)

USGS Bull # 782 pp. 119-20, 22, 25, 45

Arizona Mining Journal March 1920 p. 24

May 27, 1957

TILLIE STARBUCK Yavapai County

This property inactive.

MARK CRISTILL

COE & VAN LOO
CONSULTING ENGINEERS INC.
ENGINEERING · PLANNING

OF COUNSEL
P. E. COE, P. E. (1915-1977)
H. W. VAN LOO, P. E.
ALBERT B. CUTLER, JR., P. E.

J. E. COE, P. E., PRESIDENT
H. MASON COGGIN, P. E., L.S.
RONALD J. MLNARIK, R. L. A.
PLANNING
JOHN B. NELSON, P. E., L.S.
RONALD C. FISHER, P. E.
RAMESH I. PATEL, P. E.
PAUL SIDERS, P. E.
WESLEY K. ZICKER, P. E.
KARL A. HIRLINGER, P. E.

July 3, 1980

Mr. Ken Phillips
Arizona Dept. of Mineral Res.
Mineral Bldg. - Fairgrounds
Phoenix, Arizona 85007

Re: Tillie Starbuck Mine
Hassayampa Mining District
Yavapai County, Arizona

Dear Ken:

The package of information you picked up on the Tillie Starbuck from my office is only a portion of the information available.

The Tillie was first brought to my attention by Dunning's book on Silver about 5 or 6 years ago. After making several attempts to contact the owner, I finally discovered that Graham International had acquired a lease on the property and were in need of an engineer. I applied and was accepted for the job.

My recommendations included accessing, renovating, sampling and mapping the Slate Creek Adit. It is my opinion that sampling of the Slate Creek would identify about 50% of the potential reserves blocked out by the previous development work.

We immediately ran into problems. The air shortly beyond the portal would not support a candle flame, and we bought and brought in a fan and ventilation pipe. After finding and cleaning up one small cave-in, we ran into another about 1800 feet in from the portal.

This cave consisted of white fault gouge which behaves much like soft plastic. After attempting to secure an opening through this cave for about one month, it was apparent that we would not be successful. A new approach would be required and this would consist of retracking the 1800 feet of adit with 25 pound rail and attempting to drive around the cave. The estimated cost for this work would be about $125,000 including a property payment, labor, material and equipment rental.

Out of the four other adit levels, all are caved. The uppermost workings (7070) consist of about 100 feet of drifting which is caved at the portal.

The 7025 level was caved at the portal. We opened up this portal only to find it was again sluffed in about 250' from the portal in a 500' level. We sampled this first 250 feet with mixed results. These results are attached.

4550 NORTH 12TH STREET · PHOENIX, ARIZONA 85014 · TELEPHONE (602) 264-6831 · TELEX 910-951-1372

The cave at 250 feet is not severe and can probably be spilled and timbered and the rest of the level sampled, mapped and assayed for about $10,000. The information from this work, if it were done, would provide information on whether or not to proceed with the Slate Creek Tunnel.

The 6870 level is caved about 240 feet in from the portal. The old timber has deteriorated and fallen out. It does not seem reasonable to pick up this cave at this time.

The first 250 feet were sampled with poor results, but this was not surprising because this portion of the vein was avoided by the other workings.

The 6750 or Arctic level was caved about 100 feet in from the portal. The cave extends about 50 feet to the surface. No attempt was made to reopen this adit at this time. It would probably be better to remove this cave with an air track and a bulldozer.

In addition to the previously described work, we also prepared property and land status maps of the Hassayampa District, put in survey control and had aerial photographs flown.

In retrospect, I am still optomistic about the property, and I believe it represents one of the better bets for proving up a mineable reserve with a relatively small investment.

Graham International is planning to hold this property and is looking for someone to make the next investment in the property. For an expenditure of $125,000 in property payments and exploration, an interested party should be able to acquire a 50% partnership with the option of either participating equally, diluting or buying out the other interest.

If you know of anyone who would be interested in participating in this venture, they may call me or Mr. Jack Blakenship at Graham International in Escondido, California 92025. Mr. Blankenship's phone number is (714) 743-7850.

Sincerely,

COE & VAN LOO
Consulting Engineers, Inc.

H. Mason Coggin, P.E. & L.S.
Senior Vice President - Mining

HMC:do
Encl.

TILLIE STARBUCK MINE Yavapai County

KAP WR 12/19/80: H. Mason Coggin reported that progress has continued in efforts to open up the Tillie Starbuck vein via Artic Tunnel. They have reached the vein and are starting a sampling program.

KAP WR 4/16/82: No work appears to have been done at the Tillie Starbuck Mine, Yavapai County, since AZL Resources and Graham International shut down exploration operations.

NJN WR 5/13/88: Mason Coggin (card) reported that Barbara Whitlocke (card) 2167 Banyon Drive, Los Angeles, 90049, is trying to determine the value of recrods of the Tillie Starbuck (file) Yavapai County and the Oatman Mining and Milling (file) Mohave County. Mr. Coggin suggested donation of her records to our Department. Ms. Whitlocke's Oatman Mining and Milling file consists of the followin 5 parcels of patented claims: 1. Yankee, Annie, Wheeler, Wheeler Fraction, Merrill, Gratiot, Louise Fraction, New Years, Tonopah #1 2. Elephant Faction, Gold Range Fraction, Emma, Gold Range Extension 3. Million Mark 4. Dorsey and 5. Telluride #5.

TILLIE STARBUCK MINE Yavapai County

KAP WR 5/14/80: The samples taken from the Tillie Starbuck No. 2 Tunnel were delivered to Walt Statler at Iron King Assay Office for gold-silver analysis. Two of the higher grade samples and two of the lower grade samples would have rejects and the pulp sent to Union Assay Office in Salt Lake City, Utah, to assist in verifying sample preparation methods.

KAP WR 6/20/80: Mason Coggin reported continuing progress on spiling through old cave-ins in the Slate Creek Tunnel at the Tillie Starbuck Mine in Hassayampa District, Yavapai County. They have also located two upper drifts above the No. 2 tunnel.

KAP WR 7/4/80: Mason Coggin of Coe & Van Loo Consulting Engineers reported that Graham International has shut down work on the Tillie Starbuck Mine, Hassayampa District, Yavapai County. Some sample work has been completed but the main objective, which was to re-sample the drift at the Slate Creek Tunnel, was not completed. Gaining access to the drift was hampered by excessively bad ground and difficulty in making headway through caved areas. Of the $92,000 committed by Graham International for the evaluation work, approximately $80,000 was spent. In addition to the work on the Slate Creek Tunnel, four upper levels were partially opened and some sample work done; roads were improved for access to all of the levels and equipment and timber were purchased for work on the Slate Creek Tunnel. The salvage value of the equipment will return a portion of the $80,000, if a joint venture partner to continue the project is not found. Both Graham International and Mason Coggin are trying to locate a joint venture partner to commit approximately $125,000 to match Graham International's total investment thus far and continue the work. A large report on the property, which included a work plan and extensive economic projections was provided for addition to the file.

KAP WR 6/27/80: Mason Coggin reported that the crew at Tillie Starbuck Mine is still trying to spile through cave-ins at the Slate Creek Tunnel.

Mason Coggin reported his work is continuing at the Artic Tunnel at Tillie Starbuck Mine, Hassayampa District, Yavapai County. A crew of men working for "M" Company is continuing to muck out caved ground of the Artic Tunnel.

KAP WR 11/14/80: In the company of H. Mason Coggin, Mining Engineer for Coe & Van Loo Consulting Engineers and D. Cocanour, a visit was made to the Tillie Starbuck Mine, Hassayampa District, Yavapai County. The Tillie Starbuck Mine is again under active underground exploration. The mine director and operator is "M" Company under the direction of Frank Montonati. Mr. Montonati has four men working to open up the Artic Tunnel (cross cut) for access to Tillie Starbuck vein. They are using a Hy-Matic loader (small LHD) to muck out cave-ins. The use of LHD is requiring some widening of the tunnel. At the present time the access to Tillie Starbuck vein at the Artic Tunnel level is being developed because of extreme difficulties in opening the Slate Creek Tunnel at the lower level. AZL Resources has a joint venture with Graham International to conduct this portion of the exploration program. H. Mason Coggin is the Consulting Engineer in charge of the project.

AMr. Pierson, Day Mines Company, Wallace, Idaho called regarding Tillie Starbuck Au mine. The best information we had was given plus a letter containing copies of reports. GW WR 6-11-73

CJH WR 3/26/80: Carl J. Columbo, Investment Analyst and Venkat R. Chintala, Manager, Technical Research and Analysis, both of Graham International, Inc., 135 West Mission Avenue, Suite 209, Escondido, California 92025, phone (714) 743-7850. This company has leased the TILLIE STARBUCK from the owner Barbara Whitlock of Los Angeles. They are going to clean up the mine workings and have an engineering, geological and sampling program conducted by a Arizona consulting firm, possibly Coe and Van Loo.

KAP WR 5/14/80:

TILLIE STARBUCK MINE

In the company of H. Mason Coggin I participated in a sampling project of the No. 2 tunnel at the Tillie Starbuck Mine, Hassayampa District, Yavapai County. The sampling project consisted of mucking out the portal, setting up a compressor, laying 200 ft of air line, survey 184 ft of tunnel, establishing sample points at 6 ft intervals and cutting 2" X 4" channel samples across the vein exposed in the back of the tunnel. Samples were cut with an air moil, the cuttings were dropped to a canvas sheet on the floor and loaded in the bags. The samples weighed between 30 to 50 pounds each. They were delivered to the Iron King Assay Office in Humboldt for gold-silver analysis.

The project was manned by three miners, Mr. Coggin, and myself, and took approximately sixty (60) manhours to complete. It consisted of thirty-one (31) samples.

The Arctic Tunnel of the Tillie Starbuck Mine was visited. This tunnel consisted of crosscut to the Tillie Starbuck vein and probably considerable drifting on the vein based on quantity of material on the dump. The cross cut is caved approximately 60' in from the portal and the caved area is making considerable water. The material at the dump indicates in excess of 1000 feet of workings. A considerable amount of vein material is on the dump.

The Slate Creek Tunnel is the lowest working on the Tillie Starbuck vein. It consists, reportedly, of a 1200' (some reports are 1800') crosscut to a drift on the vein that is possibly a few thousand feet long. The crosscut has been cleaned out for the first approximately 1100'. The clean up work thus far completed consists of setting a generator, ventilation fan, air bag, mucking out, and spiling through caved ground. A second cave in is presently being mucked. Mucking is done by hand into a single ore car and car is hand trammed to the dump. The use of air motor is planned. Once access is gained to the drift, the vein will be sampled in the tunnel to verify previous data and obtain information which will establish the validity of projected economic models of the mine.

The Tillie Starbuck property is leased by the Graham Corporation and the operations are being carried out by "M" Company of Silverton, Colorado. The crew is supervised by Frank Montonati and the project is under the control of Mason Coggin as Project Consulting Engineer.

H. Mason Coggin, PE & LS

Mining Engineering and Land Surveying
317 East Griswold Phoenix, AZ 85020
(602) 944-3763

April 30, 1988

Mrs Barbara Whitlock
2167 Banyan Drive
Los Angeles, CA 90049

Dear Barbara:

Very sorry to hear about your husband.

It is good to hear from you! Of course, I would be very happy to have your father's records and furniture, but could not begin to offer you their worth.

The furniture, I have no doubt, will bring a good price on the LA market and perhaps, even in Prescott. I have a Globe Map/Book Case that gets many comments.

I doubt that anyone could pay what the documents are worth. First, they would have to review them to find if there was any thing of value, and then they would not need them. Perhaps, it is best to donate them to the Arizona Department of Mines and Mineral Resources and take the donation off your taxes. Your accountant could tell you what this might be worth to you. You may want to do it this year.

ADMMR would make these files available to the public and this should enhance the possibilities of selling your property.

With your permission, I would like to add your Oatman and Bradshaw properties to my news letter. A copy of my last one is attached. I will need an information package for backup. From this, I hope to get some consulting work, if not on these properties, then on another.

If you are interested in any of these ideas, I will be try to be available during the first two weeks of July. Please call.

Sincerely,

H. Mason Coggin

Encl.

COMMODITIES Au, Ag

ID NO. _____ DATE 2/8/80

PROPERTY SUMMARY

I. MINE NAME: Tillie Starbuck AKA; _____
AKA; _____ AKA; _____
AKA; _____ AKA; _____

II. LOCATION: T 12N R 2W Sec(s) SW1/2 2 UTM; _____
ELEV.; _____ DIST.; Hassayampa STATE; Az. CO.; Yavapai
DIRECTIONS; See U.S.G.S. Groom Creek quad. Sheet
_____
_____ Map Attached ☒

III. OWNERSHIP: Name; Marian Barbara Whitlock Phone; _____
Address: 10813 Rose Avenue, Los Angeles California
Date of Information; 1965
DBA; _____ Title Report Attached / /

IV. PROPERTY: 14 patented lode claims
_____
_____ Date of Property Status; _____ Map Attached / /

V. HISTORY: First Located; _____ Operated; _____
Remarks; _____
_____
_____ Report(s) Attached / /

VI. PAST PRODUCTION: _____
_____
_____ Schedule(s) Attached / /

VII. WORKINGS: development on 4 levels with several hundred feet of drifting - some raise - no map of workings

Map Attached / /

VIII. GEOLOGY: Deposit Type; Vein - fault fracture Vein Strike; S 5° to 10° SE
Distance; _____ Width; 2 to 17' Dip; 80° westerly Age; _____
Host Rock; Lava Pair Schist Age; Pre Cambrian Ore
Control Structural
Existing Report(s) Attached / / Report Based on New Examination Attached /X/

IX. MINEROLOGY: Economic Minerals; Au, Ag - Pyrite, galena
Gossan Minerals; limonite
Alteration; _____
Gangue; _____
Petrographic Study; _____ Report(s) Attached / /

X. METALLURGY: Flotation Report(s) Attached / /
Method of Determination; Southwestern Eng Co Metallurgical Reports Attached /X/
Remarks; Johns reported his co. tested the ore and concluded it was amenable to cyanide with 90% recovery - results ATT. /X/

XI. SAMPLE DATA: _____ Sampling Technique; Unknown but 2 slab chips were channel samples
Samples Taken By; A. L. Johns Number of Samples; 17
Date; 1923 ± Assay Report(s)/Maps Attached /X/
Drilling; _____ Type; _____ Total Footage; _____
When Drilled; _____ Drilling/Report Attached / /

XII. GEOCHEMISTRY: NO Type; _____ Type Anomolies; _____
Report(s)/Map(s) Attached / /

XIII. GEOPHYSICS: NO Type; _____
Anomolies; _____
Report(s)/Map(s) Attached / /.

XIV. AERIAL PHOTOGRAPHY: NO Photo Attached / /

XV. RESERVES: Proven; 100,000 tons Calculations Attached / / Probable; _____ Calculations Attached / / Possible; _____ Calculations Attached / / Total; _____ Calculations Attached / / Potential; _____ Calculations Attached / /

XVI. ECONOMICS: Mine Life; _____ Yrs. Annual Production; _____ Capital Outlay; _____ Time; _____ Operating Cost; _____ /Yr. _____ Gross Annual Income; _____ DCF/ROI; _____ Metal Prices Used; _____ Sensitives; _____ _____ Report(s)Attached / /

XVII. REFERENCES:

Author; Wilson, E. D. et al. Title; AZBM Bull 137
Date; 1934 Abstracted By; [illegible] Date; 2/11/80
Status; on file CVL
Remarks; _____

Author; Pendegast W. Title; U.S. Geol. Survey Bull 782
Date; 1926 Abstracted By; _____ Date; _____
Status; _____
Remarks; should be limited - not on file at CVL

Author; ADMG File Title; Tillie Starbuck
Date; _____ Abstracted By; [illegible] Date; 2/11/80
Status; on File ADMG & CVL
Remarks; not much information on report - no maps

Author; Arizona mining Journal, Date. March 1920 p. 24

XVIII. REMARKS:

Tillie Starbuck

March 11, 1980

Ralph E. Pray, D.Sc.
Research Laboratories
40 N. Sycamore
Pasadena, California 91107

Dear Dr. Pray:

John Jett has given me your letter of February 22, 1980, regarding planned activity at the Tillie Starbuck Mine. Enclosed is a copy of Pertinent Data For New Or Prospective Mining Operations In Arizona. This circular should generally answer most of your questions. We would additionally be happy to discuss any particular details or questions you may have.

You may want to give consideration to some topics in addition to those in the circular. As a gesture of good will it might be valuable to make contact with the Yavapai County Board of Supervisors in Prescott. If eventual permits happened to be required by the County (for example possible water discharge) or if the County were asked by a State or Federal agency to comment on a permit application, your initial contact will have done much to promote cooperation. I doubt the County Governments are overly pleased when they are the last to hear about a project in their County, which is so often the case.

Although the Tillie Starbuck is on patented land, if any of the operation is to take place on the Prescott National Forest land, the Forest Service may be involved under their surface resources management plans and they might require letters of intent and plans of operation.

If your plans include dewatering the mine, the disposal of mine water may be regulated by the State Health Department or the County. In one case I know of, evaluation of an old property included pumping out a mine and the water was to be let run in to the Hassamppa River. Somehow the river got classified as navigable and the EPA became involved in issuing a permit. They received the permit, but what a hassle.

The Federal Mine Safety and Health Administration requires certain minimum training requirements for miners. The State Mine Inspector's Office can provide such mine safety instruction and I would recommend discussing it with them as soon as you know when men will be working. It is a free service of the Mine Inspector's Office.

As you may already know, the official duty of our agency, the Arizona Department of Mineral Resources, is to aid in the promotion and development of the State's mineral resources. We are a non-regulatory agency. We require no permits, filings or notifications but we are available to assist in any way possible. Our engineers make

field visits to operating mines and prospects. Our familiarity with most of the State's operations, many of the government regulations and most of the problems of the small operation, make the Department an excellent source of information and a true friend of the mining industry. When we visit a mining operation it is to offer our assistance and best wishes. Although we require no official notification, we would appreciate hearing of your progress. When field visits are made to mines in the area of your planned operation, it is usually Mr. Jett or myself who makes the visit.

GOOD LUCK and please feel free to contact us any time we MIGHT be of further assistance.

Sincerely,

Ken A. Phillips
Mineral Resources Engineer

KAP:mw

Enclosure

Tillie Starbuck file

DR. RALPH E. PRAY
Consulting Engineer
MINING AND METALLURGY
[213] 797-3617

Research Laboratories - 40 N. SYCAMORE
PASADENA, CALIFORNIA 91107
[213] 793-6471

February 22, 1980

Mr. John H. Jett, Director
Department of Mineral Resources
State of Arizona
Mineral Building, Fairgrounds
Phoenix, AZ 85007

Dear Mr. Jett:

It appears probable that the Tillie Starbuck Mine, situate on patented land near Prescott, will be the subject of serious investigation during 1980. No promotional aspects are involved.

The several thousand feet of adits intersecting the ten-foot wide vein on the property are to be cleaned out and repaired this Spring. A critical evaluation will then be made of the reserve potential by a senior geological engineer.

Tentative plans call for a 300 TPD cyanide plant containing fine grind and agitation circuits. A budget of four million has been conditionally approved by an associate firm.

I wish to ask your assistance in determining how best to initiate communications with safety, insurance, and environmental agencies concerned with Arizona activities of the described nature. Which agencies may be involved in the clean-out work? Which agencies would you recommend I call concerning the mine and mill operation? I would like to begin the paperwork on the cyanide circuit and tailing impound approval.

Any suggestions you may offer will be greatly appreciated.

Thank you.

Sincerely,

Ralph E. Pray

Ralph E. Pray, D.Sc.

DR. RALPH E. PRAY
Consulting Engineer
MINING AND METALLURGY
[213] 797-3617

Research Laboratories - 40 N. SYCAMORE
PASADENA, CALIFORNIA 91107
[213] 793-6471

February 22, 1980

Mr. John H. Jett, Director
Department of Mineral Resources
State of Arizona
Mineral Building, Fairgrounds
Phoenix, AZ 85007

Dear Mr. Jett:

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Any suggestions you may offer will be greatly appreciated.

Thank you.

Sincerely,

Ralph E. Pray, D.Sc.

Julia

REPORT ON

TILLIE STARBUCK MINE

PRESCOTT ------ YAVAPAI COUNTY

ARIZONA.

CYANIDE TESTS

	Test No. 8 Composite Samples 1, 2, 3, 4	
	Ag. ozs	Au ozs.
Heads assay value	7.05	.10
Tails " "	.86	.005
% Extraction Heads and Tails difference	87.8%	95.0%
Weight of ore used	100 lbs.	
Ore crushed to	-150 mesh	
Weight of solution	150 lbs.	
Dilution	1½ to 1	
Cyanide consumed per ton of ore	2.7	
Lime consumed per ton of ore	11.0 lbs.	
Strength of solution in KCN at start	4.8 lbs.	
Strength of solution in KCN at end	3.0 lbs.	
Protective alkalinity at start	.7 lbs.	
Protective alkalinity at end	.45 lbs.	
Time of agitation	48 hours	

* This test was made in a Pachuca tank and agitated continuously for 48 hrs.

(Sgd) SILL AND SILL
MINING & METALLURGICAL ENGINEERS.

(C O P Y)

Rush T. Sill
Engineer of Mines
Harley A. Sill
Metallurgical Engineer

Metallurgical Laboratory
Ore Testing
Processes developed
Mill design

SILL AND SILL
Consulting Mining Engineers
1011 South Figueroa Street
Los Angeles,
May 25, 1922.

MajorA. J. Pickrell,
C/o California Bank,
Los Angeles, Calif.

Description	Silver Ozs.	Gold Ozs.
Oxide Sheet	9.55	.13
Silver Sheet	8.16	.10
Johnson Sheet	4.21	.05
Gardner Sheet	5.50	.12

Composite sample heads for all cyanide tests 7.05 ounces silver and .10 ounces gold.

(Signed) SILL and SILL
MINING & METALLURGICAL ENGINEERS.

(COPY)

SILL AND SILL
CONSULTING MINING ENGINEERS
1011 South Figueroa St.,
Los Angeles.

May 25, 1922.

Major A. J. Pickrell,
C/o California Bank,
Los Angeles, Calif.

Dear Sir:

Enclosed herewith are the reports on the several tests made on the Tillie-Starbuck ore.

Tests No. 1, 2, 3 and 4 were made on 500 grams (1.12 lbs.) of a composite sample of the Oxide, Silver, Johnson and Gardner shoots. The ore was ground to minus 80, 100, 150 and 200 mesh and agitated continuously for 48 hours, by shaking in bottles. These tests do not represent commercial results but indicate the fineness to which the ore should be ground.

Tests No. 5 and 6 were made on 2000 grams (4.4 lbs) and 8000 grams (17.6 lbs.) of solution and agitated for 30 and 36 hours respectively. These tests were made in small Pachuca tanks and continuously air agitated. They represent standard practice with the exception that all measurements and conditions were more accurately controlled than in commercial work. Test No. 7 was made under the same conditions as tests 5 and 6 using a dilution of 5 to 1 instead of 4 to 1.

Test No. 8 was made on 100 lbs. of a composite sample. The ore was crushed in a gyratory crusher and ground in a 3' Abbe tube mill. The product was all minus 150 mesh. It was agitated with 150 pounds of cyanide solution in a Pachuca tank for 48 hours. Samples were taken at 36, 42 and 48 hours to determine cyanide and lime consumption and the extraction. This is a thorough, practical, commercial test duplicating field working conditions.

These tests indicate that this ore is readily amenable to cyanidation with a cyanide consumption of 1.9 lbs. at 36 hours, 2.25 lbs. for 42 hours and 2.7 lbs. for 48 hours. The extraction at 36 hours was 84.2% silver and 95% of the gold, at 42 hours it increased to 86% of the silver and 95% of the gold and at 48 hours the final extraction was 87.7% of the silver and 95% of the gold.

The longer contact of the cyanide solution with the base metals present gave an increase in the cyanide consumption.

The economical time of treatment seems to be 36 hours with an 84.2% extraction of the silver and 95% extraction of the gold, and a cyanide consumption of 1.9 lbs. The time of agitation will probably be cut to about 30 hours when grinding in cyanide solution.

Yours very truly,
(Signed) SILL AND SILL
Mining & Metallurgical Engineers.

CYANIDE TESTS

	Test No. 1 Composite Samples 1,2,3,4		Test No. 2 Composite Samples 1,2,3, 4	
	Ag.ozs.	Au.ozs.	Ag.ozs.	Au.Ozs.
Heads assay value	7.05	.10	7.05	.10
Tails assay value	1.18	.01	Trace	.Tr.
% Extraction - Heads and tails difference	83.2%	90.0%	100.0%	100.0%
Ore crushed to	-80 mesh		-100 mesh	
Weight of ore used	500 grams		500 grams	
Weight of solution	1500 "		1500 "	
Dilution	3 to 1		3 to 1	
Cyanide consumed per ton of ore	.6lbs.		.6 lbs.	
Lime consumed per ton of ore	11.5 lbs.		11.5 lbs.	
Strength of solution in KCN at start	5.0 lbs.		5.0 lbs.	
Strength of solution in KCN at end	4.8 lbs.		4.8 lbs.	
Protective alkalinity at start	1.0 lb.		1.0 lb.	
Protective alkalinity at end	.5 lb.		.5 lb.	
Time of agitation	48 hours		48 hours	

* These preliminary tests were made in bottles and continuously agitated for 48 hours.

(Signed) SILL AND SILL
MINING & METALLURGICAL ENGINEERS.

CYANIDE TESTS

	Test No. 5 Composite Samples 1, 2, 3, 4		Test No. 6 Composite Samples 1, 2, 3, 4	
	Ag ozs.	Au. ozs.	Ag. ozs.	Au ozs.
Head assay value	7.05	.10	7.05	.10
Tails " "	1.3	.01	1.18	.01
% Extraction-Heads and Tails difference	81.5%	90.0%	83.2%	90.0%
Weight of ore used	2000 grams		2000 grams	
Ore crushed to	-100 mesh		-100 mesh	
Weight of solution	8000 grams		8000 grams	
Dilution	4 to 1		4 to 1	
Cyanide consumed per ton of ore	1.2 lbs.		1.4 lbs.	
Lime consumped per ton of ore	11.0 lbs.		11.2 lbs.	
Strength of solution in KCN at start	5.0 lbs.		5.0 lbs.	
Strength of solution in KCN at end	4.7 lbs.		4.65 lbs.	
Protective alkalinity at start	.5 lbs.		.6 lb.	
Protective alkalinity at end	.3 lbs.		.25 lb.	
Time of agitation	30 hours		36 hours	

* These tests were made in Pachuca Agitation Tanks and agitated continuously for 30 and 36 hours respectively.

(Signed) SILL AND SILL
MINING & METALLURGICAL ENGINEERS

CYANIDE TESTS

	Test No. 8 Composite Samples 1, 2, 3, 4	
	Ag. ozs	Au. ozs.
Heads assay value	7.05	.10
Tails " "	.99	.005
% Extraction Heads and Tails difference	86.0%	95.0%
Weight of ore used	100 lbs.	
Ore crushed to	-150 mesh	
Weight of solution	150 lbs.	
Dilution	1½ to 1	
Cyanide consumed per ton of ore	2.5 lbs.	
Lime consumed per ton of ore	11 lbs.	
Strength of solution in KCN at start	4.8 lbs.	
Strength of solution in KCN at end	3.3 lbs.	
Protective alkalinity at start	.7 lbs.	
Protective alkalinity at end	.45 lbs.	
Time of agitation	42 hours	

* This test was made in a Pachuca tank and agitated continuously for 42 hours.

(Signed) SILL AND SILL
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reach about 250 feet below the present tunnel. This tunnel would be used as an ore extraction tunnel for milling operations, and should afford reasonably cheap mining costs. Any deeper development could be done by sinking an underground shaft from this last tunnellevel.

Cyanide tests made by the Company indicate that the ore is amenable to cyanide treatment, with extraction percentage about 90 per cent.

Electric power can be obtained from the Arizona Power Company by construction of about one and a half miles of transmission line.

There is an abundance of standing timber on the claims for mining purposes, and the mine will furnish ample water for milling purposes.

The general conditions for economic operation of the property are good. On basis of 100-ton milling plant, and keeping the overhead expense to the minimum, it would appear that mining and milling costs should not exceed six dollars ($6.00) a ton.

Respectfully submitted

A. L. JOHNS.

To
Mr. A. J. Pickrell,
Los Angeles,
California.

January 20, 1923.

ORE TESTING DEPARTMENT

SOUTHWESTERN ENGINEERING COMPANY

1221 Hollingsworth Building,
Los Angeles, Calif.

CONCENTRATION TEST BY FLOTATION.

Date Sample received June 29, 1920. Date test made July 8, 1920.

Ore from Till Starbuck Mines Co., Prescott, Arizona.

Description of Sample Composite 5 samples. Weight Ore tested 680.0 gms.

Lot 801. Test A. Mesh -100. Time of Test 9 min. Ratio of Liquid to solids 4-1.

ASSAYS

Product	Weight per cent	Oz. Au.	Oz. Ag.
Assayed heads		0.18	10.94
Calculated heads	100.00	0.181	10.64
Conc.	3.46	4.16	247.96
Mids.	5.29	0.35	17.17
Tails	91.25	0.02	1.08

DISTRIBUTION PER CENT

Calculated heads	100.00	100.0	100.0
Conc.	3.46	79.5	82.0
Mids.	5.29	10.5	8.6
Tails	91.25	10.0	9.4

Oils used per ton of ore.

1 lb. P.E. oil. 5/10 lb. G.N.S. #5 oil. 1 lb. sodium sulphide.

General Remarks: The sample used in making this test was made by taking equal weights of Gardner ore - deep tunnel, Gardner ore - deep tunnel #2, and High Grade Ore from around Winze.

Assayer: Smith Emery Co.

SOUTHWESTERN ENGINEERING COMPANY
Robert Lord.

ORE TESTING DEPARTMENT.

SOUTHWESTERN ENGINEERING COMPANY
1221 Hollingsworth Building
Los Angeles, Calif.

CONCENTRATION TEST BY FLOTATION.

Date Sample Received June 29, 1920. Date test made July 15, 1920.

Ore from Tillie Starbuck Mines Co., Prescott, Arizona.

Description of Sample Composite Oxide Ore, Johnson ore. Weight ore tested 680.0gms.

Lot 600. Test B. Mesh 100. Time of Test 10 min. Ratio of Liquid to Solids 4-1

ASSAYS.

Product	Weight per cent.	Oz. Au.	Oz. Ag.
Assayed heads		0.08	5.36
Calculated heads	100.00	0.052	8.30
Conc.	2.50	1.62	80.78
Mids.	15.82	0.02	3.32
Tails	83.68	0.01	0.71
		DISTRIBUTION PER CENT	
Calculated heads	100.00	100.0	100.0
Conc.	2.50	78.8	68.2
Mids.	15.82	5.8	13.9
Tails	83.68	15.4	17.9

Oils used per ton of ore.

2 lbs. P.E. oil. 4/10 lbs. C.M.S. #5 oil. 1 lb. sodium sulphide.

General remarks: This test was run the same as test 600 A, except more P.E. Oil was used.

Assayer: Smith Emery Co.

SOUTHWESTERN ENGINEERING COMPANY
Robert Lord.

ORE TESTING DEPARTMENT

SOUTHWESTERN ENGINEERING COMPANY

1221 Hollingsworth Building,
Los Angeles, Calif.

CONCENTRATION TEST BY FLOTATION

Date sample received June 29, 1920 Date test made July 7, 1920.

Ore from Tillie Starbuck Mines Co., Presco t, Arizona.

Description of Sample Composite of 5 samples. Weight Ore tested 680.0 gms.

Lot 782. Test C Mesh -100 Time of Test 7 & 7 min. Ratio of Liquid to Solids 4-1.

Product	Weight per cent	ASSAYS Oz. Au.	Oz. Ag.
Assayed heads		0.13	8.05
Calculated heads	100.0	0.157	8.75
Conc.	5.19	5.52	209.70
Mids.	6.40	0.20	16.04
Tails	90.41	0.02	1.12
		DISTRIBUTION PER CENT	
Calculated heads	100.00	100.00	100.00
Conc.	5.19	77.4	76.6
Mids.	6.40	9.5	11.8
Tails.	90.41	13.1	11.6

Oils used per ton of ore.
1st series:- 1 lb. P.E. Oil. 3/10 lb. G.N.S. #5 oil. 1 lb. sodium sulphide. 2nd series: 1 lb. P.E. Oil. 3/10 G.N.S. #5 oil.

Assayer Smith Emery Co.

SOUTHWESTERN ENGINEERING CO.
Robert Lord.

ORE TESTING DEPARTMENT

SOUTHWESTERN ENGINEERING COMPANY

1221 Hollingsworth Building,
Los Angeles, Calif.

CONCENTRATION TEST BY FLOTATION.

Ore from Tillie Starbuck Mines, Prescott, Arizona.

Lot 301 Test E. continued.

Product	Weight per cent	ASSAYS Oz. Au.	Oz. Ag.
Table conc.	1.91	0.44	21.52
Tails	98.54	0.01	1.00
		DISTRIBUTION PER CENT	
Table conc.	1.91	4.3	5.9
Tails	98.54	5.4	8.4

Oils used per ton of ore.

1 lb. P.E. Oil. 5/10 G.M.S. #5 Oil. 1 lb. sodium sulphide.

General Remarks; Two charges of 680 gms. each were floated and the products combined. The flotation tails were tabled, making the table concentrate shown above.

Assayer: Smith Emery Co.

SOUTHWESTERN ENGINEERING CO.,
Robert Lord.

ORE TESTING DEPARTMENT.

SOUTHWESTERN ENGINEERING COMPANY,
1221 Hollingsworth Building,
Los Angeles, Calif.

CONCENTRATION TEST BY FLOTATION.

Date sample received June 29, 1920. Date test made July 1[illegible], 1920.

Ore from Tillie Starbuck Mines Co., Prescott, Arizona.

Description of Sample. Composite of 5 samples. Weight ore tested 1560.0 gms.

Lot 891. Test B. Mesh 80. Time of test 10 min. Ratio of liquid to solids 4--1.

ASSAYS

Product	Weight per cent	Oz. Au.	Oz. Ag.
Assayed heads		0.18	10.94
Calculated heads	100.00	0.186	10.57
Flot. conc.	5.82	4.01	224.39
Flot. mids.	4.93	0.50	14.14
		DISTRIBUTION PER CENT	
Calculated head	100.00	100.0	100.0
Flot. conc.	5.82	82.3	81.1
Flot. mids.	4.93	8.0	6.6

General Remarks: Equal weights of Gardner ore - deep tunnel, Gardner ore - deep tunnel #2, and high grade ore from around winze, were mixed to form the sample used in this test.

Assayer: Smith Emery Co.

SOUTHWESTERN ENGINEERING CO.,
Robert Lord.

ORE TESTING DEPARTMENT

SOUTHWESTERN ENGINEERING COMPANY

1221 Hollingsworth Building,
Los Angeles, Calif.

CONCENTRATION TEST BY FLOTATION.

Date sample received June 29, 1920. Date test made July 9, 1920.

Ore from Tillie Starbuck Mines Co., Prescott, Arizona.

Description of sample. Composite oxide ore, Johnson ore. Weight ore tested 680.0 gms.

Lot 800. Test A. Mesh -100. Time of Test 9 min. Ratio of liquid to solids 4-1.

ASSAYS

Product	Weight per cent	Oz. Au.	Oz. Ag.
Assayed heads		0.08	3.38
Calculated heads	100.00	0.048	3.76
Conc.	1.25	3.28	214.62
Mids.	5.00	0.15	5.71
Tails	93.75	tr.	0.84

DISTRIBUTION PER CENT

Calculated heads	100.00	100.00	100.00
Conc.	1.25	85.4	71.3
Mids.	5.00	14.6	7.7
Tails	93.75	tr.	21.0

Oils used per ton of ore.

1 lb. P.E. oil. 4/10 G.N.S. #5. 1 lb. sodium sulphide.

Assayer: Smith Emery Co.

SOUTHWESTERN ENGINEERING CO.,
Robt. Lord.

ORE TESTING DEPARTMENT

SOUTHWESTERN ENGINEERING COMPANY
1221 Hollingsworth Building,
Los Angeles, Calif.

CONCENTRATION TEST BY FLOTATION

Date sample received June 29, 1920. Date test made July 1, 1920.

Ore from Tillie Starbuck Mines Co.

Description of Sample Composite of 5 samples. Weight Ore tested 680.0 gmss

Lot 782. Test A. Mesh -100 Time of Test 7 Min. Ratio of Liquid to solids 4-1.

Product	Weight per cent	ASSAYS Oz. Au,	Oz. Ag.
Assayed heads		0.13	8.05
Calculated heads	100.00	0.101	7.41
Conc.	2.80	3.40	210.40
Mids.	4.85	0.12	10.10
Tails	92.35	Trace	1.12
		DISTRIBUTION PER CENT	
Calculated heads	100.00	100.0	100.0
Conc.	2.80	94.1	79.5
Mids.	4.85	5.9	6.6
Tails	92.35	tr.	15.9

Oils used Per ton of ore.

1 lb. P. E. Oil. 3/10 lb. G.N.S. #5 oil. 1 lb. sodium sulphide.

General Remarks: This composite was made by taking equal weights of samples marked Gardner ore, deep tunnel.; Gardner ore, deep tunnel #2; Oxide ore; Johnson ore, deep tunnel; and high grade ore from around winze.

Assayer Atkin & McRae

Signed SOUTHWESTERN ENGINEERING COMPANY
Robt. Lord.

TILLIE - STARBUCK MINE.

Wickenburg, Arizona,
April 21st, 1932.

- - - very attractive gold values were once found on the Artic vein -- expect to develop large ore body when present work intercepts said Artic vein.

The vein that is generally known as the Tillie Starbuck Vein is the same vein cutting through the Plevna Claim, and is continuous, I think, for the full length of the Tillie Group, which is over a mile in length. The ore shoots are opened on three levels known as tunnels 1, 2, 3, and tunnel number 4 is the one Frits is now driving. Tunnel #1 is the upper, and is 700 to 800 feet long, exact distance I cannot remember. In that tunnel was developed the Johnson shoot, then the Gardner shoot, and near the breast, the Gold shoot. Tunnel #2 is the tunnel that the road passes over before reaching camp and, due to its having been caved prior to the time I became interested in it with Major, I do not know its entire length but would say approximately 1300 feet. This tunnel is about 140 feet below tunnel #1 and developed the same ore and approximately the same grade as #1 with a slight increase in the ore shoots. Tunnel #3 is the one in the canyon just below camp. The first 900 feet of it was a cross cut and the Plevna vein encountered and followed in a southerly direction for some 1200 or 1400 feet to develop the Johnson, Gardner, the Gold, and the silver shoots. This is the only tunnel that had gone far enough to encounter the silver shoot and the breast of the tunnel, when stopped, still showed values. And, from surface indications I feel sure that more ore shoots could be developed in a Southerly direction if developments were continued for another 600 feet.

Three raises were driven from tunnel #2 to tunnel #3. One on the Gardner, one on the Gold, and one on the Silver Shoot, and one driven from tunnel #1 to tunnel #2 on the Gardner shoot; which proved the ore to be regular in value, and continuous from level to level, with an average width of from six to eight feet. The vein varying from as much as 2 to 17 feet wide, and 6 feet for the average is very conservative. I feel very confident that there is very close to 70,000 tons of ore blocked out between tunnel #3 and the surface which depth is from 500 feet on the Johnson shoot to 800 feet vertical on the Gold. Tunnel #4 when completed will encounter the various shoots from 800 to 1100 feet vertical. And from all evidence will more than double the tonnage available.

The values are entirely gold and silver, and the average proportions are two-fifths Gold and three-fifths Silver. When silver was a dollar I figured the entire ore would average around $8.00. Of course at the present price it would be considerably reduced. But the one great attraction to the

Tillie Starbuck is that whenever bunches of sulphide ore were encountered the grade increased substantially, and it is the opinion of those familiar with the geology of the Tillie, when the sulphide zone is reached, a very attractive ore will be encountered.

The sheet of tunnel #3 is still oxidized and no doubt impoverished from it to a considerable extent by leaching. Another very interesting feature is that all the ore sheets have continued to lengthen as greater depth has been gained. And it is my opinion and also of the Major's, when tunnel #4 is completed that a continuous ore sheet will be developed to a distance of 1000 to 1200 feet. This was strongly evidenced by almost continuous values for the entire length of tunnel #3 from where the ore was encountered on the Johnson sheet for approximately 1000 feet southerly.

In the Major's records there should be a blue print drafted by A. L. Johns showing the vertical section of the different ore sheets which will give you a better knowledge than it would be possible for you to gain otherwise. - - - -

Due to the ideal situation of the mine, even on a fifty cent silver market, the Tillie would be on a substantial productive basis for many years, as the cost of mining and milling should in no case exceed $2.50 per ton. There is plenty of timber on the property for all mining purposes, and an abundance of water coming to the mill by gravity, as well as the ore to a depth of 1100 feet when the present tunnel is completed.

A. B. PEACH.

LOCATION

The Tillie Starbuck property comprises ten (10) patented and two (2) unpatented lode mining claims located at Slate Creek, Hassayampa Mining District, about 15 miles Southeast of Prescott, Arizona. The property is reached by a good highway from Prescott, which is the nearest supply point.

EXTENT OF REPORT AND CONCLUSIONS

The mine is opened by three principal tunnels, the lowest tunnel of which exposes 4 ore shoots at depths of from 350 feet to about 600 feet. (See accompanying map whowing longitudinal section along the Tillie Starbuck vein). I did not sample any of the ore shoots on the two upper tunnel levels, but confined my examination to observing the ore conditions on the lower tunnel level, and took what I considered sufficient samples from various cross-cuts in the ore-bodies, and in particular from the Gardner Winze, so as to gain a reasonably accurate idea of ore values on this tunnel level.

In general terms the following conclusions stand out:

(1) The country rock is not the tight granitic formation which is common in the Prescott vicinity, but consists mainly of belts of soft porphyry and schists with some diorites which strike about S-17° W. The Tillie Starbuck vein occupies a very strong fault fissure which cuts the schistocity of the country rock at angle of 20° to 30°. The strike of the vein varies from 5° to 10° Southeast with dip of about 80° easterly.

(2) The vein on the lower tunnel level at depth of 600 feet on the Gardner ore shoot shows a well oxidized, loose vein structure with only occasional small patches of sulphides remaining. The oxidized ore shows good evidence of leaching action with considerable development of limonite iron, which I consider is derived from oxidation and leaching of original sulphide ores. The vein has a very favorable appearance of containing several hundred feet below the present depth.

(3) The Gardner winze is centrally located for deeper development below tunnel leve. By sinking this winze 200 to 300 feet, and drifting along the ore, should demonstrate ore conditions in the sulphide zone. The Gardner ore shoot shows $10.00 values in the oxide ores.. The values are about equally divided between gold and silver in the oxidized ore. The sulphide ores show increasing silver. Silver is figured

at $1.00 per ounce. Indications point to higher values in the sulphides -- probably to $15.00 to $20.00 per ton. It appears quite probable that further development will open sufficient ore to warrant a 100-ton milling plant.

ORE SHOOTS

My samples of the Gardner winze, now down 30 feet below the tunnel level, show average values of about $11.00 across 10½ feet in the oxidized ore. Small patches of sulphide ore now coming in indicate that the sulphide zone may be reached in the next 200 feet of sinking.

One sample of sulphide ore, showing only light sulphides of pyrite and galena, from drift on the Gardner shoot, 25 feet North of the Gardner winze on tunnel level, assayed $8.26 gold and 11.80 ounces silver -- total $20.06.

A sample of oxide ore 7 feet wide at this point assayed $4.65 gold and 5.30 ounces silver -- total $9.95. The value of $20.06 on the one sulphide sample as compared to an average of about $11.00 on the oxidized ore indicates that deeper development in the sulphide zone has a good chance of opening considerably higher grade sulphide ores than the present oxidized ores.

The Gardner and Oxidized Ore Shoots are raking toward each other, as shown on map, and should merge into one ore shoot about 150 feet below the present tunnel. The vein on the tunnel level between the Gardner and the Oxidized Ore Shoots shows small irregular lenses of ore in a loose vein structure, and it appears quite possible that greater depth may show the Gardner and Oxidized Ore Shoots as one continuous ore shoot of from 300 to 500 feet in length with indicated width at present of 10 to possibly 15 feet.

In addition to the Gardner and the Oxidized Ore Shoots, the Johnson and the Silver Shoots offer equally good possibilities with deeper development. The Johnson shoot has length of about 200 feet with average width of about 10 feet. The Silver Shoot is about 60 feet long by 3 to 5 feet in width. I have made no estimate of ore values or tonnage above the tunnel level, but Company figures indicate that about 50,000 tons of about $9.00 ore can be mined from this area.

$20.00 Au

SAMPLES - Tunnel Level	Width Feet	Gold	Silver Ozs.	Total Value $
		Tr.	Tr.	
1 & 2 In drift North end of Johnson shoot	6½	$6.20	5.70	11.90
3 Johnson shoot - middle xcut E.	9	3.72	1.00	4.72
4 Johnson shoot - South xcut (0-9) from hanging wall	5	4.54	.61	5.15
5 Johnson shoot - continuation #4 (9-14') from hanging wall	6	4.54	2.80	7.34
6 Gardner shoot - xcut at winze (0-6') from hanging wall	2½	6.20	7.10	13.30
7 Oxidized shoot - (0-2½') from hanging wall	7	3.72	1.80	5.52
8 Oxidized shoot - 2½-9½') from hanging wall	4	4.13	4.80	8.93
9 Gardner shoot - 25' North of winze (3-7') from footwall	3	5.16	5.80	10.96
16 Gardner shoot (0-3') " "	5½	6.20	4.90	11.10
10 Gardner winze - down 30' South end (0-5½') from hanging wall	5½	5.16	6.50	11.66
11 Gardner winze - down 25' South end (0-5½') from hanging wall	4½	5.16	4.75	9.91
12 Gardner winze ~~e~~ down 30' North end (0-4½') from hanging wall	7½	4.54	5.20	9.74
13 Gardner winze - down 25' North end (0-7½') from hanging wall	3	6.20	6.90	13.10
14 Gardner winze - down 25' North size xcut (7½-10½') from hanging wall	4	4.13	6.50	10.63
15 Gardner winze - down 15' North end (0-4') from hanging wall		8.26	11.80	20.06
17 Gardner winze - sulphides at #9				

It is noticeable in the above samples that the gold content is fairly constant but that the silver contents vary from .61 oz. to 7.10 ozs. Separating these samples into two groups -- those containing more than 3 ozs. silver in one group and those samples showing less than 3 ozs. silver in a second group, the following ratio of gold to silver is shown:

Group 1			Group 2		
Sample	Gold	Silver	Sample	Gold	Silver
3	$6.20	5.70 ozs.	4	$3.72	1.00 ozs.
7	6.20	7.10 "	5	4.54	.61 "
9	4.13	4.80 "	6	4.54	2.80 "
16	5.16	5.80 "	8	3.72	1.80 "
10	6.20	4.90 "	Total	$16.52	6.21 "
11	5.16	6.50 "			
12	5.16	4.75 "			
13	4.54	5.20 "			
14	6.20	6.90 "			
15	4.13	6.50 "			
Total	$53.08	58.15 "			
Average	$ 5.31	5.81 "			

Group 1 shows roughly a ratio of one dollar gold to one ounce silver. Group 2 shows nearly three dollars gold to one ounce silver. In sample 17 of sulphide ore the silver ratio increases to nearly 1½ ounces silver to one dollar gold. The low silver ratio of the samples in Group 2, in conjunction with the well oxidized condition of the vein, supports the theory that a considerable portion of the silver values have been leached out, while the hold being less susceptible to leaching action would not be leached to the same extent.

With some 500 to 600 feet of oxidized ore above the tunnel level, a very considerable zone of secondary enriched sulphide ore is quite possible at water level. The depth at which the sulphide zone will be encountered is quite indeterminate, but the appearance of scattered bunches of sulphides on the tunnel level and in the Gardner winze indicates that the sulphide zone may be reached within 200 feet below the present tunnel level.

RECOMMENDATIONS AND GENERAL CONDITIONS:

I consider the present development as sufficiently favorable to warrant sinking of the present Gardner winze to, at least the sulphide zone, with sufficient drifting along the ore from the bottom of the winze to determine the probable ore values. If this work responds favorably, a lower cross-cut tunnel about 1700 feet in length should be driven so as to

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Due to the ideal situation of the mine, even on a fifty cent silver market, the Tillie would be on a substantial productive basis for many years, as the cost of mining and milling should in no case exceed $2.50 per ton. There is plenty of timber on the property for all mining purposes, and an abundance of water coming to the mill by gravity, as well as the ore to a depth of 1100 feet when the present tunnel is completed.

A. B. PEACH.

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The mine is opened by three principal tunnels, the lowest tunnel of which exposes 4 ore shoots at depths of from 350 feet to about 600 feet. (See accompanying map showing longitudinal section along the Tillie Starbuck vein). I did not sample any of the ore shoots on the two upper tunnel levels, but confined my examination to observing the ore conditions on the lower tunnel level, and took what I considered sufficient samples from various cross-cuts in the ore-bodies, and in particular from the Gardner Winze, so as to gain a reasonably accurate idea of ore values on this tunnel level.

In general terms the following conclusions stand out:

(1) The country rock is not the light granitic formation which is common in the Prescott vicinity, but consists mainly of belts of soft porphyry and schists with some diorites which strike about S-1V° W. The Tillie Starbuck vein occupies a very strong fault fissure which cuts the schistosity of the country rock at angle of 20° to 30°. The strike of the vein varies from 5° to 10° Southeast with dip of about 80° easterly.

(2) The vein on the lower tunnel level at depth of 600 feet on the Gardner ore shoot shows a well oxidized, loose vein structure with only occasional small patches of sulphides remaining. The oxidized ore shows good evidence of leaching action with considerable development of limonite iron, which I consider is derived from oxidation and leaching of original sulphide ores. The vein has a very favorable appearance of containing several hundred feet below the present depth.

(3) The Gardner winze is centrally located for deeper development below tunnel leve. By sinking this winze 250 to 300 feet, and drifting along the ore, should demonstrate ore conditions in the sulphide zone. The Gardner ore shoot shows $10.00 values in the oxide ores. The values are about equally divided between gold and silver in the oxidized ore. The sulphide ores show increasing silver. Silver is figured

at $1.00 per ounce. Indications point to higher values in the sulphides -- probably to $15.00 to $20.00 per ton. It appears quite probable that further development will open sufficient ore to warrant a 100-ton milling plant.

ORE SHOOTS

My samples of the Gardner winze, now down 30 feet below the tunnel level, show average values of about $11.00 across 10½ feet in the oxidized ore. Small patches of sulphide ore now coming in indicate that the sulphide zone may be reached in the next 200 feet of sinking.

One sample of sulphide ore, showing only light sulphides of pyrite and galena, from drift on the Gardner shoot, 25 feet North of the Gardner winze on tunnel level, assayed $8.26 gold and 11.80 ounces silver -- total $20.06.

A sample of oxide ore 7 feet wide at this point assayed $4.65 gold and 5.30 ounces silver -- total $9.95. The value of $20.06 on the one sulphide sample as compared to an average of about $11.00 on the oxidized ore indicates that deeper development in the sulphide zone has a good chance of opening considerably higher grade sulphide ores than the present oxidized ores.

The Gardner and Oxidized Ore Shoots are raking toward each other, as shown on map, and should merge into one ore shoot about 150 feet below the present tunnel. The vein on the tunnel level between the Gardner and the Oxidized Ore Shoots shows small irregular lenses of ore in a loose vein structure, and it appears quite possible that greater depth may show the Gardner and Oxidized Ore Shoots as one continuous ore shoot of from 300 to 500 feet in length with indicated width at present of 10 to possibly 15 feet.

In addition to the Gardner and the Oxidized Ore Shoots, the Johnsen and the Silver Shoots offer equally good possibilities with deeper development. The Johnsen shoot has length of about 200 feet with average width of about 10 feet. The Silver Shoot is about 60 feet long by 3 to 5 feet in width. I have made no estimate of ore values or tonnage above the tunnel level, but Company figures indicate that about 50,000 tons of about $9.00 ore can be mined from this area.

SAMPLES - Tunnel Level	Width Feet	Gold	Silver Ozs.	Total Value
1 & 2 In drift North end of Johnson sheet		Tr.	Tr.	
3 Johnson sheet - middle cut E.	6½	$6.20	5.70	11.90
4 Johnson sheet - South cut (0-9) from hanging wall	9	3.72	1.00	4.72
5 Johnson sheet - continuation #4 9-14') from hanging wall	5	4.54	.61	5.15
6 Gardner sheet - xcut & winze (0-6) from hanging wall	6	4.54	2.80	7.34
7 Oxidized sheet - (0-8' ') from hanging wall	8½	6.20	7.10	13.30
8 Oxidized sheet - 2½-7 ') from hanging wall	7	3.72	1.80	5.52
9 Gardner sheet - 25' North of winze (3-7') from footwall	4	4.13	4.80	8.93
16 Gardner sheet (0-3' " "	3	5.16	5.80	10.96
10 Gardner winze - down 30' South end (0-5½') from hanging wall	5½	6.20	4.90	11.10
11 Gardner winze - down 45' South end (0-5½') from hanging wall	5½	5.16	6.50	11.66
12 Gardner winze - down 30' North end (0-4½') from hanging wall	4½	5.16	4.75	9.91
13 Gardner winze - down 24' North end 0-7½') from hanging wall	7½	4.54	5.20	9.74
14 Gardner winze - down 25' North side xcut (7½-10½') from hanging wall	3	6.20	6.90	13.10
15 Gardner winze - down 15' North end (0-4', from hanging wall	4	4.13	6.50	10.63
17 Gardner winze - sulphides at #9		8.26	11.80	20.06

It is noticeable in the above samples that the gold content is fairly constant but that the silver contents vary from .61 oz. to 7.10 ozs. Separating these samples into two groups -- those containing more than 3 ozs. silver in one group and those samples showing less than 3 ozs. silver in a second group, the following ratio of gold to silver is shown:

Group 1

Sample	Gold	Silver
5	$6.20	5.70 ozs.
7	6.20	7.10 "
9	4.13	4.80 "
16	5.16	5.80 "
10	6.20	4.90 "
11	5.16	6.50 "
12	5.16	4.75 "
13	4.54	5.20 "
14	6.20	6.90 "
15	4.13	6.50 "
Total	$53.08	58.15 "
Average	$ 5.31	5.81 "

Group 2

Sample	Gold	Silver
4	$3.72	1.00 ozs.
5	4.54	.61 "
6	4.54	2.80 "
8	3.72	1.80 "
Total	$16.52	6.21 "

Group 1 shows roughly a ratio of one dollar gold to one ounce silver. Group 2 shows nearly three dollars gold to one ounce silver. In sample 17 of sulphide ore the silver ratio increases to nearly 1½ ounces silver to one dollar gold. The low silver ratio of the samples in Group 2, in conjunction with the well oxidized condition of the vein, supports the theory that a considerable portion of the silver values have been leached out, while the gold being less susceptible to leaching action would not be leached to the same extent.

With some 500 to 600 feet of oxidized ore above the tunnel level, a very considerable zone of secondary enriched sulphide ore is quite possible at water level. The depth at which the sulphide zone will be encountered is quite indeterminate, but the appearance of scattered bunches of sulphides on the tunnel level and in the Gardner winze indicates that the sulphide zone may be reached within 200 feet below the present tunnel level.

RECOMMENDATIONS AND GENERAL CONDITIONS:

I consider the present development as sufficiently favorable to warrant sinking of the present Gardner winze to, at least the sulphide zone, with sufficient drifting along the ore from the bottom of the winze to determine the probable ore values. If this work responds favorably, a lower cross-cut tunnel about 1700 feet in length should be driven so as to

reach about 250 feet below the present tunnel. This tunnel would be used as an ore extraction tunnel for milling operations, and should afford reasonably cheap mining costs. Any deeper development could be done by sinking an underground shaft from this last tunnellevel.

Cyanide tests made by the Company indicate that the ore is amenable to cyanide treatment, with extraction percentage about 90 per cent.

Electric power can be obtained from the Arizona Power Company by construction of about one and a half miles of transmission line.

There is an abundance of standing timber on the claims for mining purposes, and the mine will furnish ample water for milling purposes.

The general conditions for economic operation of the property are good. On basis of 100-ton milling plant, and keeping the overhead expense to the minimum, it would appear that mining and milling costs should not exceed six dollars ($6.00) a ton.

Respectfully submitted

A. L. JOHNS.

To
Mr. A. J. Pickrell,
Los Angeles,
California.

January 20, 1923.

TILLIE - STARBUCK MINE.

Wickenburg, Arizona,
April 21st, 1932.

- - - very attractive gold values were once found on the Artic vein -- expect to develop large ore body when present work intercepts said Artic vein.

The vein that is generally known as the Tillie Starbuck Vein is the same vein cutting through the Plevna Claim, and is continuous, I think, for the full length of the Tillie Group, which is over a mile in length. The ore shoots are opened on three levels known as tunnels 1, 2, 3, and tunnel number 4 is the one Fritz is now driving. Tunnel #1 is the upper, and is 700 to 800 feet long, exact distance I cannot remember. In that tunnel was developed the Johnson shoot, then the Gardner shoot, and near the breast, the Gold shoot. Tunnel #2 is the tunnel that the road passes over before reaching camp and, due to its having been caved prior to the time I became interested in it with Major, I do not know its entire length but would say approximately 1300 feet. This tunnel is about 140 feet below tunnel #1 and developed the same ore and approximately the same grade as #1 with a slight increase in the ore shoots. Tunnel #3 is the one in the canyon just below camp. The first 700 feet of it was a cross cut and the Plevna vein encountered and followed in a southerly direction for some 1200 or 1400 feet to develop the Johnson, Gardner, the Gold, and the silver shoots. This is the only tunnel that had gone far enough to encounter the silver shoot and the breast of the tunnel, when stopped, still showed values. And, from surface indications I feel sure that more ore shoots could be developed in a Southerly direction if developments were continued for another 600 feet.

Three raises were driven from tunnel #2 to tunnel #3. One on the Gardner, one on the Gold, and one on the Silver Shoot, and one driven from tunnel #1 to tunnel #2 on the Gardner shoot; which proved the ore to be regular in value, and continuous from level to level, with an average width of from six to eight feet. The vein varying from as much as 2 to 17 feet wide, and 6 feet for the average is very conservative. I feel very confident that there is very close to 70,000 tons of ore blocked out between tunnel #3 and the surface which depth is from 500 feet on the Johnson shoot to 00 feet vertical on the Gold. Tunnel #4 when complete will encounter the various shoots from 300 to 1100 feet vertical. And from all evidence will more than double the tonnage available.

The values are entirely gold and silver, and the average proportions are two-fifths Gold and three-fifths Silver. Then silver was a dollar I figured the entire ore would average around $8.00. Of course at the present price it would be considerably reduced. But the one great attraction to the

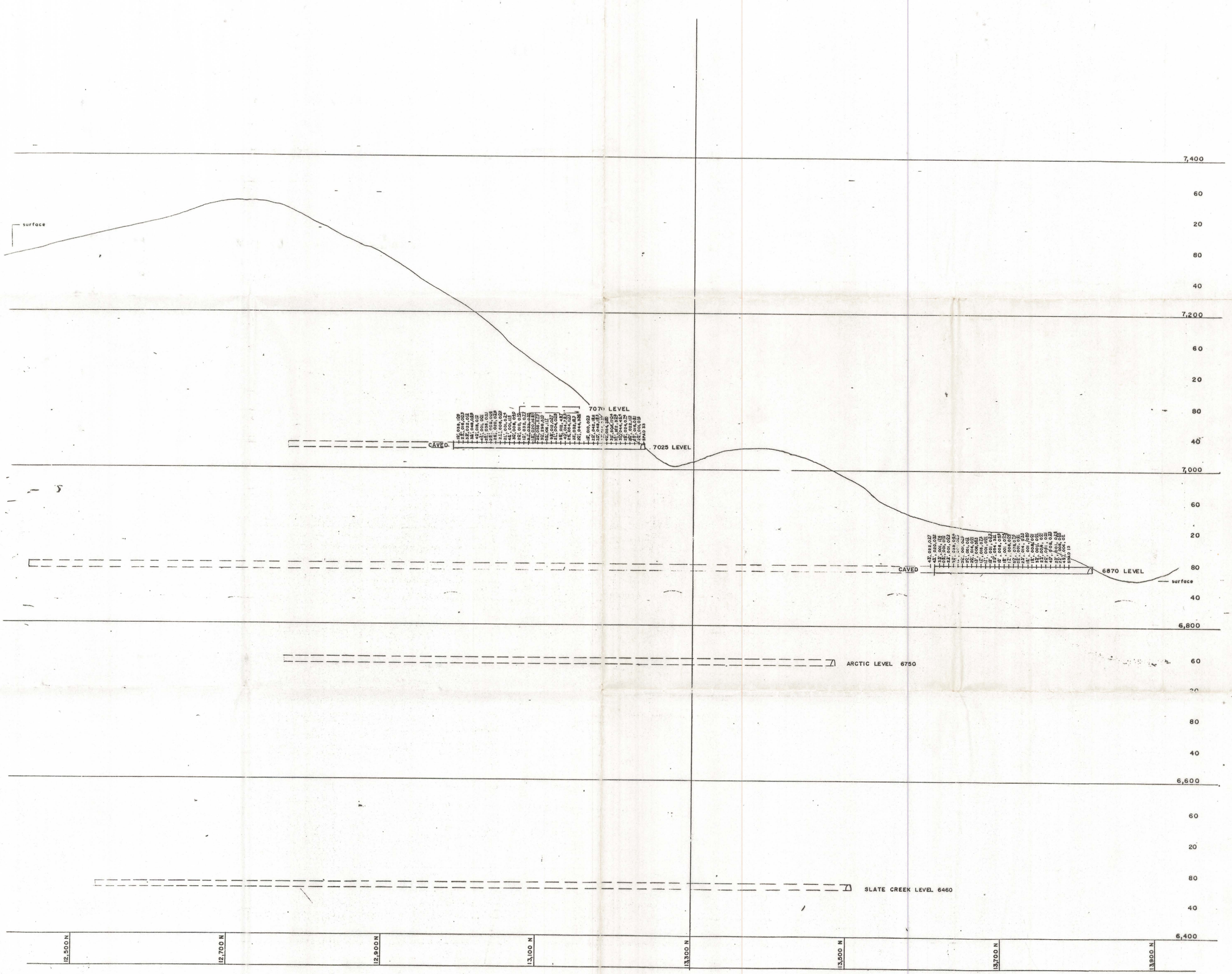
Tillie Starbuck is that whenever bunches of sulphide ore were encountered the grade increased substantially, and it is the opinion of those familiar with the geology of the Tillie, when the sulphide zone is reached, a very attractive ore will be encountered.

The sheet of tunnel #3 is still oxidized and no doubt impoverished from it to a considerable extent by leaching. Another very interesting feature is that all the ore sheets have continued to lengthen as greater depth has been gained. And it is my opinion and also of the Major's, when tunnel #4 is completed that a continuous ore sheet will be developed to a distance of 1900 to 1900 feet. This was strongly evidenced by almost continuous values for the entire length of tunnel #3 from where the ore was encountered on the Johnson sheet for approximately 1000 feet southerly.

In the Major's records there should be a blue print drafted by A. L. Johns showing the vertical section of the different ore sheets which will give you a better knowledge than it would be possible for you to gain otherwise. - - - -

Due to the ideal situation of the mine, even on a fifty cent silver market, the Tillie would be on a substantial productive basis for many years, as the cost of mining and milling should in no case exceed $2.50 per ton. There is plenty of timber on the property for all mining purposes, and an abundance of water coming to the mill by gravity, as well as the ore to a depth of 1100 feet when the present tunnel is completed.

A. B. PEACH.



ASSAY MAP

WIDTH, AU oz/ton, AG oz/ton

25', .006, 01

GRAHAM INTERNATIONAL INC.

TILLIE STARBUCK PROJECT

LONG SECTION OF WORKINGS

1"= 80' 6/20/80 N.J.N.

DWG NO 527 - 01 - 01A

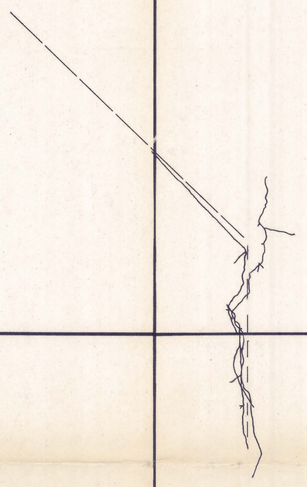
COE & VAN LOO

3

2

10

11



N

0' 100' 400' 1000'

*SCALE

DESIGNED				
DRAWN				
CHECKED				
DATE		REVISIONS	DATE	BY

MINE WORKINGS

TILLIE STARBUCK

COE & VAN LOO CONSULTING ENGINEERS INC.

PHOENIX ARIZONA

FOR:

GRAHAM INT'L INC.

ESCONDIDO, CALIFORNIA

527-01-03

UNDERGROUND WORKINGS

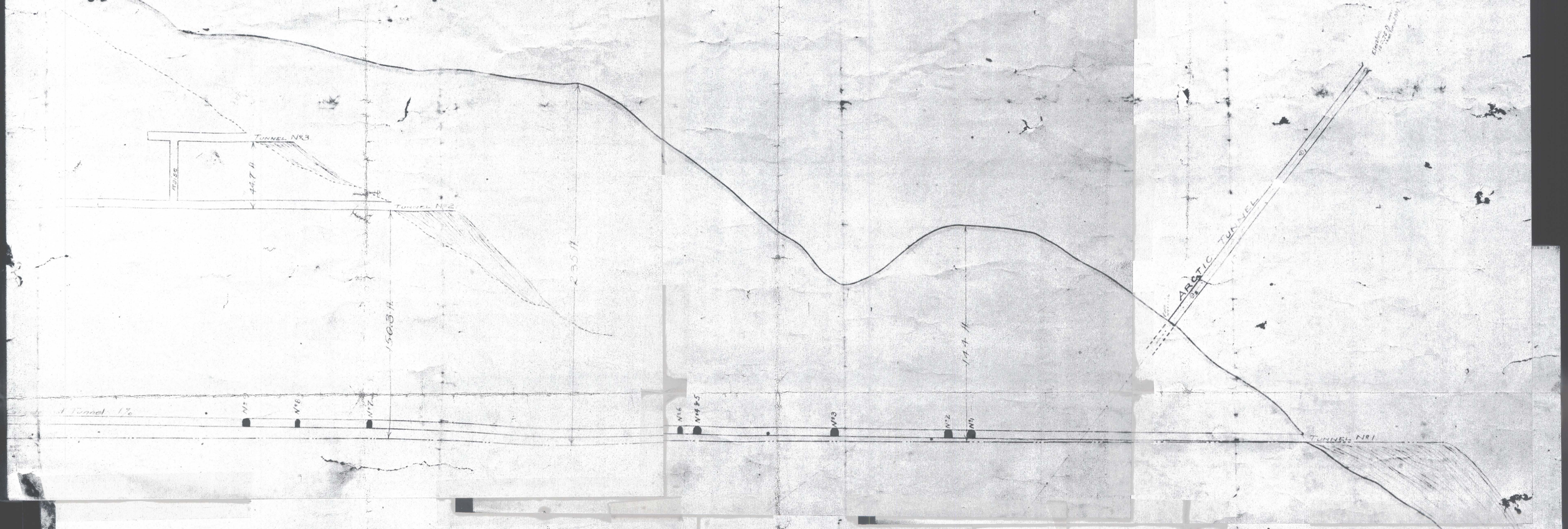
TILLIE STARBUCK GROUP

OF

MINING CLAIMS

Hassayampa Mining District Yavapai County Ariz.

Scale 1in = 40 ft.



PROJECTION

ARE...G... & GLAY BANK.