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

The following file is part of the

Arizona Department of Mines and Mineral Resources Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine SENATOR Date October 23, 1957

District Senator, Yavapai County Engineer FRANK P. KNIGHT

Subject: Present activity - Abbican Company (Canadian)

Took Mount Vernon Street south from Prescott past Groom Creek to headwaters of the Hassayampa. Can't miss the mill. Mt. Vernon runs into Senator road just out of the city.

No supervisors other than master mechanic were at the property. Mine and mill bin and other foundations were being poured with mixed concrete trucked in. A large shop building is set up near the tunnel portal. A dismantled steel building was at hand together with considerable second hand equipment on which mechanics were fin-ding much to do. The equipment was said to come "from Goldfield at the coast and Apache Junction".

A G-D 500 compressor was connected to a good 3" line going into the tunnel, but no underground work was going on.

It is said that certain capital is building the mill with agreement to handle the ore at $3.50 per ton, and it will take custom ores.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Abbican Senator

District Senator

Subject: Present Activity

Date Dec. 19, 1956

Engineer Mark Gemmill

The Abbican Senator Mines Inc. headed by Robert Dannelly has recently acquired a long term lease on the Senator-Cash properties from the joint owners, Mrs E. R. Dickie of Phoenix and Jack Orr. Iron Springs Road, Prescott. The Abbican Senator appears to be a subsidiary of Abbican of Canada. The address of the Arizona Comapny is Goldwater Bldg. Prescott.

Mr. Dannelly atated the present plans of the company are extensive development of the property and immediate construction of a mill to treat ores now available. Still and Still have been engaged to make a geological report on the property.

Full details of the financial structure of the company or of the proposed development are not available at present but probably can be had a little later.

Feb 1957 - Mining World p. #83 see item re. Abbicans Mines Ltd.

REPORT ON THE ABBICAN-SENATOR MINES INC.
YAVAPAI COUNTY, ARIZONA

Walther V. Heyden,
P. Eng. M.E.I.C.

December 18th, 1956.

LOCATION: The mine known as the Senator-Cash property of the Abbican-Senator Corporation Limited is located about 11 miles south east of the Town of Prescott, Yavapai County, Arizona.

AREA: The property consists of an interconnected group of claims individually named, ie: the 'Senator' the 'Cash', the 'Snoozer' and others, comprising of an area of more than 300 acres.

DEPOSITS: The strike of formation is roughly NE-SW, and most of the veins follow the same direction. With the exception of the mud vein, the following veins are known and have been worked previously: Little Senator, Big Senator, Tenspot, Tredwell, Cash, Snoozer, Cashier. The mud vein at earlier times contained too much water, and as far as known only contained Copper values (with a width up to 14') and was considered not interesting and also too dangerous to work.

Certain veins are partly interconnected, like the 'Little' and 'Big' Senator, with a network of diagonal veinlets, which in places might widen out over five (5) feet wide.

A series of channel and of grab samples have been taken during my first visit at the property. Assay returns of these samples have not been received, and values thus cannot be given. Checking earlier shipping records and assays, in conjunction with these records, the following values have been given:

Shipping ore	AU-ozs.	AG-ozs.	CU-%	Tons
1952	.038	3.47	4.75	14.12
1954	.037	3.6	4.97	251.24
1955	.025	2.8	3.6	386.84

At the Cash vein on the level about 110 feet above the adit, where the test holes have been bored in walls at regular intervals, the following notice was written on the wall on one location:

At 40'-46' Ore Copper 4%
Lead (was unreadable)
Silver 2 ozs.
Dated 5-25-56

This note was confirmed by Mr. Jack Orr, (the last lessee in the Senator) who pointed out, as he showed G. D. Harvey and R. Dannelley through some of the mine workings.

My own observations are, that in every vein mentioned only a core containing high grade gold ore was mined. The bulk of the base metals still remain in the walls, not only, along the drifts but also in all stopes, raises etc. Previously, estimates considered only the amount of ore worked during earlier times; it is believed the amount of ore reserves is far in excess of the estimates.

Other observations on one of the upper levels of the Cash property disclosed: That along the main drift the Cash vein was exposed at a crosscut about 20 feet to the north, the Snoozer vein crosses; at the farther end of the crosscut, another mineralized vein structure was visible, which up to this date has not been mentioned or identified anywhere, as far as the writer knows.

DEVELOPMENT: In addition to the shafts a network of drifts, on various levels, crosscuts, and stopes have been developed, which with comparatively moderate outlay can be brought into production again. If all this work, already completed, had to be done today, it would cost in excess of 3 million dollars.

There are at the shaft-sites several ore dumps, which contain ore of mill-grade and can be considered as ore reserves. I refer in that respect to statements in earlier reports. A surface survey has been completed showing all veins, shafts, dumps, etc. in relation to each other. It will be the basis for correlation with later surveys of underground workings and occurences of veins, ore shoots etc.

CONCLUSION: Referring back to my earlier mentioning of discomformity between veins, it is noted that the vein material of the Cash and the Snoozer show a marked differentiation in content. It must be assumed, that the ore as it is found at the Abbican-Senator property has been created not all at the same time but of widely apart periods.

Considering further that the Tredwell vein runs discordantly to the general strike of the other veins and formations, and also considering the diagonal cross fracturing between the Little and Big Senator veins, it indicates that the creation of the veins has not been by normal Tectonic tension fractures and filling only. With all this disconformity, a major upheaval below must have caused the irregular fractioning of these upper layers. This underlying power must be assumed to be the upthrust of an ore body, from which the presently known system of veins radiates.

Comparing the veins of the Abbican-Senator property with those at other mines in this district, it substantiates this assumption. In those other mines, veins lead to depth to substantial ore bodies, which nobody anticipated; although they do not have an extensive vein system like ours.

The Abbican-Senator property is, located at the hub of a mining district, where extensive mining and exploration work has been done successfully for many years. Being in that location, and having a stronger vein system than many of the productive mines in the district, it must be concluded that with normal expectations the Abbican-Senator property should develop into one of the major producers, if not the major producer of this county.

W. V. Heyden,
P. Eng. M.E.I.C.

Quoted from the Northern Miner
December, 1956.

PROGRESS IS GOOD ON ABBICAN GROUP

Good progress is being made by Abbican Mines in readying its Arizona copper property for production C. A. Wuest, president, advises.

The 33-claim property plus fractions lies near Prescott. It was operated in the early days as a gold producer but this was a highgrading operation. Access was gained through an adit which is 3,270 ft. long. Abbican is concentrating on developing the property for its copper possibilities but good values in silver, zinc, lead and gold have been secured. It is expected that production will start in March of 1957, at a 200-ton-per day rate.

The company has been engaged in cleaning up the old mine workings and installing new underground equipment. Rails, water lines and air lines have been installed on both the main adit level and a sub-level and progress is being made in opening three of the old drifts. These three drifts comprise only a small portion of the 11,000 ft. of lateral work done by previous owners.

Above the main adit the company has an average height of 900 ft. of back to investigate. There are six veins exposed on surface and it is stated that all of these re-appear in the adit and they seem to be widening, according to W. V. Heyden, company engineer.

The sub-level lies 280 ft. above the main adit. It is rapidly being readied for mining purposes.

The company is carrying out a drilling program at the moment to test for possible ore extension to an average depth of 500 ft. below the main adit. The search is being carried out for a possible merging of the vein systems.

Three of the veins have been bulk sampled where disclosed on the adit horizon and this material along with that from a 42,000-ton stockpile is currently out for assay.

The site for the 200-ton per day mill has been cleared and recently the company began pouring the foundations. Provisions have been made to raise the mill's rated capacity to 500 tons per day quite readily.

As stated previously in the Northern Miner, proven ore reserves, including 42,000 tons in a stockpile, are approximately 487,000 tons averaging between 3.6% and over 5% copper with about 3.0 ozs. of silver per ton. It is estimated that about 1,000,000 tons are available for mining, most of it in place above the adit. This also includes the stockpile.

Recent underwritings which provided the company with $530,000 are expected to see the company well along the road to its goal. There are no further options outstanding. Of an authorized capitalization of 6,000,000 shares, 2,115,000 are issued.

07/29/87

ARIZONA DEPARTMENT OF MINES AND MINERAL RESOURCES FILE DATA

PRIMARY NAME: SENATOR

ALTERNATE NAMES:
TEN SPOT PATENT MS 963
SNOOZER PATENTED MS 964
TREADWELL PATENT 1288
MCCLEUR
SKYLIGHT
CHERRY

YAVAPAI COUNTY MILS NUMBER: 1149D

LOCATION: TOWNSHIP 12.5N RANGE 2 W SECTION 35 QUARTER NE
LATITUDE: N 34DEG 25MIN 25SEC LONGITUDE: W 112DEG 25MIN 45SEC
TOPO MAP NAME: GROOM CREEK - 7.5 MIN

CURRENT STATUS: PAST PRODUCER

COMMODITY:
COPPER
SILVER
GOLD
LEAD
ZINC
IRON MAGNATITE

BIBLIOGRAPHY:
USGS GROOM CREEK QUAD
WILSON, E.D.ET.AL. AZ LODE GOLD MINES AZBM BULL 137 P 46
YAVAPAI MAGAZINE JULY 1918 P 5 SHARLOT HALL MUSEUM PRESCOTT, AZ
BLM MINING DISTRICT SHEET 245
AZ MINING JOURNAL AUG. 1919 P 23
ADMMR SENATOR FILE
LINDGER, W. ORE DEPTS OF JEROME & BRADSHAW MTN. QUADS USGS BULL. 782, 1926, P. 120
CLAIMS EXTEND INTO SEC. 2-T12N-R2W AND SEC. 35-T12.5N-R2W

SENATOR - COCVO FILE

FOREST
BRADSHAW
Hassayampa Lake
Hassayampa
Water Tank
Potato Patch
6849
Snowdrift Mine
7641
Mt Davis
Spring
River
31
32
36
Cash Mine
60°
Mt Union Lookout
7979
Picnic Area
BM 7193
6
5
1
7675
Silver Spruce Mine
Alligator Mine
Mt Union Mine
75°
137-48
Starlight Mine
Moscow Peak
7721
Canyon
YANKEE DOODLE TRAIL
SENATOR HIGHWAY
White Well
6337
12
7
8
Crooks
Starlight
Yankee Doodle Peak
Venezia (Site)
Ash Creek
JEEP TRAIL
Ridge
Canyon
Turkey
6470
Mastadon Mine
5975
13
18
17
The Sanator Cash Group

6/30/78

Susan Fromm

Attached are copies of the draft permit, fact sheet, + PN as you requested in your letter of 6/26/78.

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
215 FREMONT STREET
SAN FRANCISCO, CALIFORNIA 94105

JOINT NOTICE OF PROPOSED ACTION

by the

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
215 FREMONT STREET
SAN FRANCISCO, CALIFORNIA 94105

415/556-3450

On Applications for National Pollution Discharge Elimination System Permits to Discharge Pollutants to Waters of the United States

State of Arizona
State Department of Health
1740 West Adams Street
Phoenix, AZ 85007

602/271-5572

On Applications for Certification for Compliance with Applicable Effluent Limitations and Appropriate Requirements of State Law

Public Notice #A-78-1-W

February 28, 1978

On the basis of preliminary review of the requirements of the Federal Water Pollution Control Act (the Act), as amended, and implementing regulations, the Regional Administrator, Region IX, EPA proposes to issue NPDES permits to the following applicants, subject to certain effluent limitations and special conditions:

Mr. John O. Bruer
P.O. Box 263
Geneva, Illinois 60134
NPDES No. AZ0021820

The applicant is the sole leasee of Senator Mine, located twelve miles south of Prescott, Arizona. The existing discharge consists of drainage water from an abandoned mine which discharges to the Hassayampa River at latitude 34°26' N and longitude 112°27' W. The beneficial uses of the Hassayampa River include aquatic life and wildlife habitation, and aesthetic enjoyment. This permit requires compliance with effluent limitations based upon compliance with Water Quality Standards for receiving waters and Water Quality Criteria data published by the Environmental Protection Agency. This permit, as proposed, will expire March 31, 1983.

The Arizona Department of Health Services is considering a request to certify the discharges described above, pursuant to Section 401 of the Act. The certification will set forth any limitations and monitoring requirements necessary to assure compliance with any applicable effluent limitations and other limitations, under Sections 301 and 302 of the Act, standard of performance under Section 306 of the Act, or prohibition, effluent standard, or pretreatment standard under Section 307 of the Act, and any other appropriate requirement of State law. No permit will be granted if certification is denied by the State.

Persons wishing to comment upon or object to the proposed determinations or request a public hearing pursuant to 40 CFR 125.34 should submit their comments or request in writing within thirty (30) days from the date of this notice, either in person of by mail to:

U.S. Environmental Protection Agency
Region IX, Enforcement Division, E-4-1
(at the address shown above)

All comments or objections received within thirty (30) days from the date of this notice, will be considered in the formulation of the final determinations regarding the applications. If written comments indicate a significant degree of public interest in a proposed permit, the Regional Administrator shall hold a public hearing in accordance with 40 CFR 125.34.

If no public hearing is held, final determinations will be made shortly after the close of the comment period. The permit will become effective thirty (30) days following the date when final determinations are signed.

A request for an adjudicatory hearing may be submitted to the Regional Hearing Clerk within ten days following the final determinations, in accordance with 40 CFR 125.36. If granted, applicable provisions of the permit will be stayed pending the hearing.

Persons wishing to comment upon or object to certification by the Arizona Department of Health Services or request a public hearing should submit their comments of requests in writing within thirty (30) days from the date of this notice, either in person or by mail to:

the Arizona Department of Health Services
(at the address given above)

The applications, proposed draft permits and other pertinent documents may be examined or copied at the offices of the Environmental Protection Agency or the Arizona Department of Health Services.

A copy of the draft permits, and other pertinent documents may be obtained by calling or writing to the Regional Office of EPA at the above address.

Please bring the foregoing notice to the attention of all persons whom you know would be interested in this matter.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

FACT SHEET FOR

SENATOR MINE
NPDES No. AZ0021820

Jack Orr, as authorized agent for John Bruer (P.O. Box 263, Geneva, Illinois 60134), has applied to the U.S. Environmental Protection Agency, Region IX, for an NPDES permit to discharge drainage from Senator Mine to the waters of the United States. John Bruer is the sole leasee of Senator Mine. Jack and Margaret Orr (2553 Iron Springs Road, Prescott, Arizona 86301) are the owners and leasors of the mine. The mine is not currently in operation and has not been operating in over twenty years.

Senator Mine is located approximately 12 miles south of Prescott, Arizona. The discharge consists solely of ground water and surface water runoff which collects within the mine tunnel. The mine is drained via a pipe to the Hassayampa River (discharge serial number 001) at latitude 34° 26' N, longitude 112° 27' W. The discharge contains no process water. The flow varies, but averages approximately 27 gallons per minute. The primary beneficial use of the Hassayampa River is for aquatic life and wildlife habitation. The incidental uses include warm water fishery and aesthetic enjoyment.

Proposed Final Effluent Limitations:

CONSTITUENT	POLLUTANT DISCHARGE RATE 30 day Average	7 day Average	Daily	DISCHARGE CONCENTRATION LIMITS 30 day Average	7 day Average	Daily Max
Arsenic	-	-	-	-	-	0.05 mg/l
Zinc	-	-	-	-	-	0.5 mg/l
Cadmium	-	-	-	-	-	0.01 mg/l
Lead	-	-	-	-	-	0.05 mg/l
Copper	-	-	-	-	-	0.05 mg/l
Iron	-	-	-	-	-	2.0 mg/l
Total Suspended Solids	-	-	-	-	-	50.0 mg/l
pH	Not less than 6.5 standard units nor greater than 8.6 standard units.					
Turbidity	Shall not exceed 50 Jackson units.					

Proposed Final Monitoring Schedule:

Discharge Serial Number	Constituent	Minimum Frequency of Analysis	Sample Type
001	Flow	Once/Quarter	Discrete
	Arsenic	Once/Quarter	Discrete
	Zinc	Once/Quarter	Discrete
	Cadmium	Once/Quarter	Discrete
	Lead	Once/Quarter	Discrete
	Copper	Once/Quarter	Discrete
	Iron	Once/Quarter	Discrete
	Total Suspended Solids	Once/Quarter	Discrete
	pH	Once/Quarter	Discrete
	Turbidity	Once/Quarter	Discrete

Permit No. AZ0021820
Application No.

Received Lily 10-25-77

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

Mr. John O. Bruer
P.O. Box 263
Geneva, Illinois
60134

is authorized to discharge

drainage water from Senator Mine, located 12 miles south of Prescott, Arizona (Coordinates: latitude 34° 26' N, longitude 112° 27' W)

to receiving waters named

, the Hassayampa River
(Discharge serial number 001)

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on

This permit and the authorization to discharge shall expire at midnight March 31, 1983

Signed this day of

For the Regional Administrator

Director, Enforcement Division

AUG 15 1977

8-18-77

EPA Form 3320-4 (10-73)

A.1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date of this permit and lasting through March 31, 1983 the permittee is authorized to discharge from outfall(s) serial number(s) 001

Such discharges shall be limited and monitored by the permittee as specified below:

a. Effluent Characteristic

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Daily Avg	Discharge Limitations kg/day (lbs/day) Daily Max	Discharge Limitations Other Units (Specify) Daily Avg	Discharge Limitations Other Units (Specify) Daily Max	Monitoring Requirements Measurement Frequency	Monitoring Requirements Sample Type
Flow-m^3/Day (MGD)	-	-	-	-	once/quarter	discrete
Arsenic	-	-	-	0.05 mg/l	once/quarter	discrete
Zinc	-	-	-	0.5 mg/l	once/quarter	discrete
Cadmium	-	-	-	0.01 mg/l	once/quarter	discrete
Lead	-	-	-	0.05 mg/l	once/quarter	discrete
Copper	-	-	-	0.05 mg/l	once/quarter	discrete
Iron	-	-	-	2.0 mg/l	once/quarter	discrete
Total Suspended Solids	-	-	-	50. mg/l	once/quarter	discrete
pH	Not less than 6.5 standard units nor greater than 8.6 standard units				once/quarter	discrete
Turbidity	Shall not exceed 50 Jackson units				once/quarter	discrete

b. The discharge shall not cause objectionable odors at the surface of the receiving waters.

c. There shall be no discharge of floating solids or visible foam in other than trace amounts.

d. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location(s):

Effluent samples shall be taken at the discharge point, prior to mixing with receiving waters.

AUG 15 1977

Revised

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

Not Applicable

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

3. A "schedule of compliance" means a program composed of two integral parts: (a) plan - description of new or modified facilities to treat and dispose of the effluent; and (b) schedule - a timetable setting forth the date by which all wastewaters will be in compliance with the effluent limitations of this permit. The schedule shall include (if appropriate) dates by which the permittee will accomplish:

   a. Completion of a preliminary engineering plan report;

   b. Completion of construction plans and specifications;

   c. Initiation of construction;

   d. Completion of construction;

   e. Demonstration of compliance with effluent limitations.

C. MONITORING AND REPORTING

1. *Representative Sampling*

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. *Reporting*

Monitoring results obtained during the previous 3 months shall be submitted on forms to be supplied by the Regional Administrator, to the extent that the information reported may be entered on the forms. The results of all monitoring required by this permit shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this permit. Unless otherwise specified, discharge flows shall be reported in terms of the average flow over each 30-day period and the maximum daily flow over that 30-day period. Monitoring reports shall be postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on April 28, 1978. Duplicate signed copies of these, and all other reports required herein, shall be submitted to the Regional Administrator and the State at the following addresses:

Regional Administrator
Environmental Protection Agency
Region IX, ATTN: E-5/MR
100 California Street
San Francisco CA 94111

ARIZONA DEPT. OF HEALTH SERVICES
BUREAU OF WATER QUALITY CONTROL
1740 WEST ADAMS STREET
PHOENIX, ARIZONA 85007

3. *Definitions*

See Part III.

4. *Test Procedures*

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(g) of the Act, under which such procedures may be required.

5. *Recording of Results*

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

Revised

AUG 15 1977

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. *Additional Monitoring by Permittee*

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form. Such increased frequency shall also be indicated.

7. *Records Retention*

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the State water pollution control agency.

A. MANAGEMENT REQUIREMENTS

1. *Change in Discharge*

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, or treatment modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. *Noncompliance Notification*

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

3. *Facilities Operation*

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. *Adverse Impact*

The permittee shall take all reasonable steps to minimize any adverse impact to receiving waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. *Bypassing*

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Regional Administrator and the State in writing of each such diversion or bypass, in accordance with the procedure specified in Part II.A.2. above.

6. *Removed Substances*

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. Safeguards to Electric Power Failure

In order to maintain compliance with the effluent limitations and prohibitions of this permit, and the permittee shall either:

a. Maintain in good working order, an alternative power source sufficient to operate the wastewater control facility; or if such a power source is not in existence:

b. Halt, reduce, or otherwise controll all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater facilities.

B. RESPONSIBILITIES

1. *Right of Entry*

The permittee shall allow the head of the State water pollution control agency, the Regional Administrator, and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. *Transfer of Ownership or Control*

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the State water pollution control agency.

3. *Availability of Reports*

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public

inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

4. *Permit Modification*

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. *Toxic Pollutants*

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. *Civil and Criminal Liability*

Except as provided in permit conditions on "Bypassing" (Part II, A-5) and "Power Failures" (Part II, A-7), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. *Oil and Hazardous Substance Liability*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. *State Laws*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

9. *Property Rights*

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. *Severability*

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART III

OTHER REQUIREMENTS

AUG 15 1977
Date

PART III

OTHER REQUIREMENTS

Part I.B.4.

The Regional Administrator may, upon request of the permittee, and after public notice, revise or modify a schedule of compliance in an issued permit if he determines good and valid cause (such as an act of God, strike, flood, materials shortage, or other event over which the permittee has little or no control) exists for such revision.

Part I.C.3 Definitions

a. The "30-day, or 7-day, average" discharge means the total discharge by weight during a 30, or 7, consecutive calendar day period, respectively, divided by the number of days in the period that the facility was discharging. Where less than daily sampling is required by this permit, the

30-day, or 7-day, average discharge shall be determined by the summation of all the measured discharges by weight divided by the number of days during the 30, or 7, consecutive calendar day period when the measurements were made.

If fewer than four measurements are made during a 30, or 7, consecutive calendar day period, then compliance or non-compliance with the 30, or 7, day average discharge limitation shall not be determined.

b. A "discrete" sample means any individual sample collected in less than 15 minutes.

c. The "daily maximum" discharge means the total discharge by weight during any calendar day.

d. The "30-day, or 7-day, average" concentration, other than for fecal or total coliform bacteria, means the arithmetic mean of measurements made during a 30, or 7, consecutive calendar day period, respectively. The "30-day, or 7-day, average" concentration for fecal or total coliform bacteria means the geometric mean of measurements made during a 30, or 7, consecutive calendar day period, respectively. The geometric mean is the n^{th} root of the product of n numbers.

If fewer than four measurements are made during a 30, or 7, consecutive calendar day period, then compliance or non-compliance with the 30,or 7, day average concentration limitation shall not be determined.

e. The "daily maximum" concentration means the measurement made on any single discrete sample or composite sample.

Part I.C. 8 Intermittent Discharge Monitoring

If the discharge is intermittent rather than continuous, then on the first day of each such intermittent discharge, the permittee shall monitor and record data for all the characteristics listed in the monitoring requirements, after which the frequencies of analysis listed in the monitoring requirements shall apply for the duration of each such intermittent discharge. In no event shall the permittee be required to monitor and record data more often than twice the frequencies listed in the monitoring requirements.

Part I.C.9. Monitoring Modification

Monitoring, analytical , and reporting requirements may be modified by the Regional Administrator upon due notice.

Part II.A.2. Non-compliance Notification

Non-compliance with the conditions of this permit due to causes outside the reasonable control of the permittee shall not be deemed by the Regional Administrator to be violations of the terms and conditions of this permit.

Part III.A. Reapplication

If the permittee desires to continue to discharge, he shall reapply not later than 180 days before this permit expires, on the application forms then in use.

Please obtain information mentioned on page 3 6/26/78 Def

Silver

NOTICE OF PUBLIC HEARING
BY THE
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, CA 94105
(415) 556-0102

The Environmental Protection Agency, Region IX, proposes to issue a National Pollutant Discharge Elimination System (NPDES) Permit pursuant to Section 402(a) of the Clean Water Act [33 USC 1342(a)] to John O. Bruer, the sole lessee of Senator Cash Mine near Prescott, Arizona.

The proposed Permit would authorize the discharge of mine drainage water to the Hassayampa River at a point approximately 12 miles south of Prescott, Arizona, subject to certain effluent limitations and conditions.

The Permittee in the proposed Permit is:

John O. Bruer
P.O. Box 263
Geneva, Illinois 60134

The waterway to which the discharge is proposed to be made is:

Hassayampa River at latitude 34° 26' N and longitude 112°27' W

The beneficial uses of the Hassayampa River at the point of proposed discharge include aquatic life and wildlife habitation, aesthetic enjoyment, and incidental use as a warm water fishery.

A public notice of the proposed issuance of the Permit was published on February 28, 1978, in the Prescott Courier, a daily newspaper published and circulated in the City of Prescott. The public notice referred to the proposed Permit as AZ0021820, and was designated Public Notice A-78-1-W.

A public hearing will be held on the subject of the proposed NPDES Permit as follows:

Wednesday June 14, 1978 7:30 P.M.	U.S. District Courtroom Second Floor U.S. Post Office Building Cortez and Goodwin Streets Prescott, Arizona

The hearing will be conducted by the Regional Hearing Officer who has been designated by the Regional Administrator. Any person will be permitted to submit oral or written statements and data concerning the proposed Permit. Written comments may be submitted, by June 9, 1978, in advance of the public hearing, to:

U.S. Environmental Protection Agency
Region IX
Attn: Hearing Office (HE-147)
215 Fremont Street
San Francisco, CA 94105

Oral statements will be received and considered, but for accuracy of the record, all important testimony should be submitted in writing. Oral statements should summarize extensive written materials so that there will be time for all interested persons to be heard. Enough copies of written

materials should be produced so that other interested persons may receive a copy and there will not be a necessity for written materials to be read at length.

The hearing may be continued from time to time, or to a different place, after its commencement, to accommodate the needs of witnesses or the Environmental Protection Agency.

Issues to be considered at the hearing are:

Does the discharge affect the quality of the water of the Hassayampa River?

Are the limits in the proposed Permit appropriate for the discharge?

The Draft Permit and the Fact Sheet may be reviewed at:

Prescott Public Library
215 East Goodwin Street
Prescott, AZ 86301

Interested persons may obtain further information, request a copy of the Draft Permit, the Fact Sheet, and inspect and copy forms and related documents at:

U.S. Environmental Protection Agency
Region IX
Enforcement Division, Permits Branch
215 Fremont Street
San Francisco, CA 94105
Telephone: (415)556-3450

Please bring this notice to the attention of any persons whom you know would be interested in this matter.

Dated: May 15, 1978.

L

ARMSTRONG, JONES, LAWSON & WHITE
INCORPORATED
Investment Securities
427 PENOBSCOT BUILDING, DETROIT 26, MICHIGAN
WOODWARD 3-8844

Dec. 1, 1957

Dept. of Mineral Resources
Phoenix, Arizona.

Gentlemen,

ARICANA - SENATOR MINING CORP.
near Prescott, Arizona.

We are contemplating financing for the subject mining properties in your state and will appreciate any information you may be able to furnish to us relative to the old SENATOR mine. The property is now being developed by a group in Toronto, and they have approached us for some financing in the States. Do you have any old reports on this mine and the surrounding area? What data is available concerning the mining industry, as such, in your state, - including uraniums? How many mining companies are there, and how many mills? Who would we talk to at your Prescott field office? Your help will be appreciated. Sincerely, Edward Lawson

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine YAVAPAI AREA

Date FEB. 24, 1954

District TO: R. I. C. MANNING, Director

Engineer Mark Gemmill

Subject: Present Activities

SENATOR- CASH

Work at this property has been resumed with exploration on both the Senator and Cash veins. It is expected that some shipments of ore will be made in the near future. The operators are Jack Orr, Iron Springs Road, Prescott, and E. R. Dickie, Bagdad, Arizona. Jack Orr is in charge of the work with 4 men employed.

DEPARTMENT OF MINERAL RESOURCES
STATE OF ARIZONA
FIELD ENGINEERS REPORT

Mine Senator Group Date March 5, 1952

District Hassampa Engineer Mark Gemmill

Subject: Present Operations

OWNERSHIP

Property consists of 16 Patented Claims owned by Phelps Dodge Corp. located 12 miles south of Prescott on the Senator Hiway. Now under lease and option to Jack Orr, Iron Springs Road, and E. R. Dickie, Bagdad, Ariz.

HISTORY

The Senator mine proper is reported to have produced upward to a million Dollars in gold and silver and lead in a period between 1890 and 1905. The operating company took in several adjoining mines with parralleling veins and drove a Xcut tunnel which cut first the Senator, then the Treadwell, the Tenspot and at 3200' from the portal the Cash-Snoozer vein was cut. At this point a connection was made with the Cash workings for ventilation and to drain the Cash mine. Extensive drifting was done on all of the veins. While all of these veins had produced considerable good ore near the surface, no commercial ore was found in any of them except the Senator. This tunnel cut these veins at from 450' to 600' below the surface. The Senator had been worked from a 500' shaft which bottomed at the tunnel level. A 200' winze was sunk from the tunnel level on the Senator vein but it is reported that no ore of any consequence was found. Most of the Senator production came from above the 500' level. There was reported to be however, a shoot of ore in the Tenspot, several hundred feet long and of good width but too low grade and too complex for their milling facilities of that time.

PRESENT OPERATIONS

Based on the reported ore in the Tenspot and other reports of Oldtimers that there was still some spots of ore in the Senator the Adit tunnel was reopened after having been closed for 30 years or more. The Tenspot orebody was found to be more spotty and lower grade than was reported, and not good enough to stand transportation to a mill very far away. Opening of the tunnel did afford a chance for the Cash mine to be worked from the bottom. After doing considerable investigating and some exploration work the operators decided to give it up and turned the lease and option over to Orr and Dickie to work in connection with the Cash mine.

COMMENTS

Orr and Dickie feel that between the two properties they may find enough ore to warrant installation of a mill on the property. There is ample water running out of the Senator tunnel for a mill of up to 100 tons per day capacity. Electric power is close at hand. The Tenspot orebody does not seem to warrant a mill, but no doubt it could be worked profitably at present prices if there was a mill installed. So the possibility of future production is tied in with what may be found in the Cash mine.

SENATOR PRODUCTION Conf.

Group of Claims

Senator Mont - Mt Union District - YAVAPAI Co.

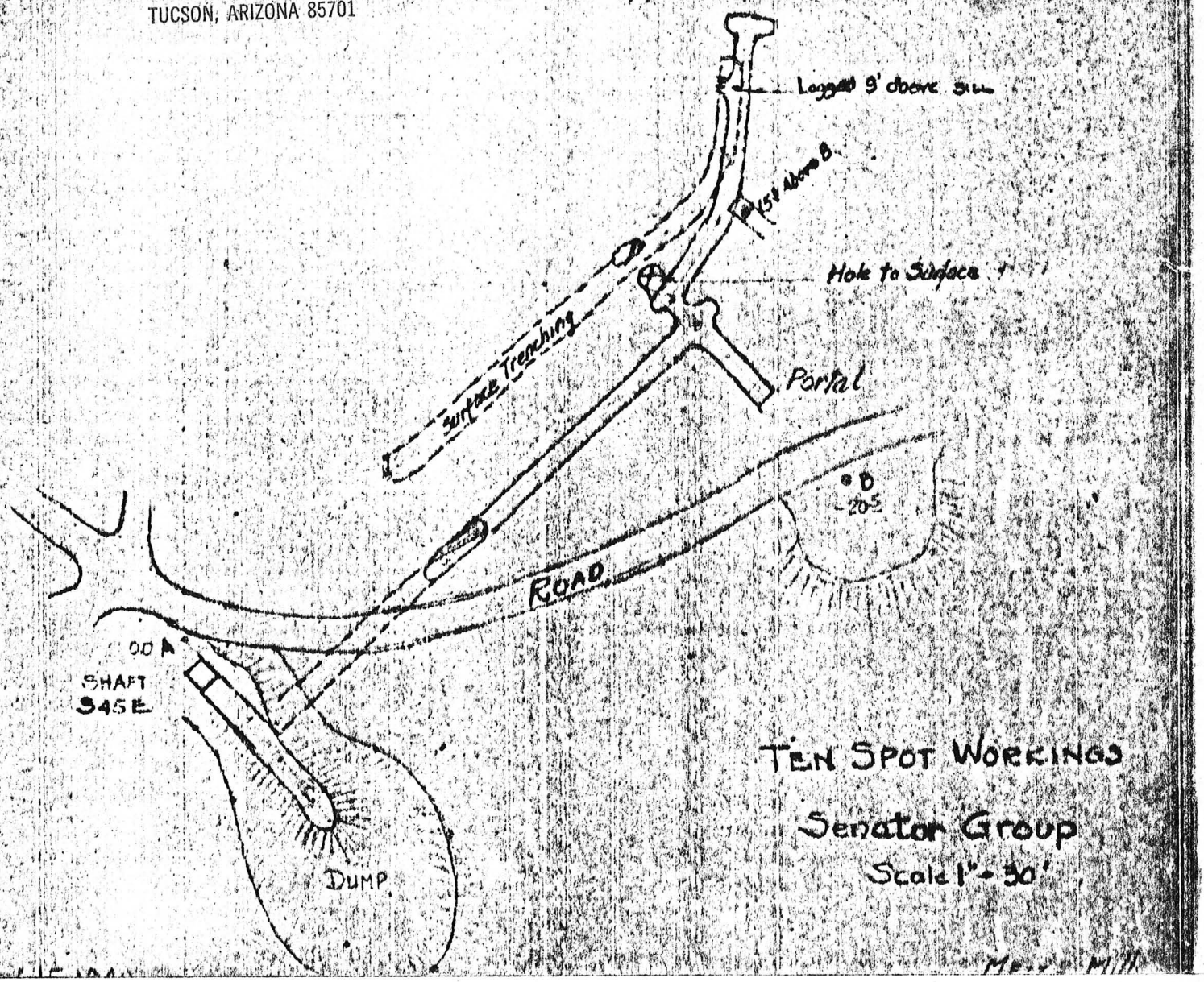
OPERATORS { P.D. John Lowney; Mark Gemmill

Reported Mining Periods: 1883[1], 1893[2], 1923[3], 1926-30[4], 1933-35[5], 1944-50[6] 1979-82[7]

Total Tons 3552

			AVG
Production:	Cu, lbs,	122126 @	%
	Ag, oz	13750 @	OPT
	Au, oz	24800 @	OPT
	Pb, lbs	8900 @	%
	Zn, lbs	4900 @	%
	Mo, lbs	0	0

ARIZONA DEPT. OF MINES & MINERAL RESOURCES
STATE OFFICE BUILDING
416 W. CONGRESS, ROOM 161
TUCSON, ARIZONA 85701



TEN SPOT WORKINGS
Senator Group
Scale 1" = 50'

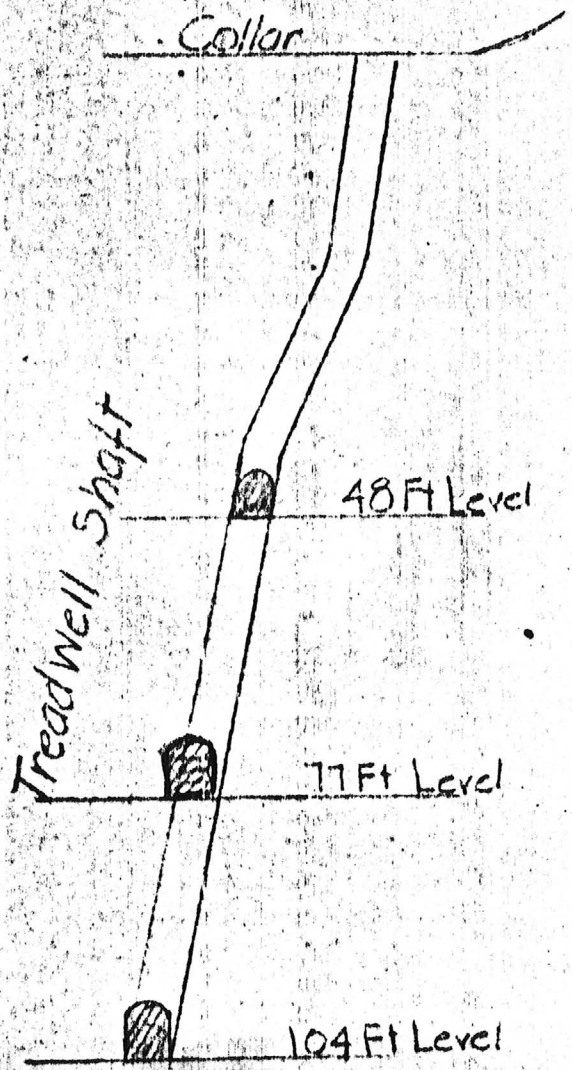
T 28 N
R 19 W
S 14

Gold Basin Dist

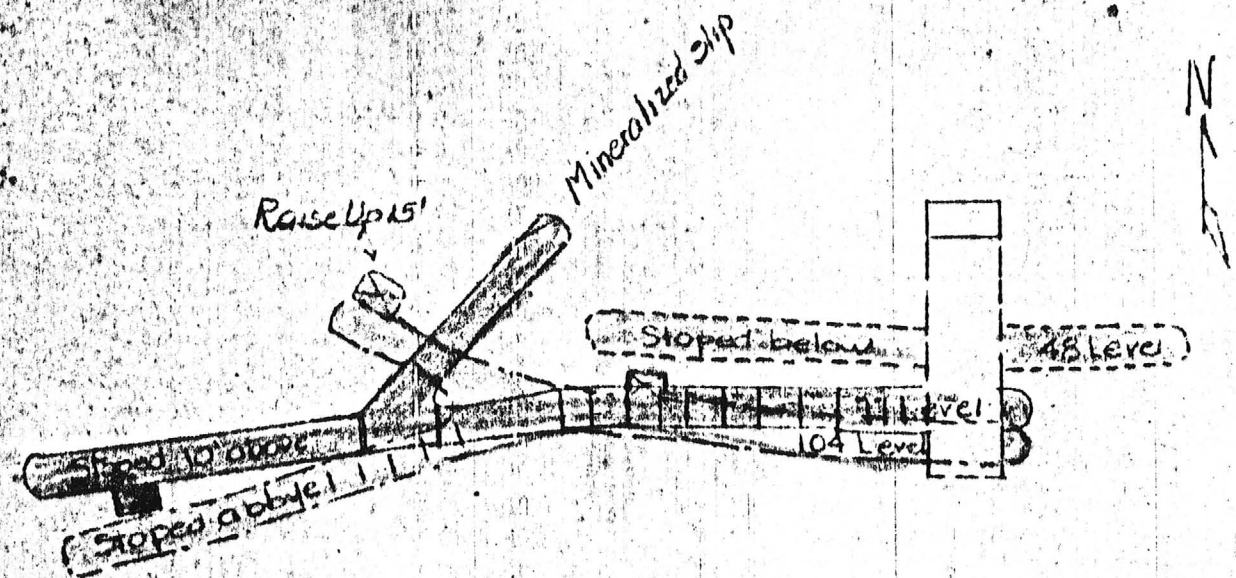
Similar & Cyclopic

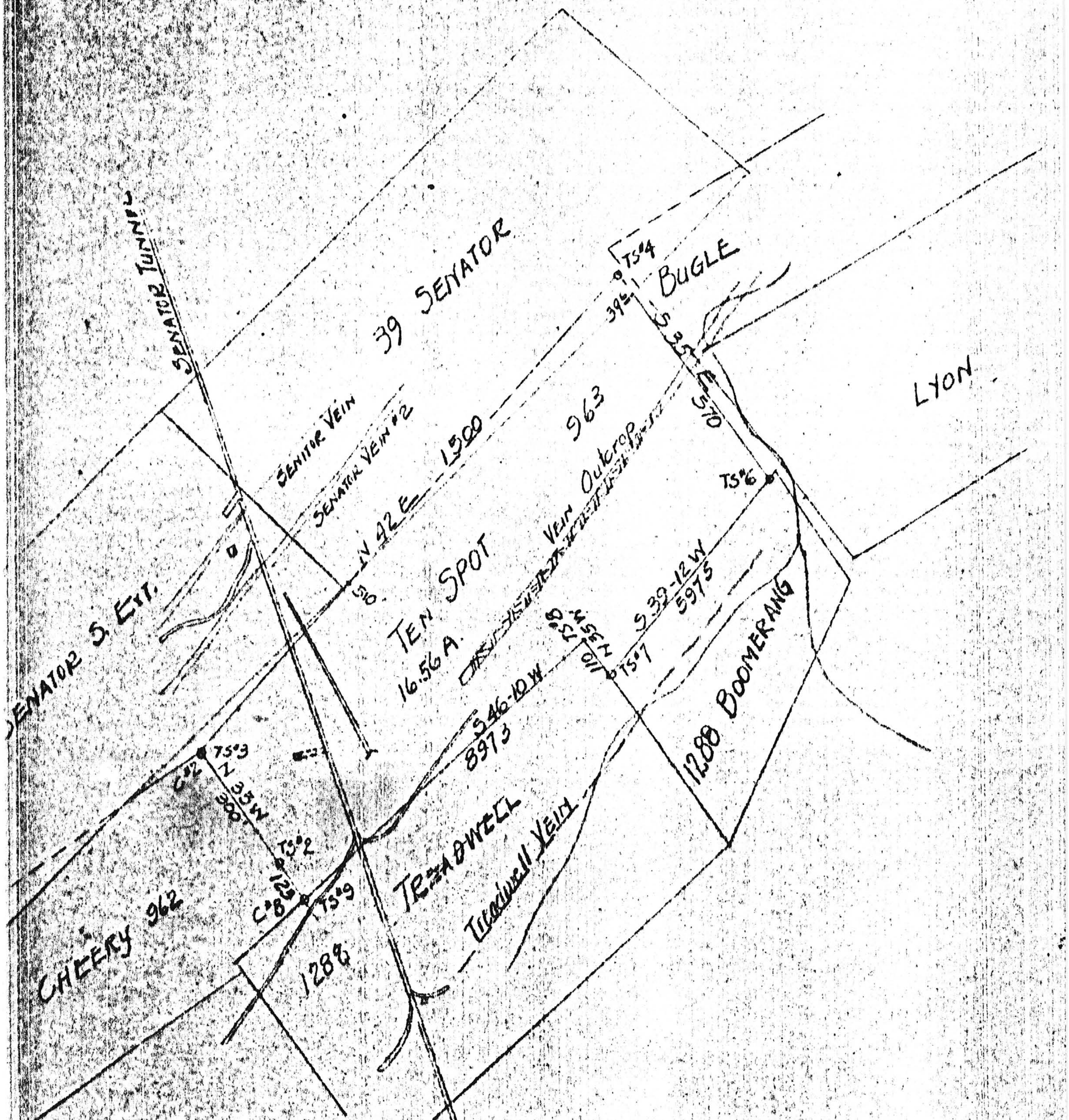
open cuts
adits

USGS 397 p. 126



TREADWELL CLAIM
SENATOR GROUP
Scale 1" = 20' June 17 1938
CEM



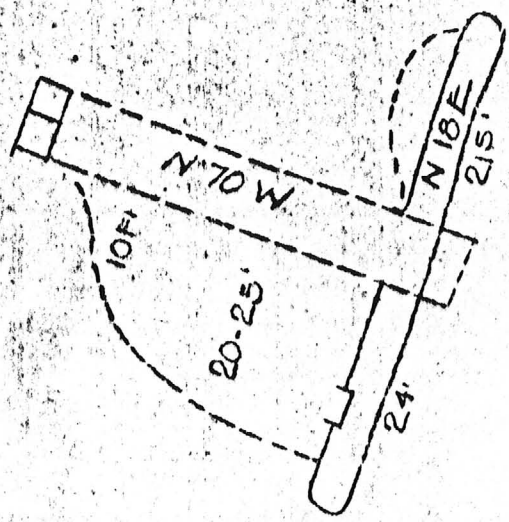


TEN SPOT CLAIM

1" = 300 Ft

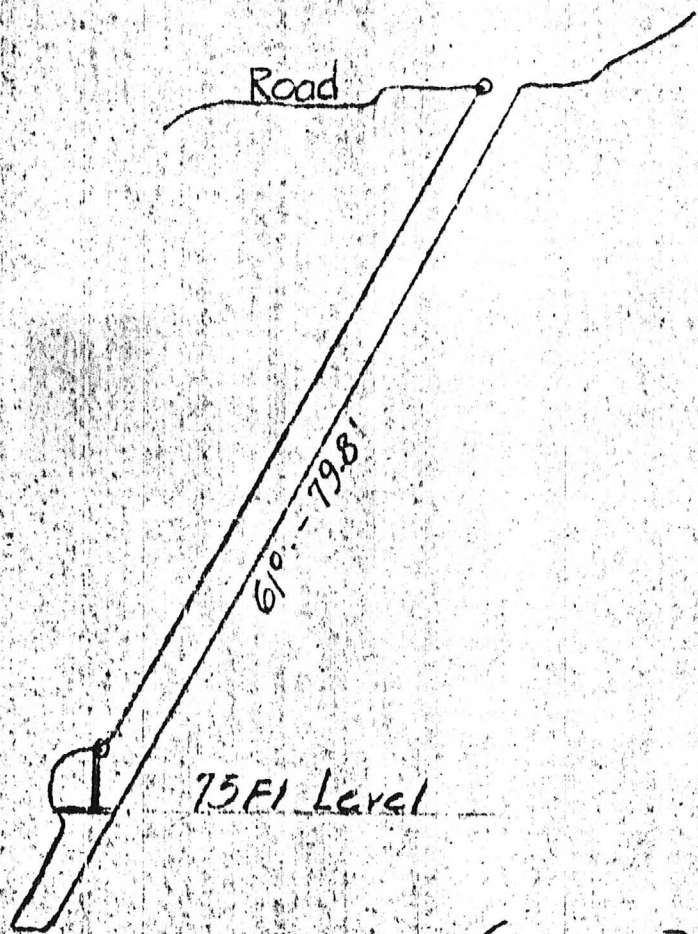
Lot No 70
GLO No 21681
Min Cert 233

Nov 15 1940



E side sloped up 18 Ft

West side sloped from 75' Level up to within 10 or 15' of surface



GREAT DIVIDE WORKINGS
SENATOR DISTRICT
Scale 1" = 20'

C.E.M.

6/17/38

CERTIFIED MAIL NO. 551612

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
215 Fremont Street
San Francisco, Ca. 94105

Mr. John O. Bruer
P.O. Box 263
Geneva, Illinois 60134

In reply refer to: E-4-1
862.C

AUG 4 1978

Dear Mr. Bruer:

Enclosed is a signed and dated copy of the National Pollutant Discharge Elimination System (NPDES) permit for:

Discharger	NPDES No.
Senator Mine	AZ0021820

The Regional Administrator has reviewed the NPDES application in accordance with the Clean Water Act of 1977 and has also published a public notice of tentative determinations regarding the application. After considering the expressed views of all interested persons and agencies, pertinent Federal statutes and regulations, and State comments and/or certification of the discharge, the Regional Administrator, pursuant to 40 CFR 125.35, has made final determinations (the enclosed permit) which do not differ significantly from those proposed in the public notice.

The permit shall be issued and shall become effective thirty days from the date of signature unless there is a written request for an adjudicatory hearing pursuant to 40 CFR 125.36(b). Any request for an adjudicatory hearing must be submitted within ten days following receipt of this letter.

Sincerely,

Clyde B. Eller

Clyde B. Eller
Director
Enforcement Division

Enclosures

cc: See attached list

RECEIVED
AUG 7 1978
DEPT. MINERAL RESOURCES
PHOENIX, ARIZONA

cc: Mr. & Mrs. Ted Nebeker, Don Juan Apartments, Prescott, AZ
Mr. R. Bruce Evans, Chairman, Yavapai County Board of Supervisors, Prescott, AZ
Mr. J. C. Jones, Prescott, AZ
Mr. Lee P. Murphy, Prescott, AZ
Honorable Boyd Tenney, Prescott, AZ
Mr. Lee Poague, Thumb Butte Ranger District, Prescott National Forest
Mr. Fred Gibbs, Prescott, AZ
H. J. Wolfinger; Wolfinger, Lutey & Preston; Prescott, AZ
Honorable Bob Stump, U.S. House of Representatives, Phoenix, AZ
Honorable Barry Goldwater, U.S. Senate, Washington, D.C.
Mr. George Seideman, Prescott, AZ
Jack & Margaret Orr, Prescott, AZ
Arizona Dept. of Health Services
Central Arizona Dept. of Health Services
U.S. Fish and Wildlife Service, Phoenix
Yavapai County Health Dept.
Corps of Engineers, Los Angeles
11th Coast Guard District
K. P. Archer, Prescott, AZ
Les Bender, Ed Bunch Realty, Prescott, AZ
Elizabeth Casman, NACOG, Flagstaff, AZ
Raymond Lunoy, Prescott, AZ
L. R. McMahan, Prescott, AZ
Joseph McShane, Prescott, AZ
Ms. Caroline Mangelsdorf, Prescott Courier, Prescott, AZ
Joseph Mir, Prescott, AZ
Thomas H. Pathrace, Prescott, AZ
John A. Preston, Prescott, AZ
Keith Storm, Prescott, AZ
Dr. Donald Whitcomb, Phoenix, AZ
Jasper N. Wilkenson, Prescott, AZ
State of Arizona, Dept. of Mineral Resources
Mr. & Mrs. Hilliard, Phoenix, AZ
Mr. Bruce Miller, Indianapolis, Indiana
Ms. Dianne McClaine, V.A. Center, Prescott, AZ
Ms. Janice Earhart, Chino Valley, AZ
John and Shirley Angel, Prescott, AZ
Ms. Jan Marshall, Prescott, AZ
Mr. George N. Goodman, D.C., Prescott, AZ
Mr. Roy Thornbrugh, Prescott, AZ
Masm and Cynthia Chessler, Princeton, New Jersey
Ms. Susan J. Rheem, Prescott, AZ
William Dean Moss, NACOG, Flagstaff, AZ
Charlie Mitchell, Prescott, AZ

Permit No. AZ0021820
Application No.

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et. seq; the "Act"),

Mr. John O. Bruer
P.O. Box 263
Geneva, Illinois 60134

is authorized to discharge drainage water from Senator Mine, located 12 miles south of Prescott, Arizona

(coordinates: latitude 34°26'N
longitude 112°27' W)

to receiving waters named the Hassayampa River (Discharge Serial Number 001)

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts I, II, and III hereof.

This permit shall become effective on September 7, 1978.

This permit and the authorization to discharge shall expire at midnight, March 31, 1983.

Signed this 7 day of August, 1978.

For the Regional Administrator

Lloyde B. Eller

Director, Enforcement Division

EPA Form 3320-4 (10-73)

A. 1. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning the effective date of this permit and lasting through March 31, 1983, the permittee is authorized to discharge from outfall(s) serial number(s) 001.

Such discharges shall be limited and monitored by the permittee as specified below:

a.

Effluent Characteristic	Discharge Limitations kg/day (lbs/day) Daily Avg	Daily Max	Other Units (Specify) Daily Avg	Daily Max	Monitoring Requirements Measurement Frequency	Sample Type
Flow-m^3/Day (MGD)	-	-	-	-	Once/Qtr	Discrete
Arsenic	-	-	-	0.05 mg/l	Once/Qtr	Discrete
Zinc	-	-	-	0.5 mg/l	Once/Qtr	Discrete
Cadmium	-	-	-	0.01 mg/l	Once/Qtr	Discrete
Lead	-	-	-	0.05 mg/l	Once/Qtr	Discrete
Copper	-	-	-	0.05 mg/l	Once/Qtr	Discrete
Iron	-	-	-	2.0 mg/l	Once/Qtr	Discrete
Total Suspended Solids	-	-	-	50.0 mg/l	Once/Qtr	Discrete
pH	Not less than 6.5 standard units nor greater than 8.6 standard units.				Once/Qtr	Discrete
Turbidity	Shall not exceed 50 Jackson units.				Once/Qtr	Discrete

b. The discharge shall not cause objectionable odors at the surface of the receiving waters.

c. There shall be no discharge of floating solids or visible foam in other than trace amounts.

d. Samples taken in compliance with the monitoring requirements specified above shall be taken at the following location:

Effluent samples shall be taken at the discharge point, prior to mixing with receiving waters.

B. SCHEDULE OF COMPLIANCE

1. The permittee shall achieve compliance with the effluent limitations specified for discharges in accordance with the following schedule:

Not Applicable

2. No later than 14 calendar days following a date identified in the above schedule of compliance, the permittee shall submit either a report of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirement.

3. A "schedule of compliance" means a program composed of two integral parts: (a) plan - description of new or modified facilities to treat and dispose of the effluent; and (b) schedule - a timetable setting forth the date by which all wastewaters will be in compliance with the effluent limitations of this permit. The schedule shall include (if appropriate) dates by which the permittee will accomplish:

   a. Completion of a preliminary engineering plan report;

   b. Completion of construction plans and specifications;

   c. Initiation of construction;

   d. Completion of construction;

   e. Demonstration of compliance with effluent limitations.

C. MONITORING AND REPORTING

1. *Representative Sampling*

Samples and measurements taken as required herein shall be representative of the volume and nature of the monitored discharge.

2. *Reporting*

Monitoring results obtained during the previous 3 months shall be submitted on forms to be supplied by the Regional Administrator, to the extent that the information reported may be entered on the forms. The results of all monitoring required by this permit shall be submitted in such a format as to allow direct comparison with the limitations and requirements of this permit. Unless otherwise specified, discharge flows shall be reported in terms of the average flow over each 30-day period and the maximum daily flow over that 30-day period. Monitoring reports shall be postmarked no later than the 28th day of the month following the completed reporting period. The first report is due on Dec. 28, 1978 . Duplicate signed copies of these, and all other reports required herein, shall be submitted to the Regional Administrator and the State at the following addresses:

Regional Administrator
Environmental Protection Agency
Region IX, ATTN: E-5/MR
215 Fremont Street
San Francisco CA 94105

Arizona Dept. of Health Services
Bureau of Water Quality Control
1740 West Adams Street
Phoenix, AZ 85007

3. *Definitions*

See Part III.

4. *Test Procedures*

Test procedures for the analysis of pollutants shall conform to regulations published pursuant to Section 304(g) of the Act, under which such procedures may be required.

5. *Recording of Results*

For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:

a. The exact place, date, and time of sampling;

b. The dates the analyses were performed;

c. The person(s) who performed the analyses;

d. The analytical techniques or methods used; and

e. The results of all required analyses.

6. *Additional Monitoring by Permittee*

If the permittee monitors any pollutant at the location(s) designated herein more frequently than required by this permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Discharge Monitoring Report Form. Such increased frequency shall also be indicated.

7. *Records Retention*

All records and information resulting from the monitoring activities required by this permit including all records of analyses performed and calibration and maintenance of instrumentation and recordings from continuous monitoring instrumentation shall be retained for a minimum of three (3) years, or longer if requested by the Regional Administrator or the State water pollution control agency.

A. MANAGEMENT REQUIREMENTS

1. *Change in Discharge*

All discharges authorized herein shall be consistent with the terms and conditions of this permit. The discharge of any pollutant identified in this permit more frequently than or at a level in excess of that authorized shall constitute a violation of the permit. Any anticipated facility expansions, or treatment modifications which will result in new, different, or increased discharges of pollutants must be reported by submission of a new NPDES application or, if such changes will not violate the effluent limitations specified in this permit, by notice to the permit issuing authority of such changes. Following such notice, the permit may be modified to specify and limit any pollutants not previously limited.

2. *Noncompliance Notification*

If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Regional Administrator and the State with the following information, in writing, within five (5) days of becoming aware of such condition:

a. A description of the discharge and cause of noncompliance; and

b. The period of noncompliance, including exact dates and times; or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps being taken to reduce, eliminate and prevent recurrence of the noncomplying discharge.

3. *Facilities Operation*

The permittee shall at all times maintain in good working order and operate as efficiently as possible all treatment or control facilities or systems installed or used by the permittee to achieve compliance with the terms and conditions of this permit.

4. *Adverse Impact*

The permittee shall take all reasonable steps to minimize any adverse impact to receiving waters resulting from noncompliance with any effluent limitations specified in this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

5. *Bypassing*

Any diversion from or bypass of facilities necessary to maintain compliance with the terms and conditions of this permit is prohibited, except (i) where unavoidable to prevent loss of life or severe property damage, or (ii) where excessive storm drainage or runoff would damage any facilities necessary for compliance with the effluent limitations and prohibitions of this permit. The permittee shall promptly notify the Regional Administrator and the State in writing of each such diversion or bypass, in accordance with the procedure specified in Part II.A.2. above.

6. *Removed Substances*

Solids, sludges, filter backwash, or other pollutants removed in the course of treatment or control of wastewaters shall be disposed of in a manner such as to prevent any pollutant from such materials from entering navigable waters.

7. Safeguards to Electric Power Failure

In order to maintain compliance with the effluent limitations and prohibitions of this permit, and the permittee shall either:

a. Maintain in good working order, an alternative power source sufficient to operate the wastewater control facility;

or, if such a power source is not in existence:

b. Halt, reduce, or otherwise control all discharges upon the reduction, loss, or failure of the primary source of power to the wastewater facilities.

B. RESPONSIBILITIES

1. *Right of Entry*

The permittee shall allow the head of the State water pollution control agency, the Regional Administrator, and/or their authorized representatives, upon the presentation of credentials:

a. To enter upon the permittee's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this permit; and

b. At reasonable times to have access to and copy any records required to be kept under the terms and conditions of this permit; to inspect any monitoring equipment or monitoring method required in this permit; and to sample any discharge of pollutants.

2. *Transfer of Ownership or Control*

In the event of any change in control or ownership of facilities from which the authorized discharges emanate, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Regional Administrator and the State water pollution control agency.

3. *Availability of Reports*

Except for data determined to be confidential under Section 308 of the Act, all reports prepared in accordance with the terms of this permit shall be available for public

inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the Act, effluent data shall not be considered confidential. Knowingly making any false statement on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the Act.

4. *Permit Modification*

After notice and opportunity for a hearing, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:

a. Violation of any terms or conditions of this permit;

b. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts; or

c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge.

5. *Toxic Pollutants*

Notwithstanding Part II, B-4 above, if a toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Act for a toxic pollutant which is present in the discharge and such standard or prohibition is more stringent than any limitation for such pollutant in this permit, this permit shall be revised or modified in accordance with the toxic effluent standard or prohibition and the permittee so notified.

6. *Civil and Criminal Liability*

Except as provided in permit conditions on "Bypassing" (Part II, A-5) and "Power Failures" (Part II, A-7), nothing in this permit shall be construed to relieve the permittee from civil or criminal penalties for noncompliance.

7. *Oil and Hazardous Substance Liability*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Section 311 of the Act.

8. *State Laws*

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any applicable State law or regulation under authority preserved by Section 510 of the Act.

9. *Property Rights*

The issuance of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of Federal, State or local laws or regulations.

10. *Severability*

The provisions of this permit are severable, and if any provision of this permit, or the application of any provision of this permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

PART III

OTHER REQUIREMENTS

PART III

OTHER REQUIREMENTS

Part I.B.4.

The Regional Administrator may, upon request of the permittee, and after public notice, revise or modify a schedule of compliance in an issued permit if he determines good and valid cause (such as an act of God, strike, flood, materials shortage, or other event over which the permittee has little or no control) exists for such revision.

Part I.C.3 Definitions

a. The "30-day, or 7-day, average" discharge means the total discharge by weight during a 30, or 7, consecutive calendar day period, respectively, divided by the number of days in the period that the facility was discharging. Where less than daily sampling is required by this permit, the 30-day, or 7-day, average discharge shall be determined by the summation of all the measured discharges by weight divided by the number of days during the 30, or 7, consecutive calendar day period when the measurements were made.

If fewer than four measurements are made during a 30, or 7, consecutive calendar day period, then compliance or non-compliance with the 30, or 7, day average discharge limitation shall not be determined.

b. A "discrete" sample means any individual sample collected in less than 15 minutes.

c. The "daily maximum" discharge means the total discharge by weight during any calendar day.

d. The "30-day, or 7-day, average" concentration, other than for fecal or total coliform bacteria, means the arithmetic mean of measurements made during a 30, or 7, consecutive calendar day period, respectively. The "30-day, or 7-day, average" concentration for fecal or total coliform bacteria means the geometric mean of measurements made during a 30, or 7, consecutive calendar day period, respectively. The geometric mean is the n^{th} root of the product of n numbers.

If fewer than four measurements are made during a 30, or 7, consecutive calendar day period, then compliance or non-compliance with the 30,or 7, day average concentration limitation shall not be determined.

e. The "daily maximum" concentration means the measurement made on any single discrete sample or composite sample.

Part I.C. 8 Intermittent Discharge Monitoring

If the discharge is intermittent rather than continuous, then on the first day of each such intermittent discharge, the permittee shall monitor and record data for all the characteristics listed in the monitoring requirements, after which the frequencies of analysis listed in the monitoring requirements shall apply for the duration of each such intermittent discharge. In no event shall the permittee be required to monitor and record data more often than twice the frequencies listed in the monitoring requirements.

Part I.C.9. Monitoring Modification

Monitoring, analytical , and reporting requirements may be modified by the Regional Administrator upon due notice.

Part II.A.2. Non-compliance Notification

Non-compliance with the conditions of this permit due to causes outside the reasonable control of the permittee shall not be deemed by the Regional Administrator to be violations of the terms and conditions of this permit.

Part III.A. Reapplication

If the permittee desires to continue to discharge, he shall reapply not later than 180 days before this permit expires, on the application forms then in use.

Senator Cash Mine file

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
215 FREMONT STREET
SAN FRANCISCO, CALIFORNIA 94105

JOINT NOTICE OF PROPOSED ACTION

by the

UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
215 FREMONT STREET
SAN FRANCISCO, CALIFORNIA 94105

415/556-3450

On Applications for National Pollution Discharge Elimination System Permits to Discharge Pollutants to Waters of the United States

State of Arizona
State Department of Health
1740 West Adams Street
Phoenix, AZ 85007

602/271-5572

On Applications for Certification for Compliance with Applicable Effluent Limitations and Appropriate Requirements of State Law

Public Notice #A-78-1-W

February 28, 1978

On the basis of preliminary review of the requirements of the Federal Water Pollution Control Act (the Act), as amended, and implementing regulations, the Regional Administrator, Region IX, EPA proposes to issue NPDES permits to the following applicants, subject to certain effluent limitations and special conditions:

Mr. John O. Bruer
P.O. Box 263
Geneva, Illinois 60134
NPDES No. AZ0021820

The applicant is the sole leasee of Senator Mine, located twelve miles south of Prescott, Arizona. The existing discharge consists of drainage water from an abandoned mine which discharges to the Hassayampa River at latitude 34°26' N and longitude 112°27' W. The beneficial uses of the Hassayampa River include aquatic life and wildlife habitation, and aesthetic enjoyment. This permit requires compliance with effluent limitations based upon compliance with Water Quality Standards for receiving waters and Water Quality Criteria data published by the Environmental Protection Agency. This permit, as proposed, will expire March 31, 1983 .

The Arizona Department of Health Services is considering a request to certify the discharges described above, pursuant to Section 401 of the Act. The certification will set forth any limitations and monitoring requirements necessary to assure compliance with any applicable effluent limitations and other limitations, under Sections 301 and 302 of the Act, standard of performance under Section 306 of the Act, or prohibition, effluent standard, or pretreatment standard under Section 307 of the Act, and any other appropriate requirement of State law. No permit will be granted if certification is denied by the State.

Persons wishing to comment upon or object to the proposed determinations or request a public hearing pursuant to 40 CFR 125.34 should submit their comments or request in writing within thirty (30) days from the date of this notice, either in person of by mail to:

U.S. Environmental Protection Agency
Region IX, Enforcement Division, E-4-1
(at the address shown above)

All comments or objections received within thirty (30) days from the date of this notice, will be considered in the formulation of the final determinations regarding the applications. If written comments indicate a significant degree of public interest in a proposed permit, the Regional Administrator shall hold a public hearing in accordance with 40 CFR 125.34.

If no public hearing is held, final determinations will be made shortly after the close of the comment period. The permit will become effective thirty (30) days following the date when final determinations are signed.

A request for an adjudicatory hearing may be submitted to the Regional Hearing Clerk within ten days following the final determinations, in accordance with 40 CFR 125.36. If granted, applicable provisions of the permit will be stayed pending the hearing.

Persons wishing to comment upon or object to certification by the Arizona Department of Health Services or request a public hearing should submit their comments of requests in writing within thirty (30) days from the date of this notice, either in person or by mail to:

the Arizona Department of Health Services
(at the address given above)

The applications, proposed draft permits and other pertinent documents may be examined or copied at the offices of the Environmental Protection Agency or the Arizona Department of Health Services.

A copy of the draft permits, and other pertinent documents may be obtained by calling or writing to the Regional Office of EPA at the above address.

Please bring the foregoing notice to the attention of all persons whom you know would be interested in this matter.

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

December 9, 1957

Mr. Seward Lawson
Armstrong, Jones, Lewson & White
427 Penobscot Building
Detroit, 26, Michigan

Dear Mr. Lawson:

In reply to your letter of December 1st regarding the Senator mine, Waldemar Lindgren, one of America's foremost geologists, examined, among others, the Hassayampa Mining District in 1922 and on pages 120 and 121 of U. S. GeologicalSurvey Bulletin No. 782, "Ore Deposits of the Jerome and Bradshaw Mountains Quadrangles, Arizona", he discusses the Senator Mine. This bulletin now is out of print but probably can be found at your library or at the University library.

Page 101 of Arizona Bureau of Mines Bulletin No. 140, "Arizona Metal Production", gives the following figures of 'approximate production':

Senator Mine	1883-99	$ 530,000.00
Cash	1900-25	200,000.00

Ten Spot and Snoozer not listed.

Subsequent operations have been spotty with probable output of two or three thousand tons of ore from the Senator and Cash combined.

We were told in December 1956 that Still and Still, consulting mining engineers of Prescott, Arizona had been engaged to make a report on the property. The senior Mr. Still was general superintendent of Miami Copper Company operations prior to 1955.

E. R. Dickie, former part owner with Jack Orr was general manager of Bagdad Copper Company's operations and the fact that he was interested in the Senator and Cash mines should carry weight.

You may obtain from the U. S. Bureau of Mines, 224 New Customhouse, Denver, 2, Colorado, its Area Report D-63, the Mineral Industry of Arizona, 1956. We are enclosing copies of our July reviews of copper, lead and zinc.

In July we listed over 200 active mines and mills in Arizona including 31 uranium properties and about 50 mills of all types.

The 1956 Mines Register lists over 130 Arizona Mining companies whose names begin with the word Arizona. True, they are mostly inactive, but the figure gives an idea of the great number of mining companies in Arizona. There are a few thousand folders in our files of Arizona mines.

At present we have no representative at Prescott. One of our engineers gets up there at least once a month but if you wish to talk with us, it had better be here or by appointment up there.

You, of course, would have a report from an independent mining engineer of repute being investing money in a mining venture.

Assuring you of our desire to be of further service,

Yours very truly,

FRANK P. KNIGHT,
Director

Encs.

FK:lp

15 December 1939

Mr.Arthur Murphy,
Box 505,
Phoenix, Arizona.

My dear Mr. Murphy:

Before Mr. Coupal left for the east, he requested that I ask you to call at the office - 121 Capitol Building, to read a letter which he thought would be of interest to you.

Yours very truly,

Jess R. Fickas
Secretary to Mr. Coupal

jrf.

ARTHUR MURPHY
ENGINEER OF MINES
Phone 4-3204.

P. O. Box 505
Phoenix, Arizona.
December 12, 1939.

Mr. J. H. Coupal, Director,
Arizpna Mineral Resource Div.
Capital Building
Phoenix.

Dear Sam: Re: Senator et al.

I am outlining very briefly the proposed consolidation of the Hassayampa District Mines.

These consist of the Senator Group, owned since 1899 by Phelps Dodge, Corporation, and having an excellent record of past production; the StormCloud group, owned by OBrien Bros. of Toronto, Canada; and the Cash Group owned in Nevada. These properties if tied together will control the most important and most valuable area of the Hassayampa upper watershed.

The Senator tunnel. a long and large size working tunnel cuts or makes possible the operation of 27 veins, all of which have produced commercial ore. The Ten Spot vein is probably the "mother lode" of the district and is the vein depended on to produce large tonnages of low grade ($ 10.00) ore. The other veins may all be considwred feeders, yet each capable of good production, and generally of comparatively high grade. Unified ownership will make the operation of all these veins possible, and the over-all operation should be quite profitable.

Briefly: the veins are in an amphibolite and Yavapai shist interspersed with dioite and quatrz diorite and cut by dikes of rhyolite and porphyry. The ore in general is in veins of banded structure with gold the principle "pay" but with sphalerite, pyrite and chalcopyrite occurring in abundance in spots. The large veins are 5 to 8 ft. wide. The feeders generally about 16" to 18" wide. The occurance is in lenses along the veins which are apparently recurrent. A total of over 20,000 ft. of development work has been done, and much of this is accessable.

An expense of about $ 60,000. is indicated in repairing tunnell, re-opening shafts and veins and preparing for mining. A mill of 100 to 150 tons per day is indicated with the above done, and such a mill should hold around a $ 15. mill head. Located on a highway, plenty timber, water, excellent location, 8 miles from Prescott. But you know the conditions.

Truly yours,

Arthur Murphy

Mailed on 12-13-39

COPY

ARTHUR MURPHY
Engineer of Mines
Phone 4-3204

P. O. Box 5051 Phoenix, Arizona.
December 12, 1939

Mr. J. H. Coupal, Director,
Arizona Mineral Resource Div.
Capital Bldg.,
Phoenix.

RE: SENATOR, et al.

Dear Sam:

I am outlining very briefly the proposed consolidation of the Hassayampa District Mines.

These consist of the Senator Group, owned since 1899 by Phelps Dodge Corporation, and having an excellent record of past production; the Storm Cloud Group, owned by O'Brien Bros., Toronto, Canada; and the Cash Group owned in Nevada. These properties if tied together will control the most important and most valuable area of the Hassayampa upper watershed.

The Senator tunnel, a long and large size working tunnel cuts or makes possible the operation of 27 veins, all of which have produced commercial ore. The Ten Spot vein is probably the "mother lode" of the district and is the vein depended on to produce large tonnages of low grade ($10.00) ore. The other veins may all be considered feeders, yet each capable of good production, and generally of comparatively high grade. Unified ownership will make the operation of all these veins possible, and the over-all operation should be quite profitable.

Briefly: the veins are in an amphibolite and Yavapai shist interspersed with dioite and quartz diorite and cut by dikes of rhyolite and porphyry. The ore in general is in veins of banded structure with gold the principal "pay" but with sphalerite, pyrite and chalco-pyrite occurring in abundance in spots. The large veins are 5 to 8 feet wide. The feeders generally about 16" to 18" wide. The occurrance is in lenses along the veins which are apparently recurrent. A total of over 20,000 ft. of development work has been done, and much of this is accessible.

An expense of about $60,000. is indicated in repairing tunnel, re-opening shafts and veins and preparing for mining. A mill of 100 to 150 tons per day is indicated with the above done, and such a mill should hold around a $15 mill head. Located on a highway, plenty timber, water, excellent location, 8 miles from Prescott. But you know the conditions.

Truly yours,

(SIGNED) ARTHUR MURPHY

J. S. Coupal,
#126 Lincoln Road,
Medford, Mass.

United We Stand

SENATOR MINE YAVAPAI COUNTY

ABM Bull. 137 p. 46

USGS Bull. 782 p. 120

Treadwill Claim (RFC file)

Statistics of Mines and Mining in the States and Territories west of the Rocky Mountains, R. W. Raymond, 1874 p. 347

Production to 1899 - $530,000 - major metal gold - J.W. Still figures (Corres. file)

See confidential file - engineers' reports

ARIZONA DEPARTMENT OF HEALTH SERVICES

BRUCE BABBITT, Governor
LLOYD F. NOVICK, M.D., M.P.H., Director

JOINT NOTICE OF PROPOSED ACTION

by the

U. S. Environmental Protection Agency
Region 9 (M-5)
215 Fremont Street
San Francisco, CA 94105

Telephone: (415) 974-7410

On Application for National Pollutant Discharge Elimination System Permits to Discharge Pollutants to Waters of the United States

State of Arizona
Department of Health Services
2005 North Central Avenue-Room 300
Phoenix, AZ 85004

Telephone: (602) 257-2270 Wayne Palma 257-2263

On Application for Certification for Compliance with Applicable Effluent Limitations and Appropriate Requirements of State Law

On the basis of preliminary review of the requirements of the Federal Water Pollution Control Act (the Act), as amended, and implementing regulations, the Regional Administrator, Region IX, EPA proposes to deny an NPDES permit to discharge to the following applicant:

Public Notice No. 7-85-AZ April 15, 1985

John O. Bruer
10702 Stone Canyon - Apt 255
Dallas, Texas 75230
NPDES Permit No. AZ0021820

The applicant operates the Senator Mine, located approximately 12 miles south of Prescott in Yavapai County. The existing discharge consists of mine drainage water. The discharge at latitude 34° 26' N, longitude 112° 27' W is to the Hassayampa River.

The reason for denial of this permit renewal is noncompliance by the applicant with the reporting requirements of their existing permit. This denial will become effective thirty (30) days following the date of this public notice. A request for an evidentiary hearing must be submitted to the Regional Permits Records Controller at the above EPA address within thirty (30) days following notice of this determination, in accordance with 40 CFR 124 Subpart E.

If the Regional Administrator grants a request for an evidentiary hearing, public notice of such a hearing shall be given. Any person may submit a request to be admitted as a party within thirty (30) days after the publication date of the public notice of an evidentiary hearing. If no evidentiary hearing is requested, the permit will be denied and this action will be final.

A copy of the permit application and other pertinent documents may be obtained by calling or writing to the Regional Office of the Environmental Protection Agency or the State of Arizona at the above addresses.

Please bring the foregoing notice to the attention of all persons who you know would be interested in this matter.

File: Environmental Protection Agency
Alpha:"E"
Pink readingfile

June 26, 1978

U. S. Environmental Protection Agency
Region IX
Enforcement Division, Permits Branch
215 Fremont Street
San Francisco, CA 94105

Gentlemen:

We would appreciate receiving a copy of the Draft Permit, Fact Sheet and all other pertinent data regarding the Senator Cash mine, Yavapai County, Prescott, Arizona.

Thank you.

Sincerely,

Susan E. Fromm
Secretary

/sef

SENATOR MINE YAVAPAI County

MG WR 10/18/85: An inquiry from a stock broker in Tulsa, Oklahoma, indicates that a property package comprising the Senator and Cash mines (Yavapai County) is being sold to investors. The prospectus reportedly states there is a reserve of approximately 1,100,000 tons of +0.3 oz gold/ton.

KAP WR 5/29/87: Paul Strobel, Resource Exploration and Development (REDCO-card) P O Box 21088, Reno, Nevada 89515, phone (702) 329-0666 inquired about file information on the Senator Mine (file) Yavpai County. They are "taking a look" at the property.

SENATOR MINE (file) YAVAPAI CO.

JHJ/Memo 3/27/79 - The Special Investigative Division, Yavapai County Sheriff's Office, had a call from the Illinois S.E.C. relating to the Senator-Cash Mine. Mr. Jack Orr is the owner. Mr. Breuer is reportedly selling stock in Illinois.

KAP WR 5/6/80: A report was received from a reliable source, that John Bruer holds or has held a lease on the Senator-Cash Mine, Hassayampa District, Yavapai County. The mine is reported to be owned by a Mr. Orr. John Bruer is reported to have received a Cease and Desist Order for selling unregistered securities.

KAP WR 5/29/81: John Challinor reported that the Senator Mine, Hassayampa District or possibly the Groom Creek District, Yavapai County is to be sold at a Sheriffs auction.

NJN WR 11/6/81: Jim Sullivan of J. Sullivan Co, Scottsdale phone 947-8075 called for information on the Senator-Cash Mine, Yavapai County. He wondered if the mineralogy would be favorable to cyanide leaching. From checking the files, the answer is obviously no by the high amount of base metals in the ore.

KAP WR 4/16/82: In the company of Dick Beard the Senator Mine, Hassayampa District, Yavapai County, was visited. There is no apparent change at the portal since 1971. Water is discharging from the portal through a pipe in the dump at about 150-300 gal/min. A steel gate is in place at the second portal set. Some new lagging at the portal may have been installed in the last few years. The EPA water discharge permit may have only been to allow historic drainage to continue and not for a dewatering project.

RRB WR 4/8/83: Assisted Mr. Gilbert of the BWQC-ADHS in locating the owners of the Senator Mine to inform them that their water discharge permit is about to expire.

KAP WR 4/19/85: Discussed the water discharge permit application at the Senator Mine (file) Hassayampa District with Wayne Palsma at the Bureau of Water Quality at the Arizona Department of Health Services. A separate report was written for the Senator Mine file.

OBJECTIVES OF THE ARICANA MINING CO.

To promote better relations with our associates in the business of mining, with governmental agencies and the public in general.

To produce basic raw materials and metals essential to the economic growth of our Country.

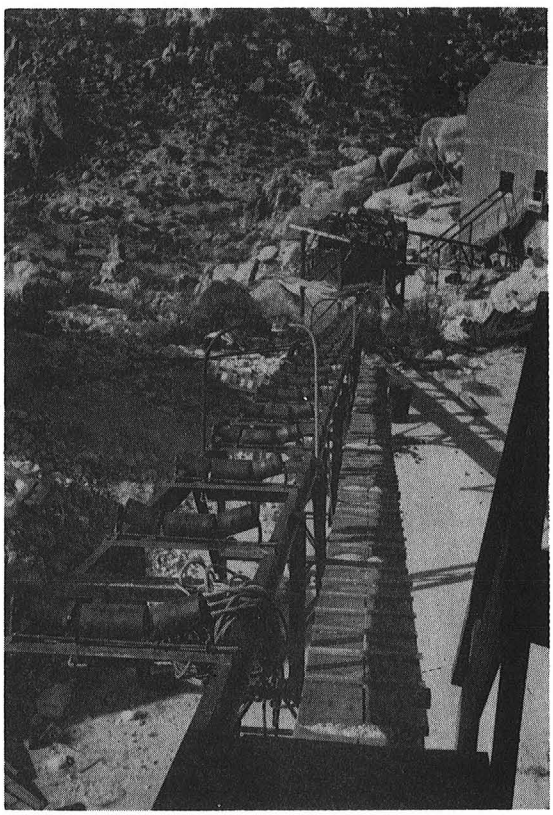
To earn a return on the stockholders' investment which is both fair and equitable.

To increase our productivity and improve the earnings and security of our employees.

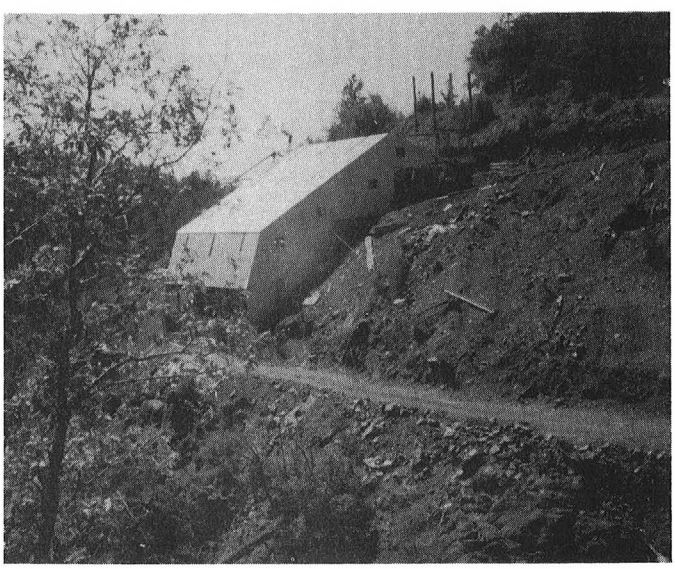
To secure greater efficiency in producing, processing and marketing our products.

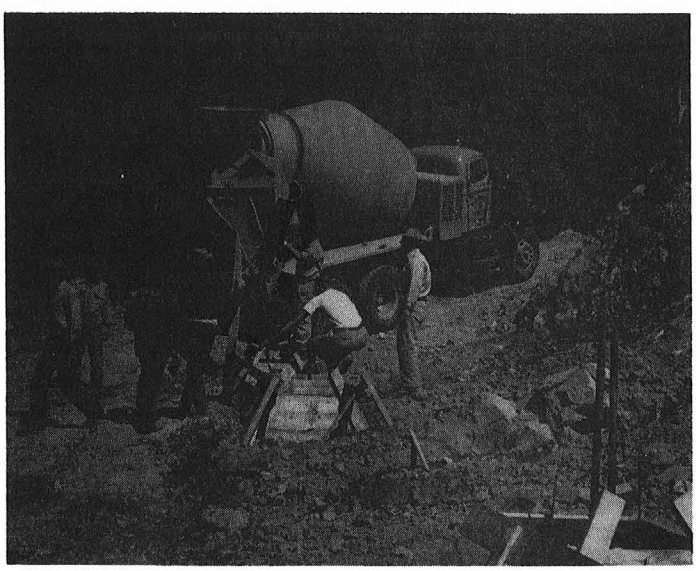
To promote the cultural, educational and spiritual advancement of our employees and the communities in which they live.

To stimulate research, improve the methods and reduce the costs in our industry.



These are photographs of the Aricana 200-ton mill under construction at Prescott, Arizona.





Aricana-Senator Mines Corporation at Prescott, Arizona is a wholly owned subsidiary of Abbican Mines, Ltd. of Toronto, Canada.

HISTORY OF THE SENATOR CASH MINES

The mines under consideration are in Mount Tritle, approximately 12 miles south of Prescott, Arizona, near the Senator Highway in Yavapai County, Hassayampa District, near where Maple Gulch meets the Hassayampa.

"The greatest period of mining activity was evidenced on this property just before the turn of the century. Since that time no large scale systematic exploration, development or mining has taken place. All work since about the year 1900 has related to leasing operations with a resultant of high-grading, small scale intermittent mining." (1)

The first mine in the group was discovered and productive in the early 1860's and various of them have been worked with varying degrees of success, first by the early day miners, and developers, among whom were a Senator Clark; a Dr. James Douglas (one of the major mine developers in the Arizona-Nevada territory during that era); later development and exploration was carried on by his son J.S. Douglas and his associate Major A.J. Pickering of Prescott; Phelps Dodge & Co. , for whom Mr. Douglas had worked, purchased all his remaining interests about 1917. However, due to cave-ins, and some resulting miscalculations on the part of an inexperienced engineer, the company did not pursue operations. Engineer Ernest R. Dickie and J.S. Prescott, also ex-employees of the Phelps Dodge & Co., became associates of Jack Orr, and together they purchased all the interests from the lessees and owners of all the mines in a 500-acre area, then worked some of the mines---for which we have copies of mill tickets, assay reports, etc. Their purchases were completed about 1949, and the mines were worked successfully until the untimely death of Mr. Dickie in Dec. 1955. The properties then became tied up in an estate and trust with an Arizona state bank. (2)

In 1969, Mr. John Bruer of Geneva, Illinois was in a group that obtained the mineral leases, and he, in turn, took over complete control of the leases and mines March 29, 1971. Since then, we have been doing more testing, exploring, and evaluation work. Presently, preparatory repair work and reconstruction of timbering is being done, so that, when funds become available, mining and milling may be resumed. In some areas of the mines, mining operations could commence immediately, while in others, additional core drilling, research, and development will be necessary.

Past interruptions to the mining activity have occurred for several reasons: In the late 1800's, and early 1900's they ran into water that had to be pumped out (by hand)-- the rate of flow eventually increased with mine depth until pumping requirements exceeded 800 gallons per minute, making pumping physically and economically unfeasable; so, a tunnel was driven into the side of the mountain, which partially solved the problem; then, timbering problems arose when they crossed what is called the "mud vein" in the tunnel; there were various lawsuits when one mine vein crossed over and invaded the claim of another; for instance, "Shortly after the whole area was drained (by the tunnel) mining operations were resumed at the Cash and Mr. Douglas discovered, some time after, that the operators of the Cash property were mining on property owned by himself. This created some hard feelings and finally resulted in a lawsuit. This stopped temporarily the Cash operation and certainly kept them from mining within the property lines of the Senator. What settlement they finally arrived at, is unknown;" developers, upon making a new discovery in another location, would pull out and leave the original location for what was presumeably a richer find (which did not always pan

out, of course); leases were purchased by developers who did not have sufficient remaining capital to perform the mining and milling operations; World War I; disagreements between investors; and, plain dis-interest after exceedingly rich deposits were mined out---they just did not need to pursue the vein further to find the next deposit of richer ore. (3)

Estimates of past production from all the mines included in the present Senator-Cash mine group, based on current prices, far exceed $35,000,000, much of which was never reported. Most of the mining has been to obtain only the gold and silver, and, occasionally, copper. (Present-day mining engineers estimate that only 10% of the total value above the tunnel level has been mined.)

"It might be informative to mention that here these earlier operators have not been concerned with the copper, but with the gold values in the veins. By reason of the high-cost of transportation, especially for the raw ore to the smelter, only reasonable high-grade ore would be profitable to ship. Consequently, their work was concentrated on the high-grade sections of the veins only, leaving much bulk of ore either in place or on the dumps. With a mill available, these ores can now be profitably mined, milled, and processed in a smelter (at the mine site)into a high-concentrate ore---especially since the price of metals has gone up considerably. Also, the water, which has in the past been a problem, will be a necessary asset in the type of operation currently being proposed. (4) (Power-lines and year-round, all-weather roads are readily accessable from the property.)

The proforma projections of future profits do not include the over 300,000 tons of dumps that can be reprocessed profitably. "A bulk sample from the surface of Senator and Cash dumps was recently sent to Denver Equipment Company for gravity mill tests which yielded an assay of 0.1555 in gold, 1.2 in silver, 0.81% in lead, 0.055% in copper and 0.31% in zinc." (5) Neither do projections of future profit include any projection for potential veins below the main tunnel. One auxiliary shaft (winze) has been sunk below the main tunnel to a depth of an additional 280'. "During sinking operations, one pocket of tremendously high-grade gold ore was encountered somewhere below the tunnel level, which produced about $30,000 in gold from a very small tonnage of ore." (3) This auxiliary shaft was abandoned due to water problems---which can now be resolved relatively easily. Current value of the above gold would be in excess of $240,000.

Further, from the local historical records of the veins that are obviously evident in the mines and that have been produced and developed, we have learned that "As early as 1880, extremely rich gold floats were found along the slopes of the hills where the Senator-Cash property is now located. Looking for the Mother Lode where these rich ore samples originated from--which, by the way, has never been found--various veins were discovered which are known as the Senator, The Ten Spot, the Tredwell, the Cash, and others." (3)

From the Snoozer claim, "about 4,000 tons were produced with an average value of 9 1/2% copper; 9 oz. silver; no gold present in this vein." (4) Present value of this would be over $830,000.

In one conversation "Mr. Douglas reported to Mr. Dickie that the Senator mine was by no means worked out above the adit (tunnel opening) level, and that he did not quit for any motives other than to give the Cash-Senator mine a chance to drain; during which time, he concentrated his efforts on the new operation which was at

Jerome. He assured him some $1,000 per ton ore was still in place and that limited quantities of ore--which had been mined and milled--ran as much as $10,000 to the ton (at $20 oz. for gold)." (3)

"Another feature is claimed by a man who was at that time an employee and who states that any portion of that high-grade ore was certainly worth stealing, and consequently, the miners generously helped themselves whenever they had the opportunity."

On one occassion, a cross-cut tunnel was driven between the Ten Spot and the Senator shaft, for ventalation. "Old timers, working in this tunnel, claimed that two stringers of high-grade ore were cut within the Ten Spot vein, but no lateral work was done on them." "Fritz Viedtholer, foreman of this work, stated repeatedly that at the 250' level, pockets of very high-grade gold ore were encountered, but no lateral work was done on it." (1)

ECONOMIC GEOLOGY:

"The many rich concentrations of metallic minerals throughout the vein system indicates that medium to high temperature mineralizing solutions were injected into the fissures and faults created in the older rocks during the later stages of their structural deformation.

"The dips of the vein system are steep and their continuity along both dip and strike, together with their strongly apparent relationship to the major faults outlined by the precipitous mountain canyons, leaves little doubt that these veins or related structures continue for several thousand feet.

"The fact that the vein fissures have been subjected to intense dynamic metamorphism and are on the upper levels of the mountains, points to a strong possibility of encountering large shears and fissures at depths of 1,000 to 3,000 feet to which the mineralizing soultions must have had access.

"The veins appear to be as strong, wide and well mineralized on the 570-foot level as on the surface outcrops on the top slopes of the mountain.

"In addition, they have been traced by long outcrops intermittently showing through the light overburder for distances over a mile in length as indicated by the following: Senator 4,500', Little Senator 1,100', Ten Spot 3,000', Ten Spot North 1,400', Ten Spot South 1,200', Little Ten Spot 1,700', Cash North 4,000', Cash East 1,200, Cash 4,500', Snoozer 2,350'." (5)

SOURCES:

(1) Morley R.P. Mulliette, B.Sc., M.Sc. Professional Mining Engineer
217 Bay St., Suite 605, Toronto, Ontario.
(2) Court Records, Yavapai County, Prescott, Arizona.
(3) "Rocks to Riches" by Harold Dunning, Phoenix, Arizona, pub. 1965 by Holt Pub. Co., Pasadena, Calif., plus additional added information by local "old-timers," former workers, and owner-operators (i.e., Mrs. Dickie, Mr. Jack Orr, and his father), and Arizona Bureau of Mines.
(4) Mr. Gregory Sali, Prof. Mining & Operationg Eng., 5625 Bond St., Boise Id., 83704.
(5) A.S. Bayne & CO., B.Sc., P.Eng., Consulting Engineers, Suite 200, 2 Toronto St., Toronto 1, Canada.

Complete text of all quotations are available from Mr. Bruer.

SENATOR CASH MINES

The mining claim of the patented lode mining claims and mill site, known as the SENATOR GROUP, situated in the Hassayampa mining district, Yavapai County, State of Arizona, the names, survey numbers, patent numbers, and books and pages of the record in the office of the County Recorder of Yavapai County, Arizona, whereof, are as follows:

NAME OF CLAIM	SURVEY NO.	PATENT NO.	BOOK OF DEEDS, PAGES	
Great Divide	1457	GLO 34261	56	477-481
Cahsier	1458	GLO 34262	56	474-477
Gold Dust	1458	GLO 36716	69	159-163
Senator	39	GLO 5502	14	571-577
Cascade	965	GLO 22324	32	320-325
Cherry	962	GLO 21680	32	303-309
Ten Spot	963	GLO 21681	32	309-315
Smith	963	GLO 21566	32	292-297
West Point	975	GLO 21682	32	297-303
Snoozer	964	GLO 21972	32	315-326
Senator South Extension	40	GLO 5303	14	578-584
Senator No. 2	1460A	GLO 34640	61	177-181
Senator No. 2 Mill Size	1460B	GLO 34640	61	177-181
Boomerang	1288	GLO 31741	49	598-603
Treadwell	1288	GLO 31741	49	598-603
Devernon	45	GLO 6517	27	621-627
Sky Light	1289	GLO 31019	47	617-621
Lewis	1291	GLO 30949	47	590-594

Those certain patented lode mining claims, known as the CASH GROUP, situated in the Hassayampa mining district, Yavapai County State of Arizona, the names, and the books and pages of the record of the patents in the office of the County Recorder of Yavapai County, Arizona, whereof, are as follows:

NAME OF CLAIM	BOOK OF DEEDS	PAGES
Cash	49	449
H.J.Glenn	49	455
Yavapai	95	576-578

except the surface of the Cash, H.J. Glenn, and Yavapai claims to a depth of 200 feet, which surface is hereby reserved to the lessors of the lease of this agreement.

SENATOR MINE YAVAPAI COUNTY

Visited Senator Mine. Discussed the project with Morley Mulliette, consulting engineer, and Bert Harvey, supt. Drilling is in progress - exploring the Cash vein on the 260' level. TPL WR 6-2-59

Interview with Bert Harvey in Prescott. He advised that work at the Senator mine was suspended and the drill crew moved out several weeks ago. About 1000 ft. of drilling (of a scheduled 6000 ft.) had been performed on the Cash and Snoozer veins with reported "very encouraging" results. Early resumption of work is planned. TPL WR 6-31-59

Interviewed the Cottonwood District Ranger - Jack Matthews. Bert Harvey who supervised the recent drilling in the Senator Mine for the Canadian Company - Aricana Resources Corp. - in an interview, reported that work has been suspended again at the mine.
TPL WR 10-3-59

Visited the Senator Mine with Bert Harvey, former supt., to check on the equipment items for sale. The property is still idle waiting upon refinancing by the Canadian operating company - Aricana Resources Corp. Only a few items which the company does not expect to use are up for sale. These include, principally a 150 HP Fairbanks-Morse type Y semi-diesel with generator, a 22" x 7' Hardinge mill, a 6 cell (20" x 20" flot machine and a 4 cell machine (32" x 32"). TPL WR 12-26-59

Hole No.	This hole 168 ft. above adit level	Angles Dip	Bear	Sample No.	Width of Intersection From:	To:	Core Length
				NORTH CASH VEIN			
N C W 2	17' from crosscut face, west wall	- 31	S14E	1-NCW-2	119'6"	124'1"	4'7"
N C W 4	14' from crosscut face, west wall	0	S15E	1-NCW-4	33'1"	38'10"	5'9"
N C W 3	17' from crosscut face, west wall	0	S29E	2-NCW-3	25'	29'2"	4'2"
N C W 1	5' from crosscut face, west wall	-5	S41E	3-NCW-1	36'9"	39'2"	2'5"
				CASH VEIN			
N C W 3	17' from crosscut face west wall	0	S29E	3-NCW-3	67'2"	70'2"	2'10"
N C W 1	5' FROM crosscut face, west wall	-5	S41E	4-NCW-1	65'11"	69'4.5"	3'5.5"

Note: Values based on price of: Gold (oz) $34.00 Silver (oz) $0.90

TABLE NO. 111

Diamond Drilling Data, Cash and North Cash Veins---

Hole No.	Location This hole 168 ft. above adit level	Angles Dip	Angles Bear	Samples No.	Width of Intersection From:	To:	Core Length
NCE1	7'from X-Cut Face	5	N87 E	1-NCE-1	65'11"	69'	3'1"
NCE 1	"	"	"	3-NCE-1	69'	70'	1'0"
NCE 1	"	"	"	4-NCE-1	70'	75'	5'0"
NCE 1	"	"	"	5NCE-1	75'	80'	5'0"
NCE 1	"	"	"	6-NCE-1	80'	82'10"	2'10"
NCE 1	"	"	"	7-NCE-1	82'10"	84'10"	2'0"
NCE 1	"	"	"	Combined	70'	84'10"	14'10"
NCE 1	"	"	"	8-NCE-1	84'10"	87'10"	3'0"
NCE 1	"	"	"	9-NCE-1	87'10"	91'1.5"	3'3.5"
NCE 1	"	"	"	11NCE-1	92'	95'	3'0"
NCE 1	"	"	"	12-NCE-1	113'	115'	2'0"

Note: Values based on price of : Gold(oz) $34.00 Silver (oz) $0.90

Diamond Drilling Data, Hole No. NCE-1,

Crosscut Wall, East Side

TABLE No. 11

indicated vein width?

Au oz.	Ag oz.	Pb %	Zn %	Cu %	Combined VALUES %	¢	REMARKS
			NORTH CASH VEIN				
tr	3.4	5.5	3.1	.46	24.12		Not a complete vein section as at 124' it is believed that the drill broker into a filled stope.
.18	2.4	tr	nil	4.46	35.04		Altered quartz diorite. Much magnetite, pyrite, and specularite.
.01	0.6	nil	nil	2.40	15.28		Highly altered quartz diorite with much magnetite, and specularite, very silicious in places. Some alteration of the chalcopyrite.
6.30	2.1	-	-	.10	216.09		Highly sheared and altered quartz diorite, very silicious. Chalcopyrite shows some alteration to bornite. Much hematite & magnetite. Lost Care-23%
			CASH VEIN				
.97	3.6	1.8	7.2	.36	58.56		
.02	.0.8	tr	nil	2.38	15.68		

Note: Values based on price of:

Lead (lb)	Zinc (lb)	Copper (lb)
$0.12	$0.11	$0.30

West Crosscut Wall

Hole No.	Location All drill holes in easterly wall, W. Drift portion	Angles Dip	Bear	Samples No.	Width of Intersection From:	To:	Core Length
TSW 1	28'10" N-E along drift from channel sample marked TSW 1.	0	N70E	1-TSW1	10'	12'10"	2'10"
TSW 1	"	0	"	2-TSW1	12'10"	16'3"	3'5"
TSW 3	6'4" North easterly along drift from channel sample marked TSW 1	0	"	1-TSW3	15'4"	18'8.5"	3'4.5"
TSW 5 & TSW 5A	18' S-W along drift from channel sample marked TSW 6	0	N65E	1-TSW5	9'7"	14'2"	5'7"
TSW 6 & TSW 6A	1'3" E along drift from channel sample TSW 7 / Hole 6A is 6" above Hole 6.	0	N66E	TSW6	6'	10'3"	4'3"

Note: Values based on price of: Gold (oz) $34.00 Silver (oz) $0.90 Lead(oz) $0.12

TABLE NO. 1

Diamond Drilling Data, Ten Spot Vein, East Drift Portion

Assay Value					Combined Values		REMARKS
Au oz	Ag oz.	Pb %	Zn %	Cu %	$	¢	
nil	nil	tr.	tr.	0.12			
tr.	0.2	tr	nil	0.28			
.05	2.8	0.1	0.4	4.56			
.03	5.0	0.6	1.0	4.06			
.04	6.8	0.6	0.8	6.10			
.03	3.3	-	-	2.5			
.038	4.61	.99	.62	4.63	36.86		Combined weighted averages of samples: Nos. 4-NCE-1 6-NCE-1 and 7-NCE-1
tr.	tr.	-	-	0.10			
.02	0.1	-	-	0.13			
.30	2.1	3.5	3.8	0.40	31.23		
.07	2.3	2.3	2.0	0.38	16.63		

Lead (lb) $0.12

Zinc (lb) $0.11

Copper (lb) $0.30

NORTH CASH VEIN (Crocker ?)

Au oz.	Ag oz.	Pb %	Zn %	Cu %	Combined Values $ ¢	REMARKS
tr.	1.0	"	"	"		Hanging wall contact of altered rhyolite porphyry.
.06	9.5	3.3	7.7	.58	38.93	Vein Hole #1 is 120 feet from previously channelled sampled & weighted assayed section. (Channel marked TSW 9)
.22	3.6	5.2	4.7	.46	35.40	
.15	4.9	0.9	1.2	1.16	21.27	Holes No. 5 & No. 5A combined for assaying. Hole 5A is 4" above Hole 5.
tr.	nil	"	"	"		Holes No. 6 and 6A combined for assaying. Very incomplete core recovery. Important mineral concentration 2' from Hanging Wall contact 'ground out'.

Lead (lb) $0.12

Zinc (lb) $0.11

Copper (lb) $0.30

TABLE OF CONTENTS

1. CONCLUSIONS

1. The results of my investigations indicate that this property is worthy of more thorough examination and exploration than has been performed by past mining interests. Supervised diamond drilling and sampling, mine surveying and geological mapping are all essentials that must be undertaken as the next progressive step towards evaluating the true merits of this property.

2. The proposed examination and exploration program will entail disbursements of about $33,000.00. This expenditure will enable sufficient precise information to be tabulated that a decision can be adequately made in respect to the mine's future operations.

3. Past mining operations conducted on the Ten Spot, East and West vein portions, suggest the possibility of developing an orebody in the sections outlined in the body of the report. Diamond drilling will greatlu assist in assessing the sections of the vein not disclosed in the drift or not available for thorough sampling. Such drilling must be performed before further conclusions can be reached respecting the ore potential of the Ten Spot Vein.

4. Past mining operations conducted on the North Cash Vein (Snoozer?) suggest the possibility of developing an orebody above the adit level horizon of 125-ft. in an easterly direction. Diamond drilling must also be carefully performed on this section to assess more fully the possibilities of this mineralized portion of the vein.

5. Both the Senator and Cash Veins are worthy of careful examination and sampling.

11 GENERAL DETAILS

A. History

The greatest period of mining activity was evidenced on this property just before the turn of this Century. Since that time no large scale systematic exploration, development or mining has taken place. All work since about the year 1900 has related to leasing operations with a resultant of high-grading, small scale intermittent mining.

Between the years 1880-1899, extensive mining operations were conducted by the Commercial Mining Company under the direction of J. S. Douglas. During this period a 20-stamp amalgamation mill treated ore from various veins present on the property.

It is reported that during 1917 Phelps-Dodge Corporation acquired an interest in the Senator Group of claims from J. S. Douglas. Later they obtained complete ownership which in turn was transferred to E. Dickie. In recent years, the adjoining Cash Group of claims were amalgamated with the Senator Group and both holdings can be now expeditiously investigated. This was not possible in the past.

1. SHIPMENTS

Between 1880-1899 it is reported that $530,000.00 net was obtained from mining and milling operations. As a result of desultory operations between the years 1900-1925 ore shipments totalling $200,000.00 are reported to have been made from the Cash Group.

From 1900-1951, minor leasing operations resulted in a number of small tonnages of high-grade ore shipments to the smelter.

1. Buildings:

(a) Steel Building. A pre-fabricated steel structure 140-ft. by 40-ft. has been erected. It has adequate facilities for the intended purpose of engineering office, warehouse, general repairs, change and shower, compressor, and storage.

(b) Mill Building. A terraced mill has been almost completed and several pieces of heavier equipment have been moved into place on concrete foundations. It is designed for flotation. Generally, a mill of this type is better adapted to flat or gently sloping sites and the expensive main terraces are thus eliminated as well as the costly detailed designings. Ore bins for treatment by graded crushing have their super-structure erected.

(c) Assay Office. A building for assaying has been erected and certain pieces of equipment have been installed.

2. Equipment:

Sufficient mining equipment is present to investigate thoroughly the ore-making potential of this property. Much of the main workings has been equipped with light tracks along with air and water lines.

III. DEVELOPMENT AND ECONOMIC GEOLOGY

Past operators have explored these mineral claims extensively both from surface and underground. They investigated several of the more promising surface exposures of the various veins. Most of the money received by the various operators from past production was utilized for further underground mining. It is doubtful if the total gross revenue from all mineral production to date would be sufficient to cover the cost of the approximate total of eight mile of shafts, drifts, crosscuts, raises, and stopes. Future operators will receive major benefits from these underground openings. Within the last year considerable progress has been made in rehabilitating much of the underground workings. It is now possible to adequately inspect important sections of the various veins from different elevations. These veins have been designated by past operators by definite nomenclature and where reasonably possible, the same system will be followed. However, until a thorough underground survey has been made and connected with the surface there will be doubt as to the correctness of some of the name vein reference underground.

The district in which these holdings are situated as well as the property proper have been examined and described by various technical personnel and reported thereon. No point is served in editing a repetitious mass of geological data at this time. Waldemar Lindgren in Bulletin 782 (1926) U. S. Geological Survey, covers the general phase fairly adequately.

A. Senator or Main Adit Level (570 - ft.)

This adit is the main haulageway for servicing and investigating the extensive underground openings. In the event of producing operations, heavier gauge rails would be required to adequately transport ore to the mill.

(c) Sampling. Twenty samples were taken along this West Section. All samples were mailed channels that were thoroughly freshened before cutting. Their location has been identified underground by waterproof yellow paint markings that permit ready correlation with Map No. 2. Samples T. S. W. 1 to 7 inclusive were cut at five foot intervals.

The purpose of this sampling was to ascertain if any values existed in the altered silicified metamorphic section which adjoined the mineralized zone on the footwall side.

The results show that no commercial values are present. Samples T. S. W. 4A and B were selected from near the footwall contact of a small raise about 90-ft. from where the Senator adit crosses the Ten Spot Vein, West Section. While they represent the same channel sample a division was made in order to separate the varaible band. The combined weighted assay averaged:

Sample No.	Width (ft.)	Au. (oz)	Ag. (oz)	Pb (%)	Zn (%)	Cu (%)
T. S. W. 4A-4B	4.7	0.09	2.10	1.20	3.04	0.23

The results from this sample tend to confirm the contention that much of the drift workings are not on the most important mineral bearing portion of the altered zone. Minor folding is evidenced in the workings associated with this limited raise.

Samples T. S. W. 8 to 16 inclusive were selected from a position in the drift about 200 - ft. from the intersection with the Main Adit Level. Heavy channels were cut on five foot intervals after all rock surfaces had been chipped to freshness. The assay results of this work are set forth in Table No. 1. No samples were taken between T. S. W. 7 and 8 as the backs had caved above the timbering and were considered extremely dangerous. In addition, the vein leaves the drift between two samples. The location of the samples along with other pertinent information are detailed on Map No. 2.

(d) Ore Potential. The combined weighted average of assayed samples T.S.W.8 to 16 inclusive gave the following results: -

Length (ft)	Width (ft)	Au. (oz)	Ag. (oz)	Pb (%)	Zn (%)	Cu (%)
40	4.9	0.21	2.74	0.56	0.40	0.76

These results when considered in conjunction with sample T.S.W. 4A and B suggest the possibility of developing an ore body along this section. Beyond Sample T.S.W. 16 the heavily mineralized section between the hanging wall and the silicified metamorphic portion of the altered zone narrows to one foot. It is probable that this mineralized section will show a tendency to pinch and swell and wider extensions should be sought along the drift on the other side of the present rock obstacle. Reports and maps by other interested personnel showed much greater lengths, widths and values than those obtained during this examination. Careful scrutinization of the walls and backs for previous evidence of channel sampling suggests the explanation for the divergence in investigating results are attributed chiefly to the unreliable procedures and techniques followed by such previously inquiring individuals.

There is a two-compartment shaft which has been rehabilitated to a height of 180-ft. above the Main Adit Level. No upper levels have been confirmed as existing to such point. All reports indicate that only minor lateral and vertical exploration have been conducted. A level one hundred feet below the shaft collar is reported. Time did not permit confirmation of this fact.

2. Ten Spot Vein, East Section:

The drift east of the Main Adit level has been rehabilitated for its entire length with the exception of a small pile of muck near the face. From adit intersection to end of drift is a distance of 568-ft. of which most of the first 250-ft. is heavily timbered. Due to such timbering the back of the drift is not available for adequate examination.

(a) Map No. 2. This plan map shows the location of samples T.S.E.1 to 4, inclusive.

(b) Geology and Mineralogy. The most important mineral change in comparison to the West Vein portion is the prevalence of quartz with altering pyrite. It was at and near the footwall that the greatest concentration of sulphide mineralization was observed. In contrast, the West Vein section showed the most important sulphide concentration to be in proximity to the hanging wall side of the altered porphyry. The quartz is white, coarsely crystalline containing scattered pyrite which is altering to limonite. Small amounts of magnetite and specularite also were noted. Cellular structure was observed in several instances, but the pattern was poorly formed and not extensive. In places near the footwall contact sulphide concentration of pyrite, sphalorite, chalcopyrite, galena and magnetite in descending order of abundance were seen.

(c) Sampling. Samples were selected in the vicinity of a minor stope which is 190-ft. from the drift intersection with the Main Adit Level. Four samples T.S.E. 1 to 4 inclusive were taken along a length of 77 - ft. easterly from the raise. Timbered backs did not permit more detailed sampling. In addition four samples T.S.E. R1, R1A, R2, R3, were taken from the west face of the small stope. Two of these samples T.S.E. - R1 and R1A were combined in a weighted average:

Sample No.	Width (ft)	Au (oz)	Ag. (oz)	Pb (%)	Zn (%)	Cu (%)
T.S.E. R1-1A	4.5	0.06	0.97	0.31	0.96	0.66

(d) Map No. 3. This cross-sectional map shows information relating to samples T.S.E. -R1 to R3 inclusive.

Facilities for sampling the back and easterly side of this stope were not available at the time of examination but as the workings are small the values can be safely projected between samples T.S.E. - 1, the raise samples and T.S.E. -2. Maps Nos. 2 and 3 and Table No. 1 set forth information relating to this sampling.

The footwall samples taken from this stope were not represented in samples T.S.E. 1 to 3 inclusive as the drift does not disclose this mineralized portion of the vein. Sample T.S.E. - R1A is adjacent to the westerly side of the drift.

(e) Ore Potential. The results of examining the Ten Spot Vein, East Section, suggests the possibility of developing an orebody of marginal grade for at least 50 - ft. each side of the center of the stope. Although timbering did not permit channel sampling along much of this 100 - ft. section, visual examination was possible. It is thus known that the important mineralized footwall contact is not disclosed in most of the drift along this portion of the vein.

C. NORTH CASH VEIN (Snoozer ?)

Examination of this vein can be most adequately performed at the 125 - ft., 168 ft., and 260 - ft. elevations above the Main Adit Level. Uncertainty exists whether at the Main Adit Level the same vein explored in the drift is the same as the other three stated horizons. One of the most important mineralogical and structural features of this vein is the copper mineralizations which occur in blobs and small stringers in the footwall contact rock. This rock which is dioritic in character has been very irregularly interfingered by an altered rhyolitic quartz porphyry which was noted in several places. The relationship of mineral occurrence to this quartz porphyry has yet to be determined. In addition quartz stringers dipping 85 - 90 impregnate the diorite in numerous places. At and near the footwall contact the rock is extremely fine grained mixture of chlorite and magnetite containing minor amounts of chalcopyrite. The dip of the footwall contact rock closely follows the related vein.

1. 125 - ft. Horizon above Main Adit Level.

This elevation can be reached by following the Main Adit Level to its termination, then following the left hand (easterly) drift until the fourth manway-chute is reached. By utilizing the ladders in this narrow irregular manway it is possible to reach the 125 - ft. horizon.

(a) Geology and Mineralogy. The drift which is 87 - ft. long follows the vein which strikes N. 40 E and dips 60 southerly. In the vicinity of the raise leading to the 168 - ft. horizon the footwall is well-mineralized with pyrite and chalcopyrite. The wallrock on the footwall side displays up to three per cent chalcopyrite neighboring channel sample 125, R1 - 1. The most important portion of the vein is in the vicinity of sample 125, R1 - 1. For 15 - ft. on either side of this sample the vein and wall rock on the footwall side are well-mineralized with chalcopyrite. The selected sample was taken in order to evaluate the economic mineral occurrence of this horizon and station in consideration of those at the 168-ft. and 260-ft. elevation.

Near the point at which the sample was selected another vein sparsely mineralized was observed striking N. 30 E. and dipping 46 southerly.

(b) Table No. 1. This table sets forth the assay results obtained from sampling.

2. 168 - ft. Horizon above the Main Adit Level.

Approach to this horizon can be made by following the irregular raise from the 125 - ft. elevation. However, the most convenient manner is the alternate means which is reached by following the left-hand drift at the end of the Main Adit Level, thence to the first right-hand crosscut, then along the first left-hand drift 38 - ft. at which point a two compartment raise is located. Ladders in the manway side of the raise permit means of access to this level. The drift is short and constitutes a station for handling ore rather than a development working place.

(a) Geology and Mineralogy. The vein strikes N. 26 E. and dips 51 southerly. At this level this vein is 30 - ft. northerly from the Cash Vein. It is three feet wide and contains prominent pyrite, chalcopyrite, and a little magnetite and specularite mineralization for one foot along the footwall side. The balance of the vein material is highly altered to a chloritic schist which forms a clay gauge in places, containing minor amounts of finely disseminated pyrite, magnetite, specularite, and chalcopyrite mineralization. Southwesterly along the vein a short raise has been made for about 25-ft. on the dip of the vein. It is sparsely mineralized with pyrite and chalcopyrite. However, the footwall contact rock contains two to three per cent chalcopyrite mineralization in many places. There is no drift development northeasterly along the vein as the short drift terminates in a raise leading to the 260 - ft. horizon.

(b) Crosscut. A crosscut has been advanced past the footwall of the vein for 54.5 feet. This working permits a thorough examination and smapling of the footwall contact rock. This contact is a medium-grained rock containing dark green silicate minerals including amphibole, along with altered feldspar and minor epidote. It is dioritic in texture. In places the rock is metamorphosed with scattered fine-grained chlorite and seams of epidote. The white and pink feldspar and small amounts of quartz suggest a granodiorite. At and near the contact rock is highly metamorphosed. It becomes an extremely fine-grained dark green chloritic rock containing minor amounts of chalcopyrite and magnetite with small seams of homatite and quartz.

A channel sample accross 11 - ft. measured from the footwall contact yielded on assaying the results set forth in Table No. 1.

3. 260 - ft. Horizon above Main Adit Level.

This level is reached by climbing the ore-chute from the 168 - ft. horizon for 60 ft. on about a 50 incline at which point a manway is reached. Ladders in the manway facilitate the remaining 60 - ft. to 70 - ft. at 75 incline leading directly to the 260 ft. drift level.

(a) Development; The drift is 55 - ft. in length having small stopes on each end with an enlargement in center around the manway and ore-chute. Information from several sources confirm that only minor stoping was performed between this level and the 168 - ft. horizon, surrounding this portion of the vein. Two feet of vein in East stope next to the footwall is highly altered and contains sparsely disseminated pyrite, chalcopyrite and specularite. The balance of about one foot to the hanging wall contact is massive chalcopyrite. In addition, the footwall rock contains from one to three per cent chalcopyrite. This is a very important section. Little or no stoping is reported to the east and at higher elevations. While facilities were not available for complete channel sampling, visual examination combined with the samples obtained readily confirmed the existence of the massive chalcopyrite for one foot from the hanging wall contact across the east face and the back of the stopes.

The vein in the west stope strkies N. 60 E. and dips 50 southerly. It could be a faulted portion of the vein examined in the east stope. It is characterized by the abundance of specularite with a little pyrite, magnetite and chalcopyrite all contained in an altered chloritic gangue, three feet wide.

(b) Sampling. Three channel samples were cut in the east stope one of which was sectioned in order to ascertain the value of the distinguishing vein segments of high and low grade. A combined weighted average of this sample 260 - 1 and 260 -A on assay gave the following results: -

Assay No.	Width (ft)	Au. (oz)	Ag. (oz)	Pb (%)	Zn (%)	Cu (%)
260-1-A	3.1	.01	1.94	nil	nil	3.45

This sample was channelled from the bottom of the east face of the stope. Location of all samples taken at this level are shown on Map No. 4.

D. Cash and Seantor Veins

Facilities for a thorough examination and channel sampling of the stopes and drifts of those two veins were not available. However, visual inspection suggests that both these veins are worthy of further examination.

E. Snoozer Vein - Shaft Section

By means of a short adit, laddered shaft and ropes, examination was made of portions of the vein to the 200 ft. level. At this point there is a bulkhead. Fallen timbers and waste obstruct further downward progress. Most of the vein has been extracted in the sections examined, probably by hand-cobbling. The gob remaining in the stopes contains chalcopyrite altering to bornite in many places, but investigation of the gob is not warranted unless a mining operation develops.

On the 100 - ft. level the vein strikes N. 48 E. and dips 72 southeasterly. There has been only minor stoping for 60 - ft. from the end of the drift. At this station the vein averages three feet for 55 - ft. at which point it narrows to two feet at the face. No channel samples were taken, but visual inspection suggests 5% to 7% chalcopyrite in many portions of this length. Three diamond-drill holes to probe the easterly extension of the Snoozer vein at 100 - ft. depth is merited.

F. Surface Mine Dumps.

At the Senator, Cash, Ten Spot, and Snoozer shafts sizeable dumps exist. However, much oxidation has taken place during the many years of mineral exposure to the elements which limit the advisability of assessing their value at this time.

The economic life of this mining property does not depend upon the value of these old mine dumps. Until sufficient ore is established to warrant a mining operation, the cost of proving the value of these dumps should be held in abeyance for future consideration.

G. Drilling

1. DIAMOND DRILLING

The only diamond drilling reported to have been performed underground was four holes comprising 589 - ft. of AXT core. This drilling was inadequatley performed and supervised. It is considered worthless.

2. LONG HOLE DRILLING

Long hole drilling was improvised as a means to test the vein and footwall contact of the North Cash Vein (Snoozer?). Using such a method of exploration, the only recordable results are obtained from the recovered sludge. As the possible sources of error in sludge collection are so numerous and as the same supervision was involved as related to the diamond drilling, the accuracy of the results obtained must be weighed accordingly. It is not a recommended testing technique only under the most unusual circumstances.

H. Tables

1. TABLE NO. 1.

This table sets forth data relating to the channel sampling performed during this investigation. In all computations the values are based on the set forth market price of:

Gold (oz)	Silver (oz)	Lead (lb)	Zinc (lb)	Copper (lb.)
$35.00	$0.85	$0.11	$0.10	$0.25

All channel samples were taken after the rock surface had been freshened. The location and numbers of the samples have been preserved by utilizing yellow waterproof paint to establish their existence underground. They can be thus, readily correlated with the maps.

2. TABLE NO. 2

The cost of the proposed mining investigations are detailed in this table.

IV. FUTURE PROGRAMME

A planned program involving a maximum of 10 weeks of investigation is required in order to assess satisfactorily the true merit of this property. The surveying and preparing the workings for examination and sampling should be undertaken as the first phase of the proposed project. Then the geological examination and sampling can be progressed after the first couple of weeks of surveying have been completed.

The diamond drilling campaign will probably take the full 10 week period to complete. Initial drilling can commence immediately to investigate the Ten Spot and North Cash (Snoozer?) Vein. Sufficient footage and drilling time will remain after these portions have been drilled to explore other favourable areas which may be designated as the result of geological examination, mapping and sampling.

Table No. 2 sets forth cost details relating to the proposed mining programme of examination and exploration.

V. RECOMMENDATIONS

1. Prepare for sampling, the stopes on the Senator Vein, east of the Main Adit Level and the stopes on the Cash Vein on the 300 - ft., 400 - ft, and Main Adit Levels. Channel sampling in these sections should be planned to yield a precise result from which ore interpretations can be evaluated, when completed.

2. Conduct an underground survey of the main workings and veins and connect them with the surface survey. The relationship between veins on each level and between underground and surface workings is very important.

3. Geologically map all the workings on the Ten Spot, North Cash (Snoozer?), Senator and Cash workings along with the Main Adit Level. Special attention to structural conditions as related to ore deposition should be reported upon. Trends inferred from the distribution of values, taken in conjunction with the trends in the geological structure give an indication of the probability of vein reoccurrence, its direction and continuation.

4. Three thousand feet of diamond-drilling using ATT size bits should be performed.

5. Short diamond drill holes on 20 - ft. centers to test the hanging wall contact of the Ten Spot, West Vein portion and the footwall contact of the Ten Spot, East Vein portions should be undertaken.

6. Diamond Drill the North Cash Vein (Snoozer?) east of the related workings on both the 168 - ft. and 260 - ft. horizons above the Main Adit Level. The footwall contact should be penetrated for a minimum of 15 - ft. in order to test adequately its mineral content.

7. Diamond drill three holes on 50 - ft. centers, from surface, to test the easterly extension of the Snoozer Vein shaft, section at 100 - ft. depth. No other investigation to be performed in this area at this time.

8. All engineering and geological records should be kept current, copies made and the originals carefully preserved. All assay results should be promptly recorded both in written form and on maps as soon as they are received.

9. Consideration can be given to metallurgical testing after all assaying has been completed.

10. The results obtained from these progressive mining steps will serve as a criterion for considering future mining development.

Underground preparation	$ 3,500
Sampling	1,700
Assaying	700
Diamond Drilling (3,000 ft)	15,000
Geologist and Assistant (two months)	4,000
Surveying (2 months)	2,500
Consulting Engineering	2,000
Transportation	1,500
Metallurgical Testing	1,000
Supplies	500
Contingencies (10%)	3,000
TOTAL	$ 33,000

COST OF PROPOSED MINING PROGRAM

TABLE NO. 2

APPENDIX I

Tables

1. Sampling Data

2. Cost of Proposed Mining Programme

Sample No.	Gold Oz.	Gold Value	Silver Oz.	Silver Value	Lead Oz.	Lead Value	Zinc Oz.	Zinc Value
TSW 1	.02	0.70	tr.	nil	-	-	-	-
TSW 2	tr.	nil	tr.	nil	-	-	-	-
TSW 3	nil	nil	tr.	nil	-	-	-	-
TSW 4	tr.	nil	tr.	nil	-	-	-	-
TSW 4A	.26	9.10	7.0	5.95	4.30	9.46	11.0	22.00
TSW 4B	.02	.70	.20	.17	-	-	-	-
TSW 5	tr.	nil	.20	.17	-	-	-	-
TSW 6	tr.	nil	.50	.43	.10	0.22	-	-
TSW 7	tr.	nil	tr.	nil	-	-	-	-
TSW 8	.04	1.40	.90	.77	tr.	nil	.20	.40
TSW 9	.21	7.35	4.80	4.08	1.00	2.20	.50	1.00
TSW 10	.34	11.90	1.70	1.45	.10	.22	.60	1.20	
TSW 11	.24	8.40	3.90	3.32	.40	.88	.50	1.00
TSW 12	.43	15.05	4.10	3.51	1.20	2.64	.60	1.20
TSW 13	.41	14.35	3.10	2.64	1.00	2.20	1.30	2.60
TSW 14	.06	2.10	1.80	1.53	1.00	.22	.30	.60
TSW 14A	.01	.35	.50	.43	-	-	-	-
TSW 15	.13	4.55	1.00	.85	.10	.22	.60	1.20
TSW 16A	tr.	nil	tr.	nil	1.00	.22	tr.	nil
TSW 16B	.13	4.55	5.90	5.02	2.20	4.84	.10	.20
TSE 1	.05	1.75	.80	.68	tr.	nil	.20	.40
TSE 2	.02	.70	2.00	1.70	tr.	nil	-	-
TSE 3	.01	.35	.60	.51	.10	.22	.60	1.20
TSE 4	.02	.70	.90	.77	.40	.88	1.30	2.60
TSE-P1	.07	2.45	1.00	.85	.40	.88	1.10	2.20
TSE-R1-A	.04	1.40	.90	.77	.10	.22	.60	1.20
TSE-R2	.08	2.80	1.40	1.19	.50	1.10	.80	1.60
TSE-R3	.56	19.60	1.00	.85	.10	.22	3.40	6.80
125 R1-1	.05	1.75	2.70	2.30	.10	.22	-	-
168-1	.02	.70	.80	.68	tr.	nil	-	-
260-1	.04	1.40	3.80	3.23	tr.	nil	-	-
260-A	.02	.70	.90	.77	tr.	nil	-	-
260-2	.14	4.90	.80	.68	tr.	nil	-	-
260-3	.06	2.10	4.10	3.49	tr.	nil	-	-

Note: Values based on prices of:

Gold (oz)	Silver (oz)
$35.00	$0.85

TABLE NO. 1

VII. APPENDIX II

MAPS

1. Mining Claim Map
2. Plan View, Ten Spot Vein, Main Adit Level
3. Raise Section, Ten Spot Vein, East Portion
4. Vertical Section, North East (Snooter?) Vein, 260 - ft. above Main Adit Level.

Maps in attached Separate Cover.

Copper %	Copper Value	Total	Width	REMARKS
"	"	$ .70	5' 7"	All TSW Nos. refer to channel samples from Ten Spot Vein, west of Main Adit Level
"	"	nil	5' 10"	
"	"	nil	5' 5"	
"	"	nil	5' 4"	
.82	4.10	50.61	1' 4"	
"	"	.87	3' 4"	Two samples from same channel. From small raise, hangingwall of vein. This section does not show in drift
"	"	.17	6'	
.06	.80	1.45	6' 7"	
"	"	nil	5' 3"	
.24	1.20	3.77	6' 9"	
1.34	6.70	21.33	5' 2"	
.56	2.70	17.47	4' 10"	
.96	4.80	18.10	5'	TSW 1-t inclu. channelled to test silicified section in drift but not on main mineralized zone.
1.44	7.20	30.00	5' 2"	
.72	3.60	25.39	4'	
.44	2.20	6.65	3'	
"	"	.76	4'	
.08	.40	.62	2' 4"	
.44	2.20	9.92	5'	From X-cut adjoining mineralized ozone From same channel but sectioned for accuracy.
1.26	6.30	20.91	2' 4"	
.56	2.70	5.53	6' 5"	
.74	3.70	6.10	7' 6"	
.14	.70	1.78	4' 9"	
v.14	.76	5.65	5' 6"	
.66	3.30	9.68	3' 2"	TSR N1-R3 incl. from raise. This portion of the vein does not show in this section of drift.
.68	3.40	6.99	1' 4"	
.84	4.20	10.89	3' 5"	
1.12	5.60	33.84	5' 4"	
2.04	10.20	14.47	5'	North Cash Vein 125 ft. above Adit Level; x-Cut 168 ft. above Adit Level; 260-ft. horizon, E. Stope; adjoins sample 260-1; from west stope
.82	4.10	5.48	11'	
8.04	40.20	44.83	1' 2"	
.92	4.60	6.07	1' 11"	
1.96	9.79	15.37	2' 8"	
7.12	35.62	41.21	1' 3"	Back of East Stope

Lead (lb)	Zinc (lb)	Copper (lb)
$0.11	$0.10	$0.25

Report of Examination
of
Senator Group of Mining Properties
at
Prescott, Arizona, U.S.A.

INTRODUCTION

Early in February, Mr. Carl Guest, President of Abbican Mines Limited, requested the author to conduct a personal examination and investigation of the Company's operations at Prescott, Arizona.

This examination and investigation was conducted from February 15th to 25th inclusive.

In order to retain an independent perspective on the project, no previous reports maps or records were read or referred to until after the author's return to Toronto on February 26th, last.

A Work Schedule was draughted and mailed to the mine immediately following the examination, but the final preparation of this report has necessarily been delayed pending the arrival of assay results of samples taken at the property during the examination period.

The utmost co-operation was accorded the author by all concerned and data and information was freely given without reservation by each and every member of the Company staff.

The following report, therefore, based on detailed personal examination of the mine properties and workings, check sampling of the mine workings, either by the author or under his personal supervision, examination of all the Company operating records, reports, maps and full cognizance of the facts

W. S. Haynes, B. Sc. P. Eng.
Toronto, Canada
March 16th, 1957

Senator Properties
Prescott, Arizona

W.S. Haynes, Prof. Eng.
March 16th, 1957.

SUMMARY

1. The operation is in competent and energetic hands at the mine site, with an experienced labour force of 35 to 37 men.

2. The progress made during the last four months has been rapid and economically completed.

3. Until February 15th, the maximum effort was wisely devoted to gaining access to the greatest amount of mine workings in the minimum time.

4. By March 1st, a sufficient area of the mine was made safe to permit concentration on surveying for locational and geological mapping of the mine.

   A precise surface survey of the properties was completed and mapped on November 30, 1956.

5. Examinations of the veins proves that most of the oldest operations were confined to limited mining of the high-grade sections of the veins over 3 to 5 foot widths, for gold and silver.

Later small lessors in the past 10 years have proven that most of the veins carry high values in copper, lead and zinc. The recent examination also proves this.

In addition, observation and sampling has proven that the walls of many of the veins carry values which will yield economic milling values up to widths of 15 to 25 feet.

6. The structural geology and attitude of the veins strongly indicate the persistence of the ore to a considerable depth below the 570' Senator adit level, with good chance of larger ore-bearing structures being encountered.

Senator Properties, Prescott, Arizona March 16th, 1957

It is not at this time possible to estimate tons and grade of ore in place in the mine.

It is obvious that the original operations extracted only a small percentage of several millions of tons of mineralized vein material, while serving to develop the veins for accurate re-appraisal in the light of modern mining, metallurgical and metal marketing conditions.

Systematic sampling of the workings commenced on March, 1st, last.

This must be done closely on a semi-bulk-sampling basis owing to the leached condition of the faces and backs and the nature of disposition of the values in the veins.

A Work Schedule has been set up. (Appendix 111) calculated to complete mine examination and proving of sufficient ore reserves for a 200 - ton a day mill by July 31st.

In view of the discovery of considerable base metal content in veins previously mined only on gold and silver it was strongly recommended that work on the initial milling plant continue in suspense until further test work can be done on sink-float concentration and selective flotation.

This work is proceeding at the Denver Equipment Company laboratories.

Electric power will be connected next week. The assay office can then go into operation. This will reduce assaying costs and allow the sampling to proceed at maximum speed.

The cost of the work outlined in Appendix 111 will require $110,000.00 from March 1st to June 30th, 1957.

To proceed further to place a 200 ton a day mining and milling project into successful operation will require a minimum of $750,000.00.

Phone
Empire 8-8056-7

"Banco" Toronto

A.S. BAYNE & COMPANY
CONSULTING ENGINEERS
Suite 200, 2 TORONTO St.
TORONTO, CANADA

March 16th, 1957.

The President & Directors,
Abbican Mines Limited,
Toronto, Canada

Gentlemen:

Senator Properties - Prescott,
Arizona

Upon request of your President, Mr. Carl Wuest, the author proceeded, from February 15th to February 25th 1957, inclusive, to Prescott, Arizona to carry out an independent personal examination of your operations at the Senator properties.

During this period, four 12 - hour days were spent inspecting the underground workings and four 12 - hour days devoted to inspecting the various surface showings directly above the underground workings.

The utmost courtesy was extended by the Mine Staff. All records were made freely available and all enquiries as to the details of the operation were answered in a competent and co-operative manner.

PERSONNEL

Mr. Robert F. Dannelley the Mine Manager, 36 years of age, has been active in mining in the southwest U.S.A. and Mexico for more than 15 years. It is understood he completed three years in mining engineering at either the Colorado School of Mines or the University of Arizona and has operated successfully as a mine manager for the past 5 years.

He is competent and energetic and has a good grasp of the practical aspects of mining.

Mr. Gerald A. Russell, Superintendent, is 42 years of age, and is an experienced mine operator of over 20 years practice. He is a graduate in mining engineering of the University of Arizona. He has an extensive experience in such jobs as Production Superintendent of Miami Copper at Globe and is capable of managing major mining operations.

Mr. Russell would be a valuable asset to any mining organization.

Mr. Fred Elliston, Mine Foreman, is 37 years of age, and has outstanding experience in the construction and mechanical engineering fields. He is competent and energetic and has a particular aptitude for instilling life into all classes of personnel.

Mr. G. D. Harvey, a Director of Abbican Mines Limited has spent considerable time on the properties during the past four months. Mr. Harvey is a practical mining man of over 25 years experience as a miner, foreman and mine captain at such Canadian mines as Lake Shore, Falconbridge Nickel and Broulan Gold Mines. It is to Mr. Harvey's credit that the Company has a well qualified capable staff at this early stage of operation.

LABOUR: Experienced labour is readily available from the Prescott-Jerome Districts. Basic wage rates are approximately the same as in Ontario mining camps. At present, there are 23 men employed at the mine, including supervision.

LOCATION OF HOLDINGS

The Senator properties are located in the Bradshaw Mountains, Yavapai County, Arizona, U.S.A. They are reached by a fair motor road about 12 miles southeast of the Town of Prescott.

They consist of a block of contigous claims comprising about 300 acres covering Mount Union and Mount Tritle.

Most of the ground is patented, some of the better-known claims being identified as the Senator, Cash, Ten Spot, Snoozer, Tredwell, Cashier, and Great Divide.

The properties examined by the author, on which the current operations are being carried out, were the Senator, Ten Spot, Cash, Snoozer, and Great Divide.

HISTORY OF PROPERTIES

The history of these properties is well detailed in the various reports in the possession of the Company.

Briefly, the most extensive operations were carried out from 1880 to 1899, by the Commercial Mining Company under Mr. J. S. Douglas. At this time, a 20 - stamp amalgamation mill was operated on ore from the Senator, Ten Spot, Snoozer, and Tredwell mines. According to government reports $530,000.00 in copper, lead, gold, and silver was realized from shipments.

The Cash Mine which adjoins the Senator is recorded to have shipped a total of $200,000.00 in gold, in intermittent operations from 1900 to 1925.

In 1917, it is reported Phelps-Dodge Corporation acquired some interest in the Senator Group, contingent with the purchase of the United Verde Extension Mine at Jerome from Mr. Douglas. Through Mr. Douglas, a Mr. Dickie obtained title and operated in a small way on the Snoozer Veins. About 4,000 tons of ore grading 9.5% Copper and 9.0 oz/ton in Gold was extracted above the 200 - ft. level at the Snoozer shaft.

It is reported that the official production returns are much lower than the total gross revenue, which was highly profitable, but the monies received were turned back into development which resulted in an overall loss at that time, when transportation and access was difficult and only a high grade smelter feed could be profitably shipped.

This was not difficult to believe in view of the extensive underground development carried out on 5 levels on the Senator Croup alone, with only a small percentage of the backs stoped out on the upper three levels. It is estimated that a total of over 40,000 feet of shafts, crosscuts, drifts and raises, most of which can be made accessible at reasonable cost for revaluation and exploitation of the remaining ore which could be made profitable at modern milling grades.

All the work carried out during this century has been desultory and on a very small scale and has been confined to high-grade operations on a few lots of ore ranging from a carload of 40 to 50 tons to 2,000 tons.

The largest of these were carried out by Mr. Jack Orr, of Prescott, who, from 1950-55, in intermittent operations, shipped 1,500 tons of smelter feed ore from the 480-ft. level of the Cash, and Snoozer Veins, grading about 15% lead and 15% zinc, with some gold and silver. Mr. Orr advised the author that his gross return was $96,000.00 from which he netted $36,000.00 from the smelter.

In 1934-37 Mr. Louis Milner of Prescott shipped 1,628 tons from near the surface in the Ten Spot Vein, with an average grade of .4475 ounces per ton in gold, 13.39 ounces per ton in silver and 2.53% copper.

GEOLOGY

The Senator Croup is located on ground elevated at from 7,500 to 8,000 feet above sea level.

The Mount Union - Mount Tritle area, on which the properties are located, is characterized by steep slopes and deep canyons, in a heavily pine - wooded country crossed by the headwater of the Hassayampa River.

The canyons and valleys definitely reflect heavy faulting which accompanied the younger intrusive rocks.

The oldest rocks are known as the Yavapai series and include sericite, chloritic, and amphibolitic schists.

The schists are intruded by small masses, dykes and sills of gabbro, quartz diorite and granodiorite.

The general strike is northeast - southwest and dips are steep, generally from 55 degrees to vertical.

Both the schist and granodiorite are intruded by light colored dykes of rhyolite porphyry which strike from northeast to north and are up to 100 feet wide.

The ores are in fissure - type veins which are strong and continous over widths of from 1 to 25 feet wide. The veins are generally straight, but roll locally on both dip and strike. The mineralization is in the form of free gold and silver together with disseminated and massive sulphides of copper, lead and zinc filling the fractures.

The veins are characterized by much fine fracturing both with the strike and dip and crossing them at angles of 30 to 40 degrees, resulting in small so-called "feeder" veins every few feet along the strike. These small veins which run into the walls of the drifts often carry good values.

The mineralization is generally in a series of well-defined lenses fairly continuous and closely spaced. Ore widths are from 3 to 25 feet.

ECONOMIC GEOLOGY

GENERAL:

1. The sequence of intrusive rocks ranging from basic to medium batholithic rocks during the first stage of magmatic intrusion, followed by the injection of the acid porphyritic dykes during the last phases of structural movement in the older Yavapai Series, definitely points to a clear - cut segregation of the main igneous mass below.

During this segregation there is little doubt that a rich concentration of the metallic minerals occurred within the igneous mass.

2. The many rich concentrations of metallic minerals throughout the vein system indicat s that medium to high temperatures mineralizing solutions were injected into the fissures and faults created in the older rocks during the later stages of their structural deformation.

3. The dips of the vein system are steep and their continuity along both dip and strike, together with their strongly apparent relationship to the major faults outlined by the precipitious mountain canyons leaves little doubt that these veins or related structures continue for several thousand feets.

4. The fact that the vein fissures have been subjected to intense dynamic metamorphism and are on the upper levels of the mountains, points to a strong possibility of encountering large shears and fissures at depths of 1,000 to 3,000 feet, to which the mineralizing solutions must have had access.

5. The veins appear to be as strong, wide and well mineralized on the 570 - ft. level as on the surface outcrops on the top slopes of the mountains.

In addition, they have been traced by long outcrops intermittently showing through the light overburden for distances over a mile in length, as indicated by the following:

Vein	Length Exposed on Property
	feet
Senator	4,500
Little Senator	1,100
Ten Spot	3,000
Ten Spot North	1,400
Ten Spot South	1,200
Little Ten Spot	1,700
Cash North	4,000
Cash East	1,200
Cash	4,500
Snooze	2,250

6. Following is a detailed summary of the author's observations during underground examination. All samples on which assays are reported were taken either by the author or under his direct supervision, unless specifically noted herein. Assays were performed by Shattuck-Denn Mining Company, Iron King Mine, Humboldt, Arizona.

Main Adit Level:

The main Senator adit tunnel is driven from the north side of Mount Tritle, toward the south-east. The portal is in the side of the mountain in the Hassayampa Creek canyon. The adit is a straight line drive on a bearing S. 15 degrees E. and is 3,275 feet long, passing under Mount Union.

The average height of the mountain slopes where the veins outcrop is 570 feet and the adit is referred to as either the 'adit level' or the '570-foot level'.

The adit crosscuts, in the following order, the Little Senator, Senator, Ten Spot, Little Ten Spot, Snoozer, and Cash veins.

(a) Senator Vein (West OF Adit) The drift on the vein is 1,500 feet south of the adit portal.

It strikes N. 50 degrees E. and dips approximately 75 degrees S. E.

The main drift has been made accessible for 800 feet southwest of the adit, at which point a winze has been sunk 280 feet. The winze is full of water.

The vein is 4 to 5 feet wide and the mineralization of predominently galena with some sphalerite and a little chalcopyrite, with gold and silver.

About 100 feet west of the adit a raise is driven up 200 feet to the 300' level. Stoping has been carried above this level for about 200 feet in length.

Muck samples taken from this stope at a point 400 feet west of the Senator Shaft, which is near the main adit, assayed as follows:

Au oz/ton	Ag oz/ton	Pb oz/ton	Zn %	Cu %
0.17	13.10	0.6	0.8	1.16
0.10	1.60	0.9	1.3	0.12

A sample cut across 12 1/2 feet of back of the 570 - foot level drift near the winze, at the extreme west end, about 370 feet west of the above samples, assayed as follows:

Width (feet)	Au oz/ton	Ag oz/ton	Pb %
1.0	0.76	1.20	1.90
1.5	0.47	1.10	1.70
10.0	0.13	0.20	1.00
12.5	0.213	0.39	1.16

Senator Vein (East of Adit) - The main drift follows the vein from the adit for more than 1,200 feet, this being the distance now accessible.

About 250 feet east of the adit is a small backstope about 60 feet long. The vein is 2 to 4 feet wide in this stope which goes up to 50 feet from the level. The mineralization is mainly galena.

On the 240-ft. level a drift driven east of the main adit centreline for about 300 feet. A small amount of stoping has been done above this level.

A muck sample from this stope assayed as follows:

Au oz/ton	Ag oz/ton	Pb %	Zn %	Cu %
0.05	3.0	7.2	3.6	0.72

Two 6-foot back samples from the sublevel drift, at a point about 300 feet east of the Senator Shaft which is near the main adit, assayed as follows:

Au oz/ton	Ag oz/ton	Pb %	Zn %	Cu %
0.12	1.50	4.2	2.1	0.10
0.08	50.00	3.3	16.5	3.02

(b) LITTLE SENATOR VEIN This is a small vein about 0.5 to 3 feet wide, about 250 feet north of and paralleling the main Senator vein.

Location	Width (feet)	Au oz/ton	Ag oz/ton	Pb %	Zn %	Cu %
East End. F.W.	1.3	0.08	6.1	0.1	0.4	4.0
East End Centre	3.5	0.08	2.5	tr	0.1	0.3
East End H.W.	16.0	0.06	0.3	tr	nil	0.06
West End Back	8.0	0.10	7.3	0.3	1.1	0.82
Test Hole in F.W.	0 - 4	0.04	1.1	-	-	0.44
Test Hole in F.W.	4 - 8	0.07	1.0	-	-	0.58

East of the adit on the 570' level, the Ten Spot drift is now accessible for about 800 feet.

About 200 feet east of the adit a raise has been driven up 30 feet in about 6 1/2 feet of vein width which is well mineralized with chalcopyrite and galena.

A 5 - foot sample taken across the back of this raise assayed as follows:

Au oz/ton	Ag oz/ton	Pb %	Cu %
0.05	4.1	2.3	2.5

About 250 feet east of this raise there is a small backstope.

A sample cut across 6 feet of vein width assayed as follows:

Width (feet)	Au oz/ton	Ag oz/ton	Cu %
3	0.09	0.70	0.92
3	0.08	2.10	1.60
6	0.085	1.4	1.09

About 100 feet east of the 570' level adit a backstope is mined from the drift about 40 feet above the rail for a length of about 60 feet. This vein is narrow but rich in galena. No samples were taken by the author, but records in possession of the Company show that Mr. Mark [illegible] of [illegible], who operated a lease in 1949, made a shipment of ore from this vein grading as follows:

Au oz/ton	Ag oz/ton	Pb %	Zn %	Cu %
0.81	6.20	4.50	3.80	0.35

(c) Ten Spot Vein. The drift on this vein is 900 feet south of the main Senator drift.

It strikes N. 50 degrees E. and dips 75 degrees N. W. toward the Senator Vein. The mineralization is mainly chalcopyrite with some galena and sphalerite and with magnetite and specularite as accessory minerals.

The drift reportedly goes 1,000 feet west of the adit, but to date only about 250 feet is accessible.

Over a length of 100 feet starting at a point 150 feet west of the adit, the backs are down for a height of 40 feet above the 570' level.

West of the backstope about 4 feet of wet mud covers the floor of the drift. Work is proceeding to make this accessible.

Samples cut from the backs at the ends of the stopes assayed as follows:

There does not appear to be any lateral development of the Ten Spot Vein between the 570' level and some small leasehold work about 40 to 60 feet below surface.

Ten Spot Vein on Surface was worked by a lessor by a shaft down 40 feet at the west end. This connects by a drift driven east 250 feet on the vein. The east 100 feet of this working is stoped up toward surface over a width of 5 to 18.5 feet. The stope of the west end of this stope breaks through the side of a hill providing a 'dog hole' adit entrance.

Sampling of this doghole and across the back of the stope at a point 150 feet east yielded the following assays:

Location	Width (feet)	Au oz/ton	Ag oz/ton	Pb %	Zn %	Cu %
(1) Doghole Portal	1.7	0.03	56.3	tr	1.7	1.02
(2) 40' East of (1)	5.0	0.11	3.8	2.5	-	0.16
(3) " " " "	1.7	0.38	6.3	tr	-	0.10
Total and Average	6.7	.18	4.4	1.9	-	0.14
(4) 10' N.E. of (2) and (3)	3.0	1.45	6.60	tr	-	0.10
(5) 100' N.E. of (4)	1.5	0.25	2.5	0.1	1.0	0.08
	4.0	0.08	1.7	2.5	1.5	0.38
	5.0	0.66	4.0	tr	-	1.14
	8.0	0.10	7.3	0.3	-	0.02
Total and Average	18.	.008	4.63	-	-	1.90

At a point on a vine ground, 350 feet northeast of the 'doghole' above, is another shaft down on the vein with a drift going west at a depth of 30 feet. This drift breaks out of the side of the hill through an adit portal about 100 feet west of the shaft.

Samples cut at this location yielded the following assays:

Location	Width (feet)	Au oz/ton	Ag oz/ton	Pb %	Zn %	Cu %
(1) Near Shaft Collar	30	0.41	3.3	-	-	0.44
(2) Surface 50'E. of (1)	20	0.27	2.4	0.5	-	0.15
(3) Adit back 100' of (1)	6	0.90	14.4	1.0	-	0.52

(d) Little Ten Spot Vein - This vein outcrops directly above the main 570' level adit at a point about 300 feet south of the main Ten Spot Vein. It can be traced on surface for 700 feet west of the centre line of the adit and for 700 feet east. The eastern half is split up into about four veins more or less parallel lying between the strike line of the west end and the main Ten Spot Vein to the north. Strike and dip roughly parallel the main Ten Spot Vein and the widths are from 3 to 4 feet.

The 570' level adit crosscuts several veins below this location, but until the underground survey is closed in with the entire surface survey, which of these is the Little Ten Spot cannot be determined.

No Samples were taken from this vein.

(e) SNOOZER VEIN - This vein is crosscut by the 570' level adit at a point 2,900 feet south of the adit portal, or about 500 feet south of the main Ten Spot Vein.

A line drive which does not follow the vein, is driven on 1,050 feet southwest of the main Snoozer shaft, where the main workings are.

At the time of the author's visit those workings were inaccessible but access has now been made by the mine manager so that the above information is now confirmed.

This vein, from surface examination, dips S.E. at 50 degrees and strikes S. 50 degrees W.

At the shaft, the strike swings east 20 degrees to a bearing of S-30 degrees W. and can be traced for a further 1,200 feet to the southwest.

According to a plan prepared by Mr. Dickie in 1938, the shaft goes vertically to a 35 - ft. depth and continues to the 250 - foot level at an angle of 65 degrees from the horizontal on a bearing of S. 42 degrees E.

An inclined raise was then driven from the 570' level tunnel driven over from the Senator adit, to connect with the bottom of the shaft.

The plan also records 450 feet of lateral work on three levels down to 250 feet with 4,000 tons stoped out above the 200 foot level averaging 0.5% copper and 9 oz/ton in silver.

Also a sample record of the 250 - foot level shows an assay of 5% copper and 5 oz/ton of silver over 2 feet.

At the east end of the Snoozer vein on surface above and about 100 feet west of the centre line of the Senator 570' level adit, a depression or canyon striking northeast appears to make a fault which has displaced the Snoozer vein about 300 to 400 feet south and is related to other parallel veins east of this fault, which have a vertical dip, both on surface and on the 570' level.

Mr. Orr sampled this dyke and obtained an assay of 0.06 oz/ton in gold, 2 oz/ton in silver, and 3% in copper.

An 8-foot check smaple taken during this examination assayed 0.04 oz/ton in gold, 1.90 oz/ton in silver, and 2.36% copper.

A sludge-recovering test hole was also drilled 21 feet into the dyke, in line with a back sample taken at the collar. Sludge samples were taken every 2 feet.

Following are the average assays:

Sample	Width (feet)	Au oz/ton	Ag %	Cu %
Back Channel	3	.04	2.40	7.62
Test Hole #1	12	.02	1.06	1.00
Total and Average	15	.024	1.33	2.32

Four other holes drilled into the wall of the dyke over a length of 100 feet have since yielded assays ranging from 0.5% to 0.9% over widths of 24 feet, which when added to the rich 3-foot section of the vein at the diorite contact average good mill grades of copper-ore.

A hole drilled north from the Cash 400' level drift 600 feet east of the above samples encountered 6 feet of ore sludge at 40 to 46 feet, assaying 4% copper, 2% lead, and 2 oz/ton in silver. This appears to be the northeasterly extension of the Snoozer Vein against the diorite.

(h) Great Divide: This vein is located about 1,500 feet south of the Snoozer Vein. It dips so slightly to the south as to be almost vertical. It strikes northeast and is from 6 to 7 feet wide.

There are two shafts sunk on the vein about 600 feet apart. The westerly shaft is about 70 feet deep and the easterly shaft is 200 feet deep.

The mineralization is disseminated chalcopyrite with pyrite, some specularite, and possibly some magnetite.

A sample cut across 6 feet of the vein about 12 feet below the collar of the east shaft, yielded the following assays:

Au oz/ton	Ag oz/ton	Fb %	Zn %	Cu %
2.29	11.8	tr	nil	1.58

The shafts are not yet safely accessible.

TONNAGE AND GRADE ESTIMATES

The work of making sufficient workings accessible has only recently reached a point where systematic sampling and examination can be carried out.

Therefore, it is not, at this time, possible to accurately estimate tons and grade in the mine.

The vein structures are strong and consistent, however, in both length and depth. Also, they are well-mineralized and contain many rich ore sections. In addition, the limited sampling done to date has yielded fair results when it is considered that underground water and air have leached the backs and faces of the drifts for from 20 wto 50 years.

To give some idea of the possible tonnages available from the underground workings the following calculations have been made of the veins most readily accessible.

1. Cash Vein - 570' foot level to Surface:

Level	Longitudinal Area
0	12,000 sq. feet
100	47,500 "
200	100,000 sq. feet
300	150,000 "
400	120,000 sq.feet
570	153,000 "
Total	582,000 Square Feet
Less Area Stoped Out	65,000
Solid backs remaining	517,500

Assume average Width of 5 feet and 10 cu. feet per ton.

Total Tons in Backs $\frac{517,500 \times 5}{10}$ is 258,750 tons

2. Cash Diorite Dyke (Snoozer East of Adit)

The area developed by Jack Orr, (described in Section (g) on Page 11), is 200 feet long. Assuming the width to be 12 feet although test holes indicate a possible mill grade of copper-gold-silver ore over 24 feet, the following is the tonnage in the backs from the 570' level to the surface.

(a) LONGITUDINAL Area 570 X 200 - 114,000 sq. ft.
Assumed average width 12 feet
Cubic content 114,000 x 12 - 1,368,000 cu. ft.
Tons $\frac{1,368,000}{10}$ 136,800 tons

Or alternatively, assuming continuity, which appears reasonable, to the test hole 600 feet east which encountered 6 feet of ore 40 feet north, this estimate becomes:

(b) Longitudinal Area - 570 X 600 - 342.000 sq. ft.
Assumed Average Width 9 feet
Cubic content 342,000 X 9 - 3,078,000
Tons $\frac{3,078,000}{10}$ - 307,800 tons

3. Ten Spot Vein Mill grade gold-silver-copper ore has been encountered over widths of from 6 to 16 feet underground and from 6 to 30 feet on surface.

Practically no stoping has been done from the 570' level to surface.

Taking the length of 800 feet now accessible underground as against the 3,000 feet of length traceable on surface and an average width of 12 feet as against an apparent average of 15 to 18 feet, the tonnage in this section of the vein is as follows:

Longitudinal Area -	570 X 800	-	456,000 sq. feet.
Average Width	12 feet		
Cubic Content	456,000	X 12	- 5,472,000 cu. ft.
Tons in Backs	5,472,000 / 10	-	547,200 tons

Summary

1.	Cash Vein	258,750 tons
2.	(b) Cash Diorite Dyke (Snoozer East?)	307,800 tons
3.	Ten Spot Vein	547,200 tons
	TOTAL	1,113,750 tons

N.B. The above is not to be taken as an estimate of ore in place in the sections used for the calculations. Much more systematic sampling must be done throughout the workings before the actual indicated ore tonnage can be calculated.

However, the excellent mineralization over the sections used above, together with the fair mill grade values obtained in the limited sampling to date, could class this tonnage as possible ore.

Therefore, as only a small fraction of the veins exposed and developed underground are included in the above, it is quite reasonable to accept the view that several million tons would result from estimates such as the above test calculations.

Cutting the total arrived at, following further sampling and surveying, by 50% to allow for the lenticular character of many of the mineralized zones in the veins, therefore it is not difficult to visualize, even at this early date the possibility of further examination to place from 1 1/2 to 2 million tons of mill grade ore in sight.

The above considerations are probably the basis of previous estimates of 500,000 to 250,000 tons in earlier reports by engineers who did not have as complete access to the workings as is now possible.

The prospect of outlining, in the next 4 to 6 months, sufficient ore to profitably feed a mill of 200 to 500 tons daily capacity, are therefore good.

Surface Dumps: The author was unable to assess the tonnage contained in the dumps at the shaft collars.

A rough measurement was .made of the Senator Dump, however, and it is estimated to contain about 80,000 tons of muck. There are sizeable dumps at the Snoozer, Cash and Ten Spot shafts as well as enumerable smaller dumps, all fairly accessible to the roads.

A bulk sample from the surface of Senator and Cash Dumps was recently sent to Denver Equipment Co. for gravity mill tests which yielded an assay of 0.155 in gold, 1.2 in silver, 0.81% in lead, 0.055% in copper and 0.31 in zinc.

ARIZONA
EARLIER ASSAY AND PRODUCTION RECORD
AT THE SENATOR-CASH PROPERTY

Date	Ozs Au	Ozs Ag	Cu %	Pb	Zn	Tons Shipments	Smelter
Apr. 28/52	.38	3.47	4.75	.5		39.	Hayden
June 11/54	.03	1.76	3.66			68	"
Aug. 3/54	.02	3.57	4.39			58	"
Aug. 17/54	.045	3.18	4.79			60	Miami
Nov. 15/54	.045	4.48	5.66			63	"
Dec. 1/54	.02	4.37	5.33			63	"
Jan. 6/55	.04	3.55	4.36			59	"
July 14/55	.02	3.20	4.35			61	"
July 14/55	.03	3.60	4.64			58	"
Aug. 25/55	.02	3.10	3.93			60	"
Sept.15/55	.02	3.06	3.65			61	"
Oct. 6/55	.04	1.73	2.44			64	"
Nov. 30/55	.07	2.20	2.90			65	Hayden

ASSAY REPORTS

Apr. 12/54	.02	2.28	3.35	Vein 58"
May 18/54	.04	1.5	3.15	
June 8/54	.02	1.6	3.7	Pulp
July 12/54	.01	7.93	5.76	Sub R. # 4
	.02	16.48	16.59	Sub. R # 5
Aug. 2/54	.03	3.51	4.60	Lot 438/1
Sept. 1/54	.02	1.94	3.37	Test for Footwall
Oct. 5/54	.02	3.77	5.98	South Drift
Oct. 19/54	.005	2.92	5.10	North Drift
	.02	5.88	9.15	South Drift
Oct. 29/54			2.33	# 11 North Drift
			2.42	# 12 South Drift
Nov. 5/54			5.15	# 13 " "
Nov. 12/54			6.	Fines from North Drift
Nov. 16/54	.01	1.27	1.70	# 14
Dec. 4/54			3.60	Round # 1 from Sub Level
			4.38	Round # 15 Sub Level South Dft.
Dec. 17/54			3.65	# 1 Sub Level Rd #1 S. End
			7.41	# 2 " " " #2 " "
			6.89	# 3 " " " #3 " "
			1.43	# 4 " " " #4 Footwall
Dec. 29/54			.55	Waste check sample N-Dft. S. Lev.
Apr. 16/55	.06	2.84	3.48	Shipment 73 tons

contin.....

Date	Au Ozs	Ag	Cu %	Pb	Zn	Shipments	Smelter
Apr. 26/55	.05	3.21	3.91			Shipments #3	
May 28/55	.03	1.50	3.22			Cash Mine Lot #6	
Feb. 15/55	.01	7.83	3.70			# 1 Round in Raise	
	.04	5.88	3.70			# 2 Round in Raise	
	.03	5.23	3.60			# 3 " " "	
	.04	7.11	2.35			# 4 " " "	
	.03	6.33	2.85			# 5 " " "	
Mar. 8/55	.02	2.06	2.45			Round # 6 Raise	
	.03	2.28	2.83			" # 7 "	
	.02	2.51	4.50			" # 8 "	
	.04	3.36	6.30			" # 9 "	
	.05	3.37	4.20			" # 10 "	
	.09	3.52	4.65			" # 11 "	
June 7/55	.04	4.16	5.90			" # 9	Cash Mine
	.05	5.55	8.60			" # 10 "	"
Oct. 31/55	.05	1.21	2.83	.05	.40	Car Sample Oct. 28/55	

Mr. Frank Knight,
Thanks for your letter to me dated 4/9/57. You may be interested to see how we have progressed.
J M Lawson

ABBICAN MINES, LTD

An underground diamond drilling program is expected to get underway--within the next two weeks --on the copper-gold properties controlled by Abbican Mines Limited, near Prescott, Arizona.

Following an underground examination of the property, Mr. R. F. Mulliette B.Sc., consulting engineer for the company, has recommended 5,000 feet of diamond drilling to explore vein extensions.

Extensive underground workings, from the 3,270 foot adit, diclosed a number of mineralized sections which have been carefully examined for further investigation. Diamond drilling workings to explore the continuity of the ore-bearing sections.

New diamond drilling equipment has been purchased, mine services installed, and all necessary facilities to expedite this drilling program are now on the property. Positive results from this diamond drilling program should facilitate plans for production in the near future. A 200-ton mill, privately financed, is already under construction on the property.

Africana Resources Corp. (Colorado charter) is the operating Company, which will be controlled by Abbican Mines. We expect to expend abot $300,000 additional on this Prescott property this year getting into production probably this summer.

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Senator et al Date May 28, 1958

District Hassayampa Engineer Travis Lane

Subject: Inspection Visit

The property comprising 21 patented and 5 unpatented claims is operated by the Aricana-Senator Mining Co., an Arizona corporation. The interested parties are Canadians. C. A. Wuest is President, and the address of the main office is 119 Adelaide St., West, Suite 209, Toronto Canada. The original company was Abbican Mine Company which leased the property from the owners, Jack Orr and the Dickie Estate in October 1956, and the Aricana-Senator Mining Company operates under agreement with Abbican Mining Company.

Mr. G.D. Harvey, 119 E. Goodwin St., Prescott, is directing the affairs of the company in Arizona. At the time of visit the property was idle waiting upon additional financing, and looking toward this purpose Mr. Morley Muliette; Mulliette a Canadian Mining Engineer, was making an examination for a group of American and Canadian people.

The Abbecan Mine Co. made accessible some 15,000 feet of the lower workings and began construction of a 200 ton flotation plant which is now about 50% completed. Aricana took over in the spring of 1957. The holdings are a consolidation of the Senator, Ten Spot, and Cash mines. These are old mines and are credited with a past gold-silver production valued at upwards of $1,000,000. In recent years attention has been directed to the base metal values (as well as gold-silver) in the deeper workings.

The country rock is amphibolite schist which is intersected by numerous rhyolitic dikes and, in the mined area, by a system of more or less parallel veins striking northeasterly and standing vertical or nearly so. The valuable vein constituents are gold and silver and the sulphides of lead, zinc and copper, with accompanying and sometimes abundant iron sulphides. The gangue filling of the veins is generally quartz, and in some instances diorite and quartz-diorite.

There are many old surface cuts and pits, and a number of shafts with extensive tributary workings, all caved except for some recent partial clean-out of two of the shafts. A main crosscut adit, 3400' long, intersects the Senator, Ten Spot, and Cash veins and a number of smaller parallel veins. Drifts extend from the adit for thousands of feet in each direction on the three main veins with connections overhead with the lower shaft workings (all caved).

The Abbecan Company cleaned out and otherwise made accessible some 15,000 feet of the workings, principally on the main adit level. The cleanout work exposed a number of sections of unstoped ground in each major vein with assays indicating "mill grade" ore; and there seems to be good promise for extending the showings with further cleanout of the workings and with development at a number of points. Vein widths vary from 3 to 10' in the exposed ore bodies.

Information from MINE INSPECTOR'S OFFICE - August 15, 1957

SENATOR MINE (1 claim) YAVAPAI CO., Senator Dist. 1-6-57

Owner - Robt. Donnelley, 100 E. Union St., Prescott, Ariz.
Operator - ABBICAN MINES
Pres. Carl Weiss, Toronto, Canada
DOWN Supt - G. A. Russell, 2617 N. 7th St., Scottsdale, Ariz.

G, S, C, L, Z Development - 19 men

L.A.S.

MINE: Senator

DATE: April 19, 1985

FILE: Senator

ENGINEER: Ken A. Phillips KAP

DISTRICT: Hassayampa

COUNTY: Yavapai

We have received a Joint Notice of Proposed action by the U.S. EPA and Arizona Department of Health Services indicating their intent to deny renewal of a water discharge permit for water flowing from the Senator Mine's tunnel, Hassayampa District, Yavapai County. The mine has been idle for many years, and in no way could be considered an operation.

Details of the application were discussed with Wayne Palsma of Arizona Department of Health Services. The previous permit required quarterly sampling of the water flowing from the main portal for arsenic, zinc, cadium, iron, lead, copper, and acidity - alkalinity. Apparently the samples were not taken.

If the permit is not renewed, there will likely not be any other action taken unless there is a complaint filed or a real problem develops. The requirement for the original permit is rumored to have resulted from a disagreement between property owners.

REFERENCE 1 F1 < ABGMT FILE DA >

REFERENCE 2 F2 < AZ DEPT MIN RESOURCES FILE DATA

REFERENCE 3 F3 < USGS BULL 787, p. 120-121

REFERENCE 4 F4 < USGS GEOL MAP GQ 997 >

FS < USBM - ABGMT FILE DATA >

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 <> *RECORD TYPE B20 <X,1,M> DEPOSIT NUMBER B40 <>

*REPORT DATE G1 <8,1,0> (YR MO) *INFORMATION SOURCE B30 <1,2> *FILE LINK IDENT. B50 <USBM 004 025 1501>

*REPORTER(SUPERVISOR) G2 <LARABA PETER (last, first, middle initial) (DEWITT ED (last, first, middle initial)>

*REPORTER AFFILIATION G5 <ABGMT> *SITE NAME A10 <TREADWELL MINE>

SYNONYMS A11 <>

LOCATION

MINING DISTRICT/AREA A30 <MT UNION DISTRICT>

*COUNTY A60 <YAVAPAI> STATE A50 <AZ> *COUNTRY A40 <U,S>

PHYSIOGRAPHIC PROV A63 <1,2>

*DRAINAGE AREA A62 <1,5,0,7,0,1,0,2> LAND STATUS A64 <0,0>

*QUADRANGLE NAME A90 <GROOM CREEK (1,9,7,4)> *QUADRANGLE SCALE A100 <2,4,0,0,0>

SECOND QUAD NAME A92 <> SECOND QUAD SCALE A91 <>

*ELEVATION A107 <7,0,0,0 FT>

UTM

*NORTHING A120 <3,8,0,9,4,8,0>

*EASTING A130 <3,6,8,6,5,0>

*ZONE NUMBER A110 <+1,2>

*ACCURACY

ACCURATE (ACC) (circle)

ESTIMATED EST <>

GEODETIC

*LATITUDE A70 <>N

*LONGITUDE A80 <>W

CADASTRAL

*TOWNSHIP(S) A77 <12.5 N> *RANGE(S) A78 <00.2 W>

*SECTION(S) A79 <36>

*SECTION FRACTION(S) A76 <SW OF SW>

*MERIDIAN(S) A81 <GILA AND SALT RIVER>

*POSITION FROM NEAREST PROMINENT LOCALITY A82 <3.9 MILES S OF GROOM CREEK, ARIZONA>

*LOCATION COMMENTS A83 <TREADWELL CLAIM ADJOINS TEN SPOT ON SOUTH>

* ESSENTIAL INFORMATION

\+ ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED

COMMODITIES PRESENT C10 <
*ORE MINERALS C30 < UNKNOWN
COMMODITY SUBTYPES C41 <
*GEN. ANALYTICAL DATA C43 <
COM. INFO. COMMENTS C50 <

* SIGNIFICANCE

	PRODUCER	NON-PRODUCER
MAJOR PRODUCTS	MAJOR < CU, AG, AU,	MAIN COMMODITIES PRESENT C11 <
MINOR PRODUCTS	MINOR < AG, AU,	MINOR COMMODITIES PRESENT C12 <
POTENTIAL PRODUCTS	POTEN <	
OCCURRENCES	OCCUR <	OCCURRENCES OCCUR <

*PRODUCTION

PRODUCER	NON-PRODUCER
PRODUCTION (YES) (circle) PRODUCTION SIZE (SML) MED LGE (circle one)	PRODUCTION UND NO (circle one)

EXPLORATION OR DEVELOPMENT

*STATUS

PRODUCER	NON-PRODUCER
STATUS AND ACTIVITY A20 < 4 >	STATUS AND ACTIVITY A20 < >

*DISCOVERER L20 <
*YEAR OF DISCOVERY L10 < > *NATURE OF DISCOVERY L30 < B > *YEAR OF FIRST PRODUCTION L40 < 1943 > *YEAR OF LAST PRODUCTION L45 < 1944
*PRESENT/LAST OWNER A12 < ALLICAN MINING CO (1950'S)
*PRESENT/LAST OPERATOR A13 <
EXPL./DEV. COMMENTS L110 <

DESCRIPTION OF DEPOSIT

*DEPOSIT TYPE(S) C40 < VEIN
DEPOSIT FORM/SHAPE M10 < TABULAR
*DEPTH TO TOP M20 < > *UNITS M21 < > *MAXIMUM LENGTH M40 < 150 > *UNITS M41 < FT
*DEPTH TO BOTTOM M30 < 105 > *UNITS M31 < FT > *MAXIMUM WIDTH M50 < 100 > *UNITS M51 < FT
*DEPOSIT SIZE M15 < SMALL > M15 < MEDIUM > M15 < LARGE > (circle one) *MAXIMUM THICKNESS M60 < 8 > *UNITS M61 < FT
*STRIKE M70 < N 40 E > *DIP M80 < VERTICAL
*DIRECTION OF PLUNGE M100 < > *PLUNGE M90 <
*DEP. DESC. COMMENTS M110 <

DESCRIPTION OF WORKINGS

*Workings are: SURFACE M120 UNDERGROUND (M130) BOTH M140 (circle one)
DEPTH BELOW SURFACE M160 < 105 > *UNITS M161 < FT > *OVERALL LENGTH M190 < 120 > *UNITS M191 < FT
LENGTH OF WORKINGS M170 < > *UNITS M171 < > *OVERALL WIDTH M200 < 10 > *UNITS M201 < FT
*OVERALL AREA M210 < 1200 > *UNITS M211 < SQ FT
DESC. OF WORK. COM. M220 < TREADWELL VEIN CUT BY SENATOR TUNNEL AT 400 FT DEPTH

GEOLOGY

*AGE OF HOST ROCK(S) K1 < P, R, O, T, , T, E, R, T, , W/PB ZIRCON GREATER THAN 1760 MILLION YEARS ; UNDATED
*HOST ROCK TYPE(S) K1A < AMPHIBOLITE, SLATE, MINOR SCHIST ; RHYOLITE
*AGE OF IGNEOUS ROCK(S) K2 < P, R, O, T, , T, E, R, T, , W/PB ZIRCON GREATER THAN 1760 MILLION YEARS
*IGNEOUS ROCK TYPE(S) K2A < ~~MED~~ BASALT ; RHYOLITE
*AGE OF MINERALIZATION K3 < C, R, E, T, - P, A, L, E, O,
*PERT. MINERALS (NOT ORE) K4 < QUARTZ, PYRITE, HEMATITE
*ORE CONTROL/LOCUS K5 < FAULTING SHEARING
*MAJ REG TRENDS/STRUCT N5 < FOLIATION IN PRECAMBRIAN ROCKS TRENDS N35E TO N50E
*TECTONIC SETTING N15 <
*SIGNIFICANT LOCAL STRUCT. N70 < DIKES AND VEINS PARALLEL FOLIATION
*SIGNIFICANT ALTERATION N75 < NONE
*PROCESS OF CONC./ENRICH. N80 < OXIDATION AT UEAR SURFACE
*FORMATION AGE N30 < P, R, O, T, , , , , W, U/A ZIRCON GREATER THAN 1760 MILLION YEARS
*FORMATION NAME N30A < UNDIFFERENTIATED GREEN GULCH VOLCANICS
SECOND FM AGE N35 < , , , , , , , , , , , , , , , W,
SECOND FM NAME N35A <
*IGNEOUS UNIT AGE N50 < C, R, E, T, - T, E, R, T, W,
*IGNEOUS UNIT NAME N50A < UNNAMED RHYOLITE DIKES
SECOND IG UNIT AGE N55 < , , , , , , , , , , , , , , , W,
SECOND IG UNIT NAME N55A <
GEOLOGY COMMENTS N85 < DEPOSIT IS VEIN WHICH CUTS PRECAMBRIAN METAVOLCANIC AND METASEDIMENTARY ROCKS. RHYOLITE PORPHYRY DIKES OF PROBABLE CRET-TERT AGE ASSOCIATED WITH VEINS

GENERAL COMMENTS

GENERAL COMMENTS GEN <

* GENERAL REFERENCES

REFERENCE 1 F1 < ABGMT CLIPPING FILES.

REFERENCE 2 F2 < AZ DEPT MIN. RESOURCES FILE DATA

REFERENCE 3 F3 < USGS BULL 782, p. 120-121

REFERENCE 4 F4 < USBM - ABGMT FILE DATA

F5 < USGS 60 QUAD NO. 997 >

U.S. CRIB-SITE FORM

RECORD IDENTIFICATION

*RECORD NUMBER B10 <> *RECORD TYPE B20 <X,1,M> DEPOSIT NUMBER B40 <>

*REPORT DATE G1 <8,1,Y,1,0> (YR. MO.) *INFORMATION SOURCE B30 <1,3> *FILE LINK IDENT. B50 <USBM 004 025

*REPORTER(SUPERVISOR) G2 <LARABA PETER (last, first, middle initial) (DEWITT ED (last, first, middle initial)>

*REPORTER AFFILIATION G5 <ABGMT> *SITE NAME A10 <TEN SPOT MINE

*SYNONYMS A11 <>

LOCATION

*MINING DISTRICT/AREA A30 <MT UNION DISTRICT>

*COUNTY A60 <YAVAPAI> *STATE A50 <A,Z> *COUNTRY A40 <U,S>

*PHYSIOGRAPHIC PROV A63 <1,2,Y>

*DRAINAGE AREA A62 <1,5,0,7,0,1,0,2,Y> *LAND STATUS A64 <0,0,Y,,Y,(,)>

*QUADRANGLE NAME A90 <GROOM CREEK (1,9,7,4,)> *QUADRANGLE SCALE A100 <2,4,0,0,0>

SECOND QUAD NAME A92 <(,)> SECOND QUAD SCALE A91 <>

*ELEVATION A107 <,7,0,0,0,Y,F,T>

UTM

*NORTHING A120 <3,8,0,9,6,1,0>

*EASTING A130 <3,6,8,7,6,0,>

*ZONE NUMBER A110 <+,1,2>

*ACCURACY

ACCURATE (ACC) (circle)

ESTIMATED EST <>

GEODETIC

*LATITUDE A70 <>N,

*LONGITUDE A80 <>W,

CADASTRAL

*TOWNSHIP(S) A77 <1,2,5,N,Y> *RANGE(S) A78 <0,0,2,W,Y>

*SECTION(S) A79 <36,Y>

*SECTION FRACTION(S) A76 <NW OF SW>

*MERIDIAN(S) A81 <GILA AND SALT RIVER>

*POSITION FROM NEAREST PROMINENT LOCALITY A82 <37 MILES S OF GROOM CREEK, ARIZONA>

*LOCATION COMMENTS A83 <TEN SPOT IS BETWEEN TREADWELL AND SENATOR CLAIMS>

* ESSENTIAL INFORMATION
+ ESSENTIAL SOMETIMES OR HIGHLY RECOMMENDED

*COMMODITIES PRESENT C10 < CU, PB, AG, AU

*ORE MINERALS C30 < ...LD, ARGENTIFEROUS GALENA

COMMODITY SUBTYPES C41 <

*GEN. ANALYTICAL DATA C43 <

COM. INFO. COMMENTS C50 <

*** SIGNIFICANCE**

PRODUCER

MAJOR PRODUCTS MAJOR < AG, AU >

MINOR PRODUCTS MINOR < CU, PB >

POTENTIAL PRODUCTS POTEN < >

OCCURRENCES OCCUR < >

NON-PRODUCER

MAIN COMMODITIES PRESENT C11 <

MINOR COMMODITIES PRESENT C12 <

OCCURRENCES OCCUR <

*PRODUCTION

PRODUCER

PRODUCTION (YES — circled) (circle) PRODUCTION SIZE (SML — circled) MED LGE (circle one)

NON-PRODUCER

PRODUCTION UND NO (circle one)

EXPLORATION OR DEVELOPMENT

***STATUS**

PRODUCER

STATUS AND ACTIVITY A20 < 4 >

NON-PRODUCER

STATUS AND ACTIVITY A20 < >

*DISCOVERER L20 <

*YEAR OF DISCOVERY L10 < > *NATURE OF DISCOVERY L30 < B > *YEAR OF FIRST PRODUCTION L40 < 1932 > *YEAR OF LAST PRODUCTION L45 < 1932

*PRESENT/LAST OWNER A12 < ABBICAN MNG. CO. (1950'S)

*PRESENT/LAST OPERATOR A13 < MILNER LEASE (1932)

EXPL./DEV.COMMENTS L110 <

DESCRIPTION OF DEPOSIT

*DEPOSIT TYPE(S) C40 < VEIN

DEPOSIT FORM/SHAPE M10 < TABULAR

*DEPTH TO TOP M20 < > *UNITS M21 < > *MAXIMUM LENGTH M40 < 800 > *UNITS M41 < FT

*DEPTH TO BOTTOM M30 < 400 > *UNITS M31 < FT > *MAXIMUM WIDTH M50 < 210 > *UNITS M51 < FT

*DEPOSIT SIZE M15 < SMALL (circled) > M15 < MEDIUM > M15 < LARGE > (circle one) *MAXIMUM THICKNESS M60 < 10 > *UNITS M61 < FT

*STRIKE M70 < N35E > *DIP M80 < NEAR VERTICAL

*DIRECTION OF PLUNGE M100 < > *PLUNGE M90 <

*DEP. DESC. COMMENTS M110 <

DESCRIPTION OF WORKINGS

*Workings are: SURFACE M120 UNDERGROUND M130 (circled) BOTH M140 (circle one) *OVERALL LENGTH M190 < 1000 > *UNITS M191 < FT

*DEPTH BELOW SURFACE M160 < 400 > *UNITS M161 < FT > *OVERALL WIDTH M200 < 10 > *UNITS M201 < FT

*LENGTH OF WORKINGS M170 < 1000 > *UNITS M171 < FT > *OVERALL AREA M210 < 10,000 > *UNITS M211 < SQ FT

DESC. OF WORK. COM. M220 < TEN SPOT SHAFT CONNECTS TO SENATOR ADIT

GEOLOGY

*AGE OF HOST ROCK(S) K1 < PROT, TERT, W/PB ZIRCON GREATER THAN 1760 MILLION YEARS; UNDATED

*HOST ROCK TYPE(S) K1A < AMPHIBOLITE, SLATE, MINOR SCHIST; RHYOLITE

*AGE OF IGNEOUS ROCK(S) K2 < PROT, TERT, U/PB ZIRCON GREATER THAN 1760 MILLION YEARS

*IGNEOUS ROCK TYPE(S) K2A < META-BASALT; RHYOLITE

*AGE OF MINERALIZATION K3 < CRET-PALEO

*PERT. MINERALS (NOT ORE) K4 < QUARTZ, PYRITE, MAGNETITE, SPECULARITE

*ORE CONTROL/LOCUS K5 < FAULTING, SHEARING

*MAJ. REG. TRENDS/STRUCT. N5 < FOLIATION IN PRECAMBRIAN ROCKS TRENDS N35E TO N50E

*TECTONIC SETTING N15 <

*SIGNIFICANT LOCAL STRUCT. N70 < DIKES AND VEINS PARALLEL FOLIATION

*SIGNIFICANT ALTERATION N75 < NONE

*PROCESS OF CONC./ENRICH. N80 < OXIDATION AT NEAR SURFACE

*FORMATION AGE N30 < PROT, U/PB ZIRCON GREATER THAN 1760 MILLION YEARS

*FORMATION NAME N30A < UNDIFFERENTIATED GREEN GULCH VOLCANICS

SECOND FM AGE N35 <

SECOND FM NAME N35A <

*IGNEOUS UNIT AGE N50 < CRET-TERT

*IGNEOUS UNIT NAME N50A < UNNAMED RHYOLITE DIKES

SECOND IG. UNIT AGE N55 <

SECOND IG. UNIT NAME N55A <

GEOLOGY COMMENTS N95 < DEPOSIT IS VEIN WHICH CUTS PRECAMBRIAN METAVOLCANIC AND METASEDIMENTARY ROCKS. RHYOLITE PORPHYRY DIKES OF PROBABLE (CRET-TERT AGE ASSOCIATED WITH VEINS

GENERAL COMMENTS

GENERAL COMMENTS GEN <

COMMODITIES Gold, Silver, Copper Lead

ID NO. _____ DATE 2/12/80

PROPERTY SUMMARY

I. MINE NAME: Senator mine AKA; Cash mine
AKA; Senator Cash AKA;
AKA; AKA;

II. LOCATION: T 12N R 2W Sec(s) 1 UTM;
ELEV.; DIST.; STATE; CO.;
DIRECTIONS;

Map Attached ☒

III. OWNERSHIP: Name; John Bruan "79" Phone;
Address: Canava, Ill.
Date of Information;
DBA; Title Report Attached / /

IV. PROPERTY: 21 patented lode claims, Great Divide, Cashman
see list attached

Date of Property Status; 78 Map Attached ☒

V. HISTORY: First Located; ±1880 Operated; 1880-1899-1950's
Remarks; water stopped mining in 1900 until drained by Cash Tunnel

Report(s) Attached / /

VI. PAST PRODUCTION: $730,000 Ariz Bureau of Mines Bull 140 1936

Schedule(s) Attached / /

still & still may have more information

VII. WORKINGS: ~~All~~ Sanston Tunnel level at elev ~~6800~~ 6518'± under cuts 9 veins ~~on~~ ~~3,870~~ 3,270' see descriptions.

Map Attached / /

VIII. GEOLOGY: Deposit Type; Vein ~~Schists & Gran~~ Vein Strike; NE

Distance; ______ Width; ~~15~~ 5-8' Dip; W Age; ______

Host Rock; schists & Granites Age; ______ Ore

Control Veins - ore shoots?

Existing Report(s) Attached /X/ Report Based on New Examination Attached / /

IX. MINEROLOGY: Economic Minerals; ______

Gossan Minerals; ______

Alteration; ______

Gangue; ______

Petrographic Study; ______ Report(s) Attached / /

X. METALLURGY: ______ Report(s) Attached / /

Method of Determination; ______ Metallurgical Reports Attached / /

Remarks; ______

XI. SAMPLE DATA: ______ Sampling Technique; ______

Samples Taken By; ______ Number of Samples; ______

Date; ______ Assay Report(s)/Maps Attached / /

Drilling; ______ Type; ______ Total Footage; ______

When Drilled; ______ Drilling/Report Attached / /

XII. GEOCHEMISTRY: ______ Type; ______ Type Anomolies; ______

Report(s)/Map(s) Attached / /

XIII. GEOPHYSICS: ______ Type; ______

Anomolies; ______

Report(s)/Map(s) Attached / /.

XIV. AERIAL PHOTOGRAPHY: _____ Photo Attached / /

XV. RESERVES: Proven; _____ Calculations Attached / / Probable; 704,000
Calculations Attached / / Possible; 1,113,750 Calculations Attached / /
Total; _____ Calculations Attached / / Potential; _____
Calculations Attached /_/ at 0.317oz/t Au 8.15oz/t Ag, 4.16% Pb, 2.5% Cu

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; _____ Title; _____
Date; _____ Abstracted By; _____ Date; _____
Status; _____
Remarks; _____

Author; _____ Title; _____
Date; _____ Abstracted By; _____ Date; _____
Status; _____
Remarks; _____

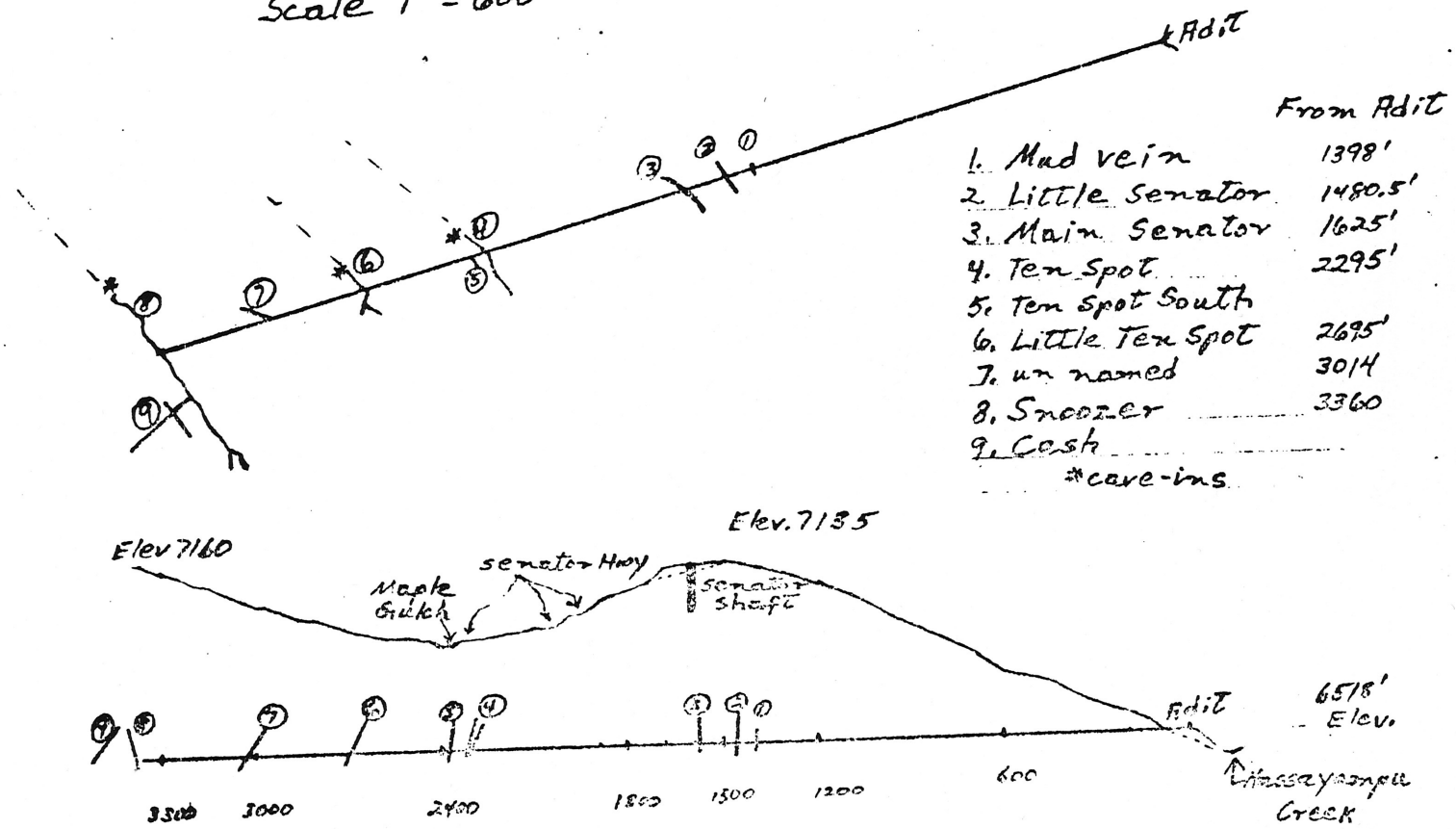
Author; _____ Title; _____
Date; _____ Abstracted By; _____ Date; _____
Status; _____
Remarks; _____

XVIII. REMARKS:

GENERALIZED PROFILE THROUGH ORE VEINS AT SENATOR CASH TUNNEL

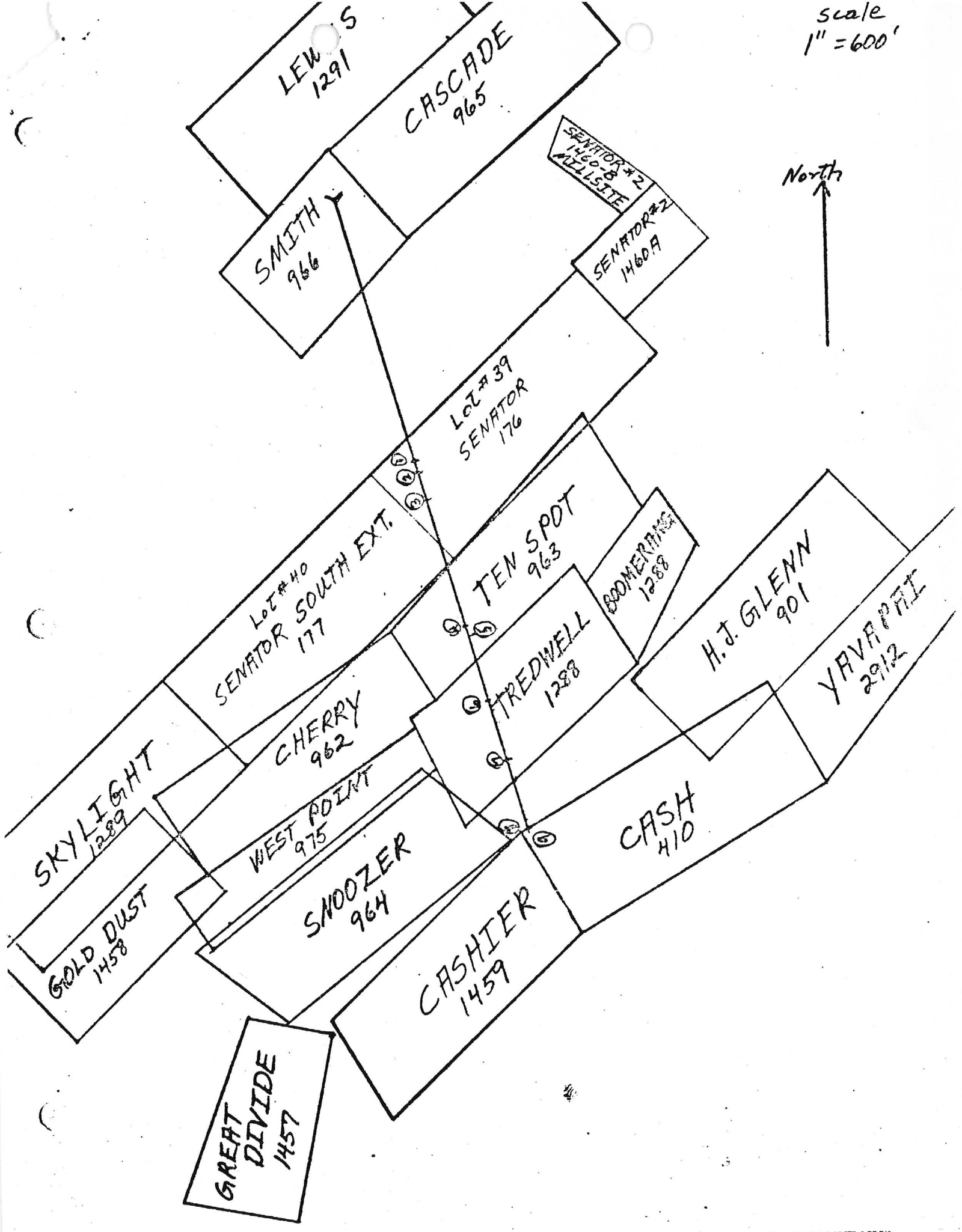
Copied from survey by S. Brown of Still & Still
Oct-Nov. 1956 Consulting Engineers & Geologists
Prescott, Arizona

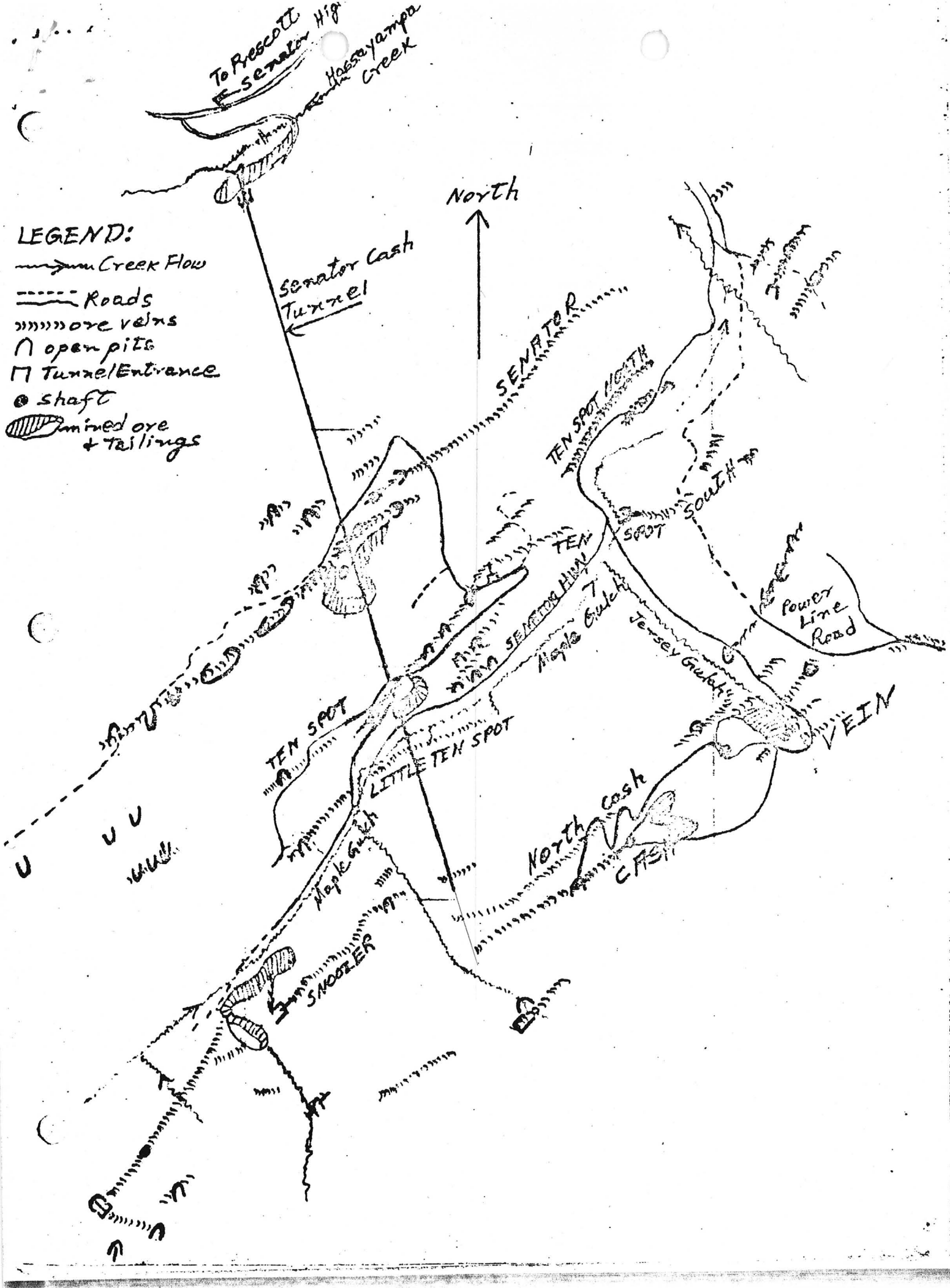
Scale 1" = 600'



	From Adit
1. Mud vein	1398'
2. Little Senator	1480.5'
3. Main Senator	1625'
4. Ten Spot	2295'
5. Ten Spot South	
6. Little Ten Spot	2695'
7. un named	3014
8. Snoozer	3360
9. Cash	

*cave-ins


scale
1" = 600'
North
LEW S
1291
CASCADE
965
SENATOR #2
1460-8
WELLSITE
SMITH
966
SENATOR #2
1460-9
LOT #39
SENATOR
176
LOT #40
SENATOR SOUTH EXT.
177
TEN SPOT
963
BOOMERANG
1288
H.J. GLENN
901
YAVAPAI
2912
SKYLIGHT
1289
CHERRY
962
TREDWELL
1288
WEST POINT
975
SNOOZER
964
CASH
410
GOLD DUST
1458
CASHIER
1459
GREAT
DIVIDE
1457


To Prescott
Senator Hi
Hassayampa
Creek
North
LEGEND:
Creek Flow
Roads
ore veins
open pits
Tunnel Entrance
shaft
mined ore
+ tailings
Senator Cash
Tunnel
SENATOR
TEN SPOT NORTH
TEN SPOT SOUTH
TEN
SENATOR HILL
Maple Gulch
Jersey Gulch
Power Line Road
TEN SPOT
LITTLE TEN SPOT
VEIN
North Cash
CASH
Maple Gulch
SNOOZER

RECAP OF ENGINEERING AND GEOLOGY REPORTS OF THE SENATOR CASH MINES

and

PERFORMA

"GOLD and SILVER are the only paths to safety in the coming depression, and that they are on the verge of an historic advance."

(Dines Letter, February 15, 1975 in FORBES)

"Gold is and always has been, a store of value. As such it is analogous to investments in works of art, coins, stamps, and gems. This type of investment cannot be compared to income producing investments which have risks different from those risks in owning gold. Gold is the universal, most readily convertible and portable store of value. Companies go bankrupt, cities default on bonds, and governments have crumbled through the ages. Yet a man owning 1000 oz. of gold is and was a wealthy man - today - 10 years ago - 100 years ago - 1000 years ago - and 5000 years ago."

(Simmons Precious Metaletter, February 3, 1975)

PROFORMA OF EARNINGS . . . . SENATOR CASH MINES 09-72, REV. 11-74.

The following proforma of potential earnings and cost on the Senator Cash Mines are based upon a report of potential ore reserves given in an evaluation report on the property by a Consulting Engineer.

This report gives a very comprehensive review of all of the series of veins on the Senator Cash mining claims and his assays from these veins. While more sampling should be done on the property to locate the better areas for initial mining of mill ore, it is felt that the ore body as it now exists available for mining justifies reopening of the mine. In general, this evaluation is based on the on-site verification of the veins and work given in the written report and the following projections are felt to be justified. The value of the ore has been upgraded to reflect present day values of gold at $ 185.00 per oz.; silver at $ 4.50 per oz.; copper at 90¢ [powder form] per lb.; lead at 24.5¢ per lb; zinc at 39¢ per lb.

The metallic assays given in the written report are taken as justified together with the tonnage estimates. A great deal of ore remains to be mined yet with drifts under much of the ore making an ideal situation. The average estimated value of the ore is as follows:

	Au oz/ton	Ag oz/ton	Pb % per ton	Zn % per ton	Cu % per ton
Senator vein	0.1	14.32	6.0	3.9	1.12
Little Senator	0.145	3.5	1.14	1.3	1.16
Ten Spot	0.81	8.8	1.02	1.4	0.70
Snooze	-.---	7.0	-.--	-.-	7.25
Cash	0.24	1.66	8.5	15.00	3.16
Great Divide	0.29	11.8	-.--	-.--	1.58

Average assay value of ALL veins:

Au oz/ton	Ag oz/ton	Pb %/ton	Zn %/ton	Cu %/ton	per/ton
0.317	8.15	4.16	5.4	2.5	

Dollar Value per ton

$58.65	$36.68	$20.38	$42.12	$45.00	$202.83

Total estimated tonnage measurable at present state of the mines:

Cash vein	258,750	tons
Cash Diorite Dyke	307,800	tons
Ten Spot	547,200	tons
Total	1,113,750	tons

In addition, there are the other veins such as the Little Ten Spot, Little Cash Snoozer, etc., together which will add another estimated 1,000,000 tons, PLUS the ore lying below the main adit level which is felt to continue for several thousand feet. There is unquestionably considerable ore yet to be developed.

Assuming that milling operations would entail 310 days per year at a capacity of 250 tons per day, then the ore in sight now ready for mining would give a 77,500 ton per year or an operation life of about 14 1/2 years.

TOTAL REVENUE PROJECTION POTENTIAL AT MILLING RATE OF 250 TONS PER DAY.

250 tons at $202.83 per ton	$ 50,707.50	per day
average 24 days operation per month	1,216,980.00	per month
revenue per year	14,603,760.00	per year.

Costs per month:

Contract mining at $55.00 per ton - 250 tons per day	$ 13,750.00	per day
26 days mining per month at $ 13,750.00 per day	357,000.00	per month

Milling costs per month:

250 tons per day at $18.00/ton	$ 4,500.00	per day
26 days milling per month at $ 4,500.00 /day	117,000.00	per month
Administrative, insurance, taxes, etc., at $ 9.00/ton	2,250.00	per day
30 days per month at $2,250.00 /day	67,500.00	per month
Total costs anticipated per month	$ 542,000.00	per month
Contingency	$ 90,000.00	per month
COST PER MONTH ------ Grand total	$ 632,000.00	per month

ESTIMATED REVENUE PER MONTH TOTAL	$1,216,980.00	
ESTIMATED COSTS PER MONTH TOTAL	$ 632,000.00	
ESTIMATED PROFIT BEFORE TAXES	$ 584,980.00	per month
ESTIMATED PROFIT BEFORE TAXES PER YEAR	$7,019,760.00	

ESTIMATED EARNINGS BEFORE TAXES OVER LIFE OF PROJECTED ORE BODY OF 1,113,750 TONS IS . . . . . $ 101,786,520.00

ESTIMATED PROJECT COSTS:

Rehabilitation of mine for operation to produce 250 tons per day average.

Labor of four (4) months by ten (10) men at $75/day,	$ 750.00	per day
26 days per month at $750.00/day	19,500.00	per month
Four (4) months at $19,500.00 / month	78,000.00	total

Material - rail, timber, pipe, etc.	$ 200,000.00
Equipment - compressors, tools, ore cars, etc.	175,000.00
TOTAL	$ 453,000.00

Mill for processing 250 to[illegible]/day - including building and [illegible]lizes good used equipment at $1,600/ton capacity	$ 400,000.00
Installation and shipping costs of mill	125,000.00
Environmental impact studies and permits	150,000.00
ESTIMATED TOTAL PROJECT COSTS	$ 1,128,000.00

ESTIMATED OPERATING COSTS:

One month's operation time before cash flow starts from Smelter receipts. Actual shipments to be made bi-weekly beginning first week.

Mining	$ 357,500.00	
Milling	$ 117,000.00	
Administration, etc.	$ 67,500.00	
Contingency	$ 90,000.00	
TOTAL operating costs	$ 632,000.00	per month

TOTAL CASH REQUIRED FOR PROJECT SENATOR CASH MINES:

1.	To rehabilitate mine, purchase and construct mill, etc., schedule 6 months	$ 1,128,000.00
2.	Operating expense for 7th month	632,000.00
3.	For contingencies of inflation, taxes, ecology, etc.	360,000.00
4.	Lease purchase, assay labs and additional administrative expenses	1,780,000.00
	PROJECTED TOTAL ESTIMATED COST	$4,000,000.00

Signed(Greg Sali)
Managing Engineer
Rev. 11 - - 74

TYPED COPY OF ASSAY, DATED December 1st, 1972.

Sample Description	Gold oz/ton	Silver oz/ton	Lead %	Zinc %	Copper %
Senator Mine Adit @ 1500 Feet	0.68	12.24	0.10	0.08	0.02

Owensboro, Ky. 01/18/69

To whom it may concern:

Within the last thirty days I have personally examined the adit tunnel located on the Senator-Cash Mines in the Mt. Tritle, Mt. Union area of the Bradshaw Mountains, Yavapai County, Arizonia, located twelve (12) miles south of Prescott, Arizonia.

This adit tunnel is open for a distance of 3,270 feet south from the portal which is at an elevation of 6,518 feet above sea-level at an average elevation of 500 feet below the surface out-croppings. It is in workable condition with 16 pound rail and 3 inch air and water lines already installed.

There are several veins of valuable ore exposed in the adit tunnel, namely: (1) "So called" mud-vein, (2) Little Senator Vein (3) Senator Vein, (4) Ten Spot Vein, (5) Little Ten Spot Vein, (6) Tredwell Vein, (7) Snoozer Vein, (8) Cash Vein.

Mill for processing 250 tons/day - including building and utilizes good used equipment at $1,600/ton capacity	$ 400,000.00
Installation and shipping costs of mill	125,000.00
Environmental impact studies and permits	150,000.00
ESTIMATED TOTAL PROJECT COSTS	$ 1,128,000.00

ESTIMATED OPERATING COSTS:

One month's operation time before cash flow starts from Smelter receipts. Actual shipments to be made bi-weekly beginning first week.

Mining	$ 357,500.00	
Milling	$ 117,000.00	
Administration, etc.	$ 67,500.00	
Contingency	$ 90,000.00	
TOTAL operating costs	$ 632,000.00	per month

TOTAL CASH REQUIRED FOR PROJECT SENATOR CASH MINES:

1.	To rehabilitate mine, purchase and construct mill, etc., schedule 6 months	$ 1,128,000.00
2.	Operating expense for 7th month	632,000.00
3.	For contingencies of inflation, taxes, ecology, etc.	360,000.00
	PROJECT TOTAL ESTIMATED COST	$2,120,000.00

Signed(Greg Sali)
Managing Engineer
Rev. 11 - - 74

TYPED COPY OF ASSAY, DATED December 1st, 1972.

Sample Description	Gold oz/ton	Silver oz/ton	Lead %	Zinc %	Copper %
Senator Mine Adit @ 1500 Feet	0.68	12.24	0.10	0.08	0.02

Owensboro, Ky. 01/18/69

To whom it may concern:

Within the last thirty days I have personally examined the adit tunnel located on the Senator-Cash Mines in the Mt. Tritle, Mt. Union area of the Bradshaw Mountains, Yavapai County, Arizonia, located twelve (12) miles south of Prescott, Arizonia.

This adit tunnel is open for a distance of 3,270 feet south from the portal which is at an elevation of 6,518 feet above sea-level at an average elevation of 500 feet below the surface out-croppings. It is in workable condition with 16 pound rail and 3 inch air and water lines already installed.

There are several veins of valuable ore exposed in the adit tunnel, namely: (1) "So called" mud-vein, (2) Little Senator Vein (3) Senator Vein, (4) Ten Spot Vein, (5) Little Ten Spot Vein, (6) Tredwell Vein, (7) Snoozer Vein, (8) Cash Vein.

These veins average from 5 to 8 feet in width and nearly all carry ore bodies of commercial grade for a considerable distance on either side of the adit tunnel and from the adit tunnel to the surface.

Two of these veins were selected for closer examination at this time for the purpose of sampling and determining whether a sizable tonnage of commercial grade ore could be developed and blocked out for mining. These two veins were more easily accessible but samples showed ore about the same quality as that exposed in the other veins.

The first ore examined was that in the Ten Spot vein which is about 2,200 feet South of the portal and runs N-50°-E and dips South at 75°.

(a) The unmined ore in the Ten Spot vein East of the adit tunnel averages 6 feet in width and will average $30.00 per ton in values for a distance of 500 feet containing 90,000 tons of ore valued at $2,700,000.00. (See samples #1 and #2).

(b) West of the adit tunnel level the ore in the Ten Spot vein continues West for a horizontal distance of 800 feet at an average width of 6 feet and a vertical distance of 500 feet with 240,000 tons of $30.00 ore. This ore body is estimated to contain $7,200,000.00. (See samples #3 and #4).

(c) The second vein examined at this time is the Snoozer which is about 3,000 feet South of the portal of the adit tunnel. This vein also runs about parallel with the other veins and has a valuable commercial grade ore exposed for at least 750 feet on either side of the adit tunnel at an average width of 5 to 8 feet. Only 5 feet is used for this computation.

(1) East of the adit tunnel the unmined ore is exposed for a distance of 750 feet and a vertical distance of 500 feet showing 187,000 tons of $30.00 ore valued at $5625,000.00. (See sample #5).

(2) West of the adit tunnel the ore continues for a horizontal distance of 750 feet averaging at least 5 feet wide and a vertical distance of 500 feet blocking out 187,000 tons of $30.00 ore valued at $5,625,000.00. (See sample #6).

TOTALS:	Ten Spot -East	90,000 TONS at $30.00	$ 2,700,000.00
	Ten Spot -West	240,000 TONS at $30.00	$ 7,200,000.00
	Snoozer -East	187,000 TONS at $30.00	$ 5,625,000.00
	Snoozer - West	187,000 TONS at $30.00	$ 5,625,000.00
		704,000 TONS at $30.00	$21,150,000.00

McClellan Watson (Signed)
Consulting Geologist. 01/18/69

UP DATED FIGURES at $202.83 per ton

90,000	tons	at $202.83	$ 18,254,700.00
240,000	tons	at $202.83	$ 48,679,200.00
187,000	tons	at $202.83	$ 37,929,210.00
187,000	tons	at $202.83	$ 37,929,210.00
704,000	tons	at $202.83	$ 142,792,320.00

REASONS FOR THE FIGURES:

1969	projection	$21,150,000.00
1974	projection	$142,792,320.00
		$121,642,320.00

MORE reasons to re-open the SENATOR CASH MINES.

Gold is going for $185.00 - [plus] per oz.
It will reach..... WELL OVER $200.00 per ounce.
NOTE: This is a TYPED copy of a hand-written report made by the Consulting Geologist.

SENATOR MINE

YAVAPAI COUNTY
SENATOR DIST.

It is reported that Aricana-Senator Mining Co. (Canadian) which discontinued at the Senator mine early in 1958 has merged with Alba Exploration Co. (Canadian) and a Penn. Oil Co. It is proposed to resume under the old name (Aricana-Senator Corp) and the plans envisage completion of the mill and putting the property on a producing basis. No personnel of the organization is on the ground as yet.

1-28-59 TPL

DEPARTMENT OF MINERAL RESOURCES

STATE OF ARIZONA

FIELD ENGINEERS REPORT

Mine Senator | Date May 1, 1959

District Hassayampa, Yavapai Co. | Engineer Travis P. Lane

Subject: Visit of April 29th

Bert Harvey, Supt.
723 Gurley St.
Prescott, Arizona

The property was visited and reported upon by the writer in a Department of Mineral Resources report under date of May 28, 1958, which see.

Following Mr. Mulliette's examination and recommendations new financing was arranged and the project is now operating under the name Aricana Resources Corp. (a Colorado Corporation). Abbican controls the new company and the home office address is still as noted in the above mentioned Department of Mineral Resources report, and Mr. Wuest continues as president of Abbican.

Mr. M. R. P. Mulliette (correction of initials and spelling given in the Department of Mineral Resources report of May 28, 1958) is consultant for the company and is directing the exploratory work supervised by Mr. Harvey. Mr. Mulliette will visit the mine at frequent intervals from his office in Toronto. The work in progress consists of exploratory diamond drilling from underground locations. The program calls for 5000' of drilling. Mr. Mulliette was at the property at the time of this visit and described the work to date as follows:

Drilling was begun on April 21. Eastern Ontario Drilling Company is the contractor and the drill crew consists of two drill runners. Two company men are employed on maintenance and service. 6 holes have already been drilled on the adit level, exploring the SE wall of the drift along the Ten Spot vein; and probably another 10 to 15 holes will be drilled for this purpose. The holes are being drilled flat and are short (maximum to date 18'). The cores have not yet been assayed but the material shows moderately heavy iron sulphide content believed to be a favorable indication at this horizon. The next drilling location will be on a level 260' above the adit level and will explore the Cash vein and the North Cash vein (Snoozer?). Some longer holes will be drilled at occasional locations to explore for possible "blind" veins.

See: CASH MINE (file)

SENATOR

YAVAPAI CO.
HASSAYAMPA DIST.
1-8-59

Operations suspended and idle since July, 1958.

T.P. LANE

1-29-58

LEE HAMMONS reports

ARICANA SENATOR MINE & MILL

Aricana Senator Mines, Inc.
Ross-Favour Bldg.,
Prescott, Ariz.
George D. Harvey, Supt.

A welding crew was building a very substantial mill building. They expect to take some custom ore. No visible activity at mine.

Report of Walter C. Smith,
Registered Civil and Mining Engineer,
State of Arizona, Reg. No. 166,
Coolidge, Arizona.

PURSUANT to request, I have examined the Cash-Senator mining property, spending the day of August 28th on the ground and herewith submit my report thereon:

SUMMARY and CONCLUSION — Within the time allotted to the examination of a property with as extensive underground workings and the goodly number of ore deposits as are found on the Cash-Senator, the most I could hope to do was to verify the information at hand and to check the conclusions already formed.

I am somewhat familiar with the general geology of the area, having worked out of Humboldt in the years 1917 and 1918, with examining engineers in a search for ore for the Old Consolidated Arizona Smelter. I later served as resident mining engineer at the Bluebell Mine out of Mayor. World War 1 closed out the smelter and most of the surrounding mines, including the Cash-Senator.

Although the Cash-Senator mines have been in operation intermittently over a long period of time, apparently a large tonnage of low grade ore remains which, though complex in character, can be readily treated by selective flotation. The location, is good in a well-mineralized area, the climate excellent, transportation facilities good, electric power and telephone lines on the property, water will run by gravity to the proposed mill site, skilled labour is plentiful, fuel and timber is on the claims. In fact, all the factors are present for a successful operation. The problem is one of milling.

LOCATION: The Cash-Senator group, lying approximately 12 miles south of Prescott, Yavapai County, Arizona, consists of 21 patented claims, the Lewis, Smith, Cascade, Senator, Senator South Extension, Skylight, Senator No. 2, Gold Dust, Cherry, Ten Spot, West Point, Snoozer, Tredwell, Boomerang, Great Divide, Cashier, Cash, H. J. Glenn, Yavapai, De Vernon, and the Senator No. 2 Mill Site, totalling approximately 322 acres, patents to some of which were issued as early as 1880.

HISTORY: The Cash group consisting of 3 claims was first located and operated in the late 19th century by an old prospector who encountered a rich gold chute which in a short time netted him a considerable profit; $100,000.00 of which he is said to have used to found the Pioneers' Home, in Prescott.

The Senator Group was patented somewhat later. Work on both groups for years was confined to shallow shafts on account of underground water. In 1917, the two groups were consolidated, the long adit driven to dewater the mines, a connection made with the Snoozer shaft at the adit level and a winze sunk from this, the main working level, 280 feet deep on an extension of the Senator Vein. This winze is reported to be in high-grade ore with exceptional values in gold, but was abandoned on account of water. Work was discontinued during World War 1 and the mines later sold to the Phelps-Dodge Corporation; which company did no work reportedly because, in the opinion of their engineers, the cost of cleaning out the main adit at the junction with the so-called "Mud Vein" would have been prohibitive; a task accomplished at a minimum of expense by their successors, the present owners, Dickey, and Orr.

Dickey and Orr timbered the adit at this vein and re-opened the stope on the Snoozer Vein mining upward for 260 feet above the adit level, shipping to the American Smeltine and Refining Company and International Smelters at Hayden and Miami, respectively, a considerable tonnage averaging over $25.00 per ton in copper and silver values according to smelter settlement sheets which are available for checking. Smelter Receipts may be available

TOPOGRAPHY: The Cash-Senator group is located in rugged country with precipitous slopes and deep canyons in a heavily wooded area traversed by the headwaters of the Hassayampa River, over which one drives to the portal of the main adit and working level. The numerous veins are easily traced due to an excess of silica in the out-crop which resists erosion and the multitude of open cuts, trenching and shallow shafts which follow the strikes along the surface.

Transportation facilities to and from the mines are exceptional, only 12 miles from the City of Prescott, the mines are reached over a county - maintained road, 8 miles of which are paved and the balance graveled. This same county road traverses the claims and provides a downhill grade for practically the entire distance from the two large dumps located at the collars of the Senator and Snoozer shafts, several hundred feet above the adit level where the mining equipment, buildings, and proposed mill site are located on the banks of the Hassayampa. Reference is here made to the claim map prepared by Mr. Ralph Johnston, attached hereto, showing the relative positions and the claims comprising the group, the surface and underground workings.

SAMPLING: Because of the limitations of time in this preliminary investigation, reliance is made on assays provided by independent surveys and smelter settlement sheets from a few shipments extracted by the present owner, Mr. Jack Orr, from the Snoozer stope.

MINERAL CALCULATIONS and AMOUNT: Assuming that the values of the dumps extracted from the Senator and Snoozer shafts prove in more extensive sampling to approximate the grab samples showing $17.50 per ton, there should be a gross value of approximatley $2,000,000.00 for an estimated 120,000 tons of muck with values in copper, silver, and lead.

The stop fills in the old workings on the Senator and Ten Spot veins, estimated at 200,000 tons, are reported to have a slightly higher value and are accessible through the main adit, increading the gross value by $3,500,000.00.

The present owners ceased work on the property in 1955, when the smelter demanded ores with a silica content of 70%, a requirement which they could not fill. Arrangements were made for a mill but negotiations were abandoned at the death of one of the partners. They did, however, leave the Snoozer stope in full working condition, complete with ore chutes, ladderways, skidways, air and water lines and a large body of ore blocked out on two sides. Smelter settlement sheets on shipments from this stope averaged around $27.00 a ton in copper and silver; the vein has an average width of 8 feet at the back of the stope; the vein measures approximately 1,045 feet from the breast of the drift on the east to the Snoozer shaft on the west; the shaft rises 730 feet, more or less, from the adit level to the collar surface. I am informed that samples taken at the surface on this vein over a greater width than at the back of the stope, 260 feet above the drift, assayed as high in values of copper and silver as the average computed from smelter settlement sheets above - mentioned. Half the vertical and horizontal dimensions and the estimated tonnage left in virgin ground above the Snoozer stope, amounts to some 50,000 tons with a value of approximately $25.00 per ton, another $1,250,000.00.

With a total of some 370,000 tons of ore which may be taken from dumps, drawn from filled stopes and mined from the Snoozer stope, there should be sufficient ore to furnish heads for a 200 - ton mill for more than five years without further development.

Suite 605
217 Bay Street

Empire 4-5922

MORLEY R. P. MULLIETTE, B.Sc., M. Sc.
MINING ENGINEERING
P. Eng. (Ontario)
TORONTO, ONTARIO.

Exploration
Development
Manangement

Diamond
Drilling
Specialist

June 30th, 1959.

The Board of Directors,
Aricana Resources Corporation,
Suite 241, 17 Queen Street East,
Toronto 1, Ontario.

Gentlemen:

I herewith submit my progress report covering the period of time from April 15th to June 30th, 1959.

The main information contained in this report relates to the 924 feet of diamond drilling performed on the Ten Spot Vein, west portion, adit level, and the Cash and North Cash (Snoozer?) Veins, from the crosscut at the 186 foot elevation above the adit level.

This progress report should be considered in conjunction with my comprehensive report of your property, dated July 11th, 1958.

Yours truly,

(MORLEY R. P. MULIETTE) signed

MM/r.

2. Underground surveying and mapping, as set forth in my original report dated July 11th, 1958, should be undertaken.

3. Arrangements should be made for the metallurgical testing of the three vein formations with the United States Bureau of Mines, Tucson, Arizona, and a milling flow sheet obtained.

4. Re-timbering of the heavy fault where it passes across the main adit level should be discharged at an early date in order to aleviate the possibility of locking this main access route. All timber used should be treated to prevent decay.

Morley R. P. Mulliette
Professional Engineer
, B. Sc., M. Sc.

IV. APPENDIX 1.

Tables

1. Diamond Drilling Data, Ten Spot Vein, West Drift Portion;

2. Diamond Drilling Data, Hole No. N C E - 1, East Side, North Cash Vein (Snoozer?) Crosscut Wall,

3. Diamond Drilling Data, Cash and North Cash Veins, West Crosscut Wall.

SENATOR TUNNEL

14 miles south of Prescott,Ariz; on Senator Highway.
Owner; Phelps Dodge Corporation.
Lessee; Mark Gemmill, Prescott,Arizona.

This old cross cut adit,straight as a string for 3270 feet,was driven through very hard rock in the 1890s. In addition to the cross cut itself,an aggregate of more than 3500 feet of drifting was done on the five or more veins that were intersected along its course. The purpose of this work,at that time,was the search for gold ores which occured in the upper portions of several of the veins.

The elevation of the tunnel level was from 500 to 700 feet below the various outcrops and well into the heavy complex sulphide zone.At this depth the veins failed to carry the former gold content that was found in them nearer the surface, but did show more or less base metal sulphides which were,at that time,without value.A relatively small gold production resulted,directly,from this extensive exploration.

For the past 25 years this old work has been inaccessible. It was reopened early in 1950 to explore the base metal values in the various veins.At about the time this rehabilitation was completed the drop in metal prices made the margin too close to justify further work.

If given satisfactory metal prices several of the veins exposed in these old workings would appear to have good possibilities of quickly producing substantial quanities of lead,zinc and copper ores.

November 1950.

L. L. Farnham