



CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
3550 N. Central Ave, 2nd floor
Phoenix, AZ, 85012
602-771-1601
<http://www.azgs.az.gov>
inquiries@azgs.az.gov

The following file is part of the Walter E. Heinrichs, Jr. Mining Collection

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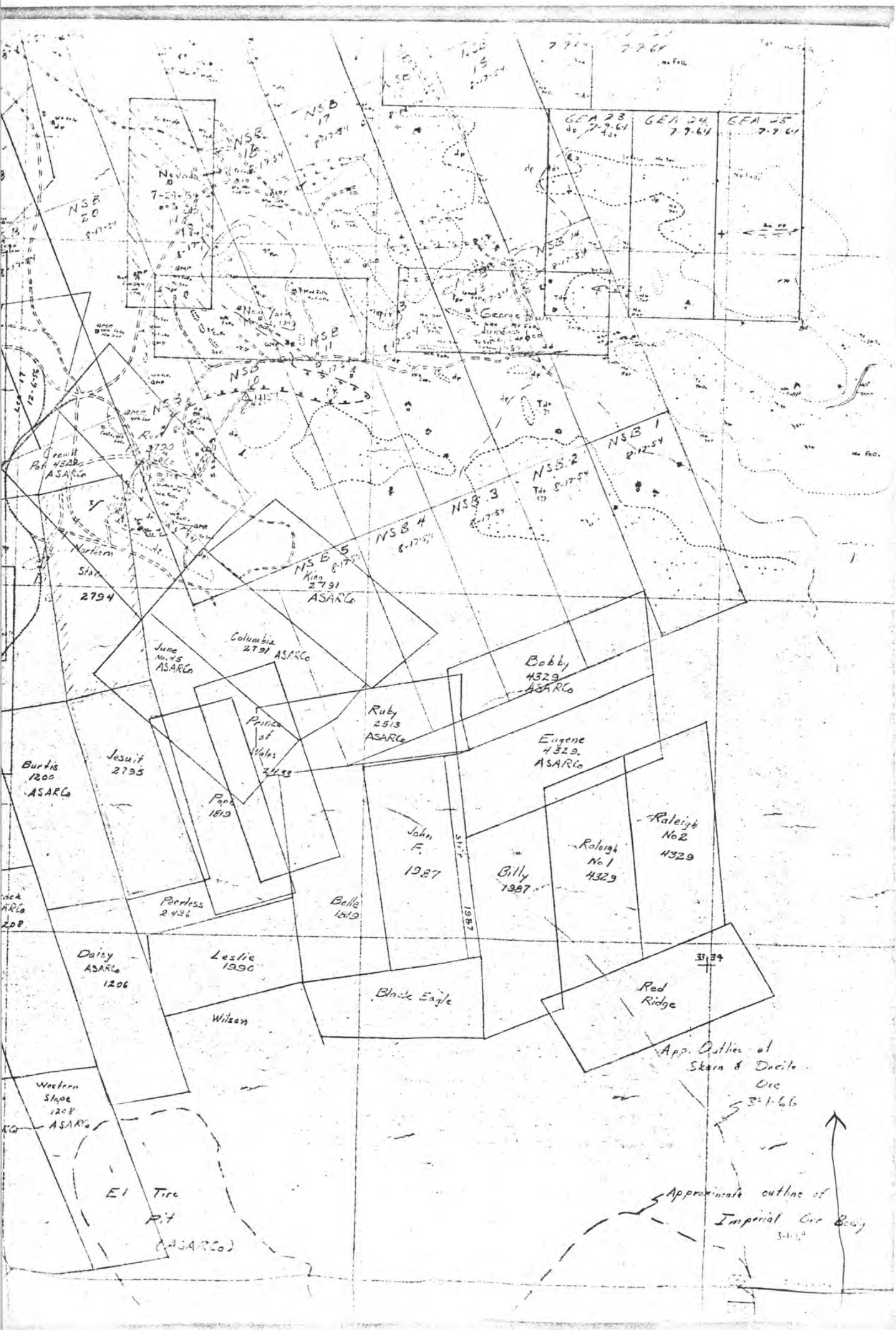
CONSTRAINTS STATEMENT

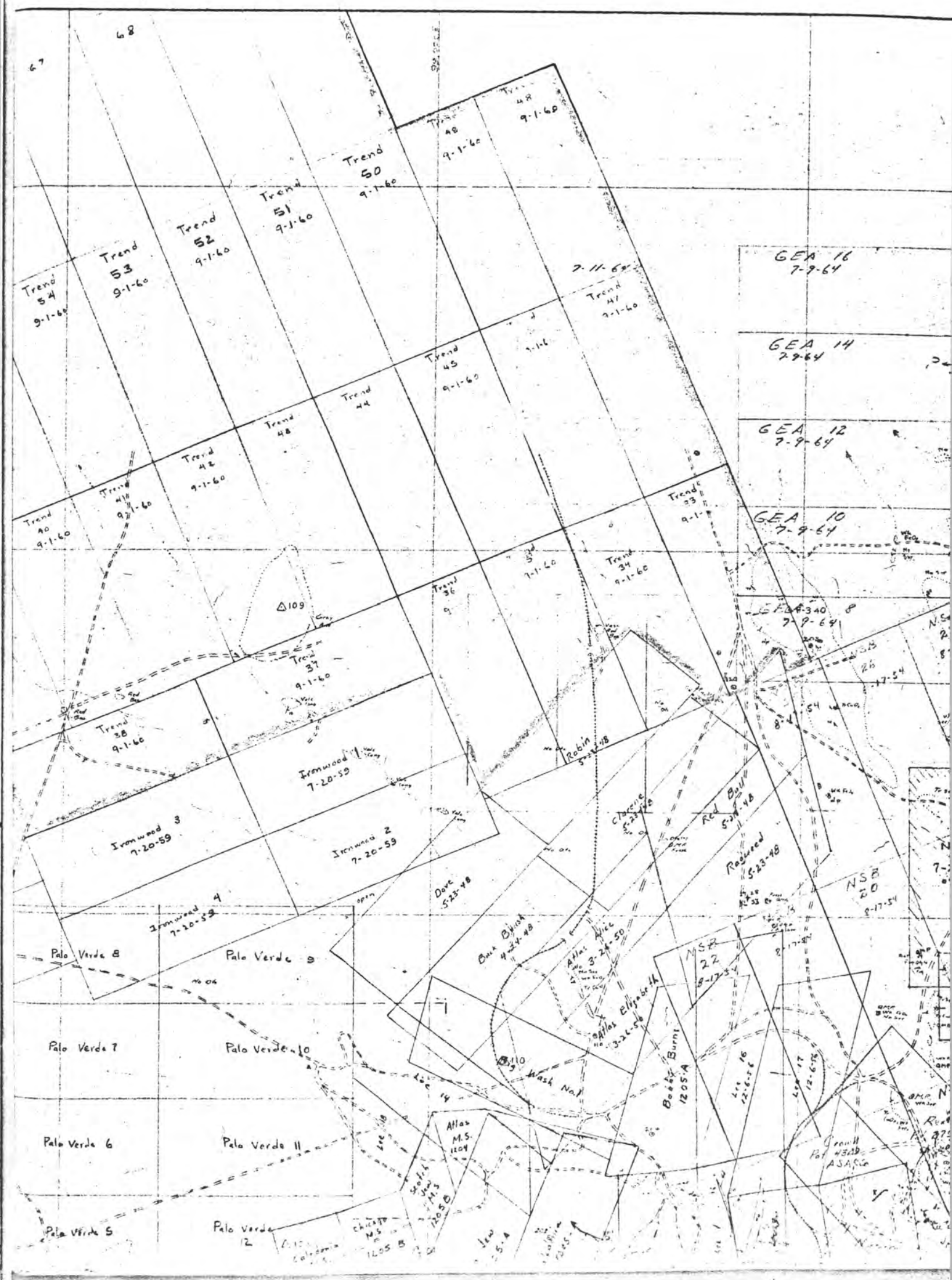
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GEA 16
7-9-64

GEA 14
7-9-64

GEA 13
7-9-64

GEA 12
7-9-64

GEA 11
7-9-64

GEA 32
7-13-64

GEA 33
7-13-64

GEA 10
7-9-64

GEA 30
7-13-64

GEA 31
7-13-64

GEA 9
7-9-64

GEA 28
7-9-64

GEA 29
7-9-64

GEA 8
7-9-64

GEA 26
7-9-64

GEA 27
7-9-64

NSB 20
8-17-54

NSB 18
7-27-54

NSB 17
8-17-54

NSB 16
8-17-54

NSB 15
8-17-54

NSB 14
8-17-54

NSB 13
8-17-54

NSB 12
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NSB 11
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NSB 19
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NSB 18
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NSB 9
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NSB 8
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NSB 7
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NSB 6
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NSB 5
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NSB 4
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NSB 3
8-17-54

NSB 2
8-17-54

NSB 1
8-17-54

NSB 0
8-17-54

NSB -1
8-17-54

NSB -2
8-17-54

NSB -3
8-17-54

NSB -4
8-17-54

NSB -5
8-17-54

NSB -6
8-17-54

NSB -7
8-17-54

© RDH
311

New York

Disc NW

BS&K No 5

New York

BS&K 15*
Disc Post
© RDH 309

RDH
© 310

Disc
BS&K
15

BS&K
RDH 309
1"=200'

RDH
311

New York

Disc NW

BS&K Nos

New York

BS&K 15x
Disc Post
RDH 309

RDH
310

Disc
BS&K
15x

BS&K
RDH 310
1"=200'

©
RDH
311

New York

Disc NW

BS&K Nos

New York

BS&K 15*
Disc Post
RDH 309

RDH
© 310

Disc
BS&K 15

BS&K
RDH 311
1" = 200'

RDH
31

New York

Disc NW

BS&K No 5

New York

BS&K 15x
Disc P. 1
RDH 309

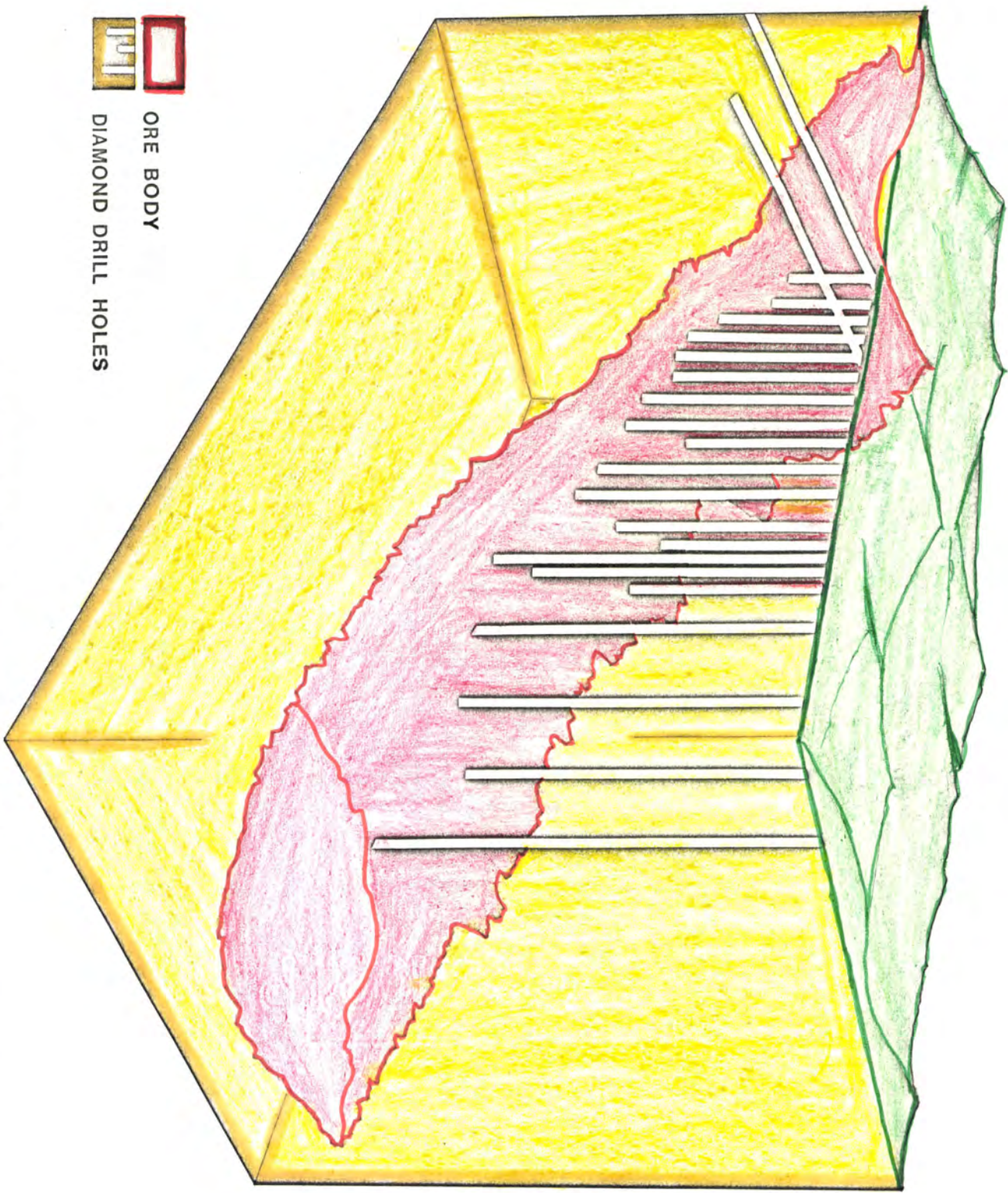
RDH
310

Disc
8x
15x

1" = 200'

← Z

indicates
Dr. 11 Hole



ORE BODY

DIAMOND DRILL HOLES

PORTION OF ORE BODY

GREAT LAKES NICKEL LIMITED · PARDEE TOWNSHIP, ONTARIO



Copper Oxide < 0.3

Copper

Mixed oxide & chalcocite
+ 0.3 % Cu

I Drill hole location

NEW YORK AREA
B. S. & K MINE

PROJECT

for

ESSEX INTERNATIONAL INC.

by

HEINRICHS GEOEXPLORATION Co.

2-70

2/2/70

100

100

100

100

100

100

100

100

100

100

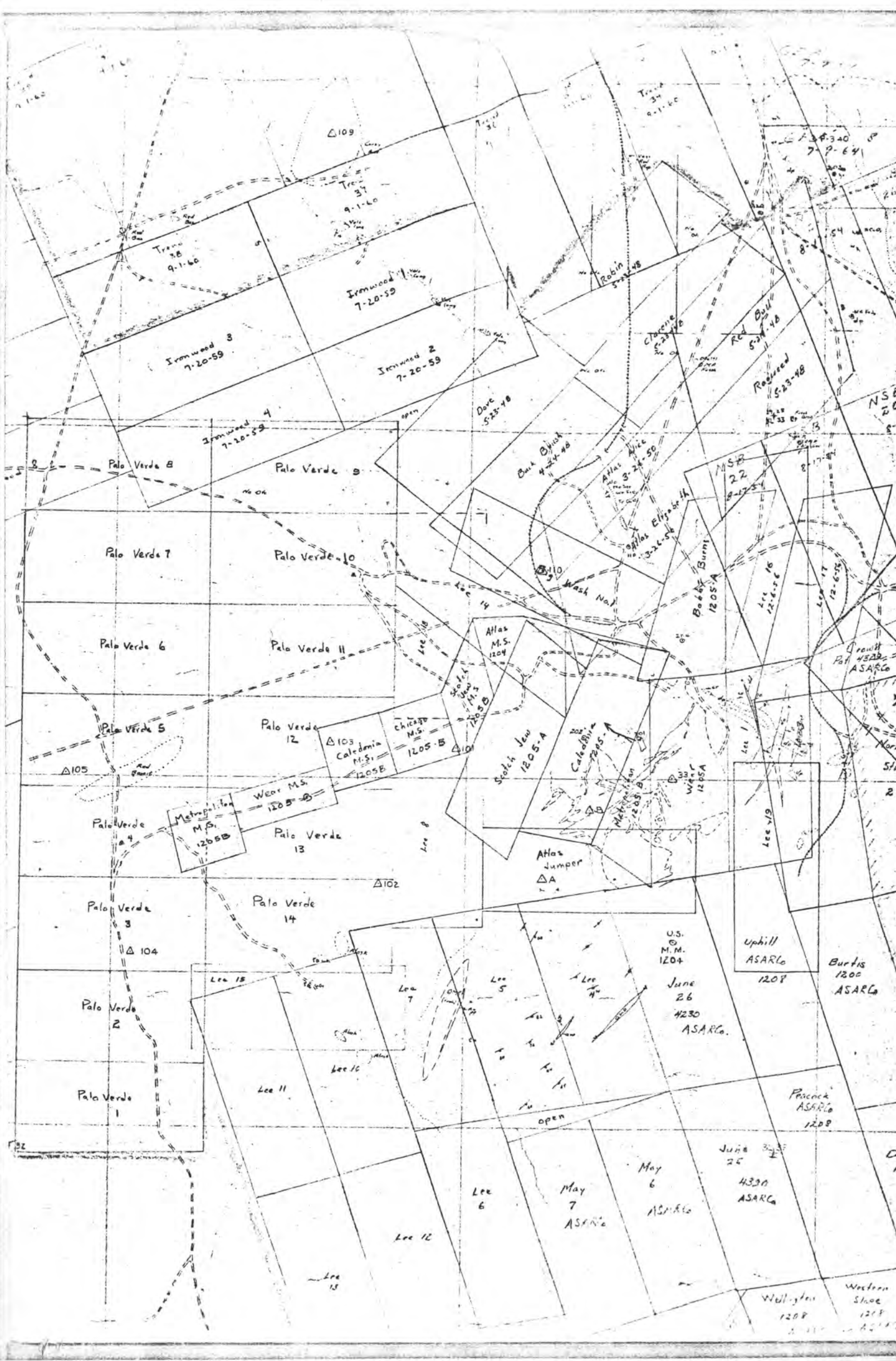
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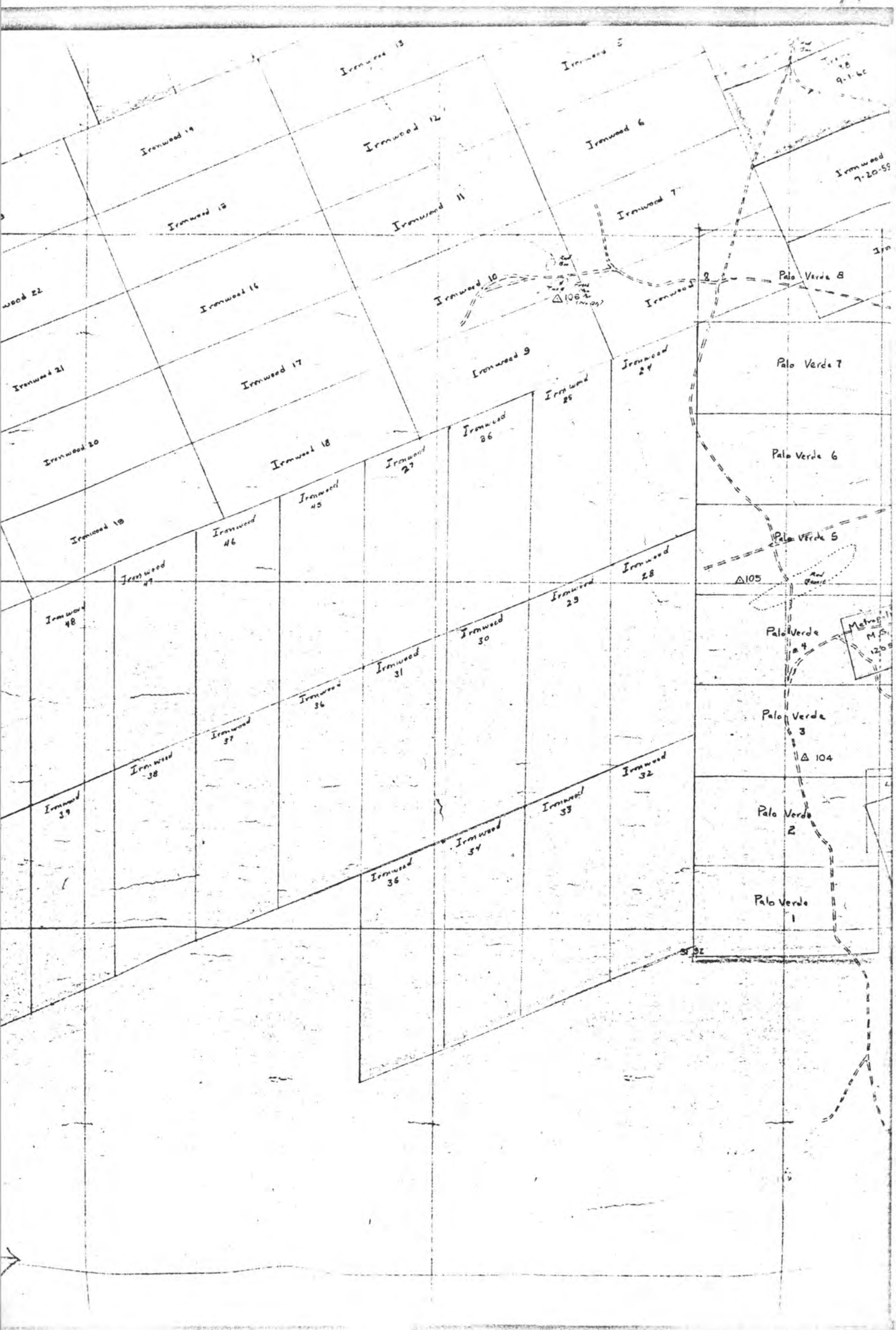
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100

100







New Pueblo CONSTRUCTORS *Inc.*

P. O. BOX 12765

TUCSON, ARIZONA 85711

4115 EAST ILLINOIS STREET — PHONE 327-6501

GENERAL CONTRACTORS AND HEAVY ENGINEERING

KARL G. RONSTADT
PRESIDENT

March 31, 1970
(1896)

HEINRICH'S
GEOEX

Cable: GEOEX



REC'D APR 1 1970 REC'D

BOX 8664 TUCSON, ARIZONA 85703

Phone: (AREA 602) 623-0578

RE: B.S.&K. Mine for
Essex International Inc.

Mr. Grover Heinrichs
Heinrichs Geoexploration Co.
808 West Grant Road
Tucson, Arizona

Dear Mr. Heinrichs:

In response to your request for a budget estimate concerning the cost of stripping and mining of your B.S.&K. project in Sections 33 and 28, Township 11 south, Range 8 east, we are pleased to submit the following information.

We would propose to mine 10,000 to 12,000 tons per shift and haul and place this material at your direction in the SE $\frac{1}{4}$ of Section 29 and NE $\frac{1}{4}$ of Section 32. The ore would be segregated and delivered to your crusher, while the overburden would be disposed of in the waste areas. We would anticipate this work to continue for at least three years. We would provide the equipment, materials, manpower and management necessary to perform the mining and hauling operations.

The cost of hauling the material out of the east end of your claim and around to the north through the central part of Section 28 to the dump would be approximately 95¢ per ton. The cost to mine and haul out of the west end of your claims directly to the dump would be approximately 77 $\frac{1}{2}$ ¢ per ton. Other than an escalation for future labor costs, I believe these figures are reasonable. This operation would require nearly two million dollars worth of equipment.

Should you determine to pursue this project, we would propose to enter into a contract which would afford you the optimum in economic operation of this project. There are numerous methods by which this could be done. A system whereby we operated on a cost plus a percentage basis for a period of time (such as six months, etc.) and then negotiated a fixed cost per ton, or a cost plus a fee per ton, has great merit. It affords us the opportunity to perfect the method of operation and gain the necessary facts pertaining to your specific operation which are so necessary to determine actual, exact costs. Once these costs are established, we would be in a much better position to provide the most economical cost on your mining operation. This method eliminates the risk so common to the standard contract method.

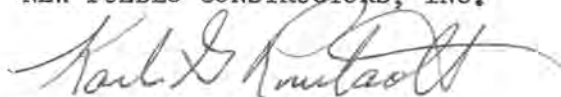
March 31, 1970 (1896)
Heinrichs Geoexploration Co.
Page 2

Our costs are maintained on an item and job basis through a computerized cost system and provide our clients with current, exact information relative to the cost of operations and the cost per unit. This would be the source of our information for final pricing.

Should this venture appear attractive, we would be pleased to discuss further the method by which we could best offer the services of our organization--which combines the skills of construction management with production know-how and substantial investments in the equipment necessary to perform this type of mining.

Very truly yours,

NEW PUEBLO CONSTRUCTORS, INC.

A handwritten signature in dark ink, appearing to read 'Karl G. Ronstadt', written in a cursive style.

Karl G. Ronstadt
President

KGR/dg



M. M. SUNDT CONSTRUCTION CO.
GENERAL CONTRACTORS



P O. BOX 2592 • 440 SOUTH PARK AVENUE • TUCSON, ARIZONA 85702 • AREA CODE 602 623-7531

March 26, 1970

Heinricks Geoexploration Company
808 West Grant Road
Tucson, Arizona

Attention: Mr. Grover Heinricks

Re: Essex International, Inc.
B. S. & K. Project

Gentlemen:

This will serve to confirm our telephone conversation of today in regard to our budget estimate for mining the above mentioned property.

Our estimate which is based on the presently known general features is as follows:

Mine and haul a distance of approximately 1.5 miles at a rate of 4,000 cubic yards per day @ \$1.24/bank cubic yard.

Mine and haul a distance of approximately 1.0 mile at a rate of 4,000 cubic yards per day @ \$0.99 per cubic yard.

If the above rate of mining should be doubled to 8,000 cubic yards per day deduct \$0.05 per cubic yard.

The above budget estimate is based on the following:

1. Mining a total 15,000,000 tons of material with a conversion factor of 12.5 cubic feet per ton.
2. We propose to control drilling and blasting methods to produce the required fragmentation, however, we do not include costs for secondary blasting.
3. We do not assume the responsibility for determining ore or waste.

Heinricks Geoexploration Company
March 26, 1970
Page Two

4. Costs have not been included for abnormal selective mining.

We hope the above will be of help in your present planning. If we can be of further service, please do not hesitate to call on us.

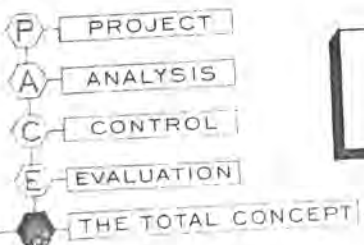
Very truly yours,

M. M. SUNDT CONSTRUCTION CO.



M. A. Hustad
Assistant Vice President and
Manager, Mining Department
Heavy Engineering Division

MAH:lh



M. M. SUNDT CONSTRUCTION CO.
GENERAL CONTRACTORS



P O BOX 2592 - 440 SOUTH PARK AVENUE - TUCSON, ARIZONA 85702 - AREA CODE 602 623 7531

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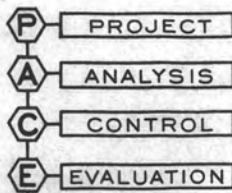
M. M. SUNDT CONSTRUCTION CO.



M. A. Hustad

Assistant Vice President and
Manager, Mining Department
Heavy Engineering Division

MAH:lh



THE TOTAL CONCEPT

M. M. SUNDT CONSTRUCTION CO.

GENERAL CONTRACTORS

P. O. BOX 2592 • 440 SOUTH PARK AVENUE • TUCSON, ARIZONA 85702 • AREA CODE 602 623-7531

March 26, 1970

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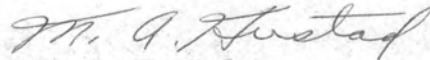
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M. M. SUNDT CONSTRUCTION CO.



M. A. Hustad
Assistant Vice President and
Manager, Mining Department
Heavy Engineering Division

MAH:lh

ESSEX

ESSEX INTERNATIONAL, INC.

NATURAL RESOURCES OFFICE

5315 E. BROADWAY #104, TUCSON, ARIZONA 85711 • PHONE (602) 326-2459

February 15, 1970

Mr. E. Grover Heinrichs, V.P.
Heinrichs Geoexploration Co.
808 W. Grant Road
Tucson, Arizona

Dear Grover:

As a part of my discussions with Mr. Abe Kalaf regarding B.S. & K. Mine, this is to instruct you that you are to furnish Mr. Kalaf with all reports, documents, etc., relative to our evaluation of the B.S. & K Mine.

Very truly yours,

ESSEX INTERNATIONAL, INC.
Natural Resources Office


J.M. Willis, Director

JMW/k

GH
FROM
Abe
KALAF

B.S. & K Mng. Co.

$$5.0 \times 10^6 \times 12 \frac{\text{lbs Cu}}{\text{cu}} = 60,000,000 \text{ lbs Cu}$$

$$7.0 \times 10^6 \times 3 \frac{\text{lbs Cu}}{\text{cu}} = 21,000,000 \text{ lbs Cu}$$

REI DEC.
EMS 1969

Recovery = 0.85% Recovery = 6.885×10^6 recoverable Cu

$$6.885 \times 10^6 \times 0.56 = 3.8556 \times 10^6$$

$$6.885 \times 10^6 \times 0.74 = 5.0949 \times 10^6$$

Stripping Waste $5.2 \times 10^6 \times 0.30 = 1.560 \times 10^6$

Stripping Ore $12.0 \times 10^6 \times 0.20 = 2.400 \times 10^6$

hi x Plant - (1250 gal/min basis

3.0 g/l Cu) Recover Resources = 3.000×10^6

(Ion Exchange - electrowinning,

operating cost - Basis F/MF-Dec

1969 - low 8.37¢/lb To 16.15¢/lb - Powers

Power + utilities - Reagent cost - labor + overhead)

$$= \frac{11.126 \times 10^6}{19.270 \times 10^6}$$

$$\frac{19.286 \times 10^6}{31.663 \times 10^6}$$

$$3.785 \times 3.0 \times 1250 = 14,193.75 \frac{\text{gal}}{\text{min}} = 31.3 \times 1440 = 45,072 \frac{\text{min}}{\text{day}}$$

$$45,072 \times 340 = 15.324 \times 10^6 \text{ annual Production}$$

$$\frac{6.885 \times 10^6}{15.324 \times 10^6} = 4.5 \text{ g/l / Approx}$$

Annual Before Taxes - $\frac{19,270 \times 10^6}{4.5} = 4.282 \times 10^6$ $\frac{31.663 \times 10^6}{4.5} = 7.036 \times 10^6$

$4.282 \times 0.25 \times 4.5 = 1.893 \times 10^6$ $7.036 \times 0.25 \times 4.5 = 3.110 \times 10^6$

Net after Federal Taxes / annually 2.389×10^6 3.926×10^6

" " " / 4.5 yr. 10.650×10^6 17.667×10^6

State Taxes ?

Mr. Leo Smith
Verity & Smith
Attorneys at Law
Suite 902 Transamerica Building
177 North Church Ave. Tucson, Ariz.

HEINRICH'S
GEOE



GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA

HEINRICH'S GEOEXPLORATION COMPANY

808 W. GRANT ROAD - P. O. BOX 5671

TUCSON, ARIZONA 85703

Area Code 602 Phone 623-0578

Geophysical Exploration Research Engineering

SUBJECT: _____

DATE: 3/25/70

Essex B.S. & K
#811

Dear Leo:

Enclosed is a list of the B.S. & K. Claims - information
obtained from Abe Kalaf and should be regarded as preliminary.

Very truly yours,
HEINRICH'S GEOEXPLORATION COMPANY

E. Grover Heinrichs
Vice President

Enclosure:

EGD/re:

PLEASE REPLY TO → SIGNED

DATE

SIGNED

SEND WHITE AND PINK COPIES WITH CARBON INTACT. PINK COPY IS RETURNED WITH REPLY.

DETACH THIS COPY-RETAIN FOR ANSWER

TO Mr. Kent Perry
Hazen Research
4601 Indiana Street
Golden, Colorado 80401



HEINRICHS GEOEXPLORATION COMPANY

808 W. GRANT ROAD - P. O. BOX 5671

TUCSON, ARIZONA 85703

Area Code 602 Phone 623-0578

Geophysical Exploration Research Engineering

SUBJECT: New York Claim Group

DATE: 3/23/70

Dear Kent:

AIR MAIL - SPECIAL DELIVERY

Enclosed is a map of the New York Claim Group and drill hole and assay information such as it is, is plotted at each drill hole location. Needless to say, this information is for the most part, sketchy and heresay.

If you have any questions please give me a buzz.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

E. Grover Heinrichs
Vice President

EGH/md

Enclosure

PLEASE REPLY TO → SIGNED

DATE

SIGNED

SEND WHITE AND PINK COPIES WITH CARBON INTACT. PINK COPY IS RETURNED WITH REPLY.

DETACH THIS COPY-RETAIN FOR ANSWER

Sob 511 F
~~EGSK~~ Re: BS & K

2/20/70

Lowell - Not Available

he returned Walt's
call.

John Kinneson

For Arnold.

Computer - New Project Saint Venture.

(Verity)

3/19/70

called Walt re: Jerry Willis

& ESSEX

Adm?

Mr. Seibert, Attorney & B.S. & K.

Ft. Wayne, Attorney Alaska Met.

~~Mr.~~ Clyde Osborne.

Probst

Valley.

Verity rep.

Essex only

no conflict w/ Jerry
on Alaska Met.

to Walt's knowledge.

W.

(Essex F

Howard LANIER

3-18-70

called Groves
Re: B.S. & K.

Look at mining limitations
Wally Pincock

Next Friday Meeting with
Verity 622 7446
Pincock 895 2536

1. Opinion on his rights

want Osborn retained

CALL LANIER tomorrow
on Mining Engineer
Consultant

Essex

3/18/70

Howard Lanier Called Walt — Re: B.S. & K.

Evaluations - Mining economic evaluation.
economist

Geologist - 2nd Guesses.

Hazen Research.
Metallurgical etc.

independents

Not Kenyon Richard.

" McPhar.

Colorado Mines possibilities -

Dave Lowell
Jack Still
Spencer Tittley

Attorney's will contact Verity & Smith today
etc.

Walt called: Bill Peters

older grad students.

John Balla.

Socorro -

Geo. Griswold

Don Gentry -
grad student.
Geol & Mining Eng

7-8 yrs. exp.

Anacosta & Keweenaw.

Sodeberg

Jay Dodson
J. Oniel

BSK
Essex

3-14-70

2,532,500 ϕ'
30 thick

75,975,000 cu' \div 12.5

6,078,000 Tons \times 12#/T

72936000 # less 25%

54,702,000 #

6,078,000 T 75% = 4,558,500 T

\times 12# = 54,702,000

2,532,500 ϕ'
40 thick

101,300,000 cu' \div 12.5

8,104, tons

ESSEX INTERNATIONAL INC.

B.S. & K. MINING CO.

ATLAS MINE & VICINITY

PIMA COUNTY, ARIZONA

Approx. full & partial
120 claims approx.

Handwritten calculations:

$$\begin{array}{r} .004 \\ .009 \\ .037 \\ .010 \\ .009 \\ \hline .069 \\ 51.069 \\ \hline 19 \end{array}$$
$$\begin{array}{r} .018 \\ .009 \\ .027 \\ .018 \\ \hline .072 \\ 41.072 \\ \hline 32 \end{array}$$
$$\begin{array}{r} .82 \\ .82 \\ .65 \\ .30 \\ .26 \\ \hline 2.85 \\ 512.85 \\ \hline 35 \end{array}$$

OWNERSHIP

B.S. & K. Mine

~~ownership~~
ownership

B S & K Mine
Pima County, ARIZONA

Handwritten calculations:

$$\begin{array}{r} .73 \\ .20 \\ .26 \\ .23 \\ \hline 1.42 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} .36 \\ 411.42 \\ \hline 12 \\ \hline 22 \end{array}$$

Handwritten calculations:

$$\begin{array}{r} 1.013 \\ \times \\ \hline 250000 \\ 1.013 \\ \hline 17500 \\ 25000 \\ \hline 253250000 \end{array}$$

+ 1.013
25,325.00

40

50,65 0,000 Cu

12.5

101,300,000

810,400,000

~~B, 104,000~~

8, 441, 666

4,22 0833

12-

四

5

③

96

5.

10

Z

$$3 \left(8, 44, 1, 666 \right)$$

2,813,889

5,627,777

5

12

5

60

001

$$\begin{array}{r} 5000 \\ 500 \\ \hline 5500 \end{array}$$
$$\begin{array}{r} 205 \\ \times 590 \\ \hline 1845 \\ 10250 \\ \hline 120950 \end{array}$$

1000

$$\begin{array}{r} 100 \\ 110 \\ \hline 1000 \end{array}$$
$$\begin{array}{r} 2340 \\ - 225 \\ \hline 2315 \\ - 225 \\ \hline 2090 \\ - 200 \\ \hline 1890 \end{array}$$
$$\begin{array}{r} 15242 \\ \hline 1534 \\ 69 \\ 50 \\ 100 \end{array}$$

| | | | |
|-----------|---|-------|--|
| 100 | x | 1.00% | |
| 50 | x | 1.00% | |
| 100 | x | .69% | |
| <u>45</u> | x | .52% | |
| 295 | | | |

295

25.

$$\% 69 \cdot \times 001$$
$$\%00.1 \times 05$$
$$100 \times 1.00\%$$

$$35 \times .47 = 16.45$$

$$40 \times .37 = 22.80$$

$$100 \times .69 = 69.00$$

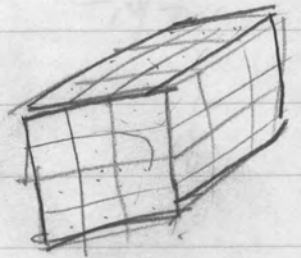
$$50 \times .42 = 21.00$$

$$50 \times 1.00 = 50.00$$

$$\underline{179.25}$$



$$9 \times 12$$



$$\begin{array}{r} .68 \\ 275 \overline{) 179.25} \\ \underline{1580} \\ 2125 \\ \underline{00} \end{array}$$

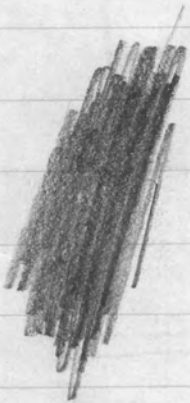
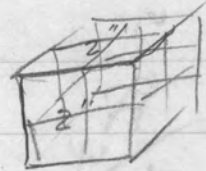
$$.425$$

$$.410$$

$$.418$$

$$\frac{.1}{10,000}$$

$$\frac{.418}{x}$$



$$37,800$$

$$.82$$

$$75600$$

$$302400$$

$$3099600$$

$$28,424$$

$$59420$$

$$41,800$$

$$.68$$

$$334400$$

$$250800$$

$$2842400$$

$$\begin{array}{r} 39800 \\ 2 \overline{) 79600} \\ \underline{6} \\ 19 \\ \underline{18} \\ 10 \end{array}$$

$$\begin{array}{r} .75 \\ 59,420.000 \\ \underline{557200} \\ 370000 \end{array}$$

$$159,420$$

$$\approx 53 \frac{1}{2} 500$$

$$39,39800$$

$$2026000000$$

$$22792500$$

$$7577500$$

$$125 / 100,793,500,000 \text{ ft}^3$$

$$\frac{19000}{1}$$

$$378000$$

$$\times \frac{378}{81}$$

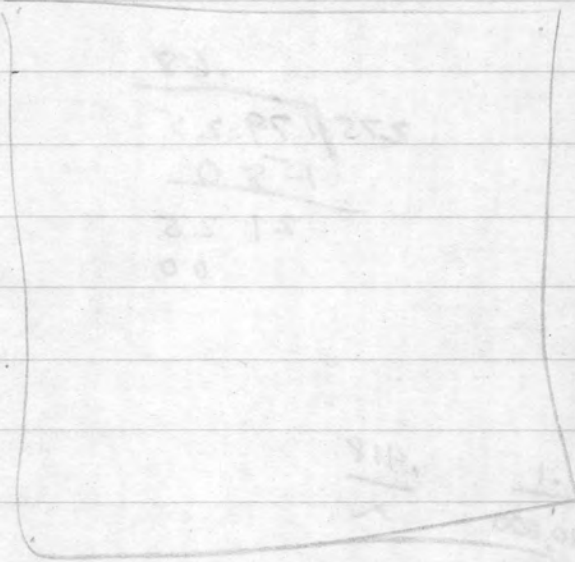
$$378$$

$$\frac{378}{10000} \times 378$$

$$\frac{378}{756} \times 378$$

$$756$$

$$\frac{12.5}{5} \times 378$$



$$\frac{1.013}{1.023} \times 2.036$$

$$2 \times \frac{1.018}{2.036}$$

$$\begin{array}{r} 10.13 \\ \times 250,000 \\ \hline 50650000 \\ 2026 \\ \hline 2532500.00 \end{array}$$

$$\frac{1550}{750}$$

✓ Calculus
✓ Algebra
✓ Geometry
✓ Trigonometry

2,532,500.00 ft² = Area of property

58.25 acres

1.013
1.023

.82 = Average % Cu for lower profile.
37,800 ft² = Area of lower profile.

.68 = Average % Cu for upper profile.
41,800 ft² = Area of upper profile.

.75 = Average % Cu
37,800 ft² = Average Area of ore

ESSEX — Walt called Laurie re: #511
Perry Knox & Kaufmann.

Gillmore No?

Consulting
personnel,
availability

3 Three Categories :-

① Evaluator economist ^{Mining} - Geo Griswold, Socorro, NM.
Appraisal.

~~Jack~~

Don Gentry

U. of A.

② Econ Geol.

Dore Lowell

Spence Tittley → Perry.

Jensen Balla

Hagen.

Rinnison

Charley Fair

Dick Woodcock?

Earl Jones?

Vandell Water

pending Roy retiree.
good on exp't.

Hal Kramer.

③ Open Cut Mining:

Soundt Const.

Jack Still *

Alex Bissett.

Jay Blum & Tom J. Ornel
Zudeberg.

B.S. & K Mng. Corp. (ARIZONA)

Kalif, Willis, Osborn, E.G.H.

160 - 170 claims

> 300 stockholders

Cash \$200,000 & over next 3 years

300,000

Banker Quarity Feasibility study

B. S. & K

2-3-70

- ① \$200,000
- ② Three yr. contract
- ③ \$300,000 monthly installments
advance royalty expense
on or before 3yr. period
must be plant producing
30,000 lbs / day copper LK or ?
based on 300 working days per
year.
When the plant commences
production advance royalty
terminates
Essex acquires 51% interest
in the property
- ④ Recover all advance royalty
payments & amortize all payments

BS&K Mine

1/26/70

Discussions for Essex

Abe Kalif of B.S.K.

Clyde Osborn of Essex

EGH of Gerex for Essex

Vic Hollister of Duval

All material of Duval turned over
to or available to Gerex

Received from Abe Kalif.

- ① Canadian Aero I.P. report
- ② McPhar " "
- ③ Drill Logs
- ④ Plan Map of claims

Side lights

Vic Hollister mentioned ^{Duval} interested in
U.S. Plywood Champion land holdings &
mineral rights & processing same.

B.S. & K. CLAIM LIST

Info. from Duval Corp. Property Map - May 29, 1964.

UNPATENTED CLAIMS

1. Ironwood 1 through 40 -
 & " 45 " 49. -
2. Palo Verde 1 through 14 -
3. Lee 1 and Lee 3 through 8 -
 Lee 10 through Lee 19 -
4. G.E.A. 8 through 14 -
 " 16 -
 " 23 through 33 -
5. Trend 33 through 36 -
 " 44 " 51 -
6. Dove, Robin, Buck Brush, Clarene, Atlas Alice,
 Red Bull, Atlas Elizabeth, Wash No. 1, Ragweed,
 Atlas Jumper. -

7. PATENTED CLAIMS

| | |
|--------------|---------------------|
| Metropolitan | Survey No. 1205 A - |
| Bobby Burns | " " " " - |
| Caledonia | " " " " - |
| Scotch Jew | " " " " - |
| Wear | " " " " - |

8. MILL SITE CLAIMS PATENTED

| | |
|--------------|-------------------|
| Atlas | Survey No. 1204 - |
| Chicago | " " 1205 B - |
| Caledonia | " " " " - |
| Wear | " " 1205 " - |
| Metropolitan | " " " " - |

UNPATENTED CLAIMS - NEW YORK AREA

Nevada 2

New York

Georgetown

Portion of NSB 9 (?)

NSB 10 through 14

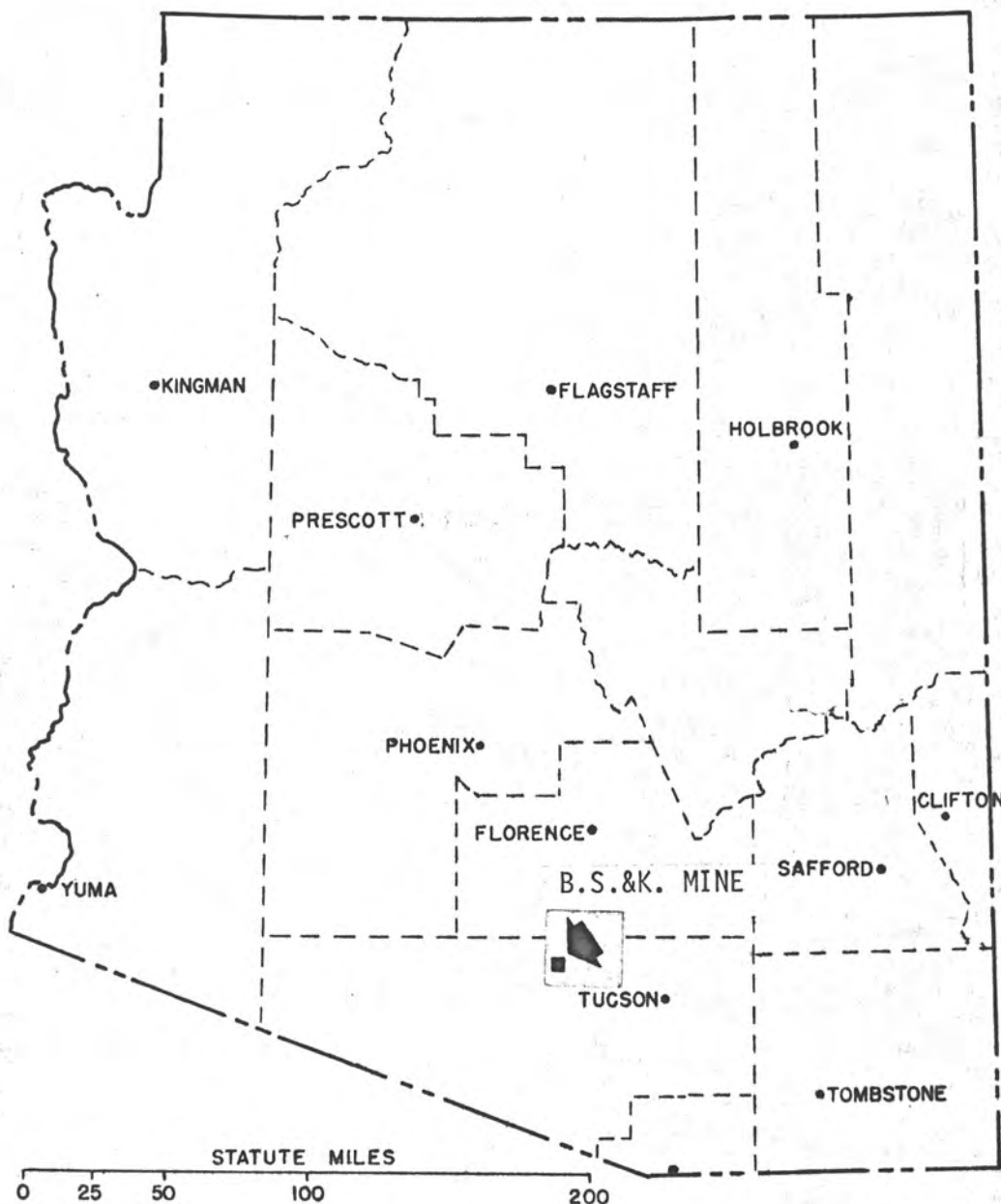
OUTLINE SUMMARY
ECONOMIC GEOLOGY, ORE RESERVES
AND
PROPERTY STATUS
of
THE B. S. AND K. MINING COMPANY

for
ESSEX INTERNATIONAL INCORPORATED

MARCH 1970

by
HEINRICHS GEOEXPLORATION COMPANY
P. O. Box 5671 Tucson, Arizona

ARIZONA



| | |
|---|-----------------------|
| HEINRICHS GEOEXPLORATION COMPANY | |
|  | |
| AUSTRALIA | U.S.A. |
| (SYDNEY) | Post Office Box 5871 |
| 39 Hume Street | Tucson, Arizona 85703 |
| Crows Nest, NSW | Phone: (602) 623-0578 |
| Phone: 439-1793 | Cable: GEQEX, Tucson |
| GEOPHYSICAL ENGINEERS | |

TABLE OF CONTENTS

| | Page |
|----------------------------|------|
| Index Map | |
| Introduction----- | 1 |
| New York Claim Group----- | 1 |
| Inferred Ore Reserves----- | 2 |
| Legal Status----- | 3 |
| The Atlas Mine----- | 3 |
| Legal Status----- | 4 |

Appended:

Drill Logs, New York Area

#300, 301, 302, 305, 306, 309, 310, 311

MAPS

Plate 1, Plan View New York Area

Plate 2, New York Area Topo Surface Profile

 Cross Section A - A'

 Cross Section B - B'

Topographic and Ownership Sepia Overlay.

INTRODUCTION

This summary outline has been prepared for Essex International Inc., and represents part of a report entitled "Preliminary Evaluation for Possible Acquisition and Operation of the B. S. and K. Mining Company Properties", by Clyde Osborn, Technical Director of the Natural Resource Office of Essex International Inc.

No field geological study of the B. S. & K. property has been conducted. However the generalized geology of the area is well published and known.

The B. S. & K. Mining Co. property consists primarily of two major mineralized areas, the New York Claim Group and the Atlas Mine.

NEW YORK CLAIM GROUP

These claims are located in the immediate area of the quarter corner of Sections 28/33, T. 11 S., R. 8 E. and consisting of the following lode mining claims, New York, Nevada No. 2, Georgetown and fractional lode claims NSB 9, 10, 11, 12, 13 and 14 and comprising a total of approximately 58.25 acres.

The mineralized area of Silverbell Mine of A. S. & R. to the immediate south is a chalcocite blanket 100 to 200 feet thick lying under a leached capping which is approximately 100 ft. thick. The New York area of B. S. & K appears to be an extension of the El Tiro pit to the north. Available drilling information

partly substantiates this assumption. (See accompanying copies of drill logs of Duval Corp.)

The leached capping of oxidized copper mineralization that overlays the chalcocite blanket carries values up to 0.15% to 0.2% copper over a considerable portion of the New York area. The chalcocite blanket varies in thickness from 30 feet to 100 feet and appears to be increasing in grade and thickness to the south and west.

Inferred Ore Reserves

Duval Corporation reportedly calculated 60,000,000 pounds of inferred copper reserves in the New York Claim Group and this figure is reasonable based on the following data:

1. Average thickness of chalcocite blanket -4 0.0 ft.
(See drill logs and assays of Duval Corp.)
2. Calculated tonnage of area 8,441,666 of which
75% may be mineable = 5,627,777 tons.
3. Assume average grade 0.6% Cu.
4. Solution = 67,533,324 pounds of copper.

In order to obtain sufficiently absolute actual tonnage and grade figures, a comprehensive evaluation program of twenty drill holes, drilled to a depth of 250 ft. each, is recommended. In addition, three drill holes, each 1,500 ft. deep to test the possible downward extensions of the chalcocite blanket is also recommended.

The Induced Polarization geophysical results by GEOEX and Canadian Aero suggests no cut-off of sulfides at depth in this

area and therefore some deep drilling is justified and certainly should be programmed.

Total cost of the shallow drilling and sampling program will be approximately \$50,000. Total cost of the deep drilling program of three holes, 1,500 feet deep would be approximately \$60,000.

Legal Status

The New York Claim Group is completely surrounded on three sides by A. S. & R. and if possible a right-of-way should be negotiated with A. S. & R. as shown on the photo mosaic as Route 1. Route 2 is currently the only available access to the New York Group from the proposed leach and dump areas and from a mining cost standpoint the less desirable route.

Litigation between B. S. & K. Mining Co. and A. S. & R. has been in the courts for many years and it is recommended that a thorough investigation be conducted by a lawyer, into the findings of the court prior to consummation of an agreement.

Favorable access negotiations with A. S. & R. is a definite possibility as indicated by the favorable solution of past problems of a similar nature and also because of the Arizona condemnation statute regarding rights-of-way for mining purposes.

THE ATLAS MINE

Located in the SE quarter of the NE quarter of Sec. 32, T. 11 S., R. 8 E., the Atlas Mine has had ore production history dating back to 1900. Production included argentiferous lead,

zinc and copper sulfides and carbonates occurring in veins and pods in the paleozoic sediments. The ore occurrence has been intermittent and difficult to follow. However, when an ore pod was encountered the values reportedly ran as high as 45% zinc and 4% to 5% copper, with some recoverable values in silver.

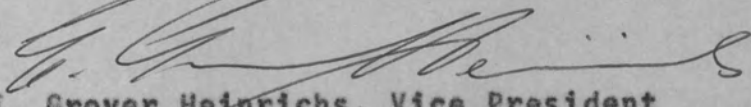
No factual information is available to compute ore reserves in this area, however, good exploration possibilities do exist in the area based on I. P. anomalism on some work done by McPhar Geophysics Ltd. of Canada in 1960.

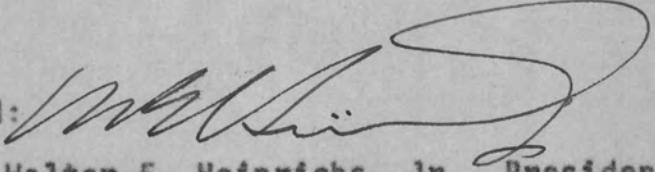
Some drilling should be done eventually to fully develop the economic mineral potential of this area.

Legal Status

The Atlas Mine area is on patented lode mining claims and the balance of the contiguous unpatented claims are reportedly in good condition from a legal standpoint. However, a thorough check of the Pima County Courthouse records should be made prior to consummation of an agreement.

Respectfully submitted,
Heinrichs GEODEXploration Company


E. Grover Heinrichs, Vice President

Approved: 

Walter E. Heinrichs, Jr., President

Sheet of 1-1

[illegible]

ASSAY-GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 2

PROJECT Atlas Mine, BS&K Mining Co., BS&K No 3 Claim

| | | |
|--|---------------------|-----------------------|
| Coörd. : N | BEARING <u>vert</u> | HOLE N° <u>300</u> |
| E | INCL. <u>vert</u> | COLLAR ELEV. |
| START <u>8-6-65</u> COMPL. <u>8-8-65</u> | <u>No core size</u> | DEPTH <u>182 feet</u> |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING — RMKS. |
|---|-------|------------|------|-----|------|------|---|---|-----|-----|---|-------|------------------|
| 0-90 Dacite Porphyry, Brown fine grained, soft, porphyritic, highly fractured, numerous gts veinlets, Arg. Alteration, Original Sulfide was ± 3%, entirely in fractures. Core very badly broken. No green or blue copper minerals visible, though entire section is oxide. | | 0 10 | 56 | .08 | .002 | | | | | | | | |
| | | 10 20 | 70 | .05 | .002 | | | | | | | | |
| | | 20 30 | 68 | .09 | .002 | | | | | | | | |
| | | 30 40 | 76 | .14 | .001 | | | | | | | | |
| | | 40 50 | 86 | .14 | .006 | | | | | | | | |
| | | 50 60 | 90 | .16 | .001 | | | | | | | | |
| | | 60 70 | 76 | .15 | .009 | | | | | | | | |
| | | 70 80 | 85 | .16 | .006 | | | | | | | | |
| | | 80 90 | 87 | .17 | .009 | | | | | | | | |
| | | 90 95 | 90 | .94 | .025 | | | | | | | | |
| 90-95 Dacite Porphyry, Gray Mixed oxide and sulfide. Soft, porphyritic, long arg. Alt., numerous gts veinlets. Sulfide occurs as oxide and chalcocite. | | 95 100 | 86 | .79 | .015 | | | | | | | | |
| | | 100 105 | 83 | .51 | .010 | | | | | | | | |
| | | 105 110 | 81 | .60 | .009 | | | | | | | | |
| | | 110 115 | 82 | .74 | .008 | | | | | | | | |
| 105-125 Dacite Porphyry Supergene zone, Gray, soft Copper occurs as chalcocite. Total Sulfide is ± 3% Iron occurs as pyrite. | | 115 120 | 80 | .12 | .001 | | | | | | | | |
| | | 120 125 | 82 | .11 | .023 | | | | | | | | |
| | | 125 | | | | | | | | | | | |

Average
oxide
is
.13 Cu
.005 Mo
for
90 feet

oxide
Mixed

Supergene
Sulfide

Average grade of
Mixed and Supergene
is 35 feet of

.47 Cu
.013 Mo

LOGGED BY V.F.H DATE 8-8-65

ASSAY—GEOLOGY COMPOSITE DRILL LOG

FORM # 355
REVISED 10-62

Sheet 1 of 2

PROJECT Atlas Mine, BS&K Mining Co., New York Claim

| | | | |
|--------------|----------------|------|--------------|
| Coörd. : N | BEARING | Vert | HOLE N° |
| E | INCL. | Vert | COLLAR ELEV. |
| START 8-9-65 | COMPL. 8-10-65 | | DEPTH 206 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz | oz | % | EQUV. | GROUPING — RMKS. |
|---|-------|-------|------|-----|------|------|---|---|----|----|---|-------|------------------|
| 0-100' Dacite Porphyry - Brown - oxide zone Soft, strong Argillic Alt., Porphyritic, fine grained. Original Sulfide was † 4%, 90% in fractures, 10% diss. Trace sericite lining fractures. Qtz veinlets rare. Some green Cu stain visible. | | 0 | | | | | | | | | | | |
| | | 10 | 20 | | .12 | .006 | | | | | | | 0'-30' |
| | | | | | | | | | | | | | .16 Cu |
| | | | | | | | | | | | | | .09 Mo |
| | | 10 | | | | | | | | | | | |
| | | 20 | 50 | | .20 | .012 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 20 | | | | | | | | | | | |
| | | 30 | 67 | | .17 | .010 | | | | | | | |
| | | | | | | | | | | | | | |
| 100-110 Dacite Porphyry Mixed Oxide and Sulfide Brown, Soft, fine grained, Porphyritic, Wk sericite and strong Arg. Alt. Copper occurs as Malachite and chalcocite, Core badly shattered. | | 30 | | | | | | | | | | | 30'-50' |
| | | 40 | 80 | | .18 | .009 | | | | | | | .17 Cu |
| | | | | | | | | | | | | | .011 Mo |
| | | | | | | | | | | | | | |
| | | 40 | | | | | | | | | | | |
| | | 50 | 85 | | .16 | .014 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 50 | | | | | | | | | | | 50-80 |
| | | 60 | 80 | | .11 | .016 | | | | | | | .12 Cu |
| | | | | | | | | | | | | | .016 Mo |
| 110-125' Dacite Porphyry Supergene Sulfide zone Dark gray, soft, weak Sericite and strong Arg. Alt. Copper occurs as chalcocite with weak pyrite, mostly in seams. Core badly broken. | | 60 | | | | | | | | | | | |
| | | 70 | 86 | | .12 | .016 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 70 | | | | | | | | | | | |
| | | 80 | 90 | | .13 | .017 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 80 | | | | | | | | | | | 80'-100' |
| | | 90 | 87 | | .24 | .010 | | | | | | | .17 Cu |
| | | | | | | | | | | | | | .009 Mo |
| | | 90 | | | | | | | | | | | |
| 110-125' Dacite Porphyry Supergene Sulfide zone Dark gray, soft, weak Sericite and strong Arg. Alt. Copper occurs as chalcocite with weak pyrite, mostly in seams. Core badly broken. | | 100 | 90 | | .10 | .009 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 100 | | | | | | | | | | | |
| | | 105 | 90 | | .15 | .013 | | | | | | | 100'-125' |
| | | 110 | 85 | | 1.31 | .040 | | | | | | | .83 Cu |
| | | 115 | 86 | | 1.74 | .019 | | | | | | | .018 Mo |
| | | 120 | 82 | | .49 | .008 | | | | | | | |
| | | 125 | 87 | | .45 | .013 | | | | | | | |

LOGGED BY VRH DATE 8-10-65

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

PROJECT Atlas Mine

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N° 300 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH 206 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % | % | % | % | oz. | oz. | % | EQUV. | GROUPING — RMKS. |
|--|-------|-------|------|-----|------|------|---|---|-----|-----|---|-------|------------------|
| 125-206 Dacite Porphyry Supergene zone as above | | 125 | | | | | | | | | | | |
| | | 130 | 80 | | 1.21 | .006 | | | | | | | 125'-150' |
| | | 135 | 90 | | .70 | .008 | | | | | | | .74 |
| | | 140 | 85 | | .65 | .009 | | | | | | | .009 Mo |
| | | 145 | 70 | | .39 | .015 | | | | | | | |
| | | 150 | 65 | | .76 | .009 | | | | | | | |
| | | 155 | 56 | | .47 | .013 | | | | | | | 150'-175' |
| | | 160 | 72 | | .38 | .043 | | | | | | | .49 Cu |
| | | 165 | 80 | | .36 | .024 | | | | | | | .027 Mo |
| | | 170 | 85 | | .51 | .040 | | | | | | | |
| | | 175 | 86 | | .72 | .014 | | | | | | | |
| | | 180 | 85 | | .50 | .010 | | | | | | | 175'-200' |
| | | 185 | 85 | | .57 | .052 | | | | | | | .69 Cu |
| | | 190 | 80 | | .88 | .011 | | | | | | | .018 Mo |
| | | 195 | 90 | | 1.12 | .013 | | | | | | | |
| | | 200 | 92 | | .40 | .004 | | | | | | | |
| | | 206 | 85 | | .19 | .006 | | | | | | | |
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ASSAY-GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 2

PROJECT Atlas Mine, BS&K Mining Co., BS&K

| | | | | |
|---------------|---------|---------|--------------|-----|
| Coörd. : N | BEARING | Vert | HOLE N° | 302 |
| E | INCL. | Vert | COLLAR ELEV. | |
| START 8-11-65 | COMPL. | 8-12-65 | DEPTH | 151 |

| DESCRIPTION | Geol. | Alt. | Int. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING — RMKS. |
|--|-------|------|------|-----|--------|------|------|---|-----|-----|---|-------|------------------|
| <u>0-68 Dacite Porphyry</u> | | | | | | | | | | | | | |
| Oxide zone, Brown, fine grained, porphyritic, strong Argillic Alt. with trace Sericite. Core badly fractured, Original Sulfide content was est. 5%. Some Malachite visible 20' to 68' | | | | | 0 | | | | | | | | |
| | | | | | 10 45 | .07 | .009 | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | 10 | | | | | | | | |
| | | | | | 20 50 | .06 | .012 | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | 20 | | | | | | | | |
| | | | | | 30 62 | .09 | .006 | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | 30 | | | | | | | | |
| | | | | | 40 70 | .07 | .004 | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | 40 | | | | | | | | |
| | | | | | 50 70 | .07 | .009 | | | | | | |
| | | | | | | | | | | | | | |
| 68-70 fault zone. Core crushed | | | | | | | | | | | | | |
| | | | | | 50 | | | | | | | | |
| <u>70-90 Quartz Monzonite Porphyry</u> | | | | | 60 65 | .10 | .009 | | | | | | |
| Brown, Oxide zone, Granitic, holocrystalline texture. Weak Argillic Alteration, with No sericite. Fracturing very strong at 70' gradually weakens down the hole. Mineralization fades with fracturing. | | | | | | | | | | | | | |
| | | | | | 60 | | | | | | | | |
| | | | | | 70 50 | .19 | .007 | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | 70 | | | | | | | | |
| | | | | | 80 55 | .11 | .012 | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | 80 | | | | | | | | |
| | | | | | 90 60 | .20 | .010 | | | | | | |
| | | | | | | | | | | | | | |
| <u>90-95 Quartz Monzonite Por.</u> | | | | | 90 | | | | | | | | |
| Mixed Oxide and Sulfide, Copper occurs as chalcocite, with limonite. | | | | | 95 70 | .66 | .010 | | | | | | |
| | | | | | 95 | | | | | | | | |
| | | | | | 100 85 | .66 | .016 | | | | | | |
| | | | | | 100 | | | | | | | | |
| | | | | | 105 85 | .61 | .005 | | | | | | |
| <u>95-135 Quartz Monzonite Por.</u> | | | | | 105 | | | | | | | | |
| Supergene zone fracturing weakens with depth. Some Moly visible in rare quartz veinlets. | | | | | 110 90 | .44 | .013 | | | | | | |
| | | | | | 110 | | | | | | | | |
| | | | | | 115 95 | .57 | .006 | | | | | | |
| | | | | | 115 | | | | | | | | |
| | | | | | 120 97 | .54 | .004 | | | | | | |
| | | | | | 120 | | | | | | | | |
| | | | | | 125 90 | .32 | .005 | | | | | | |

LOGGED BY VFR DATE 8-12-65

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 2

PROJECT Atlas Mine, Drill Hole for Nevada Claim

| | | |
|--|--------------|--------------------|
| Coörd. : N | BEARING Vert | HOLE N° 303 |
| E | INCL. Vert | COLLAR ELEV. |
| START 8-19-65 COMPL. 8-20-65 | | DEPTH 109 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % EQUV. | GROUPING — RMKS. |
|--|-------|-------|------|-----|------|------|---|---|-----|-----|---------|------------------|
| 0-15 Dacite Porphyry. Brown, oxide zone, soft, porphyritic, fine grained. Original sulfide content was 4%. Strong Arg. Alt.; tr ser. | | | | | | | | | | | | |
| | | 0 | | | | | | | | | | |
| | | 10 | 40 | | .02 | .021 | | | | | | |
| | | | | | | | | | | | | |
| | | 10 | | | | | | | | | | |
| | | 20 | 70 | | .02 | .017 | | | | | | |
| | | | | | | | | | | | | |
| | | 20 | | | | | | | | | | |
| | | 25 | 80 | | .04 | .009 | | | | | | |
| 15-25 Quartz Monzonite Brown, oxide zone, soft Holocrystalline, Est. 2% Original sulfide. Wk Arg. Alteration. | | 25 | | | | | | | | | | |
| | | 30 | 90 | | .09 | .001 | | | | | | |
| | | | | | | | | | | | | |
| | | 30 | | | | | | | | | | |
| | | 40 | 78 | | .28 | .001 | | | | | | |
| | | | | | | | | | | | | |
| | | 40 | | | | | | | | | | |
| | | 50 | 88 | | .29 | .009 | | | | | | |
| 25-60 Quartz Monzonite Gray. Supergene zone Holocrystalline. Est 2% Sulfide. Chalcocite occurs on fractures. Weak Arg. Alt. No sericite. | | | | | | | | | | | | |
| | | 50 | | | | | | | | | | |
| | | 60 | 90 | | .16 | .008 | | | | | | |
| | | | | | | | | | | | | |
| | | 60 | | | | | | | | | | |
| | | 70 | 90 | | .13 | .015 | | | | | | |
| | | | | | | | | | | | | |
| | | 70 | | | | | | | | | | |
| | | 80 | 90 | | .11 | .003 | | | | | | |
| 60-109 Quartz Monzonite Gray as above. Hypogene zone. Est 2% sulfide, in fractures. Trace of chalcopyrite. | | | | | | | | | | | | |
| | | 80 | | | | | | | | | | |
| | | 90 | 90 | | .12 | .003 | | | | | | |
| | | | | | | | | | | | | |
| | | 90 | | | | | | | | | | |
| | | 100 | 90 | | .07 | .007 | | | | | | |
| | | | | | | | | | | | | |
| | | 100 | | | | | | | | | | |
| | | 109 | 95 | | .001 | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

Average from
30 to 50 is
.28% Cu,
.005 Mo.

PROJECT B. S. & K.

| | | |
|------------------------------------|----------------|-----------------|
| Coörd. : N | BEARING | HOLE N° RDH 309 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 22 Mar. 66 COMPL. 22 Mar 66' | | DEPTH 110' |

[illegible]

ASSAY—GEOLOGY COMPOSITE DRILL LOG

PROJECT Atlas

| | | |
|--------------|--------------|--------------|
| Coörd. : N | BEARING Vert | HOLE N° 302 |
| E | INCL. | COLLAR ELEV. |
| START COMPL. | | DEPTH 151 |

[illegible]

LOGGED BY _____ DATE _____

| | | |
|------------------------------------|----------------|-----------------|
| Coord. : N | BEARING | HOLE N° RDH 310 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 22 Mar. 66 COMPL. 22 Mar. 66 | | DEPTH 140' |

[illegible]

PROJECT B. S. & K.

| | | |
|------------------------------------|----------------|-----------------|
| Coörd. : N | BEARING | HOLE N° RDH 311 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 23 Mar.66' COMPL. 23 Mar.66' | | DEPTH 150' |

[illegible]

LOGGED BY BLW DATE 23 Mar. 66

ASSAY-GEOLOGY COMPOSITE DRILL LOG

FORM # 355
REVISED 10-62

Sheet 1 of 3

PROJECT Alber Mine, B.S. & M. Co., B.S. & M. Co.

| | | |
|--------------|----------------------|---------------------|
| Coord. : N | BEARING | HOLE NO. <u>500</u> |
| E | INCL. | COLLAR ELEV. |
| START 8-6-65 | COMPL. <u>8-8-65</u> | DEPTH <u>125</u> |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % Fe | % S | % Zn | % Pb | % Ag | % Au | % Ni | % Co | % Mn | % Al | % Si | % Ca | % Mg | % K | % Na | % H ₂ O | % O ₂ | % EQUV. | GROUPING—RMKS. |
|---|-------|-------|------|-----|------|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|-----|------|--------------------|------------------|---------|----------------|
| 0-90 Dacite Porphyry, Brown fine grained, soft, porphyritic, highly fractured, numerous qtz veinlets, Arg. Alteration. Original Sulfide was 1.3%, entirely in fractures. Core very badly broken. No green or blue copper minerals visible, though entire section is oxide. | | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | | 10 | 56 | | .08 | .002 | | | | | | | | | | | | | | | | | | | |
| | | 20 | 70 | | .05 | .002 | | | | | | | | | | | | | | | | | | | |
| | | 30 | 68 | | .09 | .002 | | | | | | | | | | | | | | | | | | | |
| | | 40 | 76 | | .14 | .001 | | | | | | | | | | | | | | | | | | | |
| | | 50 | 86 | | .14 | .008 | | | | | | | | | | | | | | | | | | | |
| | | 60 | 90 | | .16 | .004 | | | | | | | | | | | | | | | | | | | |
| | | 70 | 86 | | .15 | .009 | | | | | | | | | | | | | | | | | | | |
| | | 80 | 85 | | .16 | .006 | | | | | | | | | | | | | | | | | | | |
| | | 90 | 87 | | .17 | .009 | | | | | | | | | | | | | | | | | | | |
| 90-95 Dacite Porphyry, Green Mixed oxide and sulfide. Soft, porphyritic, strong arg. Alt., numerous qtz veinlets. Copper occurs as oxide and chalcocite. | | 90 | 90 | | .94 | .025 | | | | | | | | | | | | | | | | | | | |
| | | 95 | 86 | | .79 | .015 | | | | | | | | | | | | | | | | | | | |
| | | 100 | 83 | | .51 | .010 | | | | | | | | | | | | | | | | | | | |
| | | 105 | 80 | | .60 | .007 | | | | | | | | | | | | | | | | | | | |
| 95-125 Dacite Porphyry Supergene zone. Green, soft Copper occurs as chalcocite. | | 110 | 87 | | .34 | .008 | | | | | | | | | | | | | | | | | | | |
| | | 115 | 80 | | .12 | .011 | | | | | | | | | | | | | | | | | | | |
| | | 120 | 88 | | .11 | .013 | | | | | | | | | | | | | | | | | | | |

Average
oxide
is
.13 Cu
.005 Mo
for
90 feet

oxide
Mixed
Supergene
Sulfide

Average grade of
Mixed and supergene
is 35 feet of
.47 Cu
.013 Mo

Total Sulfide is 1.3%
Iron occurs as pyrite.

LOGGED BY V. F. H. DATE 8-8-65

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 2

PROJECT Atlas Mine, BS&K Mining Co., New York Claim

| | | | |
|--------------|----------------|------|--------------|
| Coord. : N | BEARING | Vert | HOLE N° |
| E | INCL. | Vort | COLLAR ELEV. |
| START 8-9-65 | COMPL. 8-10-65 | | DEPTH 203 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | % | % | % | % | EQUV. | GROUPING — RMKS. |
|---|-------|-------|------|-----|------|------|---|---|---|---|---|---|-------|------------------|
| <u>0-100' Dacite Porphyry -</u> <u>Brown - oxide zone</u> Soft, strong Argillic Alt., Porphyritic, fine grained. Original Sulfide was ± 4%, 90% in fractures, 10% diss. Trace sericite lining fractures. Qtz veinlets rare. Some green Cu stain visible. | | | | | | | | | | | | | | |
| | 10 | 20 | | | .12 | .006 | | | | | | | | 0'-30' |
| | | | | | | | | | | | | | | .16 Cu |
| | | | | | | | | | | | | | | .09 Mo |
| | 10 | | | | | | | | | | | | | |
| | 20 | 50 | | | .20 | .012 | | | | | | | | |
| | | | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | | |
| | 30 | 67 | | | .17 | .010 | | | | | | | | |
| | | | | | | | | | | | | | | |
| <u>100-110 Dacite Porphyry</u> <u>Mixed Oxide and Sulfide</u> Brown, Soft, fine grained, Porphyritic, Wk sericite and strong Arg. Alt. Copper occurs as Malachite and chalcocite, Core badly shattered. | 30 | | | | | | | | | | | | | 30'-50' |
| | 40 | 80 | | | .18 | .009 | | | | | | | | .17 Cu |
| | | | | | | | | | | | | | | .011 Mo |
| | | | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | | |
| | 50 | 85 | | | .16 | .014 | | | | | | | | |
| | | | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | | 50-80 |
| | 60 | 80 | | | .11 | .016 | | | | | | | | .12 Cu |
| | | | | | | | | | | | | | | .016 Mo |
| <u>110-125 Dacite Porphyry</u> <u>Supergene Sulfide zone</u> Dark gray, soft, weak Sericite and strong Arg. Alt. Copper occurs as chalcocite with weak pyrite, mostly in seams. Core badly broken. | 60 | | | | | | | | | | | | | |
| | 70 | 86 | | | .12 | .016 | | | | | | | | |
| | | | | | | | | | | | | | | |
| | 70 | | | | | | | | | | | | | |
| | 80 | 90 | | | .13 | .017 | | | | | | | | |
| | | | | | | | | | | | | | | |
| | 80 | | | | | | | | | | | | | 80'-100' |
| | 90 | 87 | | | .24 | .010 | | | | | | | | .17 Cu |
| | | | | | | | | | | | | | | .009 Mo |
| | 90 | | | | | | | | | | | | | |
| <u>110-125 Dacite Porphyry</u> <u>Supergene Sulfide zone</u> Dark gray, soft, weak Sericite and strong Arg. Alt. Copper occurs as chalcocite with weak pyrite, mostly in seams. Core badly broken. | 100 | | | | | | | | | | | | | |
| | 105 | 90 | | | .15 | .013 | | | | | | | | |
| | 105 | | | | | | | | | | | | | |
| | 110 | 35 | | | 1.31 | .040 | | | | | | | | 100'-125' |
| | 110 | | | | | | | | | | | | | .83 Cu |
| | 115 | 36 | | | 1.74 | .019 | | | | | | | | .018 Mo |
| | 115 | | | | | | | | | | | | | |
| | 120 | 82 | | | .49 | .008 | | | | | | | | |
| | 120 | | | | | | | | | | | | | |
| | 125 | 37 | | | .45 | .013 | | | | | | | | |

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

PROJECT Atlas Mine

| | | |
|------------|---------|--------------|
| Coord. : N | BEARING | HOLE N° 303 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH 203 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | % | % | % | % | EQUIV | GROUPING — RMKS. |
|--|-------|-------|------|-----|------|------|---|---|---|---|---|---|-------|------------------|
| 125-206 Dacite Porphyry Supergene zone as above | | 125 | | | | | | | | | | | | |
| | | 130 | 80 | | 1.21 | .005 | | | | | | | | 125'-150' |
| | | 130 | | | | | | | | | | | | .74 |
| | | 135 | 90 | | .70 | .003 | | | | | | | | .009 Mo |
| | | 135 | | | | | | | | | | | | |
| | | 140 | 85 | | .65 | .009 | | | | | | | | |
| | | 140 | | | | | | | | | | | | |
| | | 145 | 70 | | .39 | .015 | | | | | | | | |
| | | 145 | | | | | | | | | | | | |
| | | 150 | 65 | | .76 | .009 | | | | | | | | |
| | | 150 | | | | | | | | | | | | |
| | | 155 | 56 | | .47 | .013 | | | | | | | | 150'-175' |
| | | 155 | | | | | | | | | | | | .49 Cu |
| | | 160 | 72 | | .38 | .043 | | | | | | | | .027 Mo |
| | | 160 | | | | | | | | | | | | |
| | | 165 | 80 | | .36 | .024 | | | | | | | | |
| | | 165 | | | | | | | | | | | | |
| | | 170 | 85 | | .51 | .040 | | | | | | | | |
| | | 170 | | | | | | | | | | | | |
| | | 175 | 86 | | .72 | .014 | | | | | | | | |
| | | 175 | | | | | | | | | | | | |
| | | 180 | 85 | | .50 | .010 | | | | | | | | 175'-200' |
| | | 180 | | | | | | | | | | | | .69 Cu |
| | | 185 | 85 | | .57 | .052 | | | | | | | | .018 Mo |
| | | 185 | | | | | | | | | | | | |
| | | 190 | 80 | | .88 | .011 | | | | | | | | |
| | | 190 | | | | | | | | | | | | |
| | | 195 | 90 | | 1.12 | .013 | | | | | | | | |
| | | 195 | | | | | | | | | | | | |
| | | 200 | 92 | | .40 | .004 | | | | | | | | |
| | | 200 | | | | | | | | | | | | |
| | | 203 | 85 | | .19 | .006 | | | | | | | | |
| End of hole | | | | | | | | | | | | | | |
| Average Mo for Hole is 0.0153 Mo. | | | | | | | | | | | | | | |
| Average from 105 to 200' is .72% Cu | | | | | | | | | | | | | | |
| .018 Mo | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | |
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LOGGED BY VFH DATE 8-10-65

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 1

PROJECT. B. S. & K.

| | | |
|------------------------------------|----------------|-----------------|
| Coord. : N | BEARING | HOLE N° RDH 309 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 22 Mar. 66 COMPL. 22 Mar 66' | | DEPTH 110' |

[illegible]

LOGGED BY BLW DATE 22 Mar. 66

PROJECT B. S. & K.

| | | |
|----------------------------------|----------------|-----------------|
| Coörd. : N | BEARING | HOLE N° RDH 309 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 22 Mar.66COMPL. 22 Mar 66! | | DEPTH 110' |

[illegible]

LOGGED BY BLW DATE 22 Mar. 66

DUVAL CORPORATION
COPPER DIVISION — ESPERANZA PROPERTY
SAHUARITA, ARIZONA

CERTIFICATE OF ASSAY

April 13, 1966

B.S. and K. - Screen Fractions

| BEAKER NOS. | MARKS, ETC. | SAMPLE | % TOTAL | % A-S | | | |
|----------------|---------------------------|--------|---------|-------|--|--|--|
| | | GMS. | Cu | Cu | | | |
| | RDH-309 20'-30' (+10 Mesh | | .042 | .019 | | | |
| | +20 | | .042 | .019 | | | |
| | HEAD SAMPLE +35 | | .055 | .023 | | | |
| | DISCREPECY +48 | | .049 | .026 | | | |
| | +65 | | .049 | .030 | | | |
| | +100 | | .054 | .033 | | | |
| | -100 | | .084 | .060 | | | |
| | 70'-80' +10 | | .253 | .064 | | | |
| | +20 | | .330 | .074 | | | |
| | +35 | | .382 | .083 | | | |
| | +48 | | .467 | .095 | | | |
| | +65 | | .550 | .122 | | | |
| | +100 | | .567 | .161 | | | |
| | -100 | | .637 | .190 | | | |
| | 310-120'-130' +10 | | .192 | .009 | | | |
| | +20 | | .188 | .007 | | | |
| | +35 | | .200 | .008 | | | |
| | +48 | | .218 | .009 | | | |
| | +65 | | .214 | .011 | | | |
| | +100 | | .217 | .013 | | | |
| | -100 | | .327 | .022 | | | |
| | 311-90'-100' +10 Regular | | .170 | .023 | | | |
| | +20 | | .164 | .023 | | | |
| | +35 | | .152 | .023 | | | |
| | +48 | | .155 | .027 | | | |
| | +65 | | .178 | .030 | | | |
| | +100 | | .217 | .031 | | | |
| | -100 | | .455 | .072 | | | |
| | +200 Fines | | .202 | .026 | | | |
| | +325 | | .411 | .046 | | | |
| | +400 | | .673 | .060 | | | |
| | -400 | | .537 | .097 | | | |

7

April 1, 1966

148

ASSAY-GEOLOGY COMPOSITE DRILL LOG

PROJECT Atlas Mine, BSEK Mining Co., BSEK 163 Claim

Sheet 1 of 3

| | | |
|--------------|--------------------|-----------------------|
| Coörd. : N | BEARING <u>105</u> | HOLE NO. <u>300</u> |
| E | INCL. <u>10</u> | COLLAR ELEV. |
| START 8-6-65 | COMPL. 8-8-65 | DEPTH <u>127</u> feet |
| No core size | | |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING—RMKS. |
|---|-------|------------|------|-----|------|------|---|---|-----|-----|---|-------|----------------|
| 0-90 Dacite Porphyry, Brown fine grained, soft, porphyritic, highly fractured, numerous qtz veinlets, Arg. Alteration, Original Sulfide was \pm 3%, entirely in fractures, Core very badly broken, No green or blue copper minerals visible, though entire section is oxide. | | 0 10 | 56 | | .08 | .002 | | | | | | | |
| | | 10 20 | 70 | | .08 | .002 | | | | | | | |
| | | 20 30 | 68 | | .09 | .002 | | | | | | | |
| | | 30 40 | 76 | | .14 | .001 | | | | | | | |
| | | 40 50 | 86 | | .14 | .008 | | | | | | | |
| | | 50 60 | 90 | | .16 | .004 | | | | | | | |
| | | 60 70 | 86 | | .15 | .009 | | | | | | | |
| | | 70 80 | 85 | | .16 | .006 | | | | | | | |
| | | 80 90 | 87 | | .17 | .009 | | | | | | | |
| | | 90 95 | 90 | | .94 | .025 | | | | | | | |
| 90-95 Dacite Porphyry, Gray Mixed oxide and sulfide. Soft, porphyritic, strong arg. Alt., numerous qtz veinlets. Copper occurs as oxide and chalcocite. | | 95 100 | 86 | | .79 | .015 | | | | | | | |
| | | 100 105 | 83 | | .51 | .010 | | | | | | | |
| | | 105 110 | 80 | | .60 | .009 | | | | | | | |
| | | 110 115 | 87 | | .24 | .008 | | | | | | | |
| 95-125 Dacite Porphyry Supergene zone. Gray, soft copper occurs as chalcocite. | | 115 120 | 80 | | .12 | .011 | | | | | | | |
| | | 120 125 | 88 | | .11 | .013 | | | | | | | |

Average
oxide
is
.13 Cu
.005 Mo
for
90 feet

oxide
Mixed

Supergene
Sulfide

Average grade of
Mixed and supergene
is 35 feet of

.47 Cu
.013 Mo

Total Sulfide is \pm 3%
Iron occurs as pyrite.

LOGGED BY V.F.H. DATE 8-8-65

ASSAY-GEOLOGY COMPOSITE DRILL LOG

FORM # 355
REVISED 10-62

Sheet 2 of 2

PROJECT _____

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N° |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz | oz | % | EQUV. | GROUPING — RMKS. |
|--|-------|-------|------|-----|------|------|---|---|----|----|---|-------|--|
| 125-170 Dacite Porphyry Hypogene zone, Gray, soft, porphyritic. Copper occurs in seams and veinlets as crushed chalcopryite, with pyrite. Numerous qtz veinlets. Much pyrite in seams is crushed and black. Total sulfide is 4%. Sulfide is 90% in seams, 10% in disc. Wk ser. on seams. | | 125 | | | | | | | | | | | Average Hypogene grade is .18 Cu .015 Mo |
| | | 130 | 82 | | .18 | .010 | | | | | | | |
| | | 135 | 85 | | .14 | .028 | | | | | | | |
| | | 140 | 80 | | .12 | .011 | | | | | | | |
| | | 145 | 76 | | .11 | .011 | | | | | | | |
| | | 150 | 70 | | .11 | .010 | | | | | | | |
| | | 155 | 75 | | .12 | .015 | | | | | | | |
| | | 160 | 80 | | .16 | .016 | | | | | | | |
| | | 165 | 86 | | .12 | .008 | | | | | | | |
| | | 170 | 70 | | .15 | .031 | | | | | | | |
| 170-182 Dacite Porphyry, Gray Hypogene Zone Soft, Argillic Alt. porphyritic. Copper occurs as chalcopryite with pyrite Total sulfide is 3%. Sulf. is 80% in seams and gangues and 20% as disc. Many qtz veinlets. Pyrite is frequently crushed black. Wk sericite on seams, with Molybdenite visible in quartz veinlets. Largest veinlet is 2" qtz-pyrite - chalcopryite at 177'. This veinlet also has traces of chalcocite. | | 175 | 75 | | .30 | .011 | | | | | | | |
| | | 182 | 76 | | .62 | .017 | | | | | | | |
| | | | | | | | | | | | | | |
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LOGGED BY W. F. Hall DATE 8-8-65

| | | |
|-------------|------------|---------------|
| BEARING | Coörd. : N | HOLE NO 300-A |
| INCL. VERT. | E | COLLAR ELEV. |
| 057K = 3 | | DEPTH 400' |

| DESCRIPTION | Geol | Asy | INT | CR | % Cu | % As Cu | % Mo | % As Mo | % EQIV | SAMPLE CMC | REC'y % | GROUPING—RMKS. |
|--|------|-----|-----|----|------|---------|------|---------|--------|------------|---------|----------------|
| 182'-323': Rock: Dacite porphyry made of rounded quartz eyes and pinkish feldspars in gray siliceous matrix. R. Alt.: Thin flat qtz veining w/ rims of secondary orthoclase. Moderate argillization along steep joints. Min. Chalcopyrite & moly, in grains along qtz veins. Minor diss. sulfides | | | | | 182 | | | | | | | |
| | | | | | 190 | +1000 | .14 | +300 | .045 | | 1 | 69.6 |
| | | | | | 190 | | | | | | | |
| | | | | | 200 | +1000 | .15 | 165 | .016 | | 2 | 82.8 |
| | | | | | 200 | | | | | | | |
| | | | | | 210 | 1000 | .10 | 114 | .011 | | 3 | 91.6 |
| | | | | | 210 | | | | | | | |
| | | | | | 220 | +1000 | .11 | 238 | .024 | | 4 | 80.4 |
| | | | | | 220 | | | | | | | |
| | | | | | 230 | +1000 | .14 | 245 | .024 | | 5 | 79.2 |
| | | | | | 230 | | | | | | | |
| | | | | | 240 | +1000 | .12 | 171 | .017 | | 6 | 42.3 |
| 323-340: strongly altered monzonite(?). Abund chlorite after biotite. Some fine diss. sulfides. Very poor core recov. | | | | | 240 | | | | | | | |
| | | | | | 250 | +1000 | .34 | +300 | .042 | | 7 | 46.1 |
| | | | | | 250 | | | | | | | |
| | | | | | 260 | +1000 | .20 | 193 | .019 | | 8 | 23.1 |
| | | | | | 260 | | | | | | | |
| | | | | | 270 | +1000 | .14 | 205 | .020 | | 9 | 14.1 |
| | | | | | 270 | | | | | | | |
| | | | | | 280 | +1000 | .16 | 101 | .010 | | 10 | 21.2 |
| | | | | | 280 | | | | | | | |
| | | | | | 290 | +1000 | .17 | 214 | .021 | | 11 | 25.6 |
| | | | | | 290 | | | | | | | |
| | | | | | 300 | +1000 | .24 | 174 | .017 | | 12 | 54.1 |
| 340-400: Dacite porphyry as 182-323', but chlorite is present At 348' about 1" Chalcopyrite vein | | | | | 300 | | | | | | | |
| | | | | | 310 | +1000 | .31 | 139 | .014 | | 13 | 21.6 |
| | | | | | 310 | | | | | | | |
| | | | | | 320 | +1000 | .16 | +300 | .034 | | 14 | 50.0 |
| | | | | | 320 | | | | | | | |
| | | | | | 330 | +1000 | .20 | 277 | .028 | | 15 | 18.4 |
| | | | | | 330 | | | | | | | |
| | | | | | 340 | +1000 | .28 | 41 | .004 | | 16 | 44.5 |
| | | | | | 340 | | | | | | | |
| | | | | | 350 | +1000 | .91 | +300 | .032 | | 17 | 71.3 |
| | | | | | 350 | | | | | | | |
| | | | | | 360 | +1000 | .37 | +300 | .044 | | 18 | 61.3 |
| AVERAGE REC'y Eqm. Cu-Mo | | | | | 360 | | | | | | | |
| | | | | | 370 | +1000 | .21 | 282 | .028 | | 19 | 92.1 |
| | | | | | 370 | | | | | | | |
| | | | | | 380 | +1000 | .18 | 272 | .027 | | 20 | 94.0 |
| | | | | | 380 | | | | | | | |
| | | | | | 390 | +1000 | .15 | 178 | .018 | | 21 | 80.5 |
| | | | | | 390 | | | | | | | |
| | | | | | 400 | +1000 | .20 | 256 | .026 | | 22 | 95.2 |
| | | | | | 400 | | | | | | | |
| | | | | | | | .227 | | .024 | | 56.8 | |
| | | | | | | | .312 | | | | | |

CERTIFICATE OF ASSAY

BS&K

FORM 311 M.L.

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 2

PROJECT Atlas Mine, BS&K Mining Co., New York Claim

| | | | |
|--------------|----------------|------|--------------|
| Coörd. : N | BEARING | Vert | HOLE N° |
| E | INCL. | Vert | COLLAR ELEV. |
| START 8-9-65 | COMPL. 8-10-65 | | DEPTH 206 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING—RMKS. |
|--|-------|-------|------|-----|------|------|---|---|-----|-----|---|-------|----------------|
| 0-100 Dacite Porphyry - Brown - oxide zone Soft, strong Argillic Alt., Porphyritic, fine grained. Original Sulfide was $\frac{1}{2}$ 4%, 90% in fractures, 10% diss. Trace sericite lining fractures. Qtz veinlets rare. Some green Cu stain visible. | | | | | | | | | | | | | |
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| 100-110 Dacite Porphyry Mixed Oxide and Sulfide Brown, Soft, fine grained, Porphyritic, Wk sericite and strong Arg. Alt. Copper occurs as Malachite and chalcocite, Core badly shattered. | | | | | | | | | | | | | |
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| 110-125 Dacite Porphyry Supergene Sulfide zone Dark gray, soft, weak Sericite and strong Arg. Alt. Copper occurs as chalcocite with weak pyrite, mostly in seams. Core badly broken. | | | | | | | | | | | | | |
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ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

PROJECT Atlas Mine

| | | |
|------------|---------|--------------------|
| Coörd. : N | BEARING | HOLE N° <u>300</u> |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH <u>206</u> |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | % | % | EQUV. | GROUPING — RMKS. |
|--|-------|-------------------------------------|------|-----|------|------|---|---|---|---|-------|------------------|
| <u>125-206 Dacite Porphyry</u> <u>Supergene zone as above</u> | | 125 | | | | | | | | | | |
| | | 130 | 80 | | 1.21 | .006 | | | | | | 125'-150' |
| | | 135 | 90 | | .70 | .008 | | | | | | .74 |
| | | 140 | 85 | | .65 | .009 | | | | | | .009 Mo |
| | | 145 | 70 | | .39 | .015 | | | | | | |
| | | 150 | 65 | | .76 | .009 | | | | | | |
| | | 155 | 56 | | .47 | .013 | | | | | | 150'-175' |
| | | 160 | 72 | | .38 | .043 | | | | | | .49 Cu |
| | | 165 | 80 | | .36 | .024 | | | | | | .027 Mo |
| | | 170 | 85 | | .51 | .040 | | | | | | |
| | | 175 | 86 | | .72 | .014 | | | | | | |
| | | 180 | 85 | | .50 | .010 | | | | | | 175'-200' |
| | | 185 | 85 | | .57 | .052 | | | | | | .69 Cu |
| | | 190 | 80 | | .88 | .011 | | | | | | .018 Mo |
| | | 195 | 90 | | 1.12 | .013 | | | | | | |
| | | 200 | 92 | | .40 | .004 | | | | | | |
| | | 206 | 85 | | .19 | .006 | | | | | | |
| | | End of hole | | | | | | | | | | |
| | | Average Mo for Hole is 0.0158 Mo. | | | | | | | | | | |
| | | Average from 105 to 200' is .72% Cu | | | | | | | | | | |
| | | .018 Mo | | | | | | | | | | |
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DUVAL CORPORATION
CO. PER DIVISION — ESPERANZA PROPERTY —
SAHUARITA, ARIZONA

CERTIFICATE OF ASSAY

August 13, 1965

BS&K Drills

| BEAKER NOS. | MARKS, ETC. | SAMPLE | % Total | % Mo | | | | |
|----------------|-------------|--------|---------|------|--|-----------|--|--|
| | | GMS. | Cu | | | | | |
| | # 301-0-10' | | .12 | .006 | | | | |
| | 20' | | .20 | .012 | | | | |
| | 30' | | .17 | .010 | | | | |
| | 40' | | .18 | .009 | | | | |
| | 50' | | .16 | .014 | | | | |
| | 60' | | .11 | .016 | | | | |
| | 70' | | .12 | .016 | | | | |
| | 80' | | .13 | .017 | | | | |
| | 90' | | .24 | .010 | | | | |
| | 100' | | .10 | .009 | | | | |
| | 105' | | .15 | .013 | | | | |
| | 110' | | 1.31 | .040 | | | | |
| | 115' | | 1.74 | .019 | | | | |
| | 120' | | .49 | .008 | | | | |
| | 125' | | .45 | .013 | | | | |
| | 130' | | 1.21 | .006 | | | | |
| | 135' | | .70 | .008 | | .72 % Cu, | | |
| | 140' | | .65 | .009 | | .018 Mo | | |
| | 145' | | .39 | .015 | | | | |
| | 150' | | .76 | .009 | | | | |
| | 155' | | .47 | .013 | | | | |
| | 160' | | .38 | .043 | | | | |
| | 165' | | .36 | .024 | | | | |
| | 170' | | .51 | .040 | | | | |
| | 175' | | .72 | .014 | | | | |
| | 180' | | .50 | .010 | | | | |
| | 185' | | .57 | .052 | | | | |
| | 190' | | .88 | .011 | | | | |
| | 195' | | 1.12 | .013 | | | | |
| | 200' | | .40 | .004 | | | | |
| | 206' | | .19 | .006 | | | | |

AEB

Samples collected from BSEK
Hole 302

| | | |
|---------|--------|--------|
| 95-100 | 0.71 % | 80 ppm |
| 100-105 | 0.70 % | 83 |
| 105-110 | 0.76 | 65 |
| 110-115 | 0.95 | 169 |
| 115-120 | 0.67 | 70 |
| 120-125 | 0.40 | 41 |
| 125-130 | 0.50 | 105 |
| 130-135 | 0.28 | 149 |

Hole 300

| | | | | | |
|---------|------|---------|-----------|--------------------|--------------------|
| 1AK-300 | 0.38 | 117 | 170'-175' | ^{Ca} 0.30 | ^{Mo} .011 |
| 2AK-300 | 0.78 | 0.035 % | 175-182 | 0.62 | .017 |

| BS&K | Hole | 302 | OUT Sample | BSK |
|----------------|------|-----|------------|------|
| samples (.016) | 95 | 100 | .71 | .66 |
| (.005) | 100 | 105 | .70 | .61 |
| (.013) | 105 | 110 | .76 | .44 |
| (.006) | 110 | 115 | .95 | .57 |
| (.004) | 115 | 120 | .67 | .54 |
| (.005) | 120 | 125 | .40 | .32 |
| (.009) | 125 | 130 | .50 | .43 |
| (.009) | 130 | 135 | .28 | .40 |
| ↑ | | | | ↑ |
| BS&K | | | | BS&K |
| no | | | | on |

Sheet of

| | | |
|---------|------------|-------------------|
| BEARING | Coörd. : N | HOLE N° BS4 K 301 |
| INCL. | E | COLLAR ELEV. |
| | | DEPTH |

[illegible]

Sheet of

HOLE #
312

[illegible]

Sheet of

| DESCRIPTION | Geo | ASY | INT. | CR | % Cu | % As Cu | % Mo | % AsMo | % EQIV | | GROUPING - RMKS. |
|--|-----|-----|------|----|-------|---------|-------|--------|--------|--|------------------|
| | | | | | | | | | | | |
| 92 (could not find boxes 1 thru 7) Pink gr - greenish darker per w/ thin abund irreg fracs filled w/ brn limonite (from sulf). Alt. mod to strong arg. some felds seams replac by epidote. Thin mm) barren qtz vnits are present. Toward bottom some pale green stains poss from CuCO ₃ . The core is broken in big arg frags (good core recov.?) | | | | | | | | | | | |
| 95 core from 95-100 is missing) pink pyroclastic felds per. Alt. mod arg. w/ diss calcocite Some covellite? and also coating along fracs (~ 2% total sulfides?) core strongly fractured w/ poss. low core recov. (All) core is full of mud never washed, how could be logged? thin qtz-barren vnits (2mm thick. Chalcopy is present but very lean below 125' 130' poss. fault zone The pinkish color could be K-felds alteration? | | | | | | | | | | | |
| 182: Gray clastic per w/ diss py + chalcopy. Some conc. along qtz veins + molyb. The estimated visual grade will be about 0.3% Cu. | | | | | | | | | | | |
| Sample 1-AK-300 = 170-175 2-AK-300 = 175-182 | | | | | | | | | | | |
| | | | | | B.S.K | HMC | | BSK | | | |
| | | | | | Cu | | Mo | | | | |
| | | | | | 0.30 | 0.38 | 0.011 | 0.011 | | | |
| | | | | | 0.62 | 0.78 | 0.017 | 0.035 | | | |

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet ___ of ___

PROJECT Atlas Mine, BS&K Mining Co., Hole for BS&K No. 1

| | | |
|---------------------------------|------------------|--------------|
| Coörd. : N | BEARING Vertical | HOLE N° 306 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 8-21-65 COMPL. 8-22-65 | | DEPTH 100 |

[illegible]

LOGGED BY VFH DATE 8-23-65

ASSAY-GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 7

PROJECT P S & K - Atlas Mine

| | | |
|----------------------|--------------|--------------|
| Coörd. : N | BEARING Vert | HOLE N° 312 |
| E | INCL. Vert | COLLAR ELEV. |
| START 6-25-66 COMPL. | | DEPTH 1532' |

| DESCRIPTION | Grain | Assay | INT. | C/R | % Cu | % V | % S | % Fe | % Zn | % Pb | % Ag | % Au | % Ni | % Co | % Mn | % Mg | % Ca | % Na | % K | % Ti | % Al | % Si | % O ₂ | % EQUV | GROUPING - RMKS. |
|--|---------|-------|------|------|------|-----|-----|------|------|------|------|------|------|------|------|------|------|------|-----|------|------|------|------------------|--------|------------------|
| 0-101' <u>Dacite</u> , Tan, Porphyritic. Oxidized, with weak argill. alteration. No siliceous, or silica. Est. orig. sulfide to be 4% Pyrite, none at limonite. No recovery to 101 feet. | 0-10 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 10-20 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 20 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 30 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 30-40 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 40 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 50 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 50-60 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 60 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 70 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| 101-110' <u>Dacite</u> , Gray, Porphyritic. Supergene blanket, with weak argillization. No Siliceous, or silica. Core well jointed with some pyrite in joints. Est 4% Py in rock, with 3% in joints and 1% as diss. Pyrite has supergene Cu coating. | 101 | 0 | | | | | | | | | | | | | | | | | | | | | | | |
| | 101-110 | 80 | .10 | Nil | | | | | | | | | | | | | | | | | | | | | |
| | 110 | 80 | .09 | .003 | | | | | | | | | | | | | | | | | | | | | |
| | 120 | 80 | .04 | Tr | | | | | | | | | | | | | | | | | | | | | |
| | 130 | 80 | .04 | Tr | | | | | | | | | | | | | | | | | | | | | |
| | 130-140 | 95 | .02 | Tr | | | | | | | | | | | | | | | | | | | | | |
| | 140 | 90 | .06 | Tr | | | | | | | | | | | | | | | | | | | | | |
| | 150 | 80 | .03 | .002 | | | | | | | | | | | | | | | | | | | | | |
| | 160 | 75 | .04 | .001 | | | | | | | | | | | | | | | | | | | | | |
| | 170 | 60 | .04 | Tr | | | | | | | | | | | | | | | | | | | | | |
| 110-250' <u>Dacite</u> , white, porphyritic. Hypogene zone, No siliceous or silica. Est 4% Pyrite, mostly in joints. No visible chalcophyll or molybdenite. No biotite or orthoclase. | 180 | 80 | .03 | Tr | | | | | | | | | | | | | | | | | | | | | |
| | 190 | 87 | .04 | Nil | | | | | | | | | | | | | | | | | | | | | |
| | 200 | 90 | .07 | Tr | | | | | | | | | | | | | | | | | | | | | |
| | 210 | 95 | .06 | Tr | | | | | | | | | | | | | | | | | | | | | |
| | 220 | 90 | .03 | Tr | | | | | | | | | | | | | | | | | | | | | |
| | 230 | 95 | .06 | Nil | | | | | | | | | | | | | | | | | | | | | |
| | 240 | 90 | .02 | Tr | | | | | | | | | | | | | | | | | | | | | |
| | 250 | | | | | | | | | | | | | | | | | | | | | | | | |
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LOGGED BY VFH DATE 7-4-66

PROJECT ESK - Atlas Stone

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N° |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| DESCRIPTION | Core | Assay | INT. | C/R | % Cu | % Pb | % Zn | % Fe | oz | oz | % EQUV | GROUPING — RMKS. |
|---|------|-------|------|------|------|------|------|------|----|----|--------|------------------|
| | | | | | | | | | | | | |
| 250-358 <u>Diorite</u> , gray, Porphyritic; Hypogene sulfide zone. Core well jointed, but no sericite, biotite, orthoclase or silica. Est 3% Pyrite, nearly all on joints. Trace chalcopyrite. | 250 | | | | | | | | | | | |
| | 260 | 80 | .03 | Nil | | | | | | | | |
| | 260 | | | | | | | | | | | |
| | 270 | 70 | .02 | Tr | | | | | | | | |
| | 270 | 80 | .01 | Tr | | | | | | | | |
| | 280 | | | | | | | | | | | |
| | 290 | 70 | .02 | Tr | | | | | | | | |
| | 290 | | | | | | | | | | | |
| | 300 | 85 | .01 | .001 | | | | | | | | |
| | 300 | | | | | | | | | | | |
| | 310 | 75 | .02 | Tr | | | | | | | | |
| | 310 | | | | | | | | | | | |
| | 320 | 85 | .01 | Tr | | | | | | | | |
| | 320 | | | | | | | | | | | |
| | 330 | 70 | .01 | Tr | | | | | | | | |
| | 330 | | | | | | | | | | | |
| 358-455 <u>Quartz Monzonite Por.</u> , Gray, Medium Grained, hypogene zone, practically no alteration. Biotite is fresh. Pyrite is 3% of rock, occurring on fractures and in diss. (50% & 50%). Cpy and MoS ₂ occur rarely on fractures. | 350 | | | | | | | | | | | |
| | 360 | 70 | .12 | Nil | | | | | | | | |
| | 360 | | | | | | | | | | | |
| | 370 | 85 | .07 | Nil | | | | | | | | |
| | 370 | | | | | | | | | | | |
| | 380 | 80 | .10 | Nil | | | | | | | | |
| | 380 | | | | | | | | | | | |
| | 390 | 85 | .08 | Tr | | | | | | | | |
| | 390 | | | | | | | | | | | |
| | 400 | 90 | .05 | .001 | | | | | | | | |
| | 400 | | | | | | | | | | | |
| | 410 | 75 | .15 | .002 | | | | | | | | |
| | 410 | | | | | | | | | | | |
| | 420 | 95 | .02 | Nil | | | | | | | | |
| | 420 | | | | | | | | | | | |
| | 430 | 77 | .05 | .001 | | | | | | | | |
| 455-477 <u>Dacite</u> , white, porphyritic, weak argillie alteration, fine grained, well jointed, but no Ser, Or, silica or bio. Est 3% Py. No Cpy. | 430 | | | | | | | | | | | |
| | 440 | 75 | .12 | .001 | | | | | | | | |
| | 440 | | | | | | | | | | | |
| | 450 | 97 | .08 | Tr | | | | | | | | |
| | 450 | | | | | | | | | | | |
| | 460 | 70 | .07 | .001 | | | | | | | | |
| | 460 | | | | | | | | | | | |
| | 470 | 70 | .10 | .006 | | | | | | | | |
| 477-500 <u>Qtz Mon. Porphyry</u> . Est. 4% sulfide, mostly Pyrite; half is in joints and half is in clits. No Arg., Ser. or silica. Tr | 470 | | | | | | | | | | | |
| | 480 | 85 | .06 | Tr | | | | | | | | |
| | 480 | | | | | | | | | | | |
| | 490 | 80 | .06 | Tr | | | | | | | | |
| | 490 | | | | | | | | | | | |
| 500 | 95 | .08 | .001 | | | | | | | | | |

LOGGED BY VEH DATE 7-10-88

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 3 of 7

PROJECT B S & K- Atlas Mine

| | | |
|------------|---------|--------------|
| Coord. : N | BEARING | HOLE NO. 312 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | % | % | % | % | GROUPING—RMKS. |
|--|-------|-------|------|------|------|------|---|---|---|---|---|---|----------------|
| 500-547 Qtz. Mon. Por. Gray, Med. Grained, hard, Est 2% Sulf., as disc. pyrite, No Arg. Ser. or silica. Rare Alunite or joints. Core well jointed | 500 | 90 | .24 | .001 | | | | | | | | | ✓ |
| | 510 | 87 | .23 | .001 | | | | | | | | | ✓ |
| | 520 | 90 | .15 | Tr | | | | | | | | | |
| | 530 | 94 | .08 | .002 | | | | | | | | | |
| | 540 | 75 | .10 | .004 | | | | | | | | | |
| | 550 | 90 | .11 | .006 | | | | | | | | | |
| 547-590 <u>Dacite</u> , Gray, hard, fresh appearing, with 3% total sulfide as pyrite. Core poorly jointed. | 560 | 95 | .05 | .002 | | | | | | | | | |
| | 570 | 77 | .07 | .003 | | | | | | | | | |
| | 580 | 98 | .15 | .001 | | | | | | | | | |
| | 590 | 75 | .28 | .004 | | | | | | | | | ✓ |
| | 600 | 90 | .14 | .001 | | | | | | | | | |
| | 610 | 95 | .14 | .002 | | | | | | | | | |
| 590-750 Qtz. Mon. Por. Gray, Soft, Medium grained, Est 3% total sulfide as pyrite, with 1/2 on joints and 1/2 on dissemination. Biotites fresh, but some some leaching in ground mass. | 620 | 98 | .12 | .001 | | | | | | | | | |
| | 630 | 75 | .12 | .004 | | | | | | | | | |
| | 640 | 90 | .14 | .004 | | | | | | | | | |
| | 650 | 95 | .12 | .001 | | | | | | | | | |
| | 660 | 77 | .16 | .001 | | | | | | | | | |
| | 670 | 98 | .25 | .001 | | | | | | | | | ✓ |
| | 680 | 95 | .32 | .001 | | | | | | | | | ✓ |
| | 690 | 70 | .25 | .001 | | | | | | | | | ✓ |
| | 700 | 72 | .11 | .001 | | | | | | | | | |
| | 710 | 15 | .11 | .003 | | | | | | | | | |
| | 720 | 10 | .10 | .001 | | | | | | | | | |
| | 730 | 95 | .09 | .001 | | | | | | | | | |
| | 740 | 11 | .09 | Tr | | | | | | | | | |
| | 750 | | | | | | | | | | | | |

LOGGED BY U. F. H. DATE 7-25-66

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 4 of 7

PROJECT B&K - Atlas Mine

| | | |
|------------|---------|--------------------|
| Coörd. : N | BEARING | HOLE NO <u>312</u> |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | % | % | % | EQUV. | GROUPING—RMKS. |
|---|-------|-------|------|-----|------|------|---|---|---|---|---|-------|--|
| 750-834 <u>Qtz. Mon. Por. Gray</u> hard, Medium grained, well jointed near base of intercept. Est. 2% pyrite in veinlets and dissemination. Some gypsum and anhydrite in joints. | | 760 | 87 | .17 | .006 | | | | | | | | Average from 760' - 880' .27% Cu |
| | | 760 | 85 | .20 | .001 | | | | | | | | |
| | | 770 | 90 | .14 | .001 | | | | | | | | |
| | | 780 | 90 | .20 | .001 | | | | | | | | |
| | | 790 | 75 | .14 | .005 | | | | | | | | |
| | | 800 | 75 | .14 | .001 | | | | | | | | |
| | | 810 | 90 | .40 | .001 | | | | | | | | |
| | | 820 | 95 | .10 | .002 | | | | | | | | |
| | | 830 | 95 | .02 | .002 | | | | | | | | |
| | | 840 | 75 | .04 | .001 | | | | | | | | |
| 834-894 <u>Silic. green fine</u> grained, hard. Mostly garnet- diopside facies. Some chalc. as veinlets near base of intercept. Est 2% sulfide. | | 850 | 87 | .07 | .003 | | | | | | | | |
| | | 860 | 85 | .12 | .001 | | | | | | | | |
| | | 870 | 90 | .68 | .001 | | | | | | | | |
| | | 880 | 90 | .12 | .005 | | | | | | | | |
| | | 890 | 95 | .10 | .005 | | | | | | | | |
| | | 900 | 97 | .12 | .004 | | | | | | | | |
| | | 910 | 95 | .11 | .001 | | | | | | | | |
| | | 920 | 93 | .10 | .001 | | | | | | | | |
| | | 930 | 90 | .10 | .001 | | | | | | | | |
| | | 940 | 85 | .10 | .001 | | | | | | | | |
| 894-974 <u>Qtz. Mon. Porp.</u> Crushed, Gray, Med. Grained soft. Est 2% pyrite, mostly in joints. Some gypsum in joints. | | 950 | 80 | .10 | .002 | | | | | | | | |
| | | 960 | 75 | .11 | .002 | | | | | | | | |
| | | 970 | 77 | .08 | .008 | | | | | | | | |
| | | 980 | 75 | .14 | .003 | | | | | | | | |
| | | 990 | 77 | .20 | .005 | | | | | | | | |
| | | 1000 | | | | | | | | | | | |
| 974-982 <u>Silic. green, hard</u> fine grained, as above. | | | | | | | | | | | | | |
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| 982-1000 <u>Qtz. Mon. Por. Gray</u> soft, crushed, Est 2% pyrite. | | | | | | | | | | | | | |
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LOGGED BY VEH DATE 8-1-66

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N° 317 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

[illegible]

LOGGED BY VFH DATE 8-8-66

PROJECT BS&K-Atlas Mine

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N°. 312 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

[illegible]

LOGGED BY 8.20-66 DATE VFH

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 7 of 7

PROJECT B.S. & - Atlas

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N° |
| E | INCL. | 312 |
| START | COMPL. | COLLAR ELEV. |
| | | DEPTH |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING—RMKS. |
|--|-------|-------|------|------|------|------|---|---|-----|-----|---|-------|----------------|
| 1500-1532 Dolomite fine grained, banded Black and white, Bands at 40° to core, Numerous joints, rock soft. Rare bands of garnet. | | | | | | | | | | | | | |
| | 1500 | | | | | | | | | | | | |
| | 1510 | 95 | .09 | .003 | | | | | | | | | |
| | 1520 | | | | | | | | | | | | |
| | 1520 | 90 | .09 | .005 | | | | | | | | | |
| | 1530 | | | | | | | | | | | | |
| | 1520 | 85 | .07 | .020 | | | | | | | | | |
| | 1530 | | | | | | | | | | | | |
| 1532-1572 Dolomite Medium grained, Dark gray. Beds 60° to core. Rock soft, numerous joints | | | | | | | | | | | | | |
| | 1530 | | | | | | | | | | | | |
| | 1540 | 90 | .04 | .080 | | | | | | | | | |
| | 1540 | | | | | | | | | | | | |
| | 1550 | 95 | .04 | .022 | | | | | | | | | |
| 1572-1602 Dolomite fine grained light gray with numerous carbon filled joints—rare py & cpy. | | | | | | | | | | | | | |
| | 1550 | | | | | | | | | | | | |
| | 1560 | 97 | .01 | .003 | | | | | | | | | |
| | 1560 | | | | | | | | | | | | |
| | 1570 | 98 | .01 | .001 | | | | | | | | | |
| | 1570 | | | | | | | | | | | | |
| | 1580 | 99 | .01 | .003 | | | | | | | | | |
| | 1580 | | | | | | | | | | | | |
| | 1590 | 100 | .03 | .001 | | | | | | | | | |
| | 1590 | | | | | | | | | | | | |
| | 1600 | 100 | .03 | .001 | | | | | | | | | |
| 1602-1608 Skarn Coarse grained, Brown, hard, nearly pure garnet. Trace sulfide. | | | | | | | | | | | | | |
| | 1600 | | | | | | | | | | | | |
| | 1610 | 100 | .04 | .003 | | | | | | | | | |
| | 1610 | | | | | | | | | | | | |
| | 1620 | 97 | .07 | .003 | | | | | | | | | |
| | 1620 | | | | | | | | | | | | |
| 1608-1680 Dolomite, white, fine grained, with numerous carbon seams. Bedding 40° to core at 1640. Rare sulfide | | | | | | | | | | | | | |
| | 1620 | | | | | | | | | | | | |
| | 1630 | 99 | .07 | .003 | | | | | | | | | |
| | 1630 | | | | | | | | | | | | |
| | 1640 | 100 | .02 | .002 | | | | | | | | | |
| | 1640 | | | | | | | | | | | | |
| | 1650 | 100 | .16 | .003 | | | | | | | | | |
| | 1650 | | | | | | | | | | | | |
| | 1660 | 95 | .20 | .004 | | | | | | | | | |
| | 1660 | | | | | | | | | | | | |
| | 1670 | 97 | .25 | .005 | | | | | | | | | |
| | 1670 | | | | | | | | | | | | |
| | 1680 | 100 | .19 | .007 | | | | | | | | | |
| | 1680 | | | | | | | | | | | | |
| | 1690 | 100 | .11 | .007 | | | | | | | | | |
| | 1690 | | | | | | | | | | | | |
| | 1700 | 100 | .07 | .010 | | | | | | | | | |
| | 1700 | | | | | | | | | | | | |
| | 1710 | 95 | .09 | .008 | | | | | | | | | |
| | 1710 | | | | | | | | | | | | |
| | 1720 | 97 | .12 | .003 | | | | | | | | | |
| | 1720 | | | | | | | | | | | | |
| | 1730 | 95 | .19 | .006 | | | | | | | | | |
| | 1730 | | | | | | | | | | | | |
| | 1740 | 97 | .08 | .007 | | | | | | | | | |
| | 1740 | | | | | | | | | | | | |
| | 1750 | 100 | .11 | .013 | | | | | | | | | |
| | 1750 | | | | | | | | | | | | |

LOGGED BY U.F.H. DATE 3-31-77

PROJECT Atlas Mine - BSAK

| | | |
|------------|---------|---------------------|
| Coord. : N | BEARING | HOLE NO. <u>312</u> |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Fe | % S | % Pb | % Zn | % Ag | % Au | % EQUV. | GROUPING — RMKS. |
|--|-------|-------|------|-----|------|------|-----|------|------|------|------|---------|------------------|
| 1750-1927 Abrigo Fin Skarn, hard, Medium grained, largely garnet with minor calcite, epidote, chlorite. Typical banded texture. Trace to minor sulfides, strongest near 1900-1920. Cpy visible. | 1750 | 1760 | 100 | .06 | .034 | | | | | | | | |
| | 1760 | 1770 | 100 | .01 | .014 | | | | | | | | |
| | 1770 | 1780 | 100 | .03 | .011 | | | | | | | | |
| | 1780 | 1790 | 100 | .05 | .005 | | | | | | | | |
| | 1790 | 1800 | 97 | .07 | .014 | | | | | | | | |
| | 1800 | 1810 | 95 | .08 | .008 | | | | | | | | |
| | 1810 | 1820 | 100 | .09 | .006 | | | | | | | | |
| | 1820 | 1830 | 98 | .12 | .005 | | | | | | | | |
| | 1830 | 1840 | 97 | .10 | .007 | | | | | | | | |
| | 1840 | 1850 | 100 | .09 | .006 | | | | | | | | |
| 1927-2000 Qtz, Mon. Par. hard, Medium grained, fresh appearing, with biotite and orthoclase phenos. Weak argillite Alt. No sericite. Est. total sulfide at 1%, with pyrite dominating Core badly broken | 1850 | 1860 | 100 | .04 | .004 | | | | | | | | |
| | 1860 | 1870 | 100 | .10 | .005 | | | | | | | | |
| | 1870 | 1880 | 100 | .09 | .004 | | | | | | | | |
| | 1880 | 1890 | 95 | .13 | .022 | | | | | | | | |
| | 1890 | 1900 | 97 | .04 | .003 | | | | | | | | |
| | 1900 | 1910 | 97 | .16 | .003 | | | | | | | | |
| | 1910 | 1920 | 100 | .46 | .006 | | | | | | | | |
| | 1920 | 1930 | 100 | | .615 | | | | | | | | |
| | 1930 | 1940 | 100 | .15 | .006 | | | | | | | | |
| | 1940 | 1950 | 97 | .30 | .008 | | | | | | | | |
| | 1950 | 1960 | 95 | .15 | .005 | | | | | | | | |
| | 1960 | 1970 | 95 | .18 | .004 | | | | | | | | |
| | 1970 | 1980 | 99 | .15 | .003 | | | | | | | | |
| | 1980 | 1990 | 100 | | | | | | | | | | |
| | 1990 | 2000 | 100 | .13 | .002 | | | | | | | | |

LOGGED BY V.P. DATE 11-2-67

ASSAY-GEOLOGY COMPOSITE DRILL LOG

FORM # 355
REVISED 10-62

Sheet 9 of

PROJECT Atlas Mine, B S & K

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE NO. 312 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Fe | % S | % Pb | % Zn | % Ag | % Au | % EQUV. | GROUPING — RMKS. |
|---|-------|-------|------|------|------|------|-----|------|------|------|------|---------|------------------|
| 2000-2055 Qtz. Mon. Hard, Medium Grained, no alteration, very rare veinlets apy, no pyrite Est. total sulfide as .5%, entirely in veinlets. Core weakly broken. | 2000 | 95 | .08 | .001 | | | | | | | | | |
| | 2010 | 98 | .09 | .003 | | | | | | | | | |
| | 2020 | 100 | .06 | .002 | | | | | | | | | |
| | 2030 | 100 | .07 | .003 | | | | | | | | | |
| | 2040 | 100 | .05 | .003 | | | | | | | | | |
| | 2050 | 100 | .06 | .001 | | | | | | | | | |
| | 2060 | 100 | .04 | .003 | | | | | | | | | |
| | 2070 | 100 | .07 | .004 | | | | | | | | | |
| | 2080 | 100 | .04 | .001 | | | | | | | | | |
| | 2090 | 100 | | | | | | | | | | | |
| 2085-2105 Andesite Porphyry fresh, post mineral, fine grained with feldspar phenocrysts. Rock is unjointed, gray and massive. | 2100 | 100 | | | | | | | | | | | |
| | 2110 | 100 | | | | | | | | | | | |
| | 2120 | 97 | | | | | | | | | | | |
| | 2130 | 99 | | | | | | | | | | | |
| | 2140 | 95 | | | | | | | | | | | |
| | 2150 | 100 | | | | | | | | | | | |
| | 2160 | 100 | | | | | | | | | | | |
| | 2170 | 100 | | | | | | | | | | | |
| | 2180 | 100 | | | | | | | | | | | |
| | 2190 | 100 | | | | | | | | | | | |
| 2105-2242 Quartz Monzonite No phenocrysts, hard, medium grained, no alteration. Practically no sulfide | 2200 | 100 | | | | | | | | | | | |
| | 2210 | 100 | | | | | | | | | | | |
| | 2220 | 100 | | | | | | | | | | | |
| | 2230 | 100 | | | | | | | | | | | |
| | 2240 | 100 | | | | | | | | | | | |
| | 2250 | 100 | | | | | | | | | | | |
| | 2260 | | | | | | | | | | | | |
| | 2270 | | | | | | | | | | | | |
| | 2280 | | | | | | | | | | | | |
| | 2290 | | | | | | | | | | | | |
| 2242-2250 Andesite Porphyry fresh, black, soft, fine grained no sulfide, no structure. | 2300 | | | | | | | | | | | | |
| | 2310 | | | | | | | | | | | | |
| | 2320 | | | | | | | | | | | | |
| | 2330 | | | | | | | | | | | | |
| | 2340 | | | | | | | | | | | | |
| | 2350 | | | | | | | | | | | | |
| | 2360 | | | | | | | | | | | | |
| | 2370 | | | | | | | | | | | | |
| | 2380 | | | | | | | | | | | | |
| | 2390 | | | | | | | | | | | | |

LOGGED BY W.F.C. DATE 7-25-67

FORM # 355
REVISED 10-62

ASSAY--GEOLOGY COMPOSITE DRILL LOG

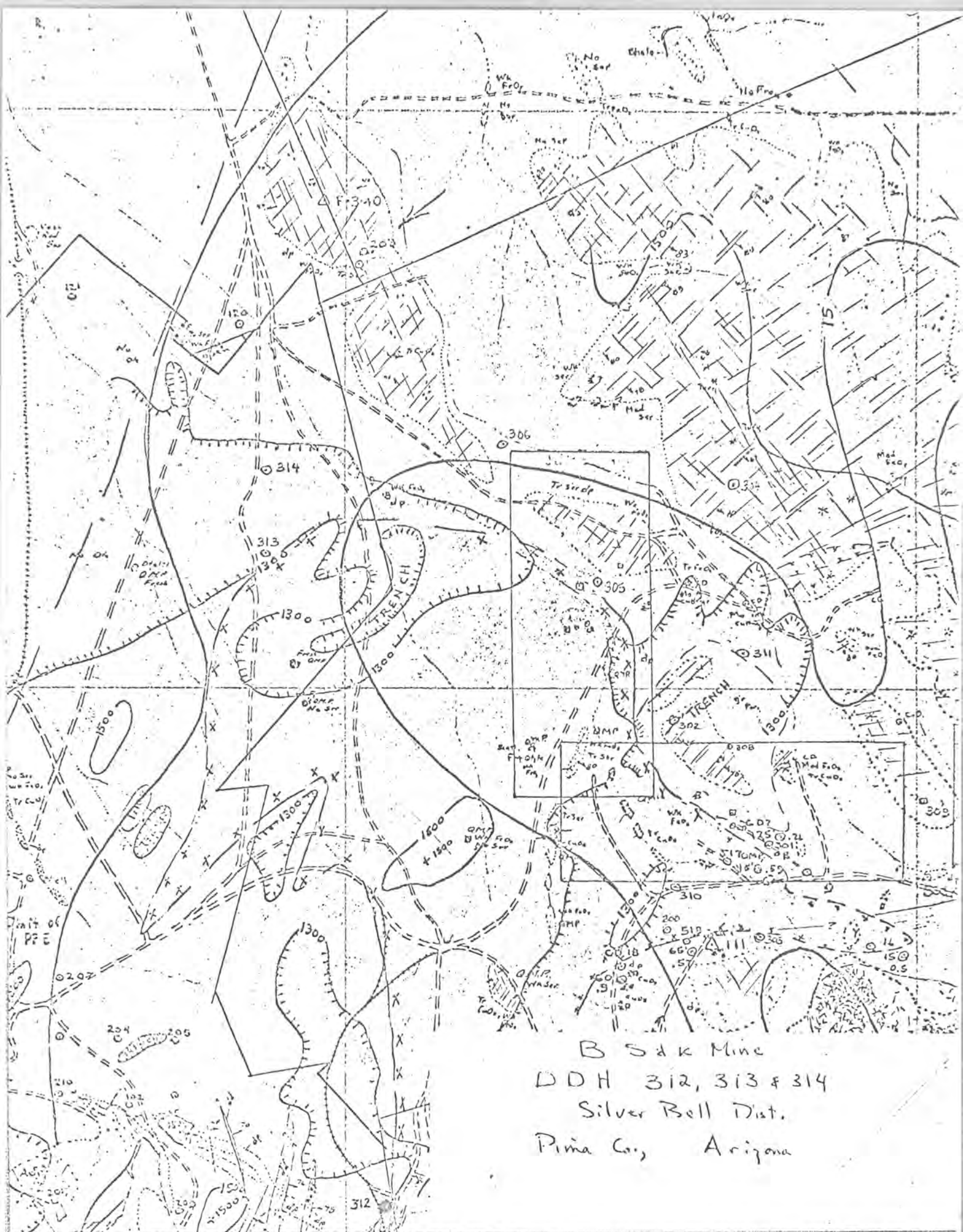
Sheet 4 of 4

PROJECT Allas Mine R S & K

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N° |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Fe | % S | % Pb | % Zn | % Ag | % Au | % Ni | % Co | % Mn | % Mg | % Ca | % Na | % K | % H ₂ O | % EQUV. | GROUPING — RMKS. |
|--|-------|-------|------|-----|------|------|-----|------|------|------|------|------|------|------|------|------|------|-----|--------------------|---------|------------------|
| 2250-2315 Qtz Monzonite Granitic texture, No alteration Estimate 1/2 % total sulfide with .05 % Cu No structures No veinlets, w nothing. | | 2250 | | | | | | | | | | | | | | | | | | | |
| | | 2260 | 100 | | | | | | | | | | | | | | | | | | |
| | | 2260 | | | | | | | | | | | | | | | | | | | |
| | | 2270 | 100 | | | | | | | | | | | | | | | | | | |
| | | 2270 | | | | | | | | | | | | | | | | | | | |
| | | 2280 | 95 | | | | | | | | | | | | | | | | | | |
| | | 2280 | | | | | | | | | | | | | | | | | | | |
| | | 2290 | 97 | | | | | | | | | | | | | | | | | | |
| | | 2290 | | | | | | | | | | | | | | | | | | | |
| | | 2300 | 100 | | | | | | | | | | | | | | | | | | |
| | | 2300 | | | | | | | | | | | | | | | | | | | |
| | | 2310 | 100 | | | | | | | | | | | | | | | | | | |
| | | 2310 | | | | | | | | | | | | | | | | | | | |
| | | 2310 | 100 | | | | | | | | | | | | | | | | | | |
| | | 2315 | | | | | | | | | | | | | | | | | | | |

LOGGED BY 11/7/62 DATE 11/7/62



B S & K Mine
DDH 312, 313 & 314
Silver Bell Dist.
Pima Co., Arizona

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 2

PROJECT Atlas Mine, Drill Hole for Nevada Claim

| | | |
|------------------------------|--------------|--------------|
| Coörd. : N | BEARING Vert | HOLE N° 305 |
| E | INCL. Vert | COLLAR ELEV. |
| START 8-19-63 COMPL. 8-20-63 | | DEPTH 109 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUIV. | GROUPING — RMKS. |
|-----------------------------------|-------|-------|------|-----|------|------|---|---|-----|-----|---|--------|------------------|
| <u>0-15 Dacite Porphyry.</u> | | | | | | | | | | | | | |
| <u>Brown. Oxide zone, soft,</u> | | | | | | | | | | | | | |
| <u>Porphyritic, fine grained.</u> | | | | | | | | | | | | | |
| <u>Original sulfide content</u> | | | | | | | | | | | | | |
| <u>was 4%. Strong Arg. Alt.;</u> | | | | | | | | | | | | | |
| <u>tr ser.</u> | | | | | | | | | | | | | |
| | 0 | | | | | | | | | | | | |
| | 10 | 40 | | | .02 | .021 | | | | | | | |
| | | | | | | | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | 20 | 70 | | | .02 | .017 | | | | | | | |
| | | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 25 | 80 | | | .04 | .009 | | | | | | | |
| | | | | | | | | | | | | | |
| | 25 | | | | | | | | | | | | |
| | 30 | 90 | | | .09 | .001 | | | | | | | |
| | | | | | | | | | | | | | |
| | 30 | | | | | | | | | | | | |
| | 40 | 78 | | | .28 | .001 | | | | | | | |
| | | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 50 | 89 | | | .29 | .009 | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 60 | 90 | | | .16 | .008 | | | | | | | |
| | | | | | | | | | | | | | |
| | 60 | | | | | | | | | | | | |
| | 70 | 90 | | | .13 | .015 | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | 70 | | | | | | | | | | | | |
| | 80 | 95 | | | .11 | .003 | | | | | | | |
| | | | | | | | | | | | | | |
| | 80 | | | | | | | | | | | | |
| | 90 | 90 | | | .12 | .003 | | | | | | | |
| | | | | | | | | | | | | | |
| | 90 | | | | | | | | | | | | |
| | 100 | 90 | | | .07 | .007 | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | 100 | | | | | | | | | | | | |
| | 109 | 95 | | | .001 | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |

Average from 30 to 50 is .28% Cu, .005 Mo.

Average from
30 to 50 is
.28% Cu,
.005 Mo.

LOGGED BY VFH DATE 8-20-65

PROJECT Atlas Mine - BS & K.

| | | |
|--------------------------------|------------------|--------------|
| Coörd. : N | BEARING Vertical | HOLE N° 313 |
| E | INCL. | COLLAR ELEV. |
| START Aug 23 COMPL. Sept 5 '66 | | DEPTH 500' |

| DESCRIPTION | Core No. | Assay Int. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUIV. | GROUPING — RMKS. |
|--|-------------|---------------|-----|------|------|---|---|-----|-----|---|--------|------------------|
| | | | | | | | | | | % | | |
| 0-42 Bedrock (Oxidized Dacite) Drilled with Tricone - No Core. | 0-4 | 0 | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 42-60 Qtz Mon. Per. Oxidized, brown, hard, No Arg. or Ser. Alt; Rock is Med. Grained, est 1% sulf. (now oxide) | 40- 50 | 50 | .15 | .011 | | | | | | | | |
| 60-80 Dacite Gray, soft, Supergene sulf. coat on py. Est 2% sulf, as diss py (5%) and 50% on veinlets. | 50- 60 | 77 | .10 | Nil | | | | | | | | |
| | 60- 70 | 85 | .09 | .004 | | | | | | | | |
| | 70- 80 | 78 | .14 | Nil | | | | | | | | |
| | 80- 90 | 80 | .03 | Tr | | | | | | | | |
| | 90- 100 | 83 | .03 | .037 | | | | | | | | |
| 80-250 Qtz Mon. Per. Grays, fine grained, hard, hypogene, Variably sheared, but well jointed, Soft. Weak Arg. Alt., No orth, bio. or Ser. Est 2% total sulfide, mostly py. Most (75%) sulfide occurs on joints. | 100- 110 | 82 | .05 | .005 | | | | | | | | |
| | 110- 120 | 77 | .02 | .006 | | | | | | | | |
| | 120- 130 | 76 | .08 | .015 | | | | | | | | |
| | 130- 140 | 80 | .06 | .010 | | | | | | | | |
| | 140- 150 | 65 | .05 | .005 | | | | | | | | |
| | 150- 160 | 67 | .15 | .006 | | | | | | | | |
| | 160- 170 | 64 | .05 | .004 | | | | | | | | |
| | 170- 180 | 65 | .05 | .011 | | | | | | | | |
| | 180- 190 | 80 | .03 | .009 | | | | | | | | |
| | 190- 200 | 90 | .04 | .017 | | | | | | | | |
| | 200- 210 | 15 | .05 | .014 | | | | | | | | |
| | 210- 220 | 94 | .03 | .014 | | | | | | | | |
| | 220- 230 | 97 | .03 | .032 | | | | | | | | |
| | 230- 240 | 95 | .08 | .014 | | | | | | | | |
| | 240- 250 | 90 | .07 | .013 | | | | | | | | |

LOGGED BY U.F.H. DATE 9-3-66

FORM # 355
REVISED 10-62

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

PROJECT B.S. & K. Atlas Mine

| | | |
|------------|---------|--------------------|
| Coörd. : N | BEARING | HOLE NO. <u>33</u> |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH <u>500'</u> |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING—RMKS. |
|--|-------|-------|------|-----|------|------|---|---|-----|-----|---|-------|----------------|
| <p>500-500' - Qtz. Mon. Por. Gray, Fine Grained, soft, well jointed and locally well sheared. Weak Arg. Al., No Ser. or orth. Est. 2% surf as pyrite. 75% of pyrite occurs on joints. Joints have gypsum and rare quartz veining, with cpy and moly.</p> | | 250 | | | | | | | | | | | |
| | | 260 | 95 | .07 | .013 | | | | | | | | |
| | | 260 | | | | | | | | | | | |
| | | 270 | 90 | .08 | .007 | | | | | | | | |
| | | 270 | | | | | | | | | | | |
| | | 280 | 89 | .10 | .013 | | | | | | | | |
| | | 280 | | | | | | | | | | | |
| | | 290 | 90 | .12 | .003 | | | | | | | | |
| | | 290 | | | | | | | | | | | |
| | | 290 | 70 | .11 | .007 | | | | | | | | |
| | | 300 | | | | | | | | | | | |
| | | 300 | 90 | .10 | .009 | | | | | | | | |
| | | 310 | | | | | | | | | | | |
| | | 310 | 92 | .16 | .005 | | | | | | | | |
| | | 320 | | | | | | | | | | | |
| | | 330 | 95 | .14 | .015 | | | | | | | | |
| | | 330 | | | | | | | | | | | |
| | | 340 | 90 | .12 | .003 | | | | | | | | |
| | | 340 | | | | | | | | | | | |
| | | 350 | 87 | | | | | | | | | | |
| | | 350 | | | | | | | | | | | |
| | | 360 | 80 | | | | | | | | | | |
| | | 360 | | | | | | | | | | | |
| | | 370 | 75 | | | | | | | | | | |
| | | 370 | | | | | | | | | | | |
| | | 380 | 70 | | | | | | | | | | |
| | | 380 | | | | | | | | | | | |
| | | 390 | 95 | | | | | | | | | | |
| | | 390 | | | | | | | | | | | |
| | | 400 | 80 | | | | | | | | | | |
| | | 400 | | | | | | | | | | | |
| | | 410 | 95 | | | | | | | | | | |
| | | 410 | | | | | | | | | | | |
| | | 420 | 90 | | | | | | | | | | |
| | | 420 | | | | | | | | | | | |
| | | 430 | 95 | | | | | | | | | | |
| | | 430 | | | | | | | | | | | |
| | | 440 | 97 | | | | | | | | | | |
| | | 440 | | | | | | | | | | | |
| | | 450 | 98 | | | | | | | | | | |
| | | 450 | | | | | | | | | | | |
| | | 460 | 95 | | | | | | | | | | |
| | | 460 | | | | | | | | | | | |
| | | 470 | 90 | | | | | | | | | | |
| | | 470 | | | | | | | | | | | |
| | | 480 | 92 | | | | | | | | | | |
| | | 480 | | | | | | | | | | | |
| | | 490 | 90 | | | | | | | | | | |
| | | 490 | | | | | | | | | | | |
| | | 500 | 90 | | | | | | | | | | |

LOGGED BY V.F.H. DATE 9-6-66

FORM # 355
REVISED 10-62

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 2

PROJECT Atlas Mine, BS&K Mining Co., BS&K

| | | |
|---------------|----------------|--------------|
| Coörd. : N | BEARING Vert | HOLE N° 302 |
| E | INCL. Vert | COLLAR ELEV. |
| START 8-11-63 | COMPL. 8-12-63 | DEPTH 151 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING — RMKS. |
|---|-------|-------|------|-----|------|------|---|---|-----|-----|---|-------|------------------|
| <u>0-68 Dacite Porphyry</u> Oxide zone, Brown, fine grained, porphyritic, strong Argillic Alt. with trace Sericite. Core badly fractured, Original Sulfide content was est. 5%. Some Malachite visible 20' to 68' | 0 | 10 | 45 | | .07 | .009 | | | | | | | |
| | 10 | 20 | 50 | | .06 | .012 | | | | | | | |
| | 20 | 30 | 62 | | .09 | .006 | | | | | | | |
| | 30 | 40 | 70 | | .07 | .004 | | | | | | | |
| | 40 | 50 | 70 | | .07 | .009 | | | | | | | |
| | 50 | 60 | 65 | | .10 | .009 | | | | | | | |
| | 60 | 70 | 50 | | .19 | .007 | | | | | | | |
| | 70 | 80 | 55 | | .11 | .012 | | | | | | | |
| | 80 | 90 | 60 | | .20 | .010 | | | | | | | |
| | 90 | 95 | 70 | | .06 | .010 | | | | | | | |
| <u>68-70 fault zone. Core crushed</u> <u>70-90 Quartz Monzonite Porphyry</u> Brown, Oxide zone, Granitic, holocrystalline texture. Weak Argillic Alteration, with No sericite. Fracturing very strong at 70' gradually weakens down the hole. Mineralization fades with fracturing. | 95 | 100 | 85 | | .66 | .015 | | | | | | | |
| | 100 | 105 | 85 | | .61 | .005 | | | | | | | |
| | 105 | 110 | 90 | | .44 | .013 | | | | | | | |
| | 110 | 115 | 95 | | .57 | .006 | | | | | | | |
| | 115 | 120 | 97 | | .54 | .004 | | | | | | | |
| | 120 | 125 | 90 | | .32 | .005 | | | | | | | |
| | 90 | 95 | 70 | | .06 | .010 | | | | | | | |
| | 95 | 100 | 85 | | .66 | .015 | | | | | | | |
| | 100 | 105 | 85 | | .61 | .005 | | | | | | | |
| | 105 | 110 | 90 | | .44 | .013 | | | | | | | |
| <u>90-95 Quartz Monzonite Por.</u> Mixed Oxide and Sulfide, Copper occurs as chalcocite, with limonite. | 110 | 115 | 95 | | .57 | .006 | | | | | | | |
| | 115 | 120 | 97 | | .54 | .004 | | | | | | | |
| | 120 | 125 | 90 | | .32 | .005 | | | | | | | |
| | 95 | 100 | 85 | | .66 | .015 | | | | | | | |
| | 100 | 105 | 85 | | .61 | .005 | | | | | | | |
| | 105 | 110 | 90 | | .44 | .013 | | | | | | | |
| | 110 | 115 | 95 | | .57 | .006 | | | | | | | |
| | 115 | 120 | 97 | | .54 | .004 | | | | | | | |
| | 120 | 125 | 90 | | .32 | .005 | | | | | | | |
| | 95 | 100 | 85 | | .66 | .015 | | | | | | | |
| <u>95-135 Quartz Monzonite Por.</u> Supergene zone fracturing weakens with depth. Some Moly visible in rare quartz veinlets. | 100 | 105 | 85 | | .61 | .005 | | | | | | | |
| | 105 | 110 | 90 | | .44 | .013 | | | | | | | |
| | 110 | 115 | 95 | | .57 | .006 | | | | | | | |
| | 115 | 120 | 97 | | .54 | .004 | | | | | | | |
| | 120 | 125 | 90 | | .32 | .005 | | | | | | | |
| | 95 | 100 | 85 | | .66 | .015 | | | | | | | |
| | 100 | 105 | 85 | | .61 | .005 | | | | | | | |
| | 105 | 110 | 90 | | .44 | .013 | | | | | | | |
| | 110 | 115 | 95 | | .57 | .006 | | | | | | | |
| | 115 | 120 | 97 | | .54 | .004 | | | | | | | |

LOGGED BY VFH DATE 8-12-63

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

PROJECT Atlas

| | | |
|------------|--------------|--------------|
| Coörd. : N | BEARING Vert | HOLE N° 302 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH 151 |

[illegible]

LOGGED BY _____ DATE _____

ASSAY--GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 3

PROJECT Atlas Mine - B. S. 4

| | | |
|---------------|------------------|--------------|
| Coörd. : N | BEARING Vertical | HOLE NO. 314 |
| E | INCL. | COLLAR ELEV. |
| START Sept. 7 | COMPL. Sept. 28 | DEPTH 625' |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Fe | % S | % Zn | % Pb | % Ag | % Au | % EQUV. | GROUPING - RMKS. |
|---|---------|-------|------|------|------|------|-----|------|------|------|------|---------|------------------|
| 0-10 No Core | | | | | | | | | | | | | |
| 10-30 Dacite, Tan, fine grains Soft, Oxidized, Strong Argillie alteration Est Orig 3% sulfide, Now FeOx Core sheared. | | | | | | | | | | | | | |
| 30-350 Dacite, Gray, fine grain Soft, sulfide zone. Strong argillie Alt. Core badly sheared. Est 3% sulfide, mostly on joints. | | | | | | | | | | | | | |
| | 0-10 | 0 | | | | | | | | | | | |
| | 10-20 | 56 | .05 | .001 | | | | | | | | | |
| | 20-30 | 42 | .25 | .003 | | | | | | | | | |
| | 30-40 | 60 | .10 | .010 | | | | | | | | | |
| | 40-50 | 72 | .09 | .003 | | | | | | | | | |
| | 50-60 | 80 | .09 | .008 | | | | | | | | | |
| | 60-70 | 76 | .06 | .010 | | | | | | | | | |
| | 70-80 | 75 | .08 | .008 | | | | | | | | | |
| | 80-90 | 70 | .01 | .004 | | | | | | | | | |
| | 90-100 | 80 | .09 | .009 | | | | | | | | | |
| | 100-110 | 85 | .13 | .010 | | | | | | | | | |
| | 110-120 | 76 | .03 | .014 | | | | | | | | | |
| | 120-130 | 80 | .07 | .006 | | | | | | | | | |
| | 130-140 | 93 | .07 | .010 | | | | | | | | | |
| | 140-150 | 95 | .07 | .003 | | | | | | | | | |
| | 150-160 | 95 | .07 | .012 | | | | | | | | | |
| | 160-170 | 90 | .03 | .012 | | | | | | | | | |
| | 170-180 | 76 | .07 | .002 | | | | | | | | | |
| | 180-190 | 78 | .17 | .001 | | | | | | | | | |
| | 190-200 | 80 | .14 | .003 | | | | | | | | | |
| | 200-210 | 90 | .17 | .001 | | | | | | | | | |
| | 210-220 | 95 | .14 | .001 | | | | | | | | | |
| | 220-230 | 96 | .12 | .002 | | | | | | | | | |
| | 230-240 | 98 | .10 | .009 | | | | | | | | | |
| | 240-250 | 97 | .08 | .002 | | | | | | | | | |

LOGGED BY VFH DATE 9-30-66

FORM # 355
REVISED 10-62

ASSAY-GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 3

PROJECT Atlas Mine B. S. R.

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N° |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING — RMKS. |
|---|-------|-------|------|------|------|------|---|---|-----|-----|---|-------|------------------|
| 250-320 <u>Dacite</u> , white, fine grained, soft, weak argill. Alt., strong shearing; est. 2% Py on shear. | 250 | 90 | .09 | .003 | | | | | | | | | |
| | 260 | 85 | .09 | .006 | | | | | | | | | |
| | 270 | 87 | .12 | .001 | | | | | | | | | |
| | 280 | 90 | .11 | .003 | | | | | | | | | |
| | 290 | 92 | .07 | .003 | | | | | | | | | |
| | 300 | 94 | .07 | .002 | | | | | | | | | |
| 320-396 <u>Alt. Magma Gneiss</u> , fine grained, soft, weak Arg. Alt., strong shearing. Est 3% Py, mostly on shear. | 310 | 90 | .07 | .004 | | | | | | | | | |
| | 320 | 87 | .06 | .015 | | | | | | | | | |
| | 330 | 90 | .07 | .001 | | | | | | | | | |
| | 340 | 80 | .07 | .001 | | | | | | | | | |
| | 350 | 76 | .05 | .002 | | | | | | | | | |
| | 360 | 80 | .08 | Tr | | | | | | | | | |
| 396-411 <u>Dacite</u> , as above | 370 | 84 | .08 | .002 | | | | | | | | | |
| | 380 | 90 | .07 | Tr | | | | | | | | | |
| | 390 | 92 | .07 | .002 | | | | | | | | | |
| | 400 | 90 | .10 | .004 | | | | | | | | | |
| | 410 | 72 | .07 | Ni | | | | | | | | | |
| | 420 | 94 | .10 | Ni | | | | | | | | | |
| 411-419 <u>Alt. Magma</u> , as above | 430 | 92 | .07 | Ni | | | | | | | | | |
| | 440 | 90 | .10 | .002 | | | | | | | | | |
| | 450 | 95 | .13 | Ni | | | | | | | | | |
| | 460 | 97 | .09 | Tr | | | | | | | | | |
| | 470 | 98 | .09 | Tr | | | | | | | | | |
| | 480 | 95 | .10 | Tr | | | | | | | | | |
| | 490 | 90 | .07 | .001 | | | | | | | | | |
| | 500 | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| 419-500 <u>Dacite</u> , as above | | | | | | | | | | | | | |
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LOGGED BY U. S. R. DATE

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N° 314 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| START | | COMPLET | | Geol. | | Assay | | INT. | | C/R | | % Cu | | % Ni | | % S | | % P | | 02 | | 02 | | % EQUV | | GROUPING — RMKS. | | |
|--------------------------------|--|---------|----|-------|----|-------|--|------|--|-----|----|------|--|------|--|-----|--|-----|--|----|--|----|--|--------|--|------------------|--|--|
| DESCRIPTION | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500-625 <u>Dacite</u> as above | | 500 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 510 | 85 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 520 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 530 | 87 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 540 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 550 | 92 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 560 | 90 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 570 | 94 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 580 | 96 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 590 | 98 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 600 | 95 | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | 610 | 90 | .04 | Ni | | | | | | | | | | | | | | | | | | | | | | | |
| | | 620 | 85 | .04 | Tr | | | | | | | | | | | | | | | | | | | | | | | |
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LOGGED BY VTH DATE 10-11-66



B S & K Mine
DDH 312, 313 & 314
Silver Bell Dist.
Pima Co., Arizona

CERTIFICATE OF ASSAY

Oct. 3, 1966

FORM 311 M.L.

DUVAL CORPORATION
COPPER DIVISION — ESPERANZA PROPERTY
SAHUARITA, ARIZONA

SPECIAL FOR GEOL. DEPT. (V.H.)
B.S.&K.

Oct. 6, 1966

CERTIFICATE OF ASSAY

| BEAKER NOS. | MARKS, ETC. | SAMPLE | Cu | Mo | | | |
|----------------|----------------------|--------|-----|-------|--|--|--|
| | | GMS. | % | % | | | |
| | B.S.&K. 314-180-190' | | .17 | .001 | | | |
| | 200 | | .14 | .003 | | | |
| | 210 | | .19 | .001 | | | |
| | 220 | | .14 | .001 | | | |
| | 230 | | .12 | .002 | | | |
| | 240 | | .10 | .009 | | | |
| | 250 | | .08 | .002 | | | |
| | 260 | | .09 | .003 | | | |
| | 270 | | .09 | .006 | | | |
| | 280 | | .12 | .001 | | | |
| | 290 | | .11 | .003 | | | |
| | 300 | | .07 | .003 | | | |
| | 310 | | .07 | .002 | | | |
| | 320 | | .07 | .004 | | | |
| | 330 | | .06 | .015 | | | |
| | 340 | | .07 | .001 | | | |
| | 350 | | .07 | .001 | | | |
| | 360 | | .09 | .002 | | | |
| | 370 | | .08 | Trace | | | |
| | 380 | | .08 | .002 | | | |
| | 390 | | .07 | Trace | | | |
| | 400 | | .07 | .001 | | | |
| | 410 | | .10 | .004 | | | |
| | 420 | | .07 | Nil | | | |
| | 430 | | .10 | Nil | | | |
| | 440 | | .07 | Nil | | | |
| | 450 | | .08 | .002 | | | |
| | 460 | | .13 | Nil | | | |
| | 470 | | .09 | Trace | | | |
| | 480 | | .09 | Trace | | | |
| | 490 | | .06 | Trace | | | |
| | 500 | | .07 | .001 | | | |
| | 610-620 | | .04 | Nil | | | |
| | 620-625 | | .04 | Trace | | | |

ASSAY--GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 5

PROJECT BS & K

| | | |
|---------------------|-------------------------|---------------------|
| Coörd. : N | BEARING <u>Vertical</u> | HOLE N° <u>315</u> |
| E | INCL. <u>Vertical</u> | COLLAR ELEV. |
| START <u>2/3/67</u> | COMPL. <u>7/14/67</u> | DEPTH <u>1043.7</u> |

| START 1/25/27 | | | | | | | | | | | | | | | | | | |
|---|--|---------|---------|-------|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|-------|------------------|
| DESCRIPTION | | Geol. | Assay | INT. | C/R | % C | % H | % S | % O | % Fe | % Cu | % Ni | % Zn | % Pb | % Ag | % Au | EQUIV | GROUPING — RMKS. |
| 0-10' - No Core | | 10' | No Core | — | — | | | | | | | | | | | | | |
| 10'-102' <u>Dacite Porphyry</u> - Fm. Grained Groundmass, Silica Phenocrysts, Hard, Est. Orig. Sulphide @ 1%, Now Nearly Completely Oxidized. Alteration Products Include Weak Sulfate On Frac. Faces, No Biotite & No Orthoclase, Some Clay. This Is A Leach & Capping. 6' Oxide Zone To ± 64' Mod-Loc. Abund. Limonite Frac. Fillings, Rare Pyrite, Rare Cu Sulfate, Mod-Strong Argill. Alt. Pyrite Below Oxide Zone Varies From 1% To Loc. 3% For The Length Of The Entire Hole. | | 10-20 | Tr | 0.005 | | | | | | | | | | | | | | |
| | | 20-30 | 0.01 | 0.005 | | | | | | | | | | | | | | |
| | | 30-40 | Tr | 0.006 | | | | | | | | | | | | | | |
| | | 40-50 | Tr | 0.001 | | | | | | | | | | | | | | |
| | | 50-60 | 0.02 | 0.005 | | | | | | | | | | | | | | |
| | | 60-70 | 0.04 | 0.006 | | | | | | | | | | | | | | |
| | | 70-80 | 0.08 | 0.001 | | | | | | | | | | | | | | |
| | | 80-90 | 0.07 | 0.002 | | | | | | | | | | | | | | |
| | | 90-100 | 0.03 | 0.005 | | | | | | | | | | | | | | |
| | | 100-110 | 0.04 | 0.001 | | | | | | | | | | | | | | |
| | | 110-120 | 0.03 | 0.001 | | | | | | | | | | | | | | |
| | | 120-130 | 0.03 | 0.001 | | | | | | | | | | | | | | |
| | | 130-140 | 0.04 | 0.004 | | | | | | | | | | | | | | |
| | | 140-150 | 0.03 | 0.001 | | | | | | | | | | | | | | |
| | | 150-160 | 0.03 | 0.003 | | | | | | | | | | | | | | |
| | | 160-170 | 0.18 | 0.002 | | | | | | | | | | | | | | |
| | | 170-180 | 0.25 | 0.003 | | | | | | | | | | | | | | |
| | | 180-190 | 0.04 | 0.001 | | | | | | | | | | | | | | |
| | | 190-200 | 0.02 | 0.002 | | | | | | | | | | | | | | |
| | | 200-210 | 0.04 | 0.001 | | | | | | | | | | | | | | |
| | | 210-220 | 0.01 | 0.002 | | | | | | | | | | | | | | |
| | | 220-230 | 0.03 | 0.005 | | | | | | | | | | | | | | |
| | | 230-240 | 0.04 | 0.005 | | | | | | | | | | | | | | |
| | | 240-250 | 0.04 | 0.001 | | | | | | | | | | | | | | |
| 102'-1043.7' <u>Quartz Monzonite</u> <u>Porphyry</u> , Fm. Grained Ground- mass, Mod. Gr. Silica, Generally Mod. Broken, Argill. Alt. Mod, Minor Sulfate Along Frac. Surfaces Loc. Some Decalcification In Breccia With Increasing Depth However Rock Continues Generally Well Broken Some Gr. Loc. However In Minor Ames, Frac. Angles Mostly V. Sharp Varying From 60° Vertical & Some Frac. In The 30-45° Range Some Minor Ames. of Calcite Along Frac. Surfaces, The Rare Cpt That Is Present Occurs Mostly As Coatings on Pyrite. Some V. Rare MoS ₂ Loc. Pyrite Usually Occurs As V. Fm. Grained Xelline Coatings Along Frac. & Loc. ± 1/2" Veinlet Pkg. Staining @ 650' Gypsum Some A Minor Mod Frac. Fillings Sulfate Decalcification & - No V. Loc. Sulfate Staining in Breccia | | | | | | | | | | | | | | | | | | |

LOGGED BY E. H. K. DATE

FORM # 355
REVISED 10-62

ASSAY-GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 5

PROJECT BS & K

| | | |
|--|---------------------|----------------------|
| Coörd. : N | BEARING <u>Vent</u> | HOLE N° <u>315</u> |
| E | INCL. <u>Vent</u> | COLLAR ELEV. |
| START <u>5/23/67</u> COMPL. <u>9/12/67</u> | | DEPTH <u>1043.7'</u> |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz | oz | % | EQUV | GROUPING — RMKS. |
|-------------|-------|-------|------|-----|------|-------|---|---|----|----|---|------|------------------|
| | | 250- | | | 0.03 | 0.002 | | | | | | | |
| | | 260- | | | | | | | | | | | |
| | | 270- | | | 0.03 | 0.001 | | | | | | | |
| | | 270- | | | | | | | | | | | |
| | | 280- | | | 0.05 | 0.004 | | | | | | | |
| | | 290- | | | | | | | | | | | |
| | | 290- | | | 0.05 | 0.002 | | | | | | | |
| | | 290- | | | | | | | | | | | |
| | | 300- | | | 0.04 | 0.005 | | | | | | | |
| | | 310- | | | 0.08 | 0.003 | | | | | | | |
| | | 320- | | | 0.05 | 0.017 | | | | | | | |
| | | 320- | | | 0.04 | Tr | | | | | | | |
| | | 330- | | | 0.02 | 0.005 | | | | | | | |
| | | 340- | | | 0.02 | 0.005 | | | | | | | |
| | | 350- | | | | | | | | | | | |
| | | 360- | | | 0.03 | 0.001 | | | | | | | |
| | | 360- | | | 0.03 | 0.006 | | | | | | | |
| | | 370- | | | 0.09 | Nil | | | | | | | |
| | | 380- | | | 0.10 | Nil | | | | | | | |
| | | 390- | | | 0.11 | 0.002 | | | | | | | |
| | | 400- | | | 0.09 | Nil | | | | | | | |
| | | 410- | | | 0.10 | 0.001 | | | | | | | |
| | | 420- | | | 0.07 | 0.001 | | | | | | | |
| | | 430- | | | 0.09 | Nil | | | | | | | |
| | | 440- | | | 0.09 | 0.005 | | | | | | | |
| | | 450- | | | 0.09 | 0.005 | | | | | | | |
| | | 460- | | | 0.08 | 0.001 | | | | | | | |
| | | 470- | | | 0.10 | 0.001 | | | | | | | |
| | | 480- | | | 0.12 | 0.006 | | | | | | | |
| | | 490- | | | 0.10 | 0.004 | | | | | | | |

Gauge → 250'

Gauge → 470'

LOGGED BY F.M. 1/2 DATE

FORM # 355
REVISED 10-62

ASSAY-GEOLOGY COMPOSITE DRILL LOG

Sheet 3 of 5

PROJECT BS & K

| | | |
|----------------------|-----------------------|----------------------|
| Coörd. : N | BEARING <u>Var.</u> | HOLE N° <u>315</u> |
| E | INCL. <u>Var.</u> | COLLAR ELEV. |
| START <u>3/23/67</u> | COMPL. <u>9/12/67</u> | DEPTH <u>1043.7'</u> |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | % Zn | % EQUV. | GROUPING — RMKS. |
|-------------|-------|-------|------|-----|---------|---------|---|---|---------|------------|------------------|
| | | 500 | | | | | | | | | |
| | | 510 | | | 0.15 | 0.005 | | | | | |
| | | 510- | | | | | | | | | |
| | | 520 | | | 0.10 | 0.002 | | | | | |
| | | 520- | | | | | | | | | |
| | | 530 | | | 0.09 | 0.004 | | | | | |
| | | 530- | | | | | | | | | |
| | | 540 | | | 0.10 | 0.001 | | | | | |
| | | 540- | | | | | | | | | |
| | | 550 | | | 0.11 | 0.004 | | | | | |
| | | 550- | | | | | | | | | |
| | | 560 | | | 0.10 | 0.002 | | | | | |
| | | 560- | | | | | | | | | |
| | | 570 | | | 0.10 | 0.003 | | | | | |
| | | 570- | | | | | | | | | |
| | | 580 | | | 0.05 | 0.001 | | | | | |
| | | 580- | | | | | | | | | |
| | | 590 | | | 0.03 | 0.001 | | | | | |
| | | 590- | | | | | | | | | |
| | | 600 | | | 0.02 | 0.002 | | | | | |
| | | 600- | | | | | | | | | |
| | | 610 | | | 0.06 | 0.003 | | | | | |
| | | 610- | | | | | | | | | |
| | | 620 | | | 0.03 | 0.002 | | | | | |
| | | 620- | | | | | | | | | |
| | | 630 | | | 0.04 | 0.001 | | | | | |
| | | 630- | | | | | | | | | |
| | | 640 | | | 0.02 | 0.002 | | | | | |
| | | 640- | | | | | | | | | |
| | | 650 | | | 0.04 | 0.002 | | | | | |
| | | 650- | | | | | | | | | |
| | | 660 | | | 0.02 | 0.002 | | | | | |
| | | 660- | | | | | | | | | |
| | | 670 | | | 0.05 | 0.002 | | | | | |
| | | 670- | | | | | | | | | |
| | | 680 | | | 0.09 | 0.005 | | | | | |
| | | 680- | | | | | | | | | |
| | | 690 | | | 0.07 | 0.008 | | | | | |
| | | 690- | | | | | | | | | |
| | | 700 | | | 0.03 | 0.001 | | | | | |
| | | 700- | | | | | | | | | |
| | | 710 | | | 0.05 | 0.002 | | | | | |
| | | 710- | | | | | | | | | |
| | | 720 | | | 0.02 | 0.001 | | | | | |
| | | 720- | | | | | | | | | |
| | | 730 | | | 0.03 | N.I. | | | | | |
| | | 730- | | | | | | | | | |
| | | 740 | | | 0.03 | 0.001 | | | | | |
| | | 740- | | | | | | | | | |
| | | 750 | | | 0.02 | 0.001 | | | | | |

Gauge → 545'
551'

State of
Gypsum
Filling

Gauge → 688'
692'
Decreased
Amount of
Gypsum
Filling
To B.O.H.

LOGGED BY F. Mark DATE _____

PROJECT RS & K

| | | |
|------------------------------|--------------|---------------|
| Coörd. : N | BEARING Vert | HOLE N° 315 |
| E | INCL. Vert | COLLAR ELEV. |
| START 8/23/67 COMPL. 9/14/67 | | DEPTH 1043.7' |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % | % | % | % | % | EQUV. | GROUPING — RMKS. |
|-------------|-------|-------|------|-----|------|-------|---|---|---|-------|------------------|
| | | | | | Cu | Mo | | | | | |
| 735 | | | | | | | | | | | |
| 740 | | | | | 0.03 | 0.001 | | | | | |
| 750 | | | | | | | | | | | |
| 770 | | | | | 0.02 | 0.002 | | | | | |
| 775 | | | | | | | | | | | |
| 780 | | | | | 0.05 | 0.001 | | | | | |
| 785 | | | | | | | | | | | |
| 790 | | | | | 0.04 | 0.001 | | | | | |
| 795 | | | | | | | | | | | |
| 800 | | | | | 0.05 | 0.002 | | | | | |
| 805 | | | | | | | | | | | |
| 810 | | | | | 0.04 | 0.002 | | | | | |
| 815 | | | | | | | | | | | |
| 820 | | | | | 0.05 | 0.002 | | | | | |
| 825 | | | | | | | | | | | |
| 830 | | | | | 0.01 | 0.002 | | | | | |
| 835 | | | | | | | | | | | |
| 840 | | | | | 0.01 | 0.001 | | | | | |
| 845 | | | | | | | | | | | |
| 850 | | | | | 0.05 | 0.001 | | | | | |
| 855 | | | | | | | | | | | |
| 860 | | | | | 0.09 | 0.001 | | | | | |
| 865 | | | | | | | | | | | |
| 870 | | | | | 0.02 | 0.003 | | | | | |
| 875 | | | | | | | | | | | |
| 880 | | | | | 0.13 | 0.001 | | | | | |
| 885 | | | | | | | | | | | |
| 890 | | | | | 0.02 | 0.001 | | | | | |
| 895 | | | | | | | | | | | |
| 900 | | | | | 0.03 | 0.003 | | | | | |
| 905 | | | | | | | | | | | |
| 910 | | | | | 0.09 | 0.002 | | | | | |
| 915 | | | | | | | | | | | |
| 920 | | | | | 0.04 | 0.001 | | | | | |
| 925 | | | | | | | | | | | |
| 930 | | | | | 0.01 | 0.002 | | | | | |
| 935 | | | | | | | | | | | |
| 940 | | | | | 0.06 | 0.001 | | | | | |
| 945 | | | | | | | | | | | |
| 950 | | | | | 0.05 | 0.002 | | | | | |
| 955 | | | | | | | | | | | |
| 960 | | | | | 0.05 | 0.002 | | | | | |
| 965 | | | | | | | | | | | |
| 970 | | | | | 0.07 | 0.002 | | | | | |
| 975 | | | | | | | | | | | |
| 980 | | | | | 0.10 | 0.002 | | | | | |
| 985 | | | | | | | | | | | |
| 990 | | | | | 0.06 | 0.001 | | | | | |
| 995 | | | | | | | | | | | |
| 1000 | | | | | 0.06 | 0.002 | | | | | |

FORM # 355
REVISED 10-62

Sheet 5 of 5

PROJECT BS & K

| | | |
|------------------------------|--------------------------|---------------|
| Coörd. : N | BEARING V_{out} | HOLE N° 315 |
| E | INCL. V_{out} | COLLAR ELEV. |
| START 8/23/67 COMPL. 9/14/67 | | DEPTH 1013.7' |

[illegible]

LOGGED BY F. Mack DATE

FORM # 355
REVISED 10-62

Sheet 1 of 5

PROJECT BS & K

| | | |
|---------------|------------------|--------------|
| Coörd. : N | BEARING Vertical | HOLE N° 315 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 5/25/67 | COMPL. 7/14/67 | DEPTH 123.7 |

[illegible]

LOGGED BY E. V. Clark DATE 10/1/54

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 5

PROJECT B S & K

[illegible]

[illegible]

PROJECT BS & K

| | | |
|---------------|----------------------|--------------|
| Coörd. : N | BEARING $\sqrt{2.4}$ | HOLE No 315 |
| E | INCL. $\sqrt{2.4}$ | COLLAR ELEV. |
| START 8/23/67 | COMPL. 9/11/67 | DEPTH 10437' |

| DESCRIPTION | Geol. | Area | INT. | C/R | Cu | Mo | % | % | oz | % | EQUV. | GROUPING — RMKS. |
|-------------|-------|------|------|-----|------|-------|---|---|----|---|-------|------------------|
| | | | | | | | | | | | | |
| 750- | | | | | | | | | | | | |
| 760 | | | | | 0.03 | 0.001 | | | | | | |
| 760- | | | | | | | | | | | | |
| 770 | | | | | 0.02 | 0.002 | | | | | | |
| 770- | | | | | | | | | | | | |
| 780 | | | | | 0.05 | 0.001 | | | | | | |
| 780- | | | | | | | | | | | | |
| 790 | | | | | 0.04 | 0.001 | | | | | | |
| 790- | | | | | | | | | | | | |
| 800 | | | | | 0.05 | 0.002 | | | | | | |
| 800- | | | | | | | | | | | | |
| 810 | | | | | 0.04 | 0.002 | | | | | | |
| 810- | | | | | | | | | | | | |
| 820 | | | | | 0.05 | 0.002 | | | | | | |
| 820- | | | | | | | | | | | | |
| 830 | | | | | 0.04 | 0.002 | | | | | | |
| 830- | | | | | | | | | | | | |
| 840 | | | | | 0.04 | 0.001 | | | | | | |
| 840- | | | | | | | | | | | | |
| 850 | | | | | 0.05 | 0.001 | | | | | | |
| 850- | | | | | | | | | | | | |
| 860 | | | | | 0.09 | 0.001 | | | | | | |
| 860- | | | | | | | | | | | | |
| 870 | | | | | 0.02 | 0.003 | | | | | | |
| 870- | | | | | | | | | | | | |
| 880 | | | | | 0.13 | 0.001 | | | | | | |
| 880- | | | | | | | | | | | | |
| 890 | | | | | 0.02 | 0.001 | | | | | | |
| 890- | | | | | | | | | | | | |
| 900 | | | | | 0.03 | 0.003 | | | | | | |
| 900- | | | | | | | | | | | | |
| 910 | | | | | 0.09 | 0.002 | | | | | | |
| 910- | | | | | | | | | | | | |
| 920 | | | | | 0.04 | 0.001 | | | | | | |
| 920- | | | | | | | | | | | | |
| 930 | | | | | 0.04 | 0.002 | | | | | | |
| 930- | | | | | | | | | | | | |
| 940 | | | | | 0.06 | 0.001 | | | | | | |
| 940- | | | | | | | | | | | | |
| 950 | | | | | 0.05 | 0.002 | | | | | | |
| 950- | | | | | | | | | | | | |
| 960 | | | | | 0.05 | 0.002 | | | | | | |
| 960- | | | | | | | | | | | | |
| 970 | | | | | 0.07 | 0.002 | | | | | | |
| 970- | | | | | | | | | | | | |
| 980 | | | | | 0.10 | 0.002 | | | | | | |
| 980- | | | | | | | | | | | | |
| 990 | | | | | 0.06 | 0.001 | | | | | | |
| 990- | | | | | | | | | | | | |
| 1000 | | | | | 0.06 | 0.002 | | | | | | |

PROJECT BS & K

| | | |
|------------------------------|--------------|--------------|
| Coörd. : N | BEARING Vert | HOLE N° 315 |
| E | INCL. Vert | COLLAR ELEV. |
| START 8/23/67 COMPL. 9/14/67 | | DEPTH 1013.7 |

[illegible]

LOGGED BY F. Mack & Vic Hollister DATE 12/1/54

Dear Abe

I was only in Tucson for a few days before being sent up to see Pollyanna. But I did see the assays on # 315 to $\pm 500'$. They show a significant and statistically important increase in copper as depth is gained. I was dismayed to hear that the hole was to be stopped at 1000' for budget reasons, regardless of what was encountered. There was nothing I could do about it until I get back. I saw no assays from 212. Has it been split? What is Mack doing? I haven't seen him for 3 weeks.

See you next week -

Vii

PROJECT Atlas Mine - BS&K Mining Co., Location Hole for BS&K 14.

| | | |
|------------------------------|--------------|--------------|
| Coörd. : N | BEARING Vert | HOLE N° 304 |
| E | INCL. Vert | COLLAR ELEV. |
| START 8-16-65 COMPL. 8-18-65 | | DEPTH 162' |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % S | % Zn | % Pb | % Ag | % Au | EQUIV. | GROUPING — RMKS. |
|--|-------|-------|------|------|------|------|-----|------|------|------|------|--------|------------------|
| <u>0-40' Quartz Monzonite Porphyry, Brown, Oxide zone</u> Porphyritic, hard, silicified, with trace sericite. Original sulfide content was 5%, now entirely oxidized. No Copper, minerals recognized. Fracturing is very strong, with original Sulfide confined to fractures. | 0 | | | | | | | | | | | | |
| | 10 | 25 | N11 | .001 | | | | | | | | | |
| | 10 | | | | | | | | | | | | |
| | 20 | 50 | N11 | Tr | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 30 | 80 | N11 | N11 | | | | | | | | | |
| <u>40-70 Quartz Monzonite Porphyry, Brown, Mixed zone.</u> Porphyritic, hard, strongly silicified, No sericite. Veinlets of pyrite and limonite with rare quartz. No copper visible. Rock badly shattered but healed with pyrite veinlets. | 30 | | | | | | | | | | | | |
| | 40 | 90 | N11 | .001 | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 50 | 85 | .01 | .001 | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 60 | 90 | N11 | .002 | | | | | | | | | |
| | 60 | | | | | | | | | | | | |
| | 70 | 95 | .03 | Tr | | | | | | | | | |
| | 70 | | | | | | | | | | | | |
| | 80 | 90 | .04 | N11 | | | | | | | | | |
| <u>70-162 Quartz Monzonite Por.</u> Gray, Sulfide zone, Soft. Porphyritic, strong Argillic Alt, trace sericite, no Orthoclase, Total Sulfide content is 7%, mostly pyrite, 80% of Sulfide occurs in fractures, 20% is in dissemination. No Cu visible. | 80 | | | | | | | | | | | | |
| | 90 | 95 | .03 | N11 | | | | | | | | | |
| | 90 | | | | | | | | | | | | |
| | 100 | 90 | .02 | Tr | | | | | | | | | |
| | 100 | | | | | | | | | | | | |
| | 110 | 90 | .02 | Tr | | | | | | | | | |
| | 110 | | | | | | | | | | | | |
| | 120 | 95 | .03 | .001 | | | | | | | | | |
| | 120 | | | | | | | | | | | | |
| | 130 | 90 | .02 | Tr | | | | | | | | | |

LOGGED BY V F Hollister DATE 8-18-65

| | | |
|---------------|----------------|--------------|
| Coörd. : N | BEARING Vert | HOLE N° 303 |
| E | INCL. Vert | COLLAR ELEV. |
| START 8-15-65 | COMPL. 8-16-65 | DEPTH |

From 100' to 105'
25'
of .36 % Cu
.018% Mo

LOGGED BY VFH DATE 8-14-65

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

PROJECT Atlas Mine

| | | | | |
|---------------|----------------|------|--------------|-----|
| Coörd. : N | BEARING | Verf | HOLE N° | 303 |
| E | INCL. | Verf | COLLAR ELEV. | |
| START 7-18-65 | COMPL. 8-16-66 | | DEPTH | 170 |

[illegible]

LOGGED BY WJH DATE 8-16-65

CERTIFICATE OF ASSAY

BS&K

FORM 311 M.L.Q. 13

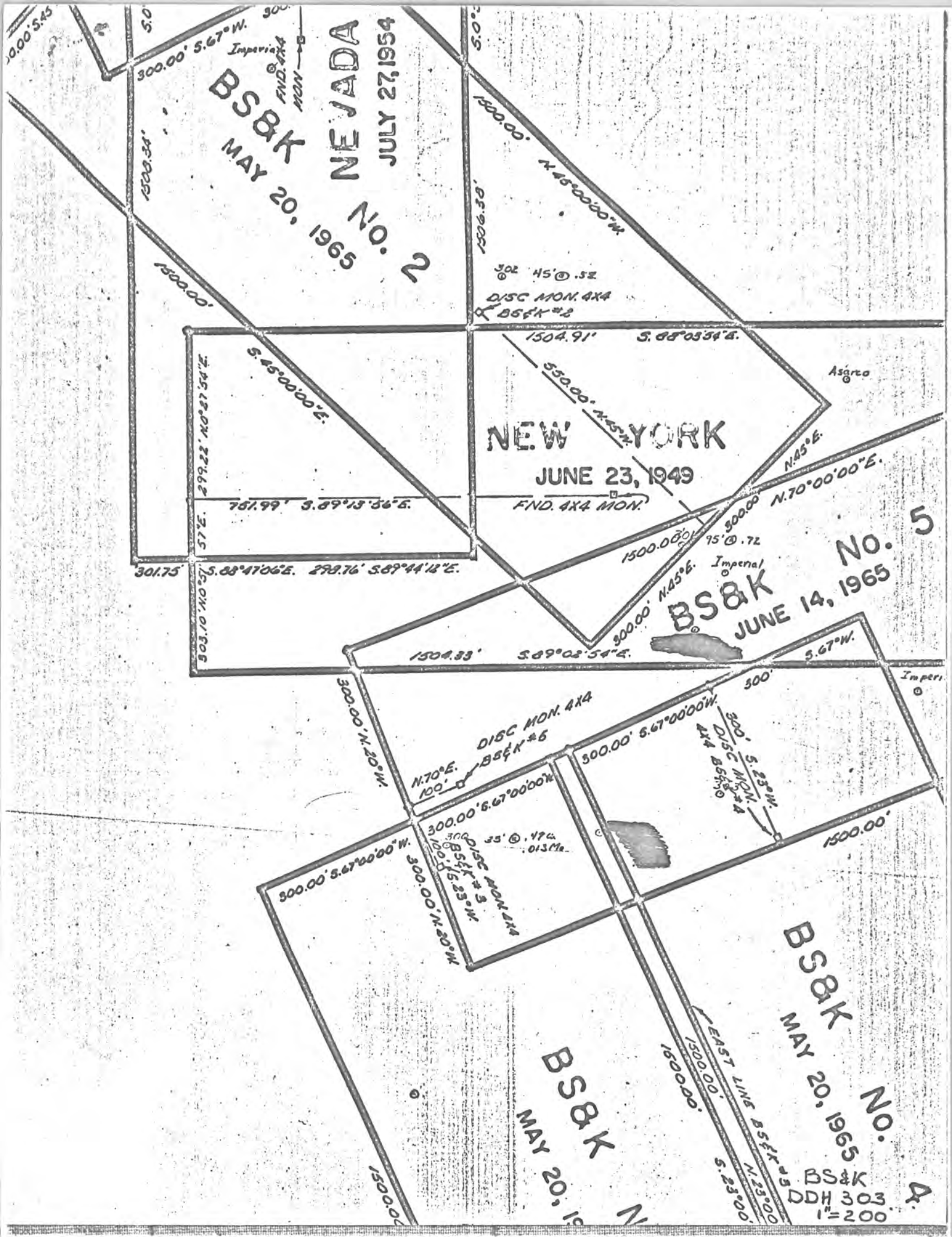
VFA

August 18, 1965

1960-1961

FORM 311 M.L.

E.a.n



NEVADA
BS&K
MAY 20, 1965
No. 2
JULY 27, 1954

NEW YORK
JUNE 23, 1949

BS&K
JUNE 14, 1965
No. 5

BS&K
MAY 20, 1965
No. 4
BS&K
DDH 303
1"=200'

ASSAY-GEOLOGY COMPOSITE DRILL LOG

Location?

Sheet 1 of 2

PROJECT Atlas Mine, BSAK Mining Co., Drill hole for BSAK 13

| | | |
|-----------------------------|--------------|--------------|
| Coord. : N | BEARING Vert | HOLE N° 308 |
| E | INCL. Vert | COLLAR ELEV. |
| START 9-8-65 COMPL. 9-10-65 | Nx wireline | DEPTH 167' |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | % | % | EQUV. | GROUPING—RMKS. |
|---|-------|-------|------|-----|------|------|---|---|---|---|-------|--|
| 0-80 Dacite Porphyry, Red, Oxide zone, Hard, Porphyritic, fine grained, Originally 47% total sulfide, 80% in strgs, 20% in diss. Very rare sericite. Some traces MoS ₂ 30'-40'. | | 0 | | | | | | | | | | from 0-90 Average for Oxide is .05 Cu, .007 Mo |
| | | 10 | 67 | .03 | .017 | | | | | | | |
| | | 10 | | | | | | | | | | |
| | | 20 | 85 | .03 | .009 | | | | | | | |
| 80-105 Dacite Porphyry, Gray Mixed oxide + sulfide zone Hard, porphyritic, fine grained, originally 5% sulfide, 80% on strgs, 20% as diss, Oxide follows strgs. Some MoS ₂ visible in strgs. | | 20 | | | | | | | | | | |
| | | 30 | 92 | .03 | .009 | | | | | | | |
| | | 30 | | | | | | | | | | |
| | | 40 | 95 | .03 | .008 | | | | | | | |
| 105-167 Dacite Porphyry, Gray Hypogene zone, Hard, fine grained, porphyritic, 47% total sulfide. Traces chalcocite or pyrite. MoS ₂ visible in strgs; strongest at 103-105' | | 40 | | | | | | | | | | |
| | | 50 | 100 | .04 | .002 | | | | | | | |
| | | 50 | | | | | | | | | | |
| | | 60 | 90 | .07 | .004 | | | | | | | |
| | | 60 | | | | | | | | | | Average 90' to 167' is .05 Cu .020 Mo |
| | | 60 | | | | | | | | | | |
| | | 70 | 87 | .06 | .001 | | | | | | | |
| | | 70 | | | | | | | | | | |
| | | 70 | | | | | | | | | | |
| | | 80 | 80 | .05 | Tr | | | | | | | |
| | | 80 | | | | | | | | | | |
| | | 90 | 90 | .07 | .011 | | | | | | | |
| | | 90 | | | | | | | | | | |
| | | 95 | 90 | .07 | .028 | | | | | | | |
| | | 95 | | | | | | | | | | |
| | | 100 | 95 | .07 | .018 | | | | | | | |
| | | 100 | | | | | | | | | | |
| | | 105 | 95 | .08 | .080 | | | | | | | |
| | | 105 | | | | | | | | | | |
| | | 110 | 90 | .07 | .010 | | | | | | | |
| | | 110 | | | | | | | | | | |
| | | 115 | 85 | .05 | .003 | | | | | | | |
| | | 115 | | | | | | | | | | |
| | | 120 | 80 | .05 | .016 | | | | | | | |
| | | 120 | | | | | | | | | | |
| | | 125 | 90 | .05 | .003 | | | | | | | |

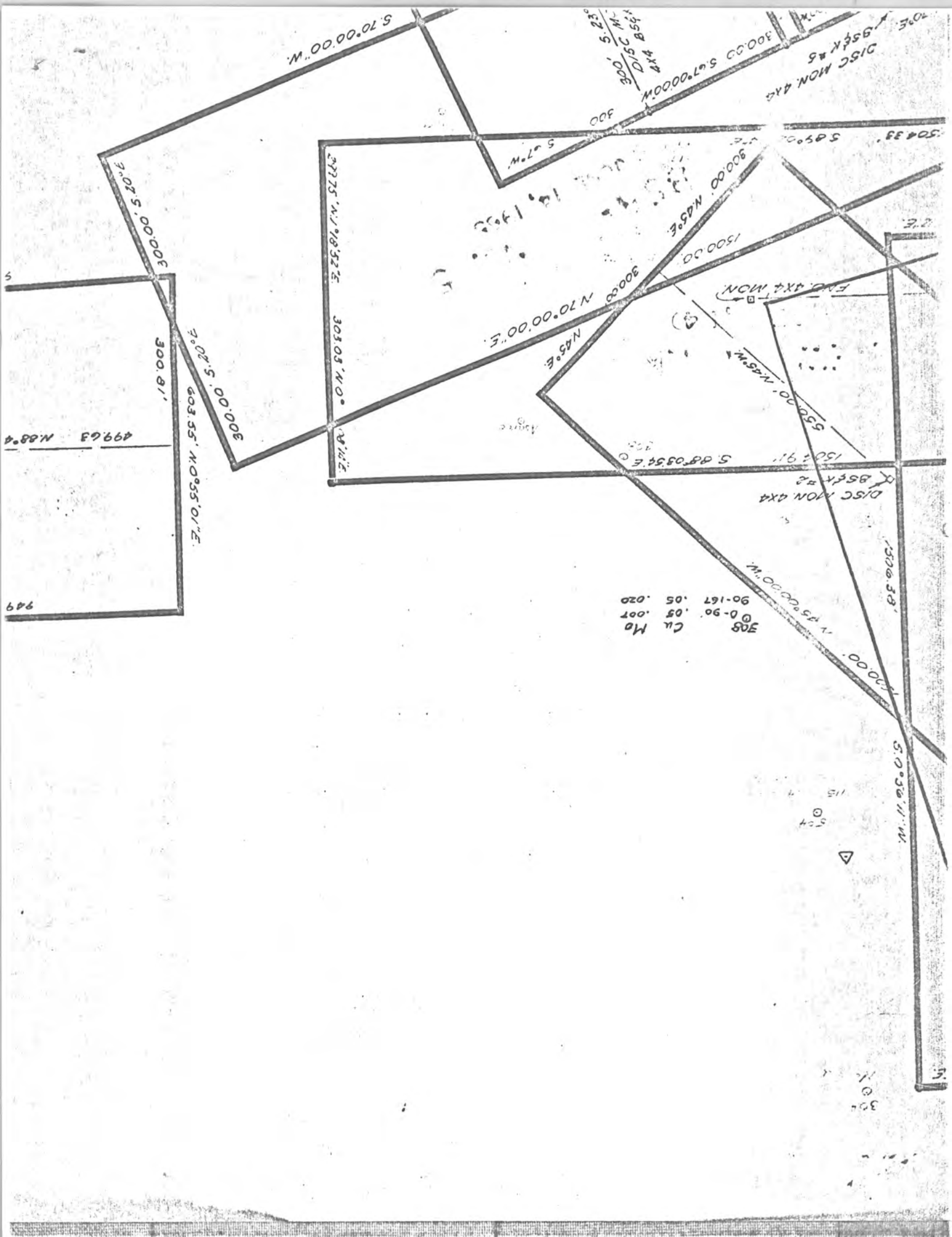
LOGGED BY V.F. Hollister DATE 9-13-65

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

| | | |
|------------|---------|--------------|
| Coörd. : N | BEARING | HOLE N° 308 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

LOGGED BY VFH DATE 9-13-65



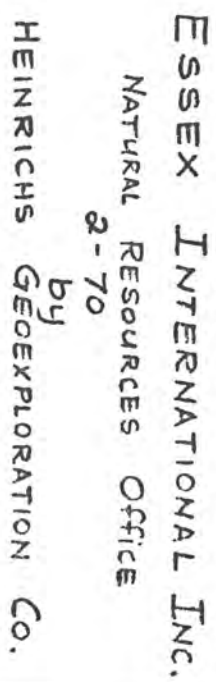
$$\begin{array}{r} 29 \overline{) 28} \\ 52 \overline{) 55} \end{array}$$
$$\begin{array}{r} 28 \overline{) 27} \\ 33 \overline{) 34} \end{array}$$


PLATE 1

ASSAY—GEOLOGY COMPOSITE DRILL LOG

FORM # 355
REVISED 10-62

PROJECT Atlin Mtn., B.S. & P. Co., B.S. & P. Co. Sheet 1 of 3

| | | |
|--|--------------|---------------------|
| Coörd. : N | BEARING | HOLE NO. <u>300</u> |
| E | INCL. | COLLAR ELEV. |
| START <u>7-6-65</u> COMPL. <u>7-6-65</u> | NO. <u>1</u> | DEPTH <u>125</u> |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % Ag | % Au | % Ni | % Co | % Mn | % Fe | % Pb | % Zn | % S | % O ₂ | % EQUV. | GROUPING—RMKS. |
|---|-------|-------|------|-----|------|------|------|------|------|------|------|------|------|------|-----|------------------|---------|----------------|
| 0-90 Dacite Porphyry, Brown fine grained, soft, porphyritic, highly fractured, numerous qtz veinlets, Arg. Alteration, Original Sulfide was 1.3%, entirely in fractures. Core very badly broken. No green or blue copper minerals visible, though entire section is oxide. | | 0 | | | | | | | | | | | | | | | | |
| | | 10 | 56 | | .08 | .002 | | | | | | | | | | | | |
| | | 10 | 70 | | .08 | .002 | | | | | | | | | | | | |
| | | 30 | 68 | | .09 | .002 | | | | | | | | | | | | |
| | | 30 | 76 | | .14 | .001 | | | | | | | | | | | | |
| | | 40 | 86 | | .14 | .008 | | | | | | | | | | | | |
| | | 50 | 90 | | .16 | .004 | | | | | | | | | | | | |
| | | 60 | 86 | | .15 | .009 | | | | | | | | | | | | |
| | | 70 | 85 | | .16 | .006 | | | | | | | | | | | | |
| | | 80 | 87 | | .17 | .009 | | | | | | | | | | | | |
| 90-95 Dacite Porphyry, Green Mixed oxide and sulfide. Soft, porphyritic, strong arg. Alt., numerous qtz veinlets. Copper occurs as oxide and chalcocite. | | 90 | 91 | | .94 | .025 | | | | | | | | | | | | |
| | | 95 | 86 | | .77 | .015 | | | | | | | | | | | | |
| | | 100 | 83 | | .51 | .010 | | | | | | | | | | | | |
| | | 105 | 80 | | .60 | .007 | | | | | | | | | | | | |
| 95-125 Dacite Porphyry Supergene zone. Gray, soft copper occurs as chalcocite. | | 110 | 87 | | .37 | .008 | | | | | | | | | | | | |
| | | 115 | 80 | | .12 | .011 | | | | | | | | | | | | |
| | | 120 | 88 | | .11 | .013 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Average
oxide
is
.13 Cu
.005 Mo
for
90 feet

oxide
Mixed
Supergene
Sulfide

Average grade of
Mixed and supergene
is 35 feet of

.47 Cu
.013 Mo

Total Sulfide is 2.3%
Copper occurs as oxide.

LOGGED BY V.F.H. DATE 8-8-65

FORM # 355
REVISED 10-62

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 2

PROJECT Atlas Mine, BSGK Mining Co., New York Claim

| | | | |
|--------------|----------------|------|--------------|
| Coord. : N | BEARING | Vert | HOLE N° |
| E | INCL. | Vert | 501 |
| START 8-9-65 | COMPL. 8-10-65 | | COLLAR ELEV. |
| | | | 203 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | % | % | % | EQUV. | GROUPING—RMKS. |
|---|-------|-------|------|-----|------|------|---|---|---|---|---|-------|----------------|
| <u>0-100' Dacite Porphyry -</u> <u>Brown - oxide zone</u> Soft, strong Argillic Alt., Porphyritic, fine grained. Original Sulfide was \pm 4%, 90% in fractures, 10% diss. Trace sericite lining fractures. Qtz veinlets rare. Some green Cu stain visible. | | 0 | | | | | | | | | | | |
| | | 10 | 20 | | .12 | .006 | | | | | | | 0'-30' |
| | | | | | | | | | | | | | .16 Cu |
| | | | | | | | | | | | | | .09 Mo |
| | | 10 | | | | | | | | | | | |
| | | 20 | 50 | | .20 | .012 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 20 | | | | | | | | | | | |
| | | 30 | 67 | | .17 | .010 | | | | | | | |
| | | | | | | | | | | | | | |
| <u>100-110 Dacite Porphyry</u> <u>Mixed Oxide and Sulfide</u> Brown, Soft, fine grained, Porphyritic, Wk sericite and strong Arg. Alt. Copper occurs as Malachite and chalcocite, Core badly shattered. | | 30 | | | | | | | | | | | 30'-50' |
| | | 40 | 80 | | .18 | .009 | | | | | | | .17 Cu |
| | | | | | | | | | | | | | .011 Mo |
| | | 40 | | | | | | | | | | | |
| | | 50 | 85 | | .16 | .014 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 50 | | | | | | | | | | | |
| | | 60 | 80 | | .11 | .016 | | | | | | | 50-80 |
| | | | | | | | | | | | | | .12 Cu |
| | | | | | | | | | | | | | .016 Mo |
| <u>110-125 Dacite Porphyry</u> <u>Supergene Sulfide zone</u> Dark gray, soft, weak Sericite and strong Arg. Alt. Copper occurs as chalcocite with weak pyrite, mostly in seams. Core badly broken. | | 60 | | | | | | | | | | | |
| | | 70 | 86 | | .12 | .016 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 70 | | | | | | | | | | | |
| | | 80 | 90 | | .13 | .017 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 80 | | | | | | | | | | | 80'-100' |
| | | 90 | 87 | | .24 | .010 | | | | | | | .17 Cu |
| | | | | | | | | | | | | | .009 Mo |
| | | 90 | | | | | | | | | | | |
| <u>110-125 Dacite Porphyry</u> <u>Supergene Sulfide zone</u> Dark gray, soft, weak Sericite and strong Arg. Alt. Copper occurs as chalcocite with weak pyrite, mostly in seams. Core badly broken. | | 100 | 90 | | .10 | .009 | | | | | | | |
| | | | | | | | | | | | | | |
| | | 100 | | | | | | | | | | | |
| | | 105 | 90 | | .15 | .013 | | | | | | | 100'-125' |
| | | 105 | | | | | | | | | | | .83 Cu |
| | | 110 | 85 | | 1.31 | .040 | | | | | | | .018 Mo |
| | | 110 | | | | | | | | | | | |
| | | 115 | 86 | | 1.74 | .019 | | | | | | | |
| | | 115 | | | | | | | | | | | |
| | | 120 | 82 | | .49 | .003 | | | | | | | |
| | | 120 | | | | | | | | | | | |
| | | 125 | 37 | | .45 | .013 | | | | | | | |

ASSAY—GEOLOGY COMPOSITE DRILL LOG

PROJECT Atlas Mine

Sheet 2 of 2

| | | |
|------------|---------|--------------|
| Coord. : N | BEARING | HOLE N° 300 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH 205 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | Gr | Gr | % | EQUV. | GROUPING — RMKS. |
|--|-------|-------------------------------------|------|-----|------|------|---|---|----|----|---|-------|------------------|
| 125-206 Dacite Porphyry Supergene zone as above | | 125 | | | | | | | | | | | |
| | | 130 | 80 | | 1.21 | .006 | | | | | | | 125'-150' |
| | | 135 | 90 | | .70 | .003 | | | | | | | .74 |
| | | 140 | 85 | | .65 | .009 | | | | | | | .009 Mo |
| | | 145 | 70 | | .39 | .015 | | | | | | | |
| | | 150 | 65 | | .76 | .009 | | | | | | | |
| | | 155 | 56 | | .47 | .013 | | | | | | | 150'-175' |
| | | 160 | 72 | | .38 | .043 | | | | | | | .49 Cu |
| | | 165 | 80 | | .36 | .024 | | | | | | | .027 Mo |
| | | 170 | 85 | | .51 | .040 | | | | | | | |
| | | 175 | 86 | | .72 | .016 | | | | | | | |
| | | 180 | 85 | | .50 | .010 | | | | | | | 175'-200' |
| | | 185 | 85 | | .57 | .052 | | | | | | | .69 Cu |
| | | 190 | 80 | | .83 | .011 | | | | | | | .018 Mo |
| | | 195 | 90 | | 1.12 | .013 | | | | | | | |
| | | 200 | 92 | | .40 | .004 | | | | | | | |
| | | 205 | 85 | | .19 | .006 | | | | | | | |
| | | End of hole | | | | | | | | | | | |
| | | Average Mo for Hole is 0.0153 Mo. | | | | | | | | | | | |
| | | Average from 105 to 200' is .72% Cu | | | | | | | | | | | |
| | | .018 Mo | | | | | | | | | | | |

| | | |
|------------------------------------|----------------|-----------------|
| Coörd. : N | BEARING | HOLE N° RDH 309 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 22 Mar. 66 COMPL. 22 Mar 66' | | DEPTH 110' |

LOGGED BY BLW DATE 22 Mar. 66

ASSAY—GEOLOGY COMPOSITE DRILL LOG

PROJECT B. S. & K.

[illegible]

LOGGED BY BLW DATE 22 Mar. '66

BS&K
HEINRICHS GEO-EX
DEEP EXPLORATION APPRAISAL

by
John E. Kinnison
Chief Geologist

March 26, 1970

Geo-Comp Exploration, Inc.
1706 W. Grant Road
Tucson, Arizona 85705
(602) 623-5448



GEO-COMP EXPLORATION, INC.



GEO-COMP EXPLORATION, INC.

SUBSIDIARY OF G.F.I. COMPUTER INDUSTRIES, INC.

1706 WEST GRANT ROAD • TUCSON, ARIZONA 85705 • Tel. 602/623-5448

EXPLORATION FOR NATURAL RESOURCES

March 26, 1970

Mr. Grover Heinrichs
Heinrichs Geoexploration Company
808 W. Grant Road
Tucson, Arizona 85705

Dear Mr. Heinrichs:

On the 24th of this month, you inquired if I was familiar with the Silver Bell Mining District, and in particular, with the area between the El Tiro Pit operated by American Smelting and Refining Company, and land held in the vicinity of the Atlas Mine by the BS&K Company. As I then informed you, I have had considerable acquaintance with the Silver Bell district in general, gained while employed by ASARCO. This company, as you are aware, has accumulated much knowledge concerning the geology and mineralization of this area, gradually collected during exploration and operation of the Asarco mines. Although I am not ethically free to divulge details of ore occurrence on Asarco ground, I have drawn freely on my general experience in the district. Also, as I informed you, I had not previously been into the specific area of BS&K ground which is now under consideration, and thus made a brief field inspection to establish certain geologic features in the subject area.

You informed me that a client of yours was considering the acquisition of BS&K claims north of El Tiro, and that this client desired to have an independent geologic evaluation of the exploration possibilities within these claims, with special emphasis on the possibilities to be found at considerable depth beneath the surface.

I herewith present my findings and conclusions.

SUMMARY AND RECOMMENDATIONS

The "corridor" of BS&K claims, as shown on the attached sketch, is without question a part of the same structural block as the area of the thin chalcocite blanket drilled by Asarco near the Old Silver Bell Camp. The character of the leached capping is similar in both areas, and the presence of a chalcocite blanket beneath the BS&K claims is thus not surprising. The total sulphide content, estimated from the leached capping, is less than 3%.

The I.P. anomaly shown by Hanna's work lies to the north of the BS&K claims, and does not appear to be reflected by the outcrops on those claims.

Our Mr. Fink has briefly examined the Hanna I.P. data, and in his opinion the psuedo section plot of this data suggests that the strong anomaly is associated with sulphides at relatively shallow depths, and that the sulphide content may decrease with increasing depth. He also notes that the strongest response is on ASARCO's ground to the north of the BS&K "corridor", and that the area of strongest response is probably limited in areal extent. However, I.P. data indicate that the rock surrounding the I.P. anomaly also contains sulphides, but of lesser concentration. This conforms to conditions I observed in the field.



In any event, it is questionable whether I.P. methods could respond to the only ore-grade target at the probable depth involved, say, 1500 feet or greater.

I see no chance for ore at depth within the dacite porphyry, below the near surface chalcocite blanket.

There is a remote possibility the Mescal limestone may underlie the dacite at a depth of 1500 feet. If this is actually the case, the limestone might have responded, within the limits of pervasive mineralization, as a favorable host rock. Limestones near the El Tiro pit average a little under 1% copper. The Mescal limestone in this area (if present at all) would not exceed 150 feet in thickness. Such a thin host rock, at depths of 1500 feet or more, would have to be of considerably higher grade to have intrinsic mining value.

I must emphasize that the geologic hazards are extremely great. The only hope of improved mineralization at depth lies with the Mescal limestone, and its mere presence is only a theoretical possibility. Therefore, I cannot recommend investment in the subject property, if such investment is predicated on deep exploration possibilities.



FIELD EXAMINATION

Tuesday, March 24, 1970, I made a brief inspection of the southern corridor of claims held by BS&K to determine the nature and extent of rock and alteration. This corridor is, according to claim maps furnished me by Grover Heinrichs, shown to be encircled by ground held by the American Smelting and Refining Company.

I first revisited an area on ASARCO ground to the south, near the old Silver Bell campsite, with which I was already familiar. In this area I am aware that ASARCO has drilled out a medium grade - about 0.6% Cu - chalcocite blanket about 50 feet beneath the level of the old Silver Bell camp. The rock is here made of dacite porphyry, which in this area is known to have a sill-like configuration, and which on the basis of a few deep drill holes on ASARCO ground is apparently about 1500 feet thick. The leached capping over the chalcocite zone on ASARCO's ground is strongly altered, but with relatively little indication (by the color and nature of the limonite present) that chalcocite is in fact beneath this capping. The primary mineralization, consisting of chalcopyrite, is relatively low, however, usually grading about 0.1 to 0.2% copper.

The dacite extends northerly to the BS&K ground, in their isolated



corridor, and is there similarly altered. Progressing eastward across this corridor however, the rock alteration and mineralization fades and then terminates. The attached sketch shows the approximate eastern limits of strong mineralization with indication of the presence of sulphides prior to oxidation and leaching. Although there are a few scattered fissure zones which have been mineralized, easterly of the contact which I have drawn, these are isolated from the main zone of alteration. Thus, it appears probable that the chalcocite zone will not extend much further east than the line which I have shown as the margin of strong mineralization. Any possibility of ore occurrence at depth must be considered with respect to the limits of pervasive mineralization as exposed at the surface.

I noted a single breccia pipe with a larger quantity of oxidized sulphide cavities than the surrounding dacite. The limonite filling these cavities is indicative of derivation from copper sulphides, and may well represent a higher copper content than that of the surrounding dacite porphyry. Unfortunately, the breccia is too small to be of commercial interest.



DISCUSSION

ASARCO had, during the time I was employed by them, done interspaced drilling to substantiate values from old churn drill holes sunk prior to 1920, in the vicinity of the old Silver Bell camp. In this area, a relatively low grade chalcocite blanket, fairly thin, lies approximately 50 feet beneath the surface of the old Silver Bell campsite. The mineralization occurs in dacite porphyry. The leached capping over this zone of chalcocite on ASARCO's ground is not, in itself, diagnostic of the existence of this chalcocite blanket, although strong pervasive rock alteration and evidence of former sulphides is present in the leached capping. The narrow corridor of BS&K claims now in question lies on an extension of the structural block containing this dacite porphyry, and the leached capping is similar to that near the old Silver Bell camp. It is not surprising, then, that drill holes on the BS&K ground show low to medium grade chalcocite at a shallow distance below the surface.

The following points are pertinent to consideration of possible deep exploration targets.

1. The dacite porphyry, as known through mining and drilling in the Silver Bell area, is one of the less favorable host rocks for disseminated mineralization. The grade of primary copper, as chalcopyrite, is



generally less than 0.2% copper, and is frequently less than 0.1%. Drill holes which have penetrated considerable distance into some of the dacite porphyry bodies do not show any tendency to increase in grade with increasing depth. Further, I should point out that, in the general case of porphyry copper deposits, an increase in grade with depth can be found in a very few deposits only. The vast majority may show vertical variations in grade, but rarely is there a significant increase or decrease in the amount of copper when explored vertically. I see no reason to expect an improvement with depth of copper content in the dacite on the BS&K claims.

2. The dacite porphyry in the vicinity of the old Silver Bell camp, and probably also on the BS&K claims, is evidently a low-dipping sill, rather than a plug with a great vertical depth. A few deep ASARCO drill holes near the El Tiro pit suggest that this sill is over 1500 feet thick.

The general habit of the dacite porphyry at Silver Bell is to intrude along bedding planes of the sedimentary rocks, and thus split the sedimentary section.

On Jesuit Peak, west of the old Silver Bell camp, the dacite porphyry appears to have intruded beneath the Cambrian Bolsa quartzite. Throughout much of southern Arizona, the Bolsa quartzite rests on the pre-Cambrian Apache group sedimentary series, of which one member - the Mescal limestone - is a favorable host for copper mineralization in many districts. In the Silver Bell area, the Apache group has been partly eroded prior to deposition of the Bolsa quartzite. Thus, across the



valley to the northwest the full section of Apache group is present, while about 5 miles north of the Atlas mine a much thinner section is present, and in the Waterman mountains south of Silver Bell the Apache group is absent. There is a remote chance, therefore, that on the BS&K ground the Apache group and Mescal limestone might have been present, and thus been split from the Bolsa quartzite by the intervening dacite porphyry sill. If the Mescal limestone was preserved from pre-Bolsa quartzite erosion, and is actually present beneath the sill, there is a possibility that it might be mineralized with grades approaching 1% Cu. If it is assumed that the boundary of mineralization as seen at the surface may be projected vertically downward, then the potential for mineralized limestone at depth would occupy that portion of the BS&K corridor to the west of the limits of mineralization as shown on the attached sketch.

Even if the Mescal limestone is present beneath the sill, and is mineralized by chalcopyrite approaching the average of the mineralization in limestone at El Tiro - about 1% - its value, other than as a negotiating lever with ASARCO, is doubtful. It is my opinion that expenditure of option money, to say nothing of the cost of drilling, is an unwise investment in view of the geologic uncertainties listed above, combined with the questionable value of deep mineralization in the Mescal limestone.



Mr. Grover Heinrichs

-9-

March 26, 1970

I trust that this letter will satisfy the purposes of your client.

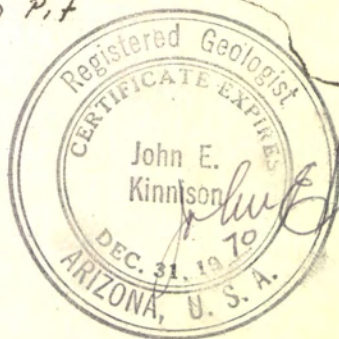
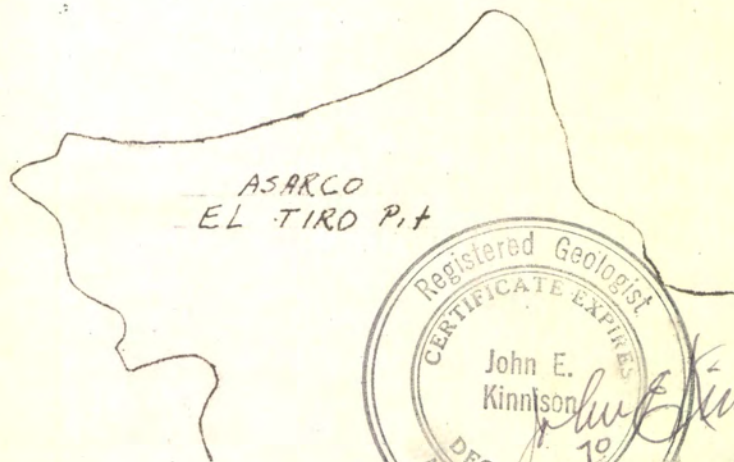
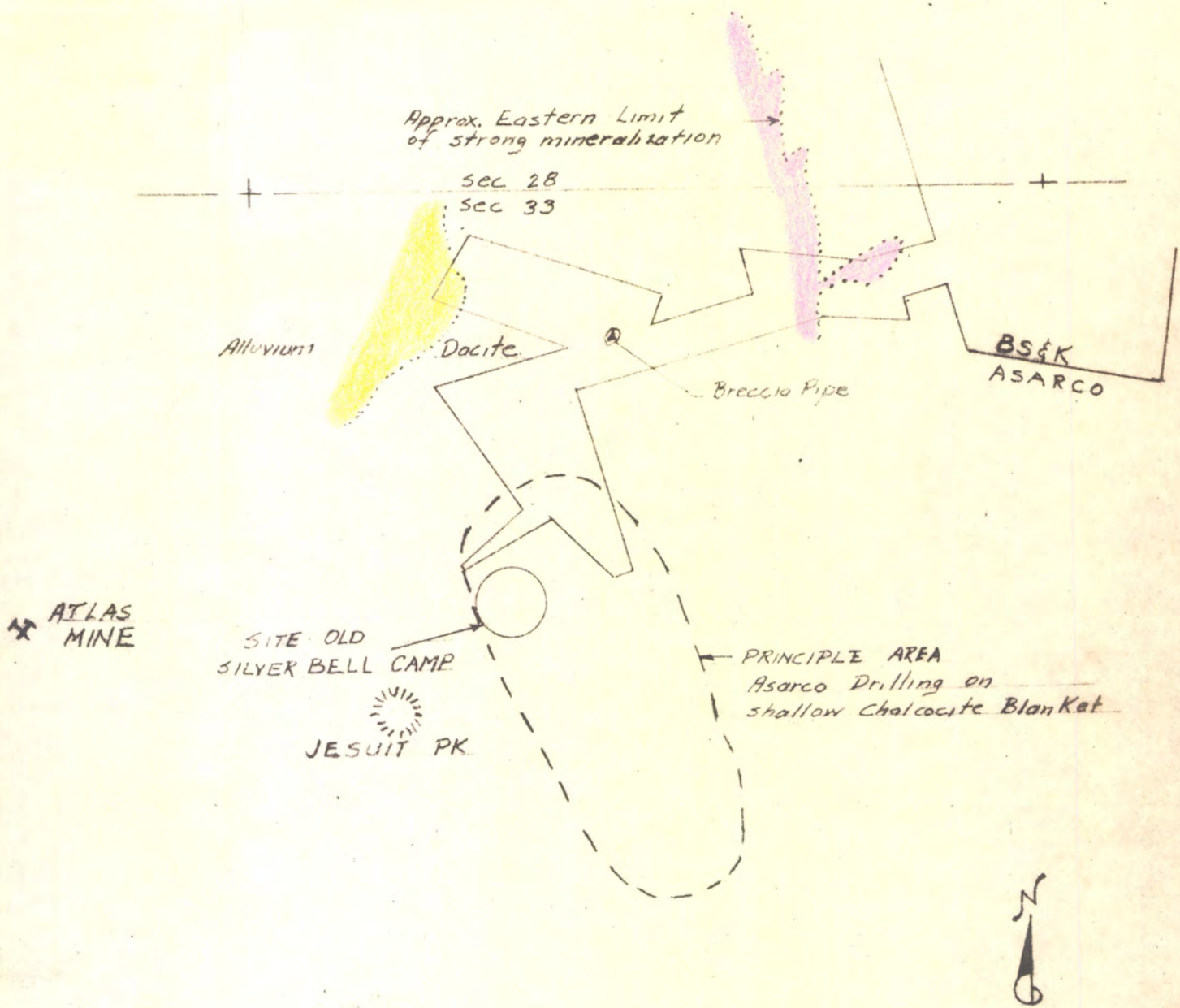


John E. Kinnison
Chief Geologist
Geo-Comp Exploration, Inc.
Registered Geologist No. 4822
State of Arizona

JEK:cc
Attachments



GEO-COMP EXPLORATION, INC.



GEO-COMP EXPLORATION

GEOLOGIC SKETCH
BS&K AREA

JE Kinnison March 1970

1" = 1000'

John E. Kinnison

KINNISON, JOHN E.

Vice President and Chief Geologist, Geo-Comp Exploration, Inc.

Tucson, Arizona

Registered Geologist, State of Arizona

Education:

M.S. in Geology, University of Arizona, 1958.

B.S. in Mining Engineering, University of Arizona, 1953.

Experience:

May, 1969 - Present: Chief Geologist, Geo-Comp Exploration.

Appointed Vice President in November, 1969. My duties

with Geo-Comp have been of four categories:

- a. I directed geologic mapping of certain properties held by General Earth Minerals, an in-house corporation, and formulated plans for exploration by drilling.
- b. I have worked with my staff geologists, in the office and in the field, both as a director of a technical development program designed to raise overall expertise of the staff in mining and geological matters, and also as associates in the examinations of specific mineral properties. This mutual association of the past months has materially aided in welding together

an expert staff who are able to work together and independently, as the situation demands.

- c. I have examined mineral properties in the western U.S. and Canada, for our clients, and made recommendations thereon. Many of these examinations have required initial feasibility studies leading to an estimated economic outcome.
- d. I have begun the initial steps leading to programs for regional exploration, as a forerunner of impending mineral exploration funds.

1957 - April, 1969: Geologist, Southwestern Exploration Department, American Smelting and Refining Company.

Work included a detailed review of drill hole data at the Mission Mine and on the San Xavier Indian Reservation.

From this review, aided by petrographic studies, a clarification was made of rocks and their alteration products into correlative units, and preparation of cross-sections and plan maps which formed the basis for ore reserve calculation.

A small exploration shaft was sunk and several thousand feet of drifts, raises, and diamond drill holes were cut prior to developing the open pit which now exists. Had major responsibility for this work and reporting thereon in a final report.

Subsequently mapped in detail the Twin Buttes district, and

four other porphyry copper districts. Geologic reconnaissance which was conducted led to the discovery of three previously unknown porphyry copper deposits, of which two are now under development. During 1960, supervised a small drilling program and later was charged with all field supervision in Casa Grande area, accounting for about 90 drill holes and an expenditure of more than one million dollars. Four rotary and four diamond drills were operated three shifts. Headed a staff consisting of 17 junior geologists and samplers and shared with the drilling engineer the responsibility of directing all activities pertaining to the quality of the sample, including control of mud chemistry, cementing, bit types, and when necessary, drilling details such as rotary speed, weight on the bit, etc. Following 1964, work consisted of special assignments of short tenure and wide diversity, ranging from prospect evaluations to detailed mineralogical distribution studies with the aid of expert consultants. Made commodity studies and price forecasts for mercury and uranium, and initiated exploration programs for the same. Beginning in 1966, ASARCO greatly expanded its staff, and duties included orientation and training of these new geologists. In April 1968, testimony was given for ASARCO in the dual capacity of witness and expert witness in the U.S. Court of Claims case #443-65 ASARCO, Plaintiff vs. United States of America,

defendant; a test case concerning income tax loss deduction of exploration monies. Preparation for this case consumed three months during 1967-1968.

1956: Civil Engineer, City of Tucson, City Engineering Department. Office studies related to city improvement projects. Work consisted largely of surveying calculations in "trouble spots" where surveys, public and private, did not close together; secondarily, writing legal land descriptions.

1955 - 1956: Geologist, U.S. Atomic Energy Commission, Globe, Arizona. Examination and mapping of small uranium mines and prospects, and general field reconnaissance. Logged drill core from Bureau of Mines drills on contract to A.E.C. In collaboration with R. Schwartz, prepared ore reserves of the Sierra Ancha district according to A.E.C. specifications, and recommended drill hole targets.

1954 - 1955: Geologist, Cyprus Mines Corporation. Examination of the Pima Mine near Tucson. Mapped underground levels, and the adjoining Daise Mine. Logged all old drill core as well as new drilling during option period. Surface churn drills and underground diamond drills. Compiled geologic maps and cross-sections for final report.

1952 - 1954: Geology teaching fellowship, University of Arizona, three semesters.

Societies:

Society of Economic Geologists

Society of Mining Engineers, A.I.M.E.

Past Chairman, Arizona Section, Mining Geology Division

Arizona Geological Society

Past Secretary

Publications and Papers:

"The Mission Copper Deposit, Arizona"; in the Wilson volume, Geology of the Porphyry Copper Deposits, South-western North America, edited by S.R. Titley and C.L. Hicks, pp 281-287, 1966.

"Probable Origin of the Mission Copper Deposit"; Soc. of Min. Eng. of A.I.M.E., Annual Meeting, 1963.

"Probable Origin of Mission Copper Deposit, Arizona"; A.I.M.E. pre-print No. 63133, 1963.

"Geology of the Mission Copper Deposit, Arizona"; A.I.M.E. Arizona section, Mining Geol. Division, Annual Meeting, 1961.

"Chaotic Breccias in the Tucson Mountains"; Geol. Soc. Am. Cordilleran section, Annual Meeting, 1959.

"Structure of the Saginaw Area, Tucson Mountains, Arizona"; Arizona Geol. Soc. Digest No. 2, pp 146-51, 1959.

"Chaotic Breccias in the Tucson Mountains, Arizona"; Abs., Bull., Geol. Soc. Am., Vol. 70, p 1727, 1959.

"Chaotic Breccias in the Tucson Mountains, Arizona"; Guide Book for Field Trips No. 2, Ariz. Geol. Soc., in collaboration with J.H. Courtright, 1959.

"Chaotic Breccias in the Tucson Mountains, Arizona";
Ariz. Geol. Soc. Digest No. 2, pp 49-57, 1959.

"The Lower Cretaceous Age of the Amole Arkose, Tucson
Mountains, Arizona"; Abs. Bull., Geol. Soc. Am., Vol. 65,
p 1235. In collaboration with D.L. Bryant, 1954.

"Alteration Features of Porphyry Copper Deposits"; Member
of panel discussion, Soc. of Min. Eng. of A.I.M.E.,
Annual meeting, 1963.

B S & K MINING COMPANY
PROPERTY

ESSEX INTERNATIONAL, INC.
Natural Resources File
5315 E. BROADWAY #104
TUCSON, ARIZONA 85711

Jan. 28, 1970

COPPER OXIDE PROPERTIES

Name of Property

B.S. & K. MINING CO.

No. 1

Location

Pima County, Arizona - 35 miles N and W of Tucson - Sections 20,21,28,29,30,31, 32 and 33 of T 11 S R 8 E - also sections 25 and 36 of T 11 S R 7 E.

Size of Property

Approximately 118 claims and fractional claims of which 6 are patented mill claims and 5 patented mining claims.

In addition there are 10 claims in conflict with ASARCO.

Ownership

B.S. & K. Mining Company.

Leased

None

Facilities

a - Accessibility - Improved roads to the mine. Paved road within 3 miles.

b - Air Fields - Tucson

c - Power - 3 phase, 11,000 volts, 650 KVA sub-station/460 V.

d - Telephone - Yes

- e - Housing - Limited
- f - Water - Can be developed on property.
- g - Labor - Available in the area.
- h - Climate - Mild - near Tucson
- i - Supply source - Tucson.

Type of Deposit

Quartz Monzonite intrusive into the sediment, contact metamorphic. Massive blanket occurrence outcropping at surface. Known depth 300'. Minerals of Cu are oxides and chalcocite. Assaying 0.08% Cu to more than 1% Cu.

Mine is a producer of Zn S and Cu S from veins and pods by underground mining methods.

Leaching tests conducted by Duval indicate good extractions of copper from oxides and chalcocite.

Open pit and/or open-cut mining appears to be feasible.

Duval has made an estimate of 5,000,000 tons containing 0.6% Cu and 5,000,000 tons of 0.15% Cu. Stripping ratio waste/ore = 0.4:1

POSSIBLE AVAILABLE
ARIZONA COPPER OXIDE PROPERTIES

Prepared by E.G.H. 1/19/70

| | | |
|-----|--|-----------------------------|
| #1 | B.S. & K | Pima Co. |
| #2 | Mame (Courtland-Gleeson Dist. Aztec Mining Co.) | Cochise Co. |
| #3 | Copper Butte (Mitchell) | Pinal Co. |
| #4 | Copper Buttes Min. Co. 137 N. White Mesa | Hoff-Tucson Coconino Co. |
| #5 | San Juan - Vern Teeter, Supt. Box 869 Safford | Graham Co. |
| #6 | North Star | Pinal Co. |
| #7 | Pima (Claims) Oxide (Annesley) | Pima Co. |
| #8 | Cuprite Mine Area | Pima Co. |
| #9 | Copper Mtn | Yuma Co. |
| #10 | Gibson (Kayser-Available) | Gila Co. |
| #11 | Hagen | Gila Co. |

OTHER POSSIBILITIES

Burno - Ira L. Mosely-Box 133
Wilcox, Ariz.

Strong & Harris Project - John Roscoe, Mgr
Continental Materials Corp. Box 11216
Emery Park Station, Tucson

Silver Ray - Walter Bopp, 43 S. 6th Ave. Tucson

Gold Hill - Dave McGee, Mgr, Little Hills Mines
Box 332, Oracle, Ariz.

Vekol Hills - Superior Oil - Pine Top, Ariz.

Zonia - Don F. Anderson, Proj. Mgr. Zonia Div.
McAlester Fuel Co. Kirkland

February 11, 1970

MEMO TO: J.M.WILLIS

From: C. E. Osborn

SUBJECT: Estimated cost for open-pit
or open cut mining- B.S.& K.
mining property.

I called an old associate of mine at Grants, New Mexico, Mr. James Hamilton, who is the owner and operator of the James Hamilton Construction Company.

While at Grants, you may recall that Jim Hamilton constructed several of the tailing ponds for the uranium mills in that area and did a considerable amount of stripping at the Jack Pile and Paguate Mines for the Anaconda Company in that area. He was always known for his excellent and low cost work. More recently he has been the contractor for the open-pit operations at Tyron, New Mexico, for the Phelps Dodge Corporation.

My reason for calling Jim was to obtain information on present costs for open-pit mining operations. He volunteered the information that the cost the Jack Pile operations is running right at 38¢ per ton on a 4,000 ton per shift basis. He said he felt that this had to do with labor, supplies and maintenance only, and that there was no allowance made for depreciation of equipment.

2/11/70

At the Tyron operation, his (Jim's) cost for labor, supplies and maintenance of equipment on a 30,000 ton per day operation have been 34¢ per ton. He went on to say that the contractor generally likes to clear 2¢ to 4¢ per ton above the costs to pay for replacement of worn out equipment and to cover interest on his investment and overhead expenses, and a profit. I threw a figure of 40¢ a ton for an estimated cost at him for a 4,000 ton perday operation on one shift. He asked if there would be much drilling and blasting. I told him I thought there would be, so he said I had better raise my estimating costs to 50¢ per ton. This figure is about 20¢ per ton higher than the estimates being made by Mr. Abe Kalaf.

In my evaluation of the B.S. & K property, I plan to use the 50¢ per ton figure.

I'll check a couple of other sources for information.

CEO.

For loader, or shovel,
and trucks + drilling & blasting

↓
Production / man shift

125 Tons. (high) (80 Tons /
(est) low)

$$\frac{4000}{125} = 32 \text{ men in}$$

the mining operation -

30⁰⁰ / day / man.

$$30 \times 32 = \frac{960}{4000} =$$

24¢ / ton for labor
only

PRELIMINARY EVALUATION
FOR POSSIBLE ACQUISITION
AND
OPERATION
OF THE
B. S. & K. MINING COMPANY PROPERTIES
OSBORNE & HEINRICHS GEOEX
MARCH 1970

HEINRICHS
GEOEXPLORATION CO.
Box 5964 Tucson, Arizona 85703
Phone: (602) 623-0578
Cable: GEOEX



GEOPHYSICAL ENGINEERS

PRELIMINARY EVALUATION

FOR POSSIBLE ACQUISITION

AND

OPERATION

OF THE

B. S. & K. MINING COMPANY PROPERTIES

INTRODUCTION

THIS REPORT WAS PREPARED BY

CLYDE E. OSBORN, E.MET.
Professional Engineer

Technical Director, Natural Resources Office, Essex International, Inc.
Tucson, Arizona

This is a preliminary report submitted as a guide for management in making a decision on how to proceed with the project. Certain statements were accepted as to the tonnage and grade of ore on the stipulation that these figures would have to be confirmed by actual field work. Further, the metallurgy and the subsequent processing is based on a report that can only be used as a guide in arriving at preliminary plant and operating costs. Considerable more test work must be done on representative samples. The mine owners have indicated a willingness to allow six months to make the necessary studies to confirm:

- 1-The tonnage and grade ore.
- 2-That the ore is amenable to leaching techniques.
- 3-That the cost estimates will be equal to, or better than those included in this report.

Signed

Clyde E. Osborn
Clyde E. Osborn, E.Met.

Date

March 12, 1970

INTRODUCTION

The B. S. & K copper ore body under consideration, is a blanket type deposit containing a mixture of oxide copper, chalcocite and chalcopyrite minerals. According to data supplied by Mr. Abe Kalaf of the B.S. & K Mining Company, the estimated drilled reserves are as follows:

5,000,000 tons assaying 0.60% Cu.

7,000,000 " " 0.15% Cu.

The waste overlying the ore blanket is estimated to be 5,200,000 tons. This material contains some oxide copper but on the whole would not average more than 0.08% Cu.

The ore is up to 50' in thickness and does not extend more than 200' below the surface, this will lend itself nicely to open cut mining methods.

Preliminary tests made by the Duval Corporation in their Tucson labs indicated an overall copper extraction of 78% from a composite of samples taken from exploration drill holes. This test is reported in a company memorandum entitled "Bacterial Leaching of B.S. & K. Exploration Composite", dated November 22, 1965, Exhibit A

In subsequent discussions with the Lab Technicians, they express the

Introduction #2

firm opinion that the minerals will respond equally as well to a sulphuric-acid ferric-sulphate leach. This will require confirmation as proposed and outlined later in this report.

A geologic description and location of the property is attached.

See Exhibits

Also attached is an analysis of the ore reserves and other comments by Mr. E. Grover Heinrichs, V.P. of Heinrichs Geoexploration Company.

The B.S. & K Mine has been an operating mine in the past.

As a result there are some assets which will accrue to this newer project.

Access Roads

There are good county roads into the property from Red Rock to the east and from Silver Bell to the south west. Roads have been developed on the property in conjunction with exploration drilling programs. For the most part, these roads are in good repair.

Water

One water well has been developed. It is 300 ft. deep and cased. It has delivered 150 gpm over a long period of time during past

Introduction #3

operation with only a few inches of draw down.

Power

A 3 phase 14,400 Volt power line supplies electric power to the mine. The B.S. & K. Mining Company has picked up the power at the edge of the property and extended the lines approximately 3 miles into the property where they have installed 3, 650 KVA transformers and a distribution system. This has an estimated value of \$125,000.

Housing

The old camp site is in need of extensive repairs. However, the power and water distribution systems are in good repair. An excellent combination office and residence is situated on the property. Floor area of 3000 sq.ft. Modern in all respects. This building is not included in the offer but it can be bought at an appraised value, or leased.

Equipment

The principal piece of equipment available to the project is an air compressor. This is an Atlas Copco 900 c.f.m. 100 p.s.i. piston type compressor, complete with a 100 h.p. Westinghouse Motor and drive and switching equipment. All in excellent condition. Includes a receiver. This has a present value of \$15,000.

Introduction #4

Other

The B.S. & K. Mining Company leases a rail side on the Southern Pacific at Red Rock, a distance of 19 miles from the mine. This siding is 400 ft. long and is equipped with a loading ramp and drop bridge. This lease cost \$300 per year.

SUMMARY

SUMMARY

This preliminary study of a plan to put the "blanket" ore body of the B.S. & K. Mining Company, situated on their New York claims, into production indicates that a reasonable return on investment can be obtained if the following conditions are satisfied:

1. The tonnage and grade of ore measure up to figures represented in this report.
2. The metallurgy proves to be satisfactory.
3. The price of copper remains at 56¢/# or higher.

Conditions 1 and 2 must be checked out before any other commitments can be made. A period of six months has been allowed to carry out the necessary work.

During the six months, some engineering should be done to confirm the costs which have been estimated in this report. It is believed that the costs in this report are reasonably close and will stand up to a more detailed study. Time did not permit a detailed study of a mining method. The cost of 40¢ per ton was arrived at by a study of recent reports and by talking with some of the operators in the Tucson area. The capital cost of the vats was factored from cost studies of a similar operation near Parker, Arizona. The writer was project engineer for the engineering company employed on this

Summary #2

job. The capital cost of the LIX and electrowinning plant was a budget estimate from Holmes and Narver, Inc., and confirmed in a subsequent conversation with engineers at Hazen Research. Operating cost for the LIX Electrowinning process includes cost for leaching the low grade mine dumps from which an estimated 5,000,000 lbs. of copper will be extracted.

The cost for the work to confirm conditions 1 and 2 as stated above is estimated at \$100,000.00.

Preliminary Investigation

Having spent several hours on the property with Mr. Abe Kalaf and Mr. Grover Heinrichs, Mr. Heinrichs and the writer suggest that 20 holes be drilled for the purpose of obtaining bulk samples for metallurgical testing and to further evaluate the ore body and confirm ore reserve figures. This work to be done on contract.

Six months time should be allowed for the drilling, sampling and metallurgical investigation. The drilling program will require three months. Sufficient sampling would be done during the first month to permit some metallurgical work to start.

Further, during this six months, a mining plan would be engineered. At the present time there is a question of access to the B.S. & K. Mining Company property over the most desirable and shortest road. The costs being presented in this report reflect the longer route from the mine to the proposed site.

MINING OPERATIONS

This mine will be a typical open cut mine. It will be necessary, over the five years of operation, to break, load and move approximately 17,000,000 tons of material.

A carefully planned mining program will be required because selective mining will be essential.

It will be necessary to mine approximately 500 tons per hour for 140 hours every week; 10,000 tons/day; 500 tons/hr. 20 hrs. per day.

The plan is to drill and blast, load the ore into 50 ton rock trucks with a 10 cu.yd. front-end loader.

A study of the technical literature and consulting with operators in the Tucson area provided the list of equipment described in this report.

Budgetary equipment cost figures were obtained from suppliers in Tucson and Phoenix.

It is possible that subsequent studies may prove that the rock can be ripped rather than blasted. Further, that a portable crushing plant can be used in the mine pit and conveyors be used to move the rock more economically than trucks. For the purpose of this evaluation, these alternates will not be considered.

It is contemplated that a certain amount of pre-mining work on

Mining Operations #2

roads, dump sites, etc., will be necessary. Also, that it will be necessary to strip up to 1,000,000 tons (500,000 cu.yds.) of overburden to prepare for the mining operation itself. The cost for these items is included in the estimate of capital required for the project.

MILLING OPERATIONS

The copper minerals in the ore are considered to be amenable to acid leaching techniques. Although a major portion of the copper is in a sulphide form, chalcocite, the ore body is too small and the ore grade too low to justify a flotation concentrator of economic size. A test employing "bacterial" leaching by the Duval Corporation indicated an extraction of 78.35% of the copper. The same technicians are of the opinion that the ore can be leached equally as well with sulphuric acid plus ferric sulphate with a somewhat higher acid consumption.

Two types of leaching techniques were given consideration:

- 1-Heap leaching
- 2-Vat leaching.

It appears from the test mentioned above that the ore should be crushed to a small size in order to obtain the high degree of extraction that will be required to make the operation economically sound. Extraction in heaps is known to be very low; sometimes this can be accepted in face of the lower capital and operating costs. Further, in order to evaluate heap leaching, it is essential to have enough material available to conduct meaningful tests. This could be in the range of 50,000 to 100,000 tons. For these and other reasons it was decided to evaluate the project on the basis of a vat leach followed by liquid ion exchange and high current density

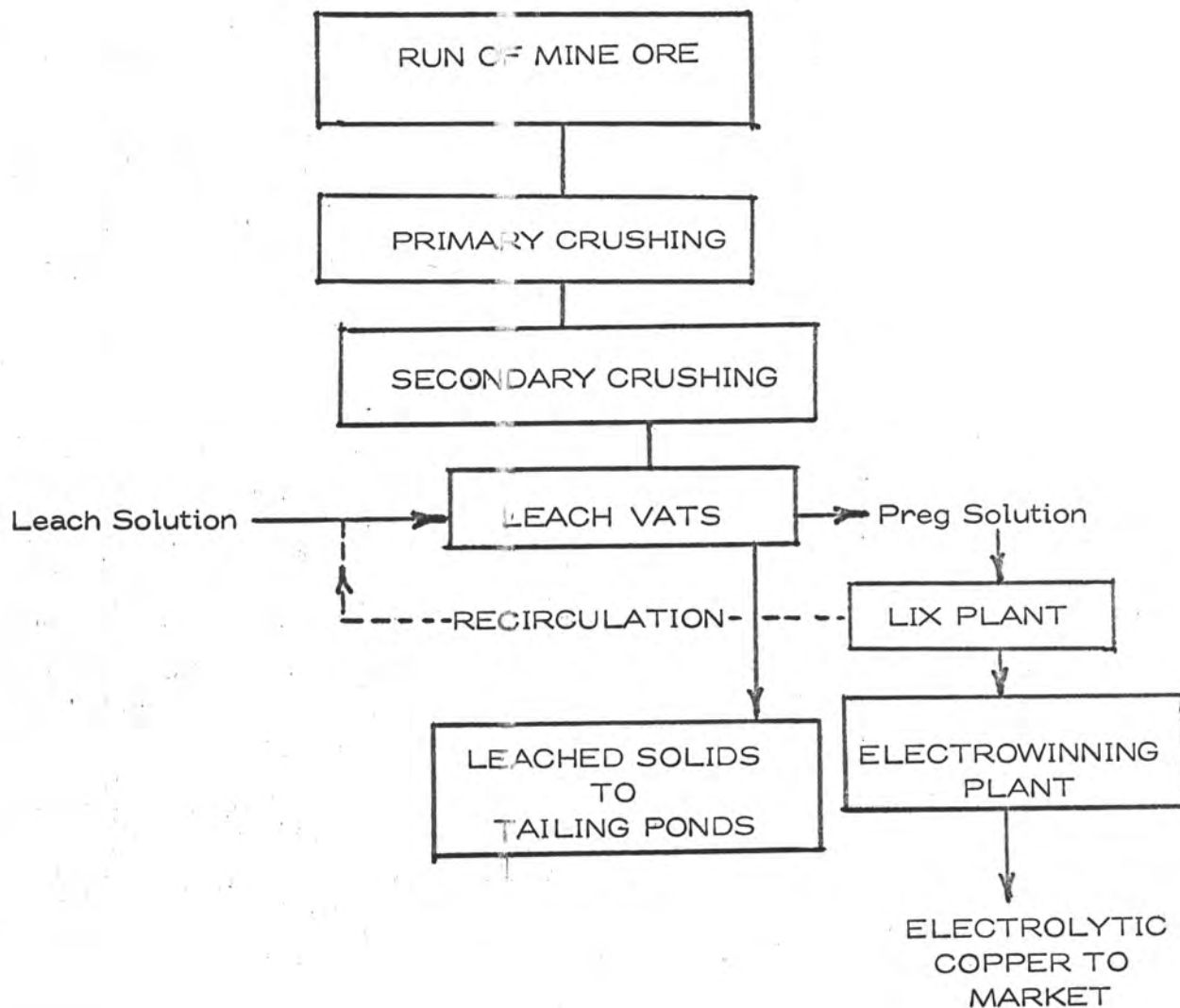
Milling Operations #2

electro winning.

In the absence of actual test data the information contained herein is based on the assumption that the project can be operated much like similar vat leaching projects presently in operation.

It has been assumed:

1. The optimum size particle is 3/8"x0
2. That 78% of the contained copper can be leached and extracted using sulphuric acid plus ferric sulphate solutions. This applies to chalcocite ore.
3. That the leaching can be accomplished in vats in an eight day cycle.
4. Upward percolation will prevent gases and slimes from blinding and/or short circuiting the ore in the vats.
5. Liquid ion exchange (LIX64) will be used to remove the copper from the leach liquor.
6. The copper will be won from the upgraded strip liquor in high current density electro-winning cells to produce an electrolytic grade copper.
7. Acid leaching of the low grade oxide copper dumps will yield approximately 25% of the copper contained therein.



SIMPLIFIED FLOW SHEET

VAT LEACHING - B.S. & K. ORE-OXIDE & CHALCOCITE.

Natural Resources Office
Essex International, Inc.
Tucson, Arizona
3/10/70

TABLE 2.—Comparison of various leaching methods

| Method | Advantages | Disadvantages | Application |
|-------------------------|--|---|---|
| 1. Heap Leaching | Minimum capital investment. Little ore preparation. Low operating cost. | Low recovery. High reagent consumption. Low grade solutions obtained. | Low grade ore bodies with marginal economics. Old leach dumps, when operation is for by-products. |
| 2. Percolation Leaching | High grade solutions obtained. Liquid-solid separation not required. High extraction efficiencies possible. | Three-stage crushing generally necessary. Capital investment and operating cost much higher than for heap leaching. | Ore bodies which can carry the high capital investment. Ores for which high recoveries are possible at a particle size of 3/8"-3/4". Ores which will not contain excessive amounts of fines, when crushed to the above size. |
| 3. Agitation Leaching | Highest extraction efficiencies. Shortest leaching cycle. | Highest capital investment. Solution grade lower than in percolation leaching. Liquid-solid separation required. | Ore bodies for which percolation leaching does not result in acceptable recoveries of valuable mineral. |

ESTIMATE OF COSTS

1. Capital
2. Preliminary Investigation
3. Mining
4. Processing

Estimates of Capital cost #2

Processing Plant

Vat Leaching

3000 tons/day. Assuming an 8 day leaching cycle - requiring 10 vats. Crushing on 2 shifts per day, 5 days per week. Optimum crush assumed to be $-3/8"$

Crushing Equipment

| | |
|---|----------------|
| 1-42"X48" Jaw crusher complete with 200 HP Motor and drive | \$90,000 |
| 1-Hopper & feeder complete | 12,000 |
| 1-EI-Jay 54" Cone Crusher complete with motor and drive | 55,000 |
| 2-EI-Jay 54" Fine cone Crusher complete with motor and drive | 120,000 |
| Miscellaneous screens, conveyers, chutes etc.. | 150,000 |
| Ground storage with recovery equipment | <u>50,000</u> |
| Total | \$507,000 |
| Installation (24%) | <u>120,000</u> |

TOTAL \$627,000

Leaching Vats with False Floors

| | |
|---|---------|
| 10 vats, 80 ft.wide X120 ft.long X12 feet deep 5500 cu.yds reinforced concrete | 650,000 |
| Loading conveyors & Loading Bridge installed | 420,000 |
| Unloading equipment | 210,000 |
| Misc. pumps, pipes, valves, tanks & sumps installed | 250,000 |

\$1, 530,000.00

ESTIMATES OF CAPITAL COST

Mine Equipment

The estimates are based on a mining rate of approximately 10,000 tons of rock per day.

| | |
|--|------------------|
| 1-10cu.yd. rubber tired front-end loaders | \$120,000 |
| 3- Trucks 50 tons International rock truck | 180,000 |
| 1-Drill-Reich #650 | 80,000 |
| 1-Road Maintainer | 15,000 |
| 1-D8 Caterpillar and Dozer | 85,000 |
| 1-Water Sprinkler Truck | 10,000 |
| 1-Grease truck | 7,500 |
| 1-Bulk Powder Truck | 6,000 |
| 1-General Service Truck (fuel svc) | 4,000 |
| 2-Pickups | 5,000 |
| 1-Portable Light Plant | 3,500 |
| Total | <u>\$516,000</u> |

There is a 900 cfm Atlas Capco Air Compressor and receiver complete on the property

Pre-mining costs

| | |
|---|---------------------------|
| Roads and dump sites | \$ 50,000 |
| Waste Stripping 1,000,000 tons @ 30¢/ton | <u>300,000</u> 350,000 |
| Total estimated Mine | \$866,000 |

Estimates of Capital Cost #3

Processing Plant

LIX Electro-winning 1250 gpm-3gpl Cu. to
produce 36,000 to 40,000 lbs. of copper
per day

Factored estimate \$2,250,000

(source: H.S. McGarr of Holmes & Narver
Inc.)

Total Processing 4,407,000

Total Mine & Processing \$5,273,000

Add 10% contingency 527,000

TOTAL \$5,800,000

Add preliminary investigation 100,000

Add initial payment to B.S. & K. Mining Co. 200,000

Total Investment Capital \$6,100,000

Pre-Production and Working Capital

Pre-production costs which will require
additional capital, amounts to 1,550,000

Working capital 350,000

Grand Total \$8,000,000

*See notes on following page.

NOTES ON CAPITAL REQUIREMENTS

In this type of operation there is considerable pre-production expense before any income can be realized.

Mining operations must start as soon as possible in order to open the ore body for production. A certain amount of this can be capitalized as provided under Capital Cost Estimates. In this projection we are assuming that mining operations will begin one year after the agreements have been finalized and the preliminary investigations have satisfied the conditions. In the absence of an engineered mining plan, it is assumed that 1,000,000 tons of waste will be stripped and 800,000 tons of low grade oxide will be mined and placed on dumps during first six months of the second year. Then approximately 80 days will lapse until any cash is realized from production. During this time another 800,000 tons of material will be stripped and/or mined, of which at least 300,000 tons of ore should be ore for processing in the vat leach. This 300,000 tons of ore will carry crushing costs. Approximately 240,000 tons of this ore will carry vat leaching costs and some LIX-Electrowinning costs.

The capital required for this pre-production expense is estimated at \$1,550,000.

ESTIMATED COST FOR PRELIMINARY INVESTIGATION

1. Drilling and Bulk Sampling

20 holes @ 250' each, 5,000 ft.

Estimated cost at \$10.00/ft. \$50,000.00

2. Metallurgical Testing

At least 4 months at \$10,000.00

per month \$40,000.00

This budget should allow for a reasonable amount
of consulting service from a firm such as
A.H. Ross & Associates.

3. Engineering services for a mining plan \$10,000.00

TOTAL

\$ 100,000.00

ESTIMATE OF OPERATING COSTS

Mining(10,000 tons/day)

| | |
|---|------------------|
| 1. Waste Stripping 5,200,00 tons @ 30¢/ton | \$ 1,560,000 |
| 2. Mining, hauling and dumping low grade copper oxide material 7,000,000 tons @ 40¢/ton | 2,800,000 |
| 3. Mining and delivering ore to crushing plant 5,000,000 tons @ 46¢/ton | <u>2,000,000</u> |
| TOTAL | \$6,300,000 |

Processing

Crushing Ore for Vat Leach (3000 tons/day) ¢/ton

| | | |
|--------------------------|-----------|--------------|
| Labor | 15 | |
| Supplies | 6 | |
| Maintenance | <u>12</u> | |
| Total | 33 | |
| 5,000,000 tons @ 33¢/ton | | \$ 1,650,000 |

Leaching Vat Operation (3000 tons/day) ¢/ton

| | | |
|----------------------------------|-----------|--------------|
| Labor | 13 | |
| Maintenance & Operating Supplies | 6 | |
| Ferric Sulphate | 8 | |
| Sulphuric Acid | <u>44</u> | |
| Total | 71 | |
| 5,000,000 tons @ 71¢/ton | | \$ 3,550,000 |

LIX-Electrowinning

¢/#Cu.

| | | |
|---------------------------|----------|--------------|
| Power | 1 | |
| Labor | 3 | |
| Organic Solvent | 2 | |
| Miscellaneous | <u>1</u> | |
| Total | 7 | |
| 51,800,000 lbs. Cu @ 7¢/# | | \$ 3,634,000 |

Overhead & Supervision

| | |
|------------|------------|
| 0.5¢/# Cu. | \$ 259,000 |
|------------|------------|

Estimate of Operating Cost #2

Recap of Operating Costs

| | |
|------------------------|--------------|
| Mining | \$6,300,000 |
| Crushing | 1,650,000 |
| Leach Vats | 3,550,000 |
| LIX-Electrowinning | 3,634,000 |
| Overhead & Supervision | 259,000 |
| | <hr/> |
| TOTAL | \$15,393,000 |

Note: The cost of acid for leaching and recovering copper from the low grade oxide dumps is included in the above costs. Dump leaching will be done for the most part with acid contained in bleed streams.

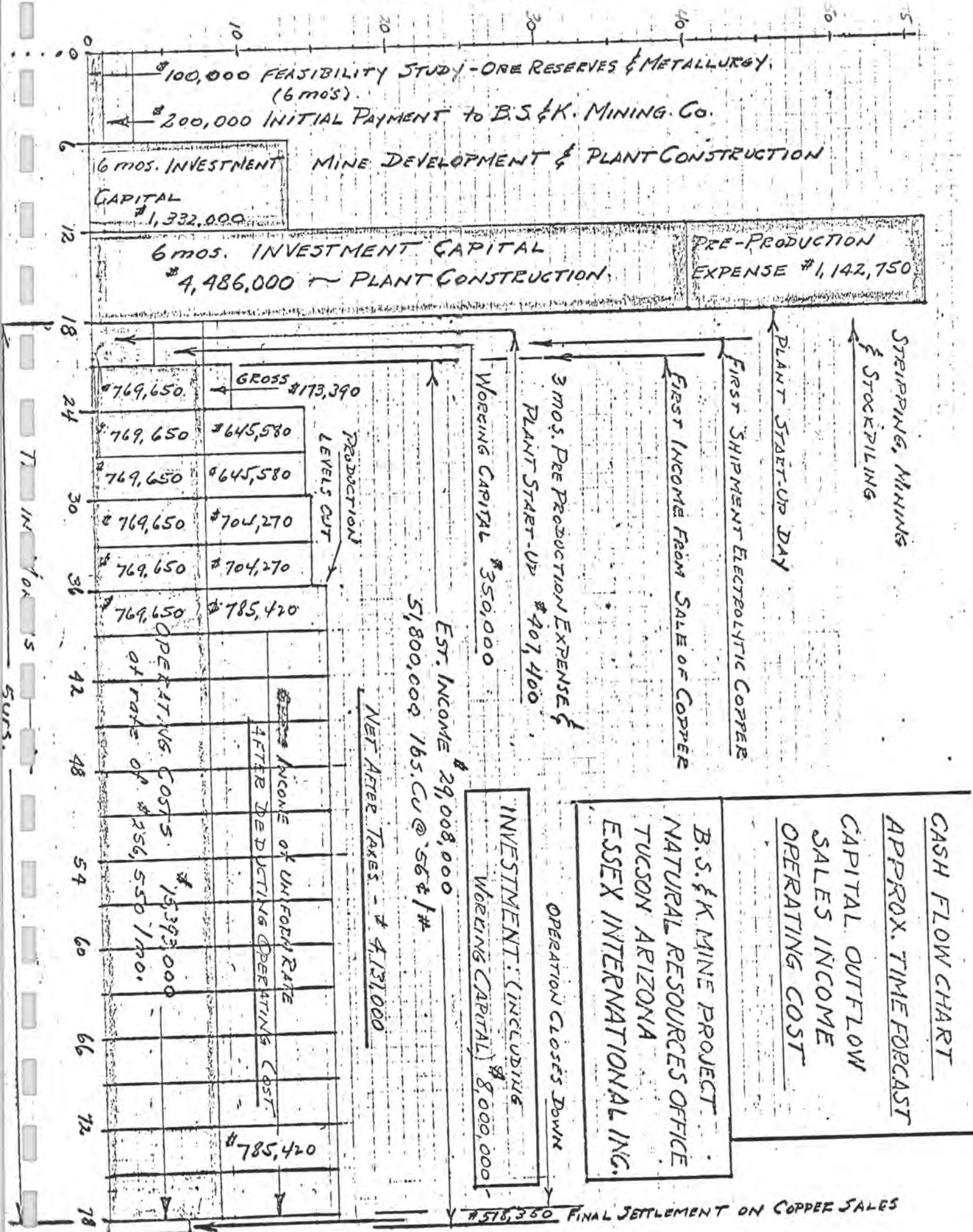
CASH FLOW

Cash Flow

Time did not permit a close detailed study of the cash flow.

The time factors for capital outflow, income from sales, start up of operations, operating costs, etc., are shown on the following charts.

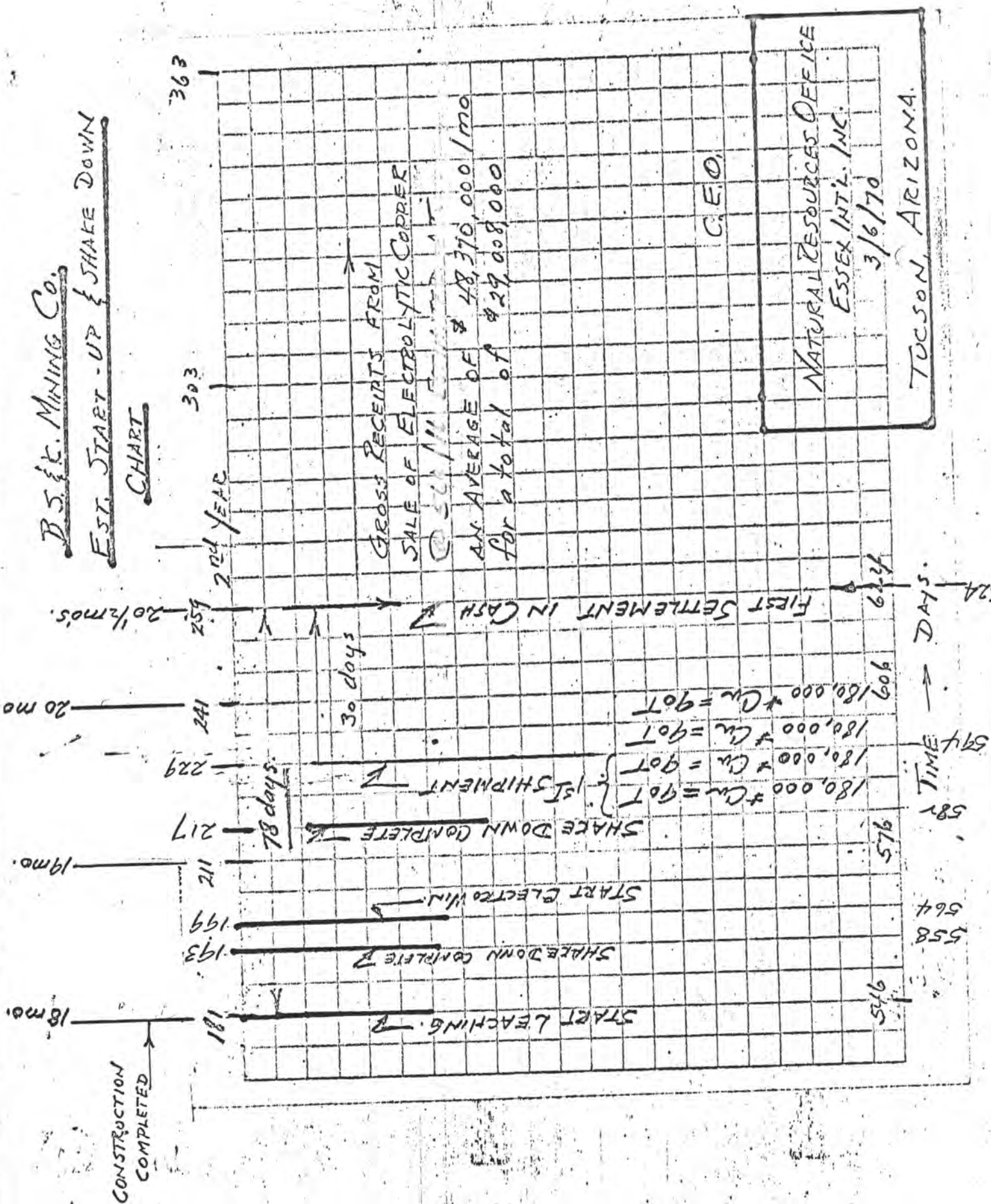
SCALE 100,000



B.S. & K. MINING CO.

EST. START - UP & SHAKE DOWN

CHART



STATEMENT
OF
INCOME AND EARNING

B.S. & K. MINING COMPANY PROJECT

STATEMENT OF INCOME & EARNING

Income

Sale of 51,800,000 lbs. of copper @ 56¢/# \$29,008,000

Cost of Production

| | | |
|------------------------------|----------------|--------------|
| Mining | \$6,300,000 | |
| Crushing | 1,650,000 | |
| Leach Vat Operation | 3,550,000 | |
| LIX-Electrowinning operation | 3,634,000 | |
| Overhead & Supervisor | <u>259,000</u> | |
| Total Production Cost | | \$15,393,000 |

Capital Cost

| | | |
|---------------------------------------|------------------|------------------|
| Mining Equipment | \$ 516,000 | |
| Pre-Mining Cost | 350,000 | |
| Crushing Equipment installed | 627,000 | |
| Leaching Vats installed | 1,530,000 | |
| LIX-Electrowinning plant installed | <u>2,250,000</u> | |
| Total | \$5,273,000 | |
| Add 10% Contingency | <u>527,000</u> | |
| Total | \$5,800,000 | |
| Add preliminary investigation | 100,000 | |
| Add initial pay't B.S. & K. Mine. Co. | <u>200,000</u> | |
| Total Capital Cost | | <u>6,100,000</u> |

Total Investment plus Operating Cost \$21,493,000

Gross Profit before provision for payment of interest on Investment and before provisions for Depletion. \$ 7,515,000

Provision for interest on Investment 1,970,000

Net income before provision for taxes on Income \$ 5,545,000

Provision for Federal Income Tax 1,414,200

Net Income \$ 4,130,800

Statement of Income & Earnings #2

Annual estimated taxable income

\$1,109,000

Estimate of Federal Income Taxes

| | |
|-----------------------------|--------------------|
| Gross annual sales | <u>\$5,800,000</u> |
| Base for applying depletion | <u>\$5,800,000</u> |

| | |
|-----------------------------------|-----------|
| 15% -percentage depletion | 870,000 |
| 50% Taxable Income (maximum) | 554,500 |
| Taxable income before depletion | 1,109,000 |
| Less percentage depletion allowed | 554,500 |

| | |
|----------------|------------|
| Taxable income | \$ 554,500 |
|----------------|------------|

U.S. Federal Income Tax

| | |
|---------------------------------|----------------|
| Normal 30% on \$554,500 | \$ 166,350 |
| Surtax 22% on \$554,500 -25,000 | <u>116,490</u> |
| Total tax | \$ 282,840 |

Net income as a percent of sales

$$\frac{4,130,800}{29,008,000} = 14.24\%$$

File

G. A. Girard

November 22, 1965

V. F. Hollister

All Concerned

Bacterial Leaching of B.S. & K. Exploration Composite

Abstract

H₂SO₄

Total copper extraction from the B.S. & K. exploration composite gave a recovery of 77%. Recovery from acid-soluble copper fraction was about 85%; from chalcocite copper was 82%; and about 51% from chalcopyrite.

There is no requirement for purchased acid. An initial acidification would, however, increase the initial copper production.

Microscopic examination of chalcopyrite particles revealed substructures of that mineral species within a network of more soluble chalcocite. The new surface exposure generated by the dissolution of chalcocite is believed to be responsible for the increased extraction from chalcopyrite.

Background

It was requested by the Exploration Department that a bacterial leach test be run on specified drill hole samples from the B.S. & K. location to determine the acid consumption of the ore, the response of the ore to copper recovery by bacteria and to evaluate this response in terms of our laboratory experience with other ores. The test head consisted of specified intervals from drill holes 300, 301, 302, 303 and 305.

Purpose

It was the purpose of this experiment to determine in a bacterial leach process:

1. The total recovery of copper over a four week leach period,
2. The copper recovery from each of the mineral species,
3. The total acid consumed and the purchased acid requirement.

Procedure

The composite sample was crushed to pass 10 mesh, the minus 100 mesh fraction rejected. Four test charges were split out from the minus 10 plus 100 mesh sample fraction. An additional sample was removed for chemical analyses, the results of which appear in Table I.

One hundred grams of sample were charged into each of four percolation columns. One hundred ml of sterile barren leach solution were added to each of the columns. The columns were each inoculated with 25 ml of an 8 day culture of T. ferrooxidans having a population of 1×10^8 bacteria per ml. The percolators had an adjusted air flow of 50 to 75 ml per minute. Each week the solutions were drained from the columns and submitted for copper, iron and pH analyses. The copper present in the sterile barren leach solution was deducted from the total copper recovered.

The ore in columns 1 and 2 were controlled at pH 2.0 by daily adjustment with sulfuric acid.

The ore in columns 3 and 4 was initially fed a solution of pH 2.0. The solutions fed the columns the second and subsequent weeks matched the pH of the effluent solutions of the previous week.

Upon termination of the test the columns were drained and rinsed with 20 ml of pH 2.0 distilled water. The combined solutions were submitted for analysis. The columns were then rinsed with two 25 ml portions of barren leach solution followed by a wash with 100 ml of one normal H_2SO_4 for five minutes. The columns were then rinsed with 20 ml of pH 2.0 distilled water. The combined solution, submitted for analysis, represented desorbed and dissolved ferric and cupric ion. The columns were then given a final rinse with 100 ml of pH 2.0 distilled water to determine the quantity of copper and ferric iron remaining after strong acid treatment. This solution was submitted for analysis.

The ore was removed from the columns, dried and submitted for chemical analysis. The test data are presented below.

TABLE I
B.S. & K. LEACH TEST

| SAMPLE NO. | 1 | 2 | 3 | 4 |
|---|-------|-------|------|-------|
| Assayed Head, % A-S Cu | ----- | ----- | .174 | ----- |
| " " % cc Cu | ----- | ----- | .269 | ----- |
| " " % cpy Cu | ----- | ----- | .091 | ----- |
| " " % Total Cu | ----- | ----- | .535 | ----- |
| Calculated Head, % Cu | .510 | .555 | .481 | .520 |
| Residue, % A-S Cu | .022 | .026 | .023 | .028 |
| " % cc Cu | .048 | .048 | .045 | .050 |
| " % cpy Cu | .046 | .046 | .046 | .043 |
| " % Total Cu | .116 | .120 | .114 | .121 |
| Copper Extracted (#/Ton) | 7.90 | 8.71 | 7.33 | 7.92 |
| #H ₂ SO ₄ Consumed (Total | 17.0 | 18.1 | - | - |
| Per } Cu | 12.2 | 13.4 | 11.3 | 12.2 |
| Ton Feed* } (Gangue | 4.8 | 4.7 | - | - |
| Distribution) (Filtrate | 77.5 | 78.5 | 76.2 | 76.1 |
| %Cu } (Residue | 22.5 | 21.5 | 23.8 | 23.9 |
| #H ₂ SO ₄ Consumed (Recovered | 2.2 | 2.1 | - | - |
| Per #Cu } (Available | 1.7 | 1.6 | - | - |
| % A-S Cu Recovered | 87.5 | 85.1 | 86.8 | 84.0 |
| % cc Cu " | 82.2 | 82.2 | 83.3 | 81.5 |
| % cpy Cu " | 49.5 | 49.5 | 49.5 | 52.7 |

* The acid consumed by columns 1 and 2 (duplicate) was based upon actual acid addition to maintain a pH of 2.0.

Data and Results:

Copper Extraction

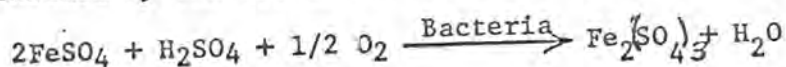
*extraction
78.35%*

Slightly more copper was extracted from the columns maintained at pH 2.0 (columns 1 & 2) than from the columns with no pH control (columns 3 & 4). An average of 78% copper was extracted from the columns maintained at pH 2.0 while only 76% was

the average copper extracted from the columns with no pH control (see Figure I, Table II). With the exception of the first week's extraction, the weekly extraction is identical and indicates that a benefit could be derived from an initial dump acidification.

Acid Consumption by Columns One and Two

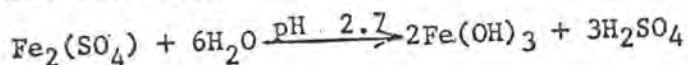
The total acid consumed by the pH controlled columns is given in Table I. Table III representing the average of pH controlled columns gives a breakdown of the acid consumed or produced by the ore and solution each week and cumulatively. Table III and Figures II and III gives specific information on the consumption of acid by oxidized ferrous ion and the net acid consumption by the ore. The total acid consumption is the actual acid necessary to maintain the system at pH 2.0. This acid was consumed by the ore and ferrous ion oxidation in solution:



The total acid consumption by ore and solution and the acid consumption by oxidized ferrous iron are illustrated in Figure III on a weekly and cumulative basis. The net acid consumption by the ore is shown in Figure IV. It will be noted that, after seventeen days, more acid was being produced by the ore than was being consumed by the ore and solution.

Acid Consumption by Columns Three and Four

The acid consumption data by the columns with no pH control is presented in Table IV and illustrated in Figures IV and V. The acid consumption is based on the actual ferric hydroxide formation:



The system is kept below pH 2.7 by the production of acid through ferric precipitation. A rise in the pH of the leach liquor throughout the test represents, also, an acid consumption. These two factors are combined in Table IV and Figure IV under the heading of "total acid consumption from $\text{Fe}(\text{OH})_3$ formation." The acid consumption by oxidized ferrous in solution is deducted from Figure IV to give the net acid consumption represented by Figure V.

Comparison of Acid Consumption Data From Each Column Pair

It will be noted from Figure V that the weekly acid consumption approaches zero asymptotically with time. The pH of this system seems to stabilize at 2.35 over the four week test. In Figure III there is a net acid production. It follows, then, that gangue consumption must be greater in the pH controlled system since acid producing constituents in the ore have been released.

The pH-controlled columns give a true picture of the acid consumption necessary to maintain a pH of 2.0. The columns with no pH control were designed to indicate any need for purchased acid. Other than the benefit to be derived from initial dump acidification, it is concluded that no additional acid need be purchased.

The Structural Nature of Chalcopyrite Used in This Test

It was noted from the results of chemical analysis of the chalcopyrite mineral species that the recovery was 12 to 25 times greater than most reported results both in our laboratory tests and in the literature. Previous work with Battle Mountain ore yielded, in certain cases, results similar to those in this test with

chalcopryrite. These prior results were regarded with suspicion and attributed to inconsistencies in the analytical procedure. Since a recovery of about 51% occurred with this mineral species, it was decided to resubmit the samples for analysis. The samples were leached for seven minutes and twenty minutes with cyanide in two separate tests to determine whether all the chalcocite had been removed prior to the analysis for chalcopryrite. These test results were in agreement with each other and those first reported.

It was then thought that this chalcopryrite must be structurally different from other specimens of the same mineral species. A polished section was made of the sink fraction of a heavy media separation. A microscopic examination of the chalcopryrite particles at 450 power revealed intimate intergrowths of chalcocite replacing chalcopryrite.

A 48 mesh particle of chalcopryrite, for example, exhibited a subparticle size of 400 mesh in many cases. Since chalcocite is readily leached in a bacterial system the surface exposure of chalcopryrite is greatly increased as leaching proceeds.

Based on our laboratory experience with unaltered chalcopryrite from the bottom of the Esperanza pit the recovery from B.S. & K. chalcopryrite is 1040% greater.

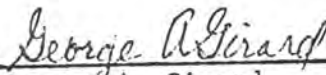
A microprojection of a typical chalcopryrite particle, illustrated in Figure VI, was traced on thin translucent paper.

Conclusions

1. Copper extraction over the four week test period gave a total recovery of about 77%. Recovery of copper from chalcopryrite about 51% and was 10.4 times greater than expected. Microscopic examination revealed the special nature of this mineral species.

2. The data indicate that purchased acid is not necessary except for the benefit to be derived from initial dump acidification.

Respectfully submitted,


George A. Girard
Process Chemist

GAG:jfg

cc: R. W. Livingston (2)
R. W. Flagg
C. H. Curtis
G. E. Atwood
J. E. Frost
E. K. Drechsel
R. R. Nelson
D. J. Bourne

TABLE II

% RECOVERY

| WEEK No. | COLUMN 1 | | COLUMN 2 | | COLUMN 3 | | COLUMN 4 | | AVERAGE CUMULATIVE PERCENT |
|-------------|-------------------|------|-------------------|------|-------------------|------|-------------------|------|----------------------------------|
| | WEEKLY CUMULATIVE | 42.4 | WEEKLY CUMULATIVE | 44.0 | WEEKLY CUMULATIVE | 41.2 | WEEKLY CUMULATIVE | 40.2 | |
| 1 | 42.4 | 42.4 | 44.0 | 44.0 | 41.2 | 41.2 | 40.2 | 40.2 | 40.7 |
| 2 | 19.0 | 61.5 | 17.9 | 62.0 | 18.7 | 59.9 | 15.0 | 55.2 | 59.7 |
| 3 | 9.6 | 71.1 | 10.0 | 72.0 | 9.3 | 69.2 | 9.8 | 65.0 | 69.3 |
| 4 | 6.4 | 77.5 | 6.5 | 78.5 | 6.6 | 76.2 | 6.7 | 76.1 | 76.2 |

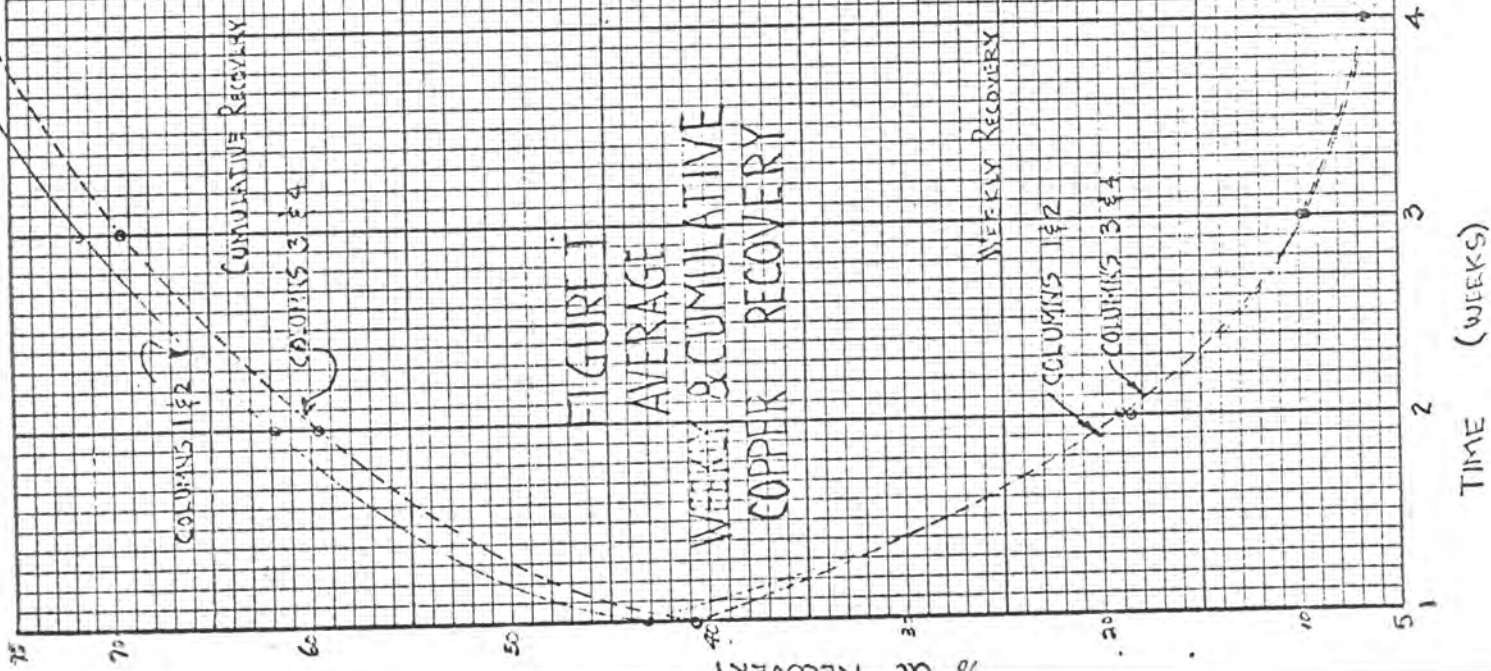
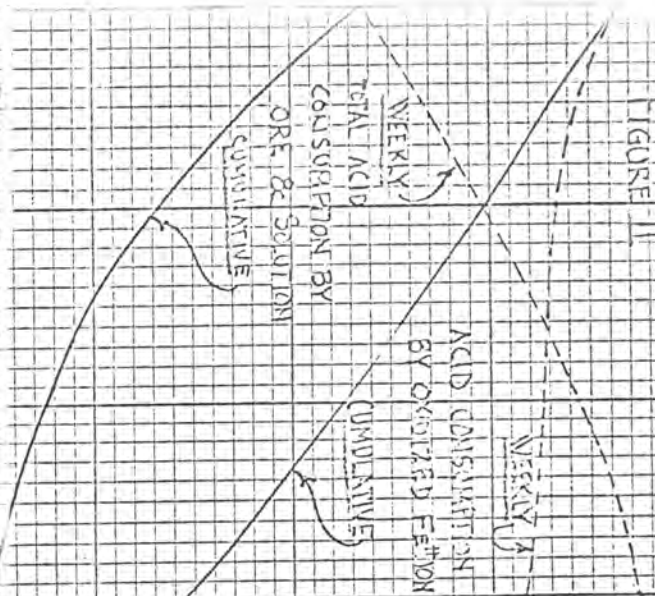


FIGURE II

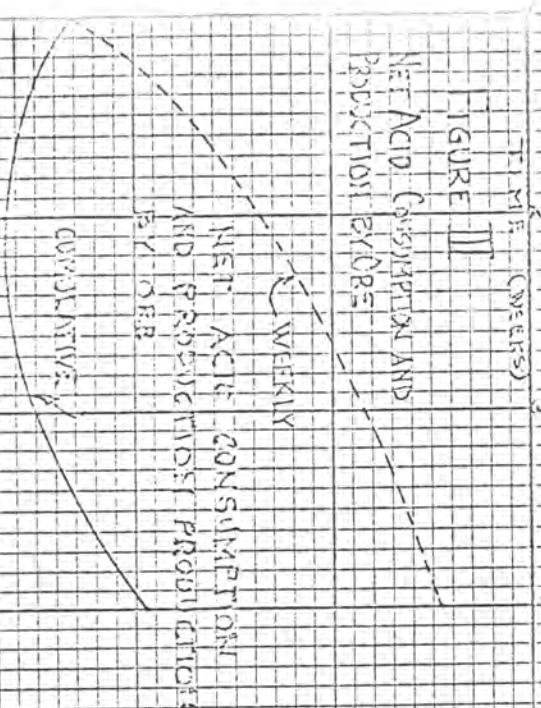


AVERAGE ACID CONSUMPTION
OF COLUMNS 1 & 2

TABLE III

| WEEK NO. | TOTAL ACID CONSUMPTION BY ORE & SOLUTION (#/Tons) | ACID CONSUMPTION BY OXIDIZED FEETION (#/Tons) | NET ACID CONSUMPTION AND PRODUCTION BY ORE (#/Tons) |
|----------|---|---|---|
| 1 | -8.17 | -1.66 | -6.51 |
| 2 | -5.71 | -3.12 | -8.83 |
| 3 | -2.78 | -3.61 | -6.39 |
| 4 | -1.50 | -4.17 | -2.67 |

FIGURE III



NOTE:
THE TOTAL ACID CONSUMPTION IS THE ACTUAL ACID ADDED TO MAINTAIN A pH OF 2.0.

AVERAGE ACID CONSUMPTION DERIVED FROM FERRIC HYDROXIDE FORMATION IN COLUMNS 3 & 4

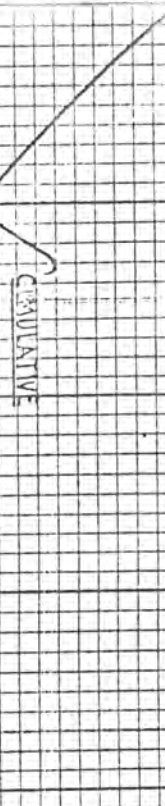
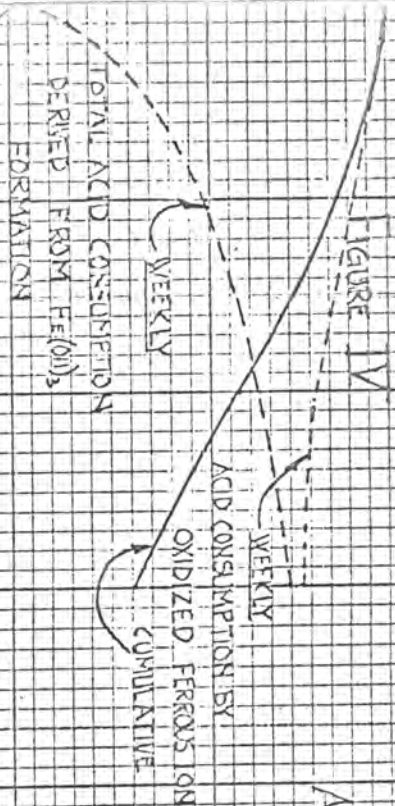


TABLE IV

| WEEK NO. | TOTAL ACID CONSUMPTION FROM $Fe(OH)_3$ FORMATION (g/TON) | ACID CONSUMPTION BY OXIDIZED FERROUS ION (g/TON) | NET ACID CONSUMPTION FROM $Fe(OH)_3$ FORMATION (g/TON) |
|------------|--|--|--|
| 1 | -9.70 | -0.53 | -9.23 |
| 2 | -5.06 | -1.23 | -3.78 |
| 3 | -3.74 | -2.43 | -1.31 |
| 4 | -3.09 | -2.70 | -0.39 |
| CUMULATIVE | -21.59 | -6.94 | -14.71 |

NOTE: THE TOTAL ACID CONSUMPTION DERIVED FROM $Fe(OH)_3$ FORMATION ALSO INCLUDES ACID CONSUMED THRU A SYSTEMIC pH RISE.



FIGURE VI
MICROPROJECTION TRACING (530X)

OUTLINE SUMMARY
ECONOMIC GEOLOGY, ORE RESERVES
AND
PROPERTY STATUS
of
THE B. S. AND K. MINING COMPANY

for
ESSEX INTERNATIONAL INCORPORATED

MARCH 1970

by
HEINRICHS GEOEXPLORATION COMPANY
P. O. Box 5671 Tucson, Arizona

ARIZONA



HEINRICHS GEOEXPLORATION COMPANY



GEOPHYSICAL
ENGINEERS

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Cable: GEQEX, Tucson

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| New York Claim Group----- | 1 |
| Inferred Ore Reserves----- | 2 |
| Legal Status----- | 3 |
| The Atlas Mine----- | 3 |
| Legal Status----- | 4 |

Appended:

Drill Logs, New York Area

#300, 301, 302, 305, 306, 309, 310, 311

MAPS

Plate 1, Plan View New York Area

Plate 2, New York Area Topo Surface Profile

Cross Section A - A'

Cross Section B - B'

Topographic and Ownership Sepia Overlay.

INTRODUCTION

This summary outline has been prepared for Essex International Inc., and represents part of a report entitled "Preliminary Evaluation for Possible Acquisition and Operation of the B. S. and K. Mining Company Properties", by Clyde Osborn, Technical Director of the Natural Resource Office of Essex International Inc.

No field geological study of the B. S. & K. property has been conducted. However the generalized geology of the area is well published and known.

The B. S. & K. Mining Co. property consists primarily of two major mineralized areas, the New York Claim Group and the Atlas Mine.

NEW YORK CLAIM GROUP

These claims are located in the immediate area of the quarter corner of Sections 28/33, T. 11 S., R. 8 E. and consisting of the following lode mining claims, New York, Nevada No. 2, Georgetown and fractional lode claims NSB 9, 10, 11, 12, 13 and 14 and comprising a total of approximately 58.25 acres.

The mineralized area of Silverbell Mine of A. S. & R. to the immediate south is a chalcocite blanket 100 to 200 feet thick lying under a leached capping which is approximately 100 ft. thick. The New York area of B. S. & K appears to be an extension of the El Tiro pit to the north. Available drilling information

partly substantiates this assumption. (See accompanying copies of drill logs of Duval Corp.)

The leached capping of oxidized copper mineralization that overlays the chalcocite blanket carries values up to 0.15% to 0.2% copper over a considerable portion of the New York area. The chalcocite blanket varies in thickness from 30 feet to 100 feet and appears to be increasing in grade and thickness to the south and west.

Inferred Ore Reserves

Duval Corporation reportedly calculated 60,000,000 pounds of inferred copper reserves in the New York Claim Group and this figure is reasonable based on the following data:

1. Average thickness of chalcocite blanket - 40.0 ft.
(See drill logs and assays of Duval Corp.)
2. Calculated tonnage of area 8,441,666 of which
75% may be mineable = 5,627,777 tons.
3. Assume average grade 0.6% Cu.
4. Solution = 67,533,324 pounds of copper.

In order to obtain sufficiently absolute actual tonnage and grade figures, a comprehensive evaluation program of twenty drill holes, drilled to a depth of 250 ft. each, is recommended. In addition, three drill holes, each 1,500 ft. deep to test the possible downward extensions of the chalcocite blanket is also recommended.

The Induced Polarization geophysical results by GEOEX and Canadian Aero suggests no cut-off of sulfides at depth in this

area and therefore some deep drilling is justified and certainly should be programmed.

Total cost of the shallow drilling and sampling program will be approximately \$50,000. Total cost of the deep drilling program of three holes, 1,500 feet deep would be approximately \$60,000.

Legal Status

The New York Claim Group is completely surrounded on three sides by A. S. & R. and if possible a right-of-way should be negotiated with A. S. & R. as shown on the photo mosaic as Route 1. Route 2 is currently the only available access to the New York Group from the proposed leach and dump areas and from a mining cost standpoint the less desirable route.

Litigation between B. S. & K. Mining Co. and A. S. & R has been in the courts for many years and it is recommended that a thorough investigation be conducted by a lawyer, into the findings of the court prior to consummation of an agreement.

Favorable access negotiations with A. S. & R. is a definite possibility as indicated by the favorable solution of past problems of a similar nature and also because of the Arizona condemnation statute regarding rights-of-way for mining purposes.

THE ATLAS MINE

Located in the SE quarter of the NE quarter of Sec. 32, T. 11 S., R. 8 E., the Atlas Mine has had ore production history dating back to 1900. Production included argentiferous lead,

zinc and copper sulfides and carbonates occurring in veins and pods in the paleozoic sediments. The ore occurrence has been intermittent and difficult to follow. However, when an ore pod was encountered the values reportedly ran as high as 45% zinc and 4% to 5% copper, with some recoverable values in silver.


No factual information is available to compute ore reserves in this area, however, good exploration possibilities do exist in the area based on I. P. anomalism on some work done by McPhar Geophysics Ltd. of Canada in 1960.


Some drilling should be done eventually to fully develop the economic mineral potential of this area.

Legal Status

The Atlas Mine area is on patented lode mining claims and the balance of the contiguous unpatented claims are reportedly in good condition from a legal standpoint. However, a thorough check of the Pima County Courthouse records should be made prior to consummation of an agreement.

Respectfully submitted,
Heinrichs GEOEXploration Company


E. Grover Heinrichs, Vice President

Approved: 

Walter E. Heinrichs, Jr., President

Sheet of 1-1

| | | |
|-------------|------------|---------------|
| BEARING | Coörd. : N | HOLE NO 302-R |
| INCL. VERT. | E | COLLAR ELEV. |
| BSK #3 | | DEPTH 400' |

[illegible]

FORM # 355
REVISED 10-62

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 3

PROJECT Atlas Mine, BS&K Mining Co., BS&K No 3 Claim

| | | |
|--|---------------------|-----------------------|
| Coörd. : N | BEARING <u>Vert</u> | HOLE N° <u>300</u> |
| E | INCL. <u>Vert</u> | COLLAR ELEV. |
| START <u>8-6-65</u> COMPL. <u>8-8-65</u> | <u>No core size</u> | DEPTH <u>182 feet</u> |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING—RMKS. |
|---|-------|-------|------|-----|------|------|---|---|-----|-----|---|-------|----------------|
| 0-90 Dacite Porphyry, Brown fine grained, soft, porphyritic, highly fractured, numerous gts veinlets, Arg. Alteration, Original Sulfide was ± 3%, entirely in fractures. Core very badly broken. No green or blue copper minerals visible, though entire section is oxide. | | 0 | 10 | 56 | .08 | .002 | | | | | | | |
| | | 10 | 20 | 70 | .05 | .002 | | | | | | | |
| | | 20 | 30 | 68 | .09 | .002 | | | | | | | |
| | | 30 | 40 | 76 | .14 | .001 | | | | | | | |
| | | 40 | 50 | 86 | .14 | .002 | | | | | | | |
| | | 50 | 60 | 90 | .16 | .001 | | | | | | | |
| | | 60 | 70 | 76 | .15 | .007 | | | | | | | |
| | | 70 | 80 | 85 | .16 | .006 | | | | | | | |
| | | 80 | 90 | 87 | .17 | .009 | | | | | | | |
| | | 90 | 95 | 90 | .94 | .025 | | | | | | | |
| 90-95 Dacite Porphyry, Gray Mixed oxide and sulfide. Soft, porphyritic, strong arg. Alt., numerous gts veinlets. Copper occurs as chalcocite. | | 95 | 100 | 86 | .79 | .015 | | | | | | | |
| | | 100 | 105 | 83 | .51 | .010 | | | | | | | |
| | | 105 | 110 | 80 | .60 | .009 | | | | | | | |
| | | 110 | 115 | 87 | .24 | .008 | | | | | | | |
| 115-125 Dacite Porphyry Supergene zone, Gray, soft Copper occurs as chalcocite. Total oxide is ± 3% | | 115 | 120 | 80 | .12 | .011 | | | | | | | |
| | | 120 | 125 | 82 | .11 | .012 | | | | | | | |
| | | 125 | | | | | | | | | | | |

Average
oxide
is
.13 Cu
.005 Mo
for
90 feet

oxide
Mixed

Supergene
Sulfide

Average grade of
Mixed and supergene
is 35 feet of

.47 Cu
.013 Mo

LOGGED BY V. F. H. DATE 8-8-65

FORM # 355
REVISED 10-62

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 2

PROJECT Atlas Mine, BS&K Mining Co., New York Claim

| | | | |
|--------------|----------------|------|--------------|
| Coörd. : N | BEARING | Vert | HOLE N° |
| E | INCL. | Vert | COLLAR ELEV. |
| START 8-9-65 | COMPL. 8-10-65 | | DEPTH 206 |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz | oz | % | EQUV | GROUPING — RMKS. |
|---|-------|-------|------|-----|------|------|---|---|----|----|---|------|------------------|
| 0-100' Dacite Porphyry - Brown - oxide zone Soft, strong Argillic Alt., Porphyritic, fine grained. Original Sulfide was \pm 4%, 90% in fractures, 10% diss. Trace sericite lining fractures. Qtz veinlets rare. Some green Cu stain visible. | | | | | | | | | | | | | |
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| 100-110 Dacite Porphyry Mixed Oxide and Sulfide Brown, Soft, fine grained, Porphyritic, Wk sericite and strong Arg. Alt. Copper occurs as Malachite and chalcocite, Core badly shattered. | | | | | | | | | | | | | |
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| 110-125 Dacite Porphyry Supergene Sulfide zone Dark gray, soft, weak Sericite and strong Arg. Alt. Copper occurs as chaleocite with weak pyrite, mostly in seams. Core badly broken. | | | | | | | | | | | | | |
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LOGGED BY VRH DATE 8-10-65

ASSAY-GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

PROJECT _____

| | | |
|------------|---------|--------------|
| Coord. : N | BEARING | HOLE N° 500 |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH |

| DESCRIPTION | Geol. | Assay | INT. | C/R | % Cu | % Mo | % | % | oz. | oz. | % | EQUV. | GROUPING — RMKS. |
|-------------------------------|-------|-------|------|-----|------|------|---|---|-----|-----|---|-------|--|
| 125-170 Dacite Porphyry | | 125 | | | .18 | .015 | | | | | | | Average Hypogene grade is .18 Cu .015 Mo |
| Hypogene zone, Gray, soft, | | 125 | 82 | | .14 | .028 | | | | | | | |
| porphyritic. Copper occurs in | | 125 | 82 | | .12 | .011 | | | | | | | |
| seams and veinlets as crushed | | 125 | 82 | | .11 | .011 | | | | | | | |
| chalcopryite, with pyrite. | | 125 | 82 | | .11 | .010 | | | | | | | |
| Numerous qtz veinlets. | | 125 | 82 | | .12 | .015 | | | | | | | |
| Much pyrite in seams is | | 125 | 82 | | .16 | .016 | | | | | | | |
| crushed and black. Total | | 125 | 82 | | .12 | .008 | | | | | | | |
| sulfide is 40%. Sulfide | | 125 | 82 | | .15 | .031 | | | | | | | |
| is 70% in seams, 30% in diss. | | 125 | 82 | | .30 | .011 | | | | | | | |
| We section seams. | | 125 | 82 | | .162 | .017 | | | | | | | |
| 170-182 Dacite Porphyry Gray | | | | | | | | | | | | | |
| Hypogene zone soft, | | | | | | | | | | | | | |
| porphyritic. | | | | | | | | | | | | | |
| Copper occurs as chalcopryite | | | | | | | | | | | | | |
| with pyrite. Total sulfide | | | | | | | | | | | | | |
| is 30%. Sulfide | | | | | | | | | | | | | |
| is 70% in seams and 30% in | | | | | | | | | | | | | |
| diss. Much pyrite veinlets. | | | | | | | | | | | | | |
| Pyrite is regularly crushed | | | | | | | | | | | | | |
| black. We section in | | | | | | | | | | | | | |
| seams, with Molybdenite | | | | | | | | | | | | | |
| visible in quartz veinlets. | | | | | | | | | | | | | |
| Largest veinlet is 2" qtz- | | | | | | | | | | | | | |
| pyrite-chalcopryite at | | | | | | | | | | | | | |
| 177'. This veinlet also has | | | | | | | | | | | | | |
| traces of chalcocite. | | | | | | | | | | | | | |

LOGGED BY V. P. Hall DATE 8-8-65

FORM # 355
REVISED 10-62

PROJECT Atlas Mine, BS&K Mining Co., Hole for BS&K No. 1

| | | | |
|---------------|------------------|--------------|-----|
| Coörd. : N | BEARING Vertical | HOLE N° | 306 |
| E | INCL. Vertical | COLLAR ELEV. | |
| START 8-21-65 | COMPL. 8-22-65 | DEPTH | 100 |

[illegible]

LOGGED BY VFH DATE 8-23-65

FORM # 355
REVISED 10-62

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 1 of 1

PROJECT B. S. & K.

| | | |
|------------------|-------------------|-----------------|
| Coörd. : N | BEARING | HOLE N° RDH 309 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 22 Mar. 66 | COMPL. 22 Mar 66' | DEPTH 110' |

| DESCRIPTION | Grain | Size | Int. | C/R | % Cu | % Mo | % | % | oz | oz | % | EQU TV | GROUPING — RMKS. |
|---|-------|------|------|-----|------|------|---|---|----|----|---|--------|------------------|
| SILVERBELL DACITE - argillically altered and siliceous, medium hardness but very abrasive, qtz. sulphide strgrs. w/ very weakly developed sericite near strgrs., thin capping: lim. after py. w/ secondary hm. derived from py. | 10 | | | | N.S. | | | | | | | | |
| | 20 | | | | .07 | Nil | | | | | | | |
| | 30 | | | | .08 | Tr. | | | | | | | |
| | 40 | | | | .08 | Tr. | | | | | | | |
| | 50 | | | | .07 | .001 | | | | | | | |
| | 60 | | | | .44 | Tr. | | | | | | | |
| | 70 | | | | .40 | Nil | | | | | | | |
| | 80 | | | | .44 | .001 | | | | | | | |
| | 92 | | | | .38 | .001 | | | | | | | |
| | 100 | | | | .29 | .001 | | | | | | | |
| | 110 | | | | .22 | Nil | | | | | | | |
| Sulphide zone @52' | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
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LOGGED BY BLW DATE 22 Mar. 66'

PROJECT B. S. & K.

| | | |
|------------------------------------|----------------|-----------------|
| Coörd. : N | BEARING | HOLE N° RDH 311 |
| E | INCL. Vertical | COLLAR ELEV. |
| START 23 Mar.66' COMPL. 23 Mar.66' | | DEPTH 150' |

LOGGED BY BLW DATE 23 Mar. 66

REPORT ON THE
INDUCED POLARIZATION SURVEY
for
B. S. & K. Mining Company, Arizona
Part II

McPhar Geophysics Limited

*June-Nov
1960*

McPHAR GEOPHYSICS LIMITED

NOTES ON THE THEORY OF INDUCED POLARIZATION AND THE METHOD OF FIELD OPERATION

Induced Polarization as a geophysical measurement refers to the blocking action or polarization of metallic or electronic conductors in a medium of ionic solution conduction.

This electro-chemical phenomenon occurs wherever electrical current is passed through an area which contains metallic minerals such as base metal sulphides. Normally, when current is passed through the ground, as in resistivity measurements, all of the conduction takes place through ions present in the water content of the rock, or soil, i. e. by ionic conduction. This is because almost all minerals have a much higher specific resistivity than ground water. The group of minerals commonly described as "metallic", however, have specific resistivities much lower than ground waters. The induced polarization effect takes place at those interfaces where the mode of conduction changes from ionic in the solutions filling the interstices of the rock to electronic in the metallic minerals present in the rock.

The blocking action or induced polarization mentioned above, which depends upon the chemical energies necessary to allow the ions to give up or receive electrons from the metallic surface, increases with the time that a d. c. current is allowed to flow through the rock, i. e. as ions pile up against the metallic interface the resistance to current flow increases. Eventually, there is enough polarization in the form of excess ions at the

interfaces to effectively stop all current flow through the metallic particle. This polarization takes place at each of the infinite number of solution-metal interfaces in a mineralized rock.

When the d. c. voltage used to create this d. c. current flow is cut off, the Coulomb forces between the charged ions forming the polarization cause them to return to their normal position. This movement of charge creates a small current flow which can be measured on the surface of the ground as a decaying potential difference.

From an alternate viewpoint it can be seen that if the direction of the current through the system is reversed repeatedly before the polarization occurs, the effective resistivity of the system as a whole will change as the frequency of the switching is changed. This is a consequence of the fact that the amount of current flowing through each metallic interface depends upon the length of time that current has been passing through it in one direction.

The values of the "metal factor" or "M. F." are a measure of the amount of polarization present in the rock mass being surveyed. This parameter has been found to be very successful in mapping areas of sulphide mineralization, even those in which all other geophysical methods have been unsuccessful. The induced polarization measurement is more sensitive to sulphide content than other electrical measurements because it is much more dependent upon the sulphide content. As the sulphide content of a rock is increased, the "metal factor" of the rock increases much more rapidly than the resistivity decreases.

For example, in one of the large porphyry copper pits, the resistivity contrast between the protore and the enriched zone was found to be only 180/18 or 10/1. The contrast in metal factor in the same pit was found to be 20/10,000. There was less than 1% sulphides in the protore and 5-9% sulphides in the enriched zones. As the sulphide content is increased the metal factor increases until for massive sulphides the values apparently are measured in hundreds of thousands.

Because of this increased sensitivity it is possible to locate and outline zones of less than 10% sulphides that can't be located by E. M. Methods. The method has been successful in locating the disseminated "porphyry copper" type mineralization in the Southwestern United States.

Measurements and experiments also indicate that it should be possible to locate most massive sulphide bodies at a greater depth with induced polarization than with E. M.

Since there is no I. P. effect from any conductor unless it is metallic, the method is useful in checking E. M. anomalies that are suspected of being due to water filled shear zones or other ionic conductors. There is also no effect from conductive overburden, which frequently confuses E. M. results. It would appear from scale model experiments and calculations that the apparent metal factors measured over a mineralized zone are larger if the material overlying the zone is of low resistivity.

Apropos of this, it should be stated that the induced polarization measurements indicate the total amount of metallic constituents in the rock. Thus all of the metallic minerals in the rock, such as pyrite, as well as

the ore minerals chalcopryrite, chalcocite, galena, etc. are responsible for the induced polarization effect. Some oxides such as magnetite, pyrolusite, chromite and some forms of hematite also conduct by electrons and are metallic. All of the metallic minerals in the rock will contribute to the induced polarization effect measured on the surface.

In the field procedure, measurements on the surface are made in a way that allows the effects of lateral changes in the properties of the rocks to be separated from the effects of vertical changes in the properties. Current is applied to the ground at one point, the sender location, and voltage difference measurements are made at several other spots, the receiver locations. The sender location is then changed and the procedure is repeated. The value of apparent resistivity and apparent metal factor for any given pair of sender and receiver locations is plotted on the map at the intersection of grid lines, one from the sender location and one from the receiver location. The resistivity values are plotted above the line and the metal factor values below the line. The lateral displacement of a given value is determined by the location along the survey line of the centre point between the sender and receiver locations. The distance of the value from the line is determined by the separation between the sender and receiver that gave that particular value.

The separation between sender and receiver is only one factor which determines the depth to which the ground is being sampled in any particular measurement. These plots then, when contoured, are not section maps of the electrical properties of the ground under the survey line.

The interpretation of the results from any given survey must be carried out using the combined experience gained from field, model and theoretical investigations.

In the field procedure, the interval over which the potential differences are measured is the same as the interval over which the sender is moved after a series of readings has been made. One of the advantages of the induced polarization method is that the same equipment can be used for both detailed and reconnaissance surveys merely by changing the interval over which the transmitter is moved each time. In the past, intervals have been used ranging from 100 feet to 1000 feet for the basic distance. In each case, the decision as to spread distance is largely determined by the expected size of the mineral deposit being sought, the size of the expected anomaly and the speed with which it is desired to progress.

The speed at which measurements can be made along a line is directly related to the length of spread used. In some detailed surveys in which the area of interest had been outlined by previous drilling and/or geology, spreads of 200 feet have been used. In these cases, distances ranging from 2500 feet to 3500 feet may be covered in a normal day's operation by one crew. In reconnaissance work using a 1000 foot spread distances of 5000 to 8000 feet may be surveyed in one day.

McPHAR GEOPHYSICS LIMITED
REPORT ON THE
INDUCED POLARIZATION SURVEY
FOR
B. S. & K. MINING COMPANY, ARIZONA
PART II

1. INTRODUCTION

During June 1960, an Induced Polarization survey was carried out over a portion of the B. S. & K. Mining Company property in the Silver Bell area of southern Arizona. The investigation revealed the presence of an interesting anomaly to the west of the mine workings and in our report of June 28, 1960, additional surveying was recommended.

This report describes the results obtained from the subsequent investigations carried out in October of this year.

2. PRESENTATION OF RESULTS

The Induced Polarization and Resistivity data are plotted in the manner described in the notes accompanying this report and are shown on the data plots as follows.

| | | |
|---------------|------------------|----------------|
| Line 2 + 00S | 300 foot spreads | Dwg. IP 2771-1 |
| Line A | 300 foot spreads | Dwg. IP 2771-2 |
| Line A | 200 foot spreads | Dwg. IP 2771-3 |
| Line 2 + 00N | 300 foot spreads | Dwg. IP 2771-4 |
| Line 10 + 00W | 300 foot spreads | Dwg. IP 2771-5 |

A sketch of the grid is shown on drawing Misc. 3298 at a scale of 1" = 200'. This is approximate only, being based on pace-and-compass traverses. The definite and possible induced polarization anomalies are indicated by solid and broken bars, respectively on this plan map as well as the data plots. These bars represent the surface projection of the anomalous zones as interpreted from the location of the transmitter and receiver electrodes when the anomalous values were measured.

Since the induced polarization measurement is essentially an averaging process, as are all potential methods, it is frequently difficult to exactly pinpoint the source of an anomaly. Certainly, no anomaly can be located with more accuracy than the spread length; i.e. when using 200' spreads the position of a narrow sulphide body can only be determined to lie between two stations 200' apart. In order to locate sources at some depth, larger spreads must be used, with a corresponding increase in the uncertainties of location. Therefore, while the center of the indicated anomaly probably corresponds fairly well with source, the length of the indicated anomaly along the line should not be taken to represent the exact edges of the anomalous material.

Unfortunately the station numbers on the two surveys do not agree. Although the lines coincide in location, the zero point on the present survey is 400' east of the zero point on the original survey. A numbered picket has been placed at each station to avoid any possible confusion in the future.

3. DISCUSSION OF RESULTS

The June survey indicated an interesting anomaly on Line A between stations 4 + 00W and 8 + 00W (i. e. 8 + 00W - 12 + 00W on the new grid). The source appeared to be a sub-vertical tabular body at shallow depth relative to the spread (i. e. less than 400 feet). Line A was re-surveyed in October using 300 foot spreads to confirm the anomaly. Parallel lines were then run 200 feet to the north and south to trace the zone and a fourth line was run along the strike of the anomaly. The results from each line are described below.

Line 2 + 00S

There is an anomaly of moderate strength and intermediate depth at about 9 + 00W on this line. The apparent Metal Factors are smaller than on Line A suggesting that the source is becoming smaller or deeper, or that the line is near the south end of the zone. The results on Line 10 + 00W indicate that this latter interpretation is correct.

Anomalous Metal Factors were also encountered at the west end of the line. These values are based on very low voltages and small frequency effects (1/4 - 3/4%) and hence cannot be considered to be reliable. The associated resistivity low may represent the boundary fault assumed to occur along the west side of the hills.

Line A

The 300 foot data show a moderate anomaly centered at 9 + 00W, corresponding with the feature outlined during the June

survey. Several anomalous values were repeated using a greater frequency spread (D. C. - 2-1/2 cps) with a resultant large increase in the apparent Metal Factor indicative of a metallic source.

In addition, there is a small shallow anomaly centered at about station 0 + 00. The east part of the line was re-surveyed using 200 foot spreads in order to obtain greater detail. This work confirmed the location of the anomaly and indicated a depth of the order of 100 - 150 feet to the source.

Line 2 + 00N

Considerable difficulty was encountered on this line because of interference from the numerous surface features. Even with the power turned off at the mill, it was not possible to obtain reliable data on part of the line. However, the resistivity data indicate the presence of the anomaly on this line and such I. P. values as were obtained seem to confirm that the zone extends this far north.

Line 10 + 00W

A line was run along the axis of the anomaly to determine the length of the zone. The results indicate that the south end occurs near station 0 or between 0 and 3S. Reliable data could not be obtained to the north because of excessive electrical noise from the power lines. The source appears to be shallower on this line, but there may be complicating factors present, especially the tailings dump.

4. SUMMARY & RECOMMENDATIONS

The October survey has confirmed the I. P. anomaly on Line A and has traced the zone farther to the north and south. A second smaller anomaly has been indicated on the eastern part of Line A.

While there are several surface features (mill, tailings dump, water pipe, etc.) which may be expected to interfere with the measurements or give rise to spurious local effects, it is felt that the main anomaly is primarily due to a sub-surface metallic source. Consequently it is recommended that a drill test be carried out to determine the cause of the anomaly. It is suggested that either a 400 foot vertical hole be drilled at 9 + 00W on Line A, or an inclined hole at 12 + 00W, Line A, drilling east at 45° for 450 - 500 feet.

From discussions with Mr. A. Kalaf, it would seem that the anomaly at 0 + 00, Line A is not related to any known ore lenses, but some interesting mineralization is known to occur in this area from previous underground work. If this is the case, then this anomaly should also be drilled. A hole is recommended at 2 + 00W, drilling east at 45°.

On completion of this test programme, the geophysical results should be reviewed in order to plan additional drilling if warranted and to plan a more extensive survey of the remainder of the property.

McPHAR GEOPHYSICS LIMITED

Robert A. Bell.

Robert A. Bell,
Geologist.

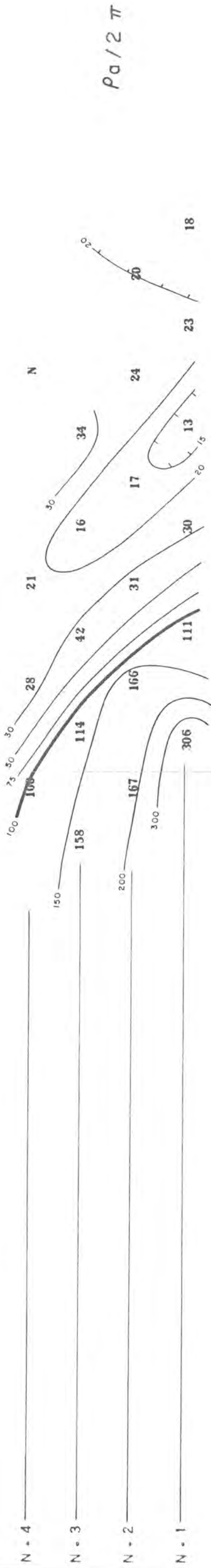
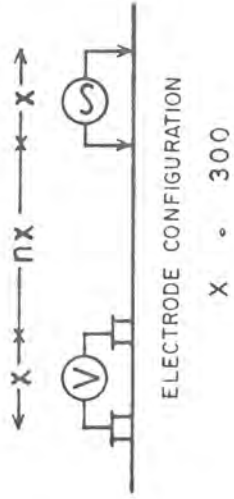
Philip G. Hallof

Philip G. Hallof,
Geophysicist.

Dated : November 8, 1960.

McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



LINE NO. 10W



FREQUENCY - 25 - 25 C.P.S.
DATE SURVEYED JUNE/60
APPROVED *MBB*
DATE *Nov. 2/60*

B.S. & K. MINING COMPANY

PIMA COUNTY - ARIZONA

Scale - One inch = 300 Feet

(10) DOUBTFUL READING

N SIGNAL/NOISE TOO LOW

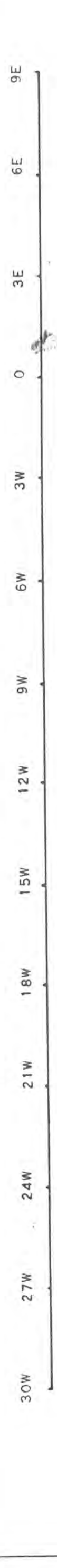
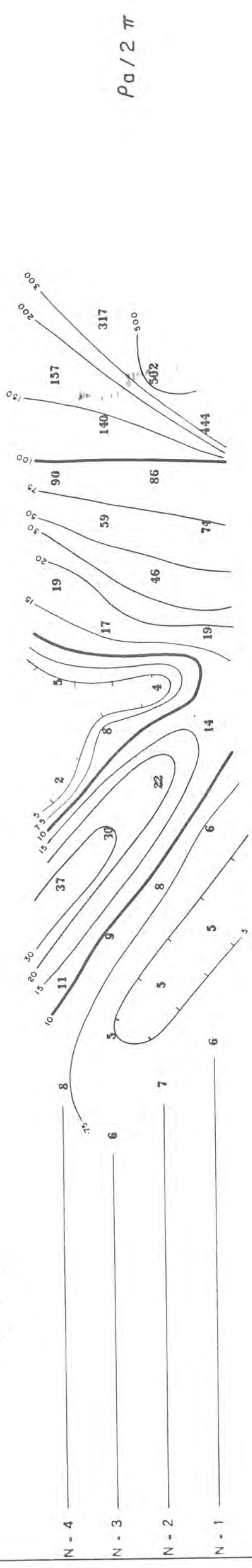
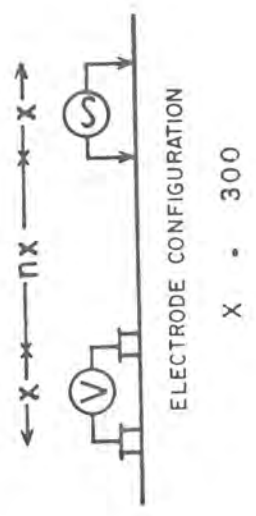
ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE

LOGARITHMIC CONTOUR INTERVAL

McPHAR GEOPHYSICS LIMITED
INDUCED POLARIZATION AND RESISTIVITY SURVEY

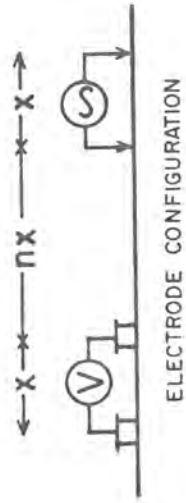


(10) DOUBTFUL READING
N SIGNAL/NOISE TOO LOW
ANOMALOUS ZONE
POSSIBLE ANOMALOUS ZONE
NOTE LOGARITHMIC CONTOUR INTERVAL

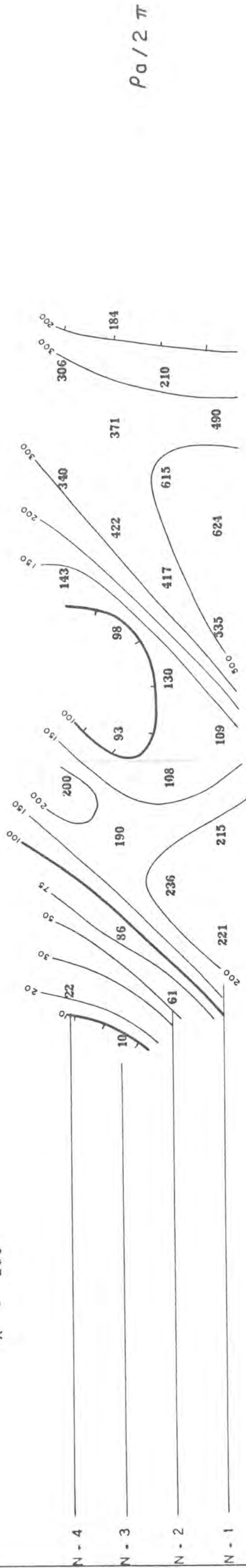
B.S.&K. MINING COMPANY
PIMA COUNTY-ARIZONA
Scale- One inch=300 Feet

FREQUENCY 25-25 C.P.S.
DATE SURVEYED JUNE/60
APPROVED RAB
DATE Nov. 2/60

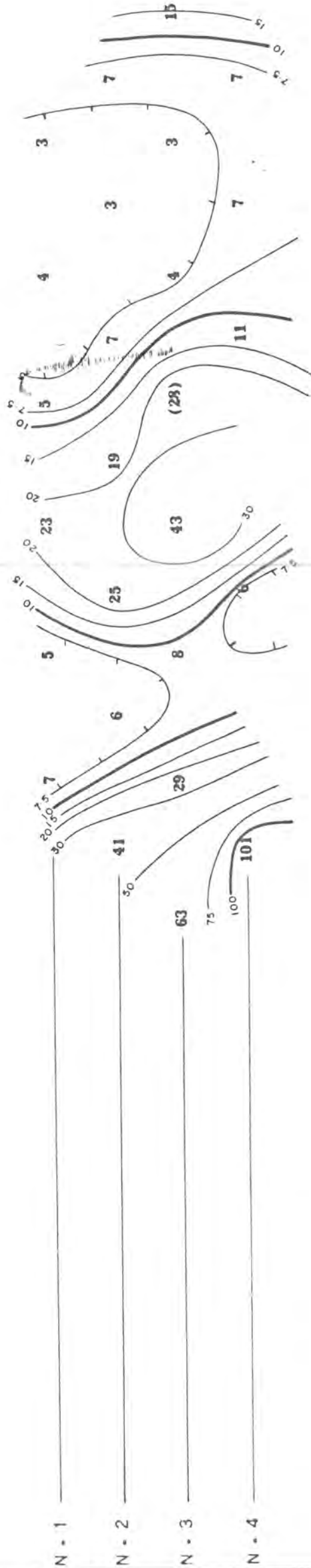
McPHAR GEOPHYSICS LIMITED
INDUCED POLARIZATION AND RESISTIVITY SURVEY



X = 200



12W 10W 8W 6W 4W 2W 0 2E 4E 6E 8E 10E 12E



(MF) a

(10) DOUBTFUL READING

N SIGNAL/NOISE TOO LOW

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE

LOGARITHMIC CONTOUR INTERVAL

B.S.&K. MINING COMPANY

PIMA COUNTY - ARIZONA

Scale - One inch = 200 Feet

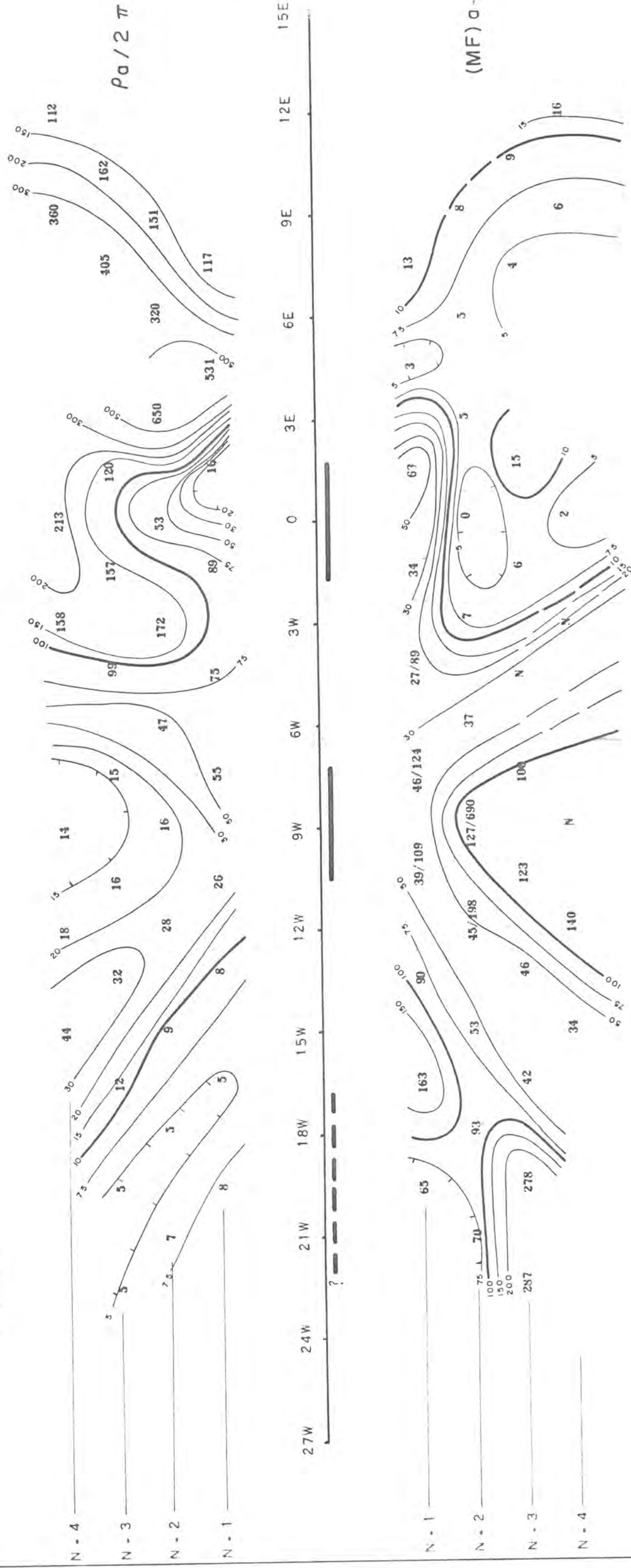
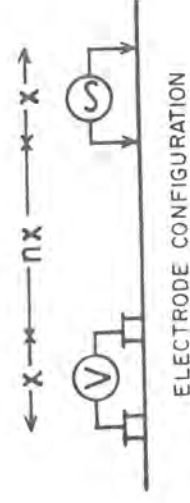
FREQUENCY 25-25 C.P.S.

DATE SURVEYED JUNE/60

APPROVED *RSB*

DATE *Nov 2/60*

McPHAR GEOPHYSICS LIMITED
INDUCED POLARIZATION AND RESISTIVITY SURVEY



FREQUENCY: 2.5 - 2.5 C.P.S.
DATE SURVEYED JUNE/50
APPROVED RRB
DATE Nov 2/60

B. S. & K. MINING COMPANY
PIMA COUNTY - ARIZONA
Scale - One inch = 300 Feet

34/106 — -25-2·5/D.C.-2·5 CPS

(10) DOUBTFUL READING

N SIGNAL/NOISE TOO LOW

ANOMALOUS ZONE

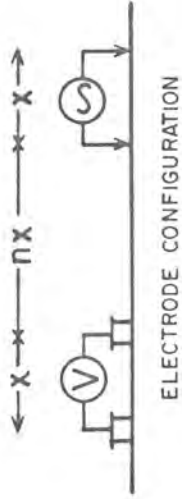
POSSIBLE ANOMALOUS ZONE

NOTE

LOGARITHMIC CONTOUR INTERVAL

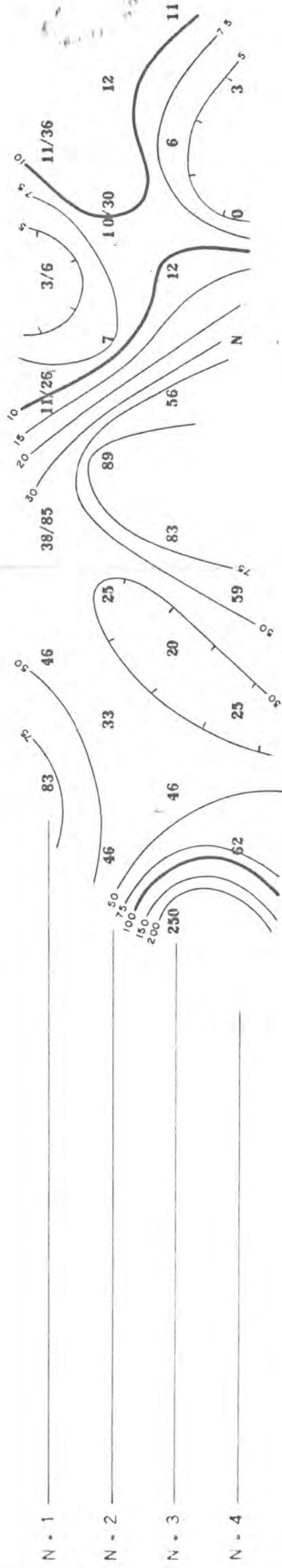
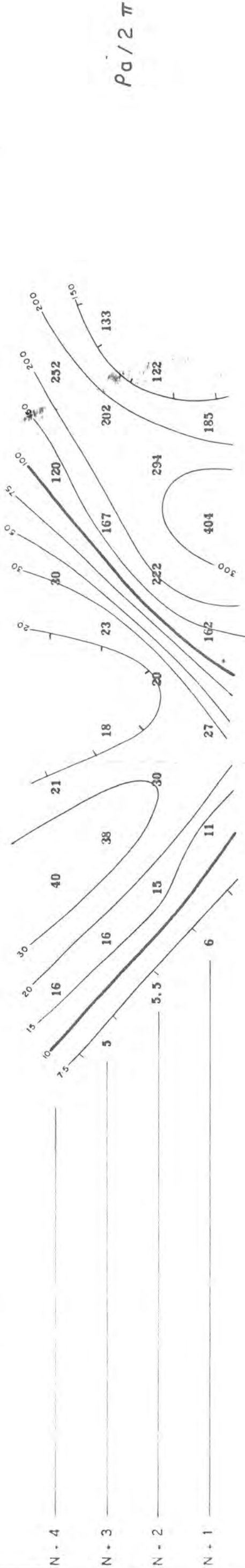
McPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY



ELECTRODE CONFIGURATION

X - 300



(10) DOUBTFUL READING

N SIGNAL/NOISE TOO LOW

ANOMALOUS ZONE

POSSIBLE ANOMALOUS ZONE

NOTE

LOGARITHMIC CONTOUR INTERVAL

B.S.&K. MINING COMPANY

PIMA COUNTY-ARIZONA.

Scale - One inch = 300 Feet

FREQUENCY 25 - 2.5 C.P.S.


DATE SURVEYED JUNE/60

APPROVED *RLB*

DATE *Nov. 2/60*



SCALE



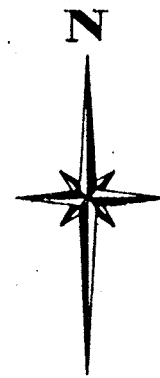
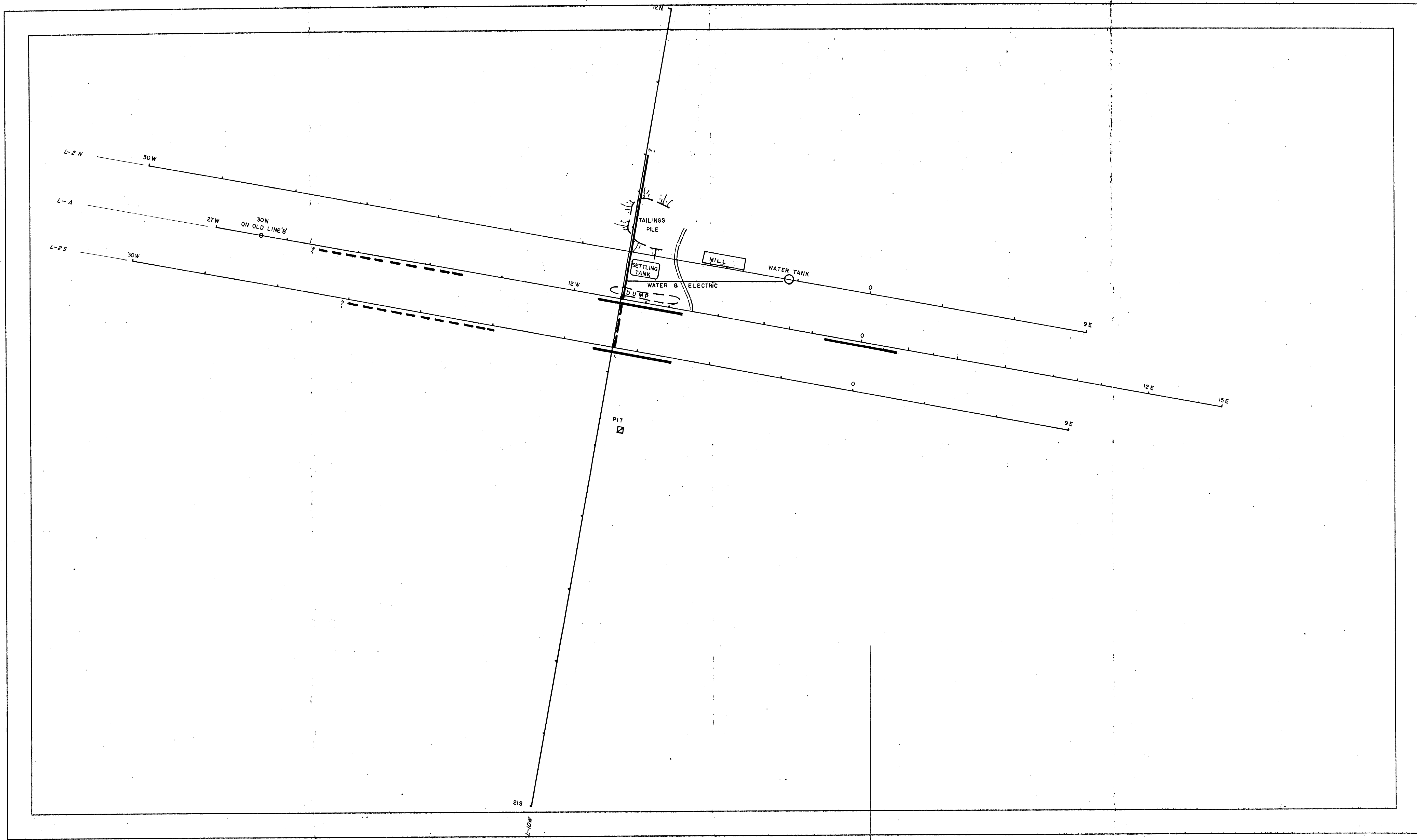
One Inch = Two Hundred Feet

WG. MISC. 3298

DWG. MISC. 3298

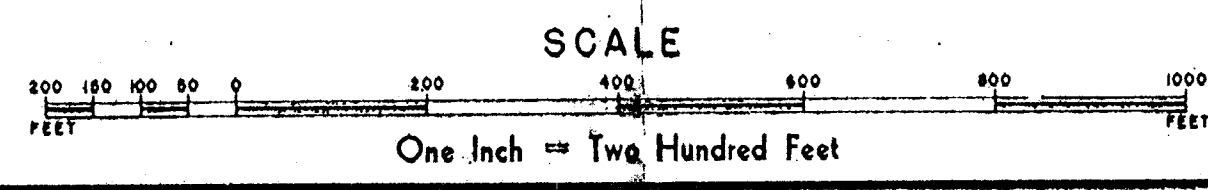
McPHAR GEOPHYSICS LIMITED

LOCATION MAP



ANOMALOUS ZONE
POSSIBLE ANOMALOUS ZONE

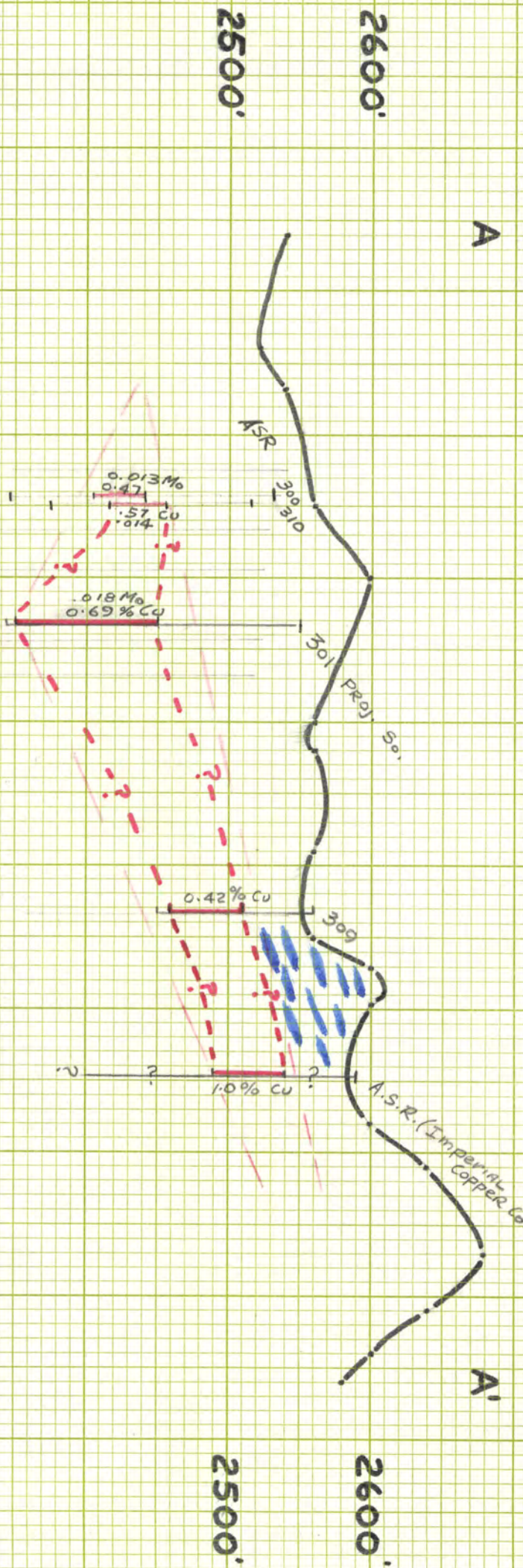
B.S. & K. MINING COMPANY
PIMA COUNTY - ARIZONA.



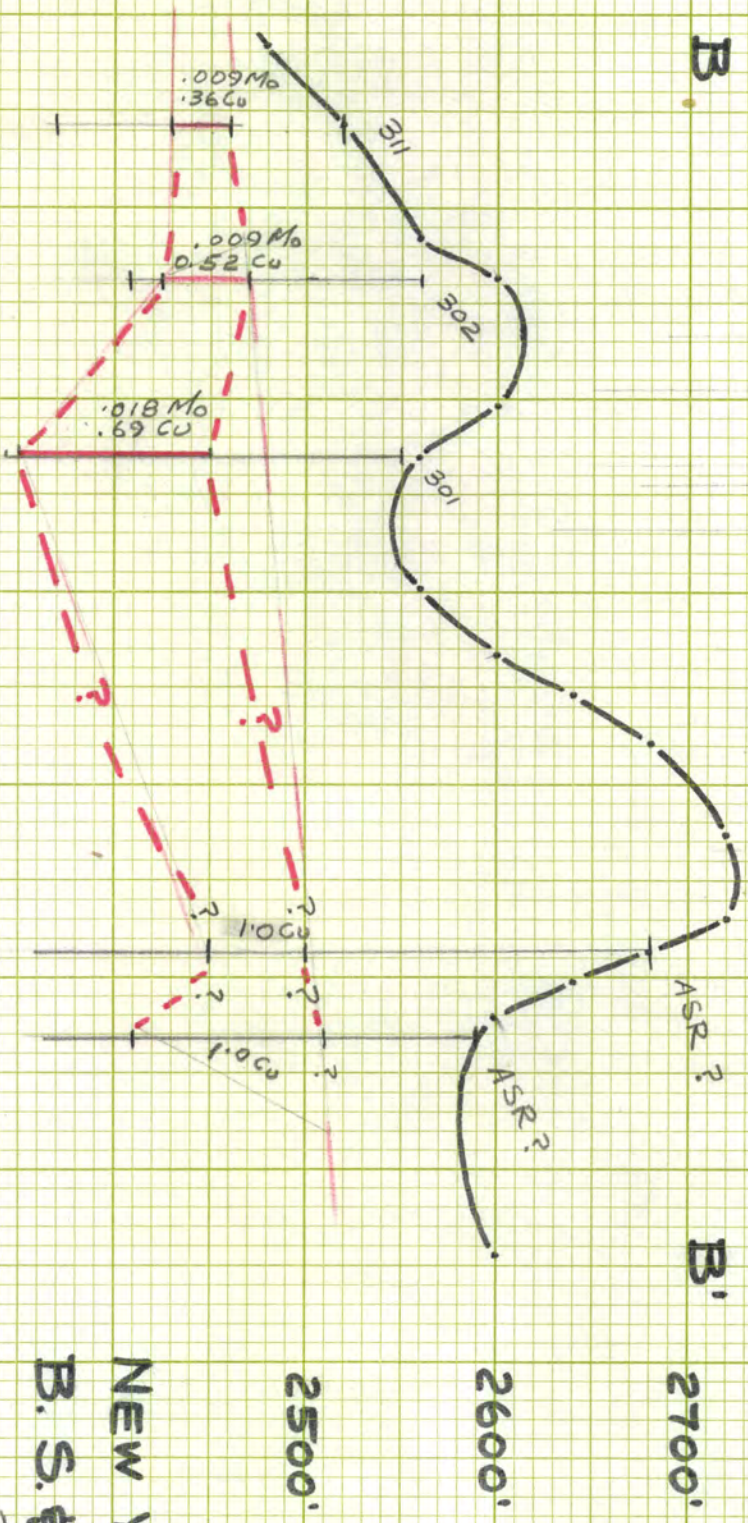
NOTE: LINES BY PACE AND COMPASS

DRAWN: F.R.P.
DATE: NOV. 1/1960
APPROVED: *RAB.*
DATE: *Nov. 2/60.*

TOPOGRAPHIC PROFILE SECTION X Looking NORTHERLY



ELEV. ABOVE SEA LEVEL



NEW YORK AREA
 B. S. & K. MINE

ESSEX**ESSEX INTERNATIONAL, INC.
NATURAL RESOURCES OFFICE**

315 E. BROADWAY #104, TUCSON, ARIZONA 85711 • PHONE (602) 326-2459

March 14, 1970

J. M. WILLIS
Director

Mr. Howard Lanier, Plant Manager
Essex International, Inc
Magnet Wire Division
618 Fourth Street
Three Rivers, Michigan 49093

Dear Howard:

Enclosed herewith is the original and one copy of the
B.S. & K. Mining Company report.

I feel the report is extremely conservative and that the
proposed six month period for evaluation and study of
the property would provide considerable additional in-
centive for bringing the B.S. & K. Mine into production.

I have been asked by the B.S. & K. people to inquire as to
the possibility of Essex purchasing, under firm contract,
50 million lbs. of copper, at the market price, deliverable
approximately as per the timetables in our report, for a
consideration whereby Essex would floor the purchase at
50¢ per lb., and B.S. & K. agree to a ceiling of 65¢ per
lb., with the B.S. & K. group providing all of the risk
capital necessary to put the property into production.

Attached hereto is a copy of the B.S. & K. memorandum
regarding their requirements for entering into a joint
venture.

If there are any questions regarding the report or other
matters pertaining to the account, please consider Mr.
Osborn and myself at your service.

Very truly yours,

ESSEX INTERNATIONAL, INC.
Natural Resources Office
J.M. Willis, DirectorJMW/k
enc

ASSAY—GEOLOGY COMPOSITE DRILL LOG

FORM # 355
REVISED 10-62

Sheet 1 of 3

PROJECT Atlas Mtn, BSEK Phosphate, BSEK No 3 Claim

| | | |
|--|--------------|---------------------|
| Coord. : N | BEARING | HOLE NO. <u>300</u> |
| E | INCL. | COLLAR ELEV. |
| START <u>7-6-65</u> COMPL. <u>8-8-65</u> | No. <u>1</u> | DEPTH <u>125</u> |

| DESCRIPTION | Core | Assay | INT. | C/R | % Cu | % Mo | % S | % Fe | % Zn | % Pb | % Ag | % Au | % Ni | % Co | % Mn | % Al | % Si | % Ca | % Mg | % K | % Na | % H ₂ O | % O ₂ | % EQUV | GROUPING—RMKS. |
|--|------|-------|------|-----|------|------|-----|------|------|------|------|------|------|------|------|------|------|------|------|-----|------|--------------------|------------------|--------|----------------|
| 0-90 Dacite Porphyry, Brown fine grained, soft, porphyritic, highly fractured, numerous qtz veinlets, Arg. Alteration, pyritic Sulfide max 1.3%, entirely in fractures. Conc very badly broken. No green or blue copper minerals visible, though entire section is oxide. | 0 | 10 | 56 | | .08 | .002 | | | | | | | | | | | | | | | | | | | |
| | 10 | 20 | 70 | | .05 | .002 | | | | | | | | | | | | | | | | | | | |
| | 20 | 30 | 68 | | .09 | .002 | | | | | | | | | | | | | | | | | | | |
| | 30 | 40 | 76 | | .14 | .001 | | | | | | | | | | | | | | | | | | | |
| | 40 | 50 | 86 | | .14 | .008 | | | | | | | | | | | | | | | | | | | |
| | 50 | 60 | 90 | | .16 | .004 | | | | | | | | | | | | | | | | | | | |
| | 60 | 70 | 86 | | .15 | .009 | | | | | | | | | | | | | | | | | | | |
| | 70 | 80 | 85 | | .16 | .006 | | | | | | | | | | | | | | | | | | | |
| | 80 | 90 | 87 | | .17 | .009 | | | | | | | | | | | | | | | | | | | |
| | 90 | 95 | 90 | | .94 | .025 | | | | | | | | | | | | | | | | | | | |
| 90-95 Dacite Porphyry, Gray Mixed oxide and sulfide. Soft, porphyritic, strong arg. Alt., numerous qtz veinlets. Copper occurs as oxide and chalcocite. | 95 | 100 | 80 | | .77 | .015 | | | | | | | | | | | | | | | | | | | |
| | 100 | 105 | 83 | | .51 | .010 | | | | | | | | | | | | | | | | | | | |
| | 105 | 110 | 80 | | .60 | .007 | | | | | | | | | | | | | | | | | | | |
| | 110 | 115 | 87 | | .87 | .008 | | | | | | | | | | | | | | | | | | | |
| 95-125 Dacite Porphyry Supergene zone. Gray, soft copper occurs as chalcocite. Total Sulfide is 1.2% Iron occurs as pyrite. | 115 | 120 | 80 | | .12 | .011 | | | | | | | | | | | | | | | | | | | |
| | 120 | 125 | 88 | | .11 | .013 | | | | | | | | | | | | | | | | | | | |

Average
oxide
is
.13 Cu
.005 Mo
for
90 feet

oxide
Mixed
Supergene
Sulfide

Average grade of
Mixed and supergene
is 35 feet of
.47 Cu
.013 Mo

LOGGED BY V. F. H. DATE 8-8-65

ASSAY—GEOLOGY COMPOSITE DRILL LOG

PROJECT Atlas Mine, BS&K Mining Co., New York Claim

Sheet 1 of 2

| | | | |
|--------------|----------------|------|--------------|
| Coörd. : N | BEARING | Vert | HOLE N° |
| E | INCL. | Vert | COLLAR ELEV. |
| START 8-9-65 | COMPL. 8-10-65 | | DEPTH 208 |

| DESCRIPTION | Geol. | Alt. | INT. | C/R | % Cu | % Mo | % | % | oz | oz | % | EQUV | GROUPING — RMKS. |
|---|-------|------|------|-----|------|------|---|---|----|----|---|------|------------------|
| <u>0-100' Dacite Porphyry</u> <u>Brown - oxide zone</u> Soft, strong Argillic Alt., Porphyritic, fine grained. Original Sulfide was $\frac{1}{2}$ 4%, 90% in fractures, 10% diss. Trace sericite lining fractures. Qtz veinlets rare. Some green Cu stain visible. | | | | | | | | | | | | | |
| | 10 | 20 | | | .12 | .006 | | | | | | | 0'-30' |
| | | | | | | | | | | | | | .16 Cu |
| | | | | | | | | | | | | | .09 Mo |
| | 10 | | | | | | | | | | | | |
| | 20 | 50 | | | .20 | .012 | | | | | | | |
| | | | | | | | | | | | | | |
| | 20 | | | | | | | | | | | | |
| | 30 | 67 | | | .17 | .010 | | | | | | | |
| | | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | 30'-50' |
| | 40 | 80 | | | .18 | .009 | | | | | | | .17 Cu |
| | | | | | | | | | | | | | .011 Mo |
| | | | | | | | | | | | | | |
| | 40 | | | | | | | | | | | | |
| | 50 | 85 | | | .16 | .014 | | | | | | | |
| | | | | | | | | | | | | | |
| | 50 | | | | | | | | | | | | |
| | 60 | 80 | | | .11 | .016 | | | | | | | 50-80 |
| | | | | | | | | | | | | | .12 Cu |
| | | | | | | | | | | | | | .016 Mo |
| | 60 | | | | | | | | | | | | |
| | 70 | 86 | | | .12 | .016 | | | | | | | |
| | | | | | | | | | | | | | |
| | 70 | | | | | | | | | | | | |
| | 80 | 90 | | | .13 | .017 | | | | | | | |
| | | | | | | | | | | | | | |
| | 80 | | | | | | | | | | | | 80'-100' |
| | 90 | 87 | | | .24 | .010 | | | | | | | .17 Cu |
| | | | | | | | | | | | | | .009 Mo |
| | | | | | | | | | | | | | |
| | 90 | | | | | | | | | | | | |
| | 100 | 90 | | | .10 | .009 | | | | | | | |
| | | | | | | | | | | | | | |
| | 100 | | | | | | | | | | | | |
| | 105 | 90 | | | .15 | .013 | | | | | | | |
| | 105 | | | | | | | | | | | | 100'-125' |
| | 110 | 85 | | | 1.31 | .040 | | | | | | | .83 Cu |
| | 110 | | | | | | | | | | | | .018 Mo |
| | 115 | 86 | | | 1.74 | .019 | | | | | | | |
| | 115 | | | | | | | | | | | | |
| | 120 | 82 | | | .49 | .008 | | | | | | | |
| | 120 | | | | | | | | | | | | |
| | 125 | 87 | | | .45 | .013 | | | | | | | |

100-110 Dacite Porphyry
Mixed Oxide and Sulfide
Brown, Soft, fine grained,
Porphyritic, Wk sericite and
strong Arg. Alt. Copper
occurs as Malachite and
chalcocite, Core badly
shattered.

110-125 Dacite Porphyry
Supergene Sulfide zone
Dark gray, soft, weak
Sericite and strong Arg.
Alt. Copper occurs as
chalcocite with weak pyrite,
mostly in seams. Core badly
broken.

ASSAY—GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

PROJECT Atlas Mine

| | | |
|------------|---------|--------------------|
| Coörd. : N | BEARING | HOLE N° <u>300</u> |
| E | INCL. | COLLAR ELEV. |
| START | COMPL. | DEPTH <u>206</u> |

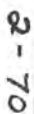
| DESCRIPTION | Gr. | Alt. | Int. | C/R | % Cu | % Mo | % | % | % | % | EQUIV | GROUPING — RMKS. |
|--|-----|------|------|-----|-------------------------------------|------|------|---|---|---|-------|------------------|
| 125-206 Dacite Porphyry Supergene zone as above | | | | | 125 | | | | | | | |
| | | | | | 130 60 | 1.21 | .006 | | | | | 125'-150' |
| | | | | | 130 | | | | | | | .74 |
| | | | | | 135 90 | .70 | .003 | | | | | .009 Mo |
| | | | | | 135 | | | | | | | |
| | | | | | 140 85 | .65 | .009 | | | | | |
| | | | | | 140 | | | | | | | |
| | | | | | 145 70 | .39 | .015 | | | | | |
| | | | | | 145 | | | | | | | |
| | | | | | 150 65 | .70 | .009 | | | | | |
| | | | | | 150 | | | | | | | |
| | | | | | 155 56 | .47 | .013 | | | | | 150'-175' |
| | | | | | 155 | | | | | | | .49 Cu |
| | | | | | 160 72 | .33 | .043 | | | | | .027 Mo |
| | | | | | 160 | | | | | | | |
| | | | | | 165 80 | .36 | .024 | | | | | |
| | | | | | 165 | | | | | | | |
| | | | | | 170 85 | .51 | .040 | | | | | |
| | | | | | 170 | | | | | | | |
| | | | | | 175 86 | .72 | .014 | | | | | |
| | | | | | 175 | | | | | | | |
| | | | | | 180 85 | .50 | .010 | | | | | 175'-200' |
| | | | | | 180 | | | | | | | .69 Cu |
| | | | | | 185 85 | .57 | .052 | | | | | .018 Mo |
| | | | | | 185 | | | | | | | |
| | | | | | 190 80 | .83 | .011 | | | | | |
| | | | | | 190 | | | | | | | |
| | | | | | 195 90 | 1.12 | .013 | | | | | |
| | | | | | 195 | | | | | | | |
| | | | | | 200 92 | .40 | .004 | | | | | |
| | | | | | 200 | | | | | | | |
| | | | | | 206 85 | .19 | .003 | | | | | |
| | | | | | End of hole | | | | | | | |
| | | | | | Average Mo for Hole is 0.0153 Mo. | | | | | | | |
| | | | | | Average from 105 to 200' is .72% Cu | | | | | | | |
| | | | | | .018 Mo | | | | | | | |

LOGGED BY VFH DATE 8-10-65

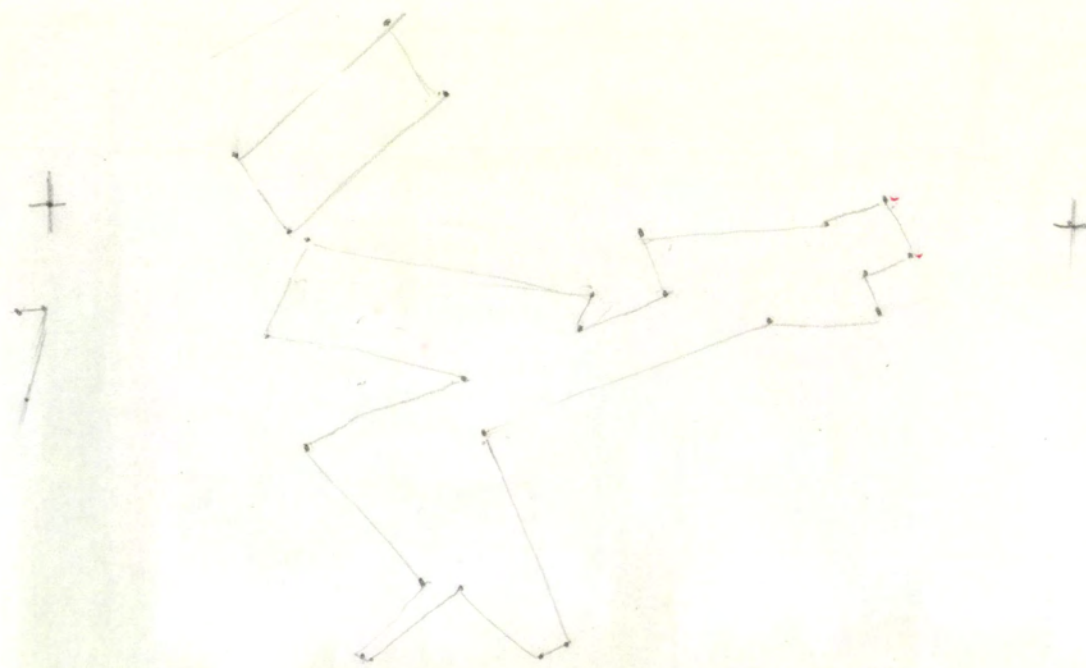
SILVERBELL DACITE - argillically altered and siliceous, medium hardness but very abrasive, qtz. sulphide strgrs. w/ very weakly developed sericite near strgrs., thin capping: lim. after py. w/ secondary hm.derived from py.

Sulphide zone @52'

LOGGED BY BLW DATE 22 Mar. 66

$$\begin{array}{r} 29 \overline{) 28} \\ 52 \overline{) 33} \end{array}$$
$$\begin{array}{r} 28 \overline{) 27} \\ 33 \overline{) 34} \end{array}$$


HEINRICH'S ^{by} GEOEXPLORATION Co.





Essex

3/23/70

B.S. & K. Project
Conference

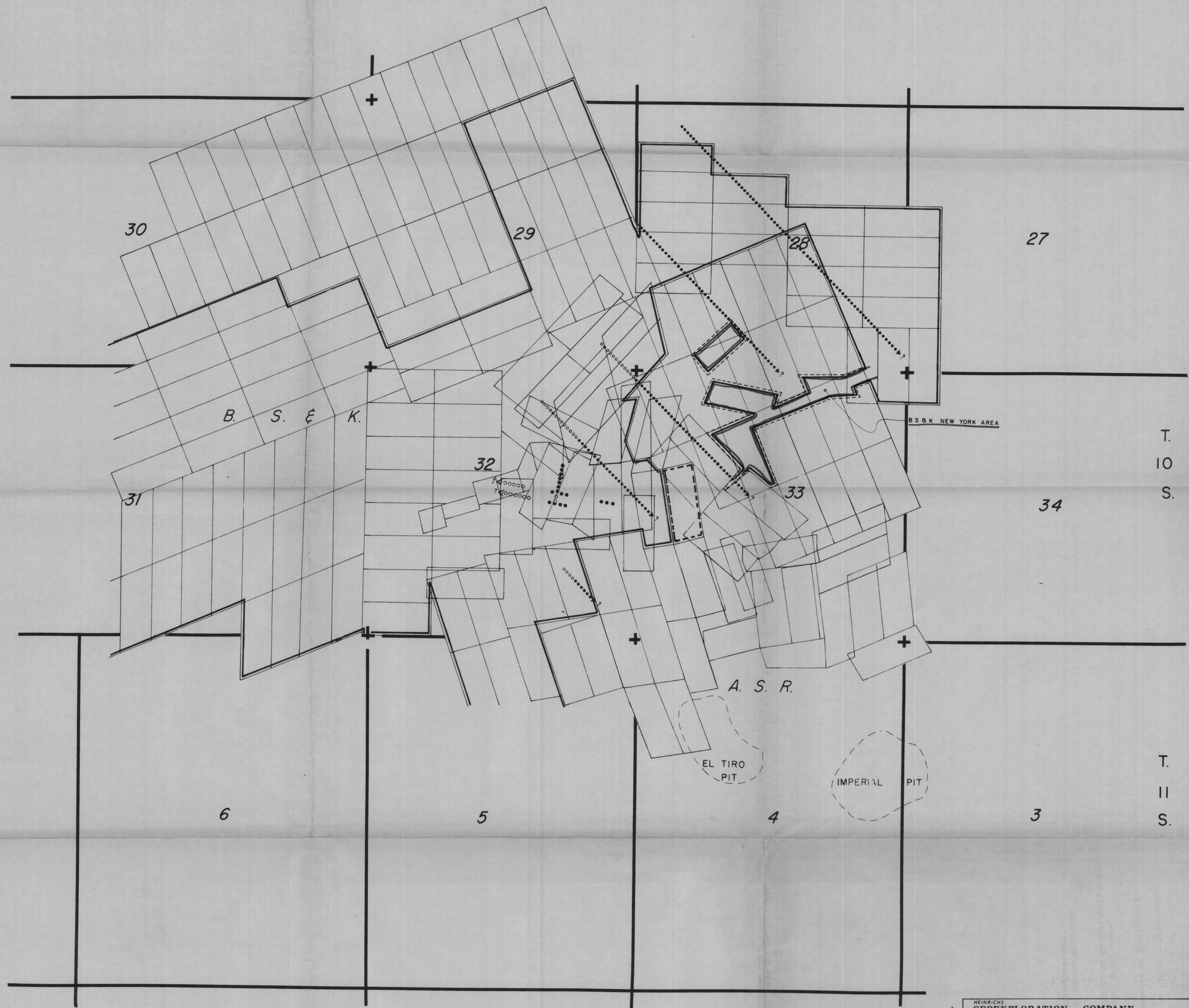
Talk to John Kinnison
Geo Camp

Vis Hollister of DUVAL Tucson

Call Kent Perry Hazen Research

207 Room RAMADA

Meet John Kinnison 3/24/70
" Jack Stille 3/24/70



T.
10
S.

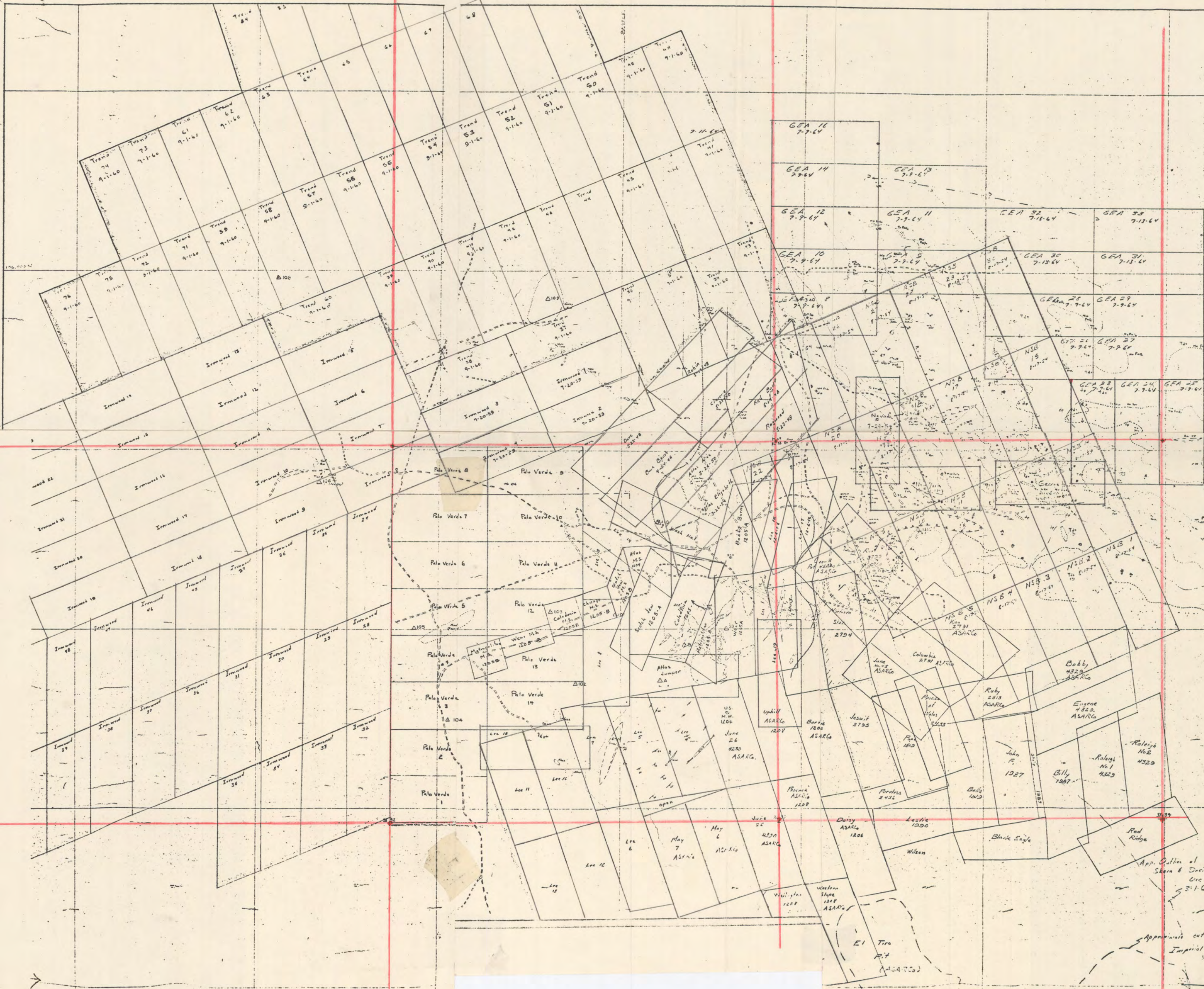
T.
11
S.

R. 8 E.

— B. S. & K. BOUNDARY

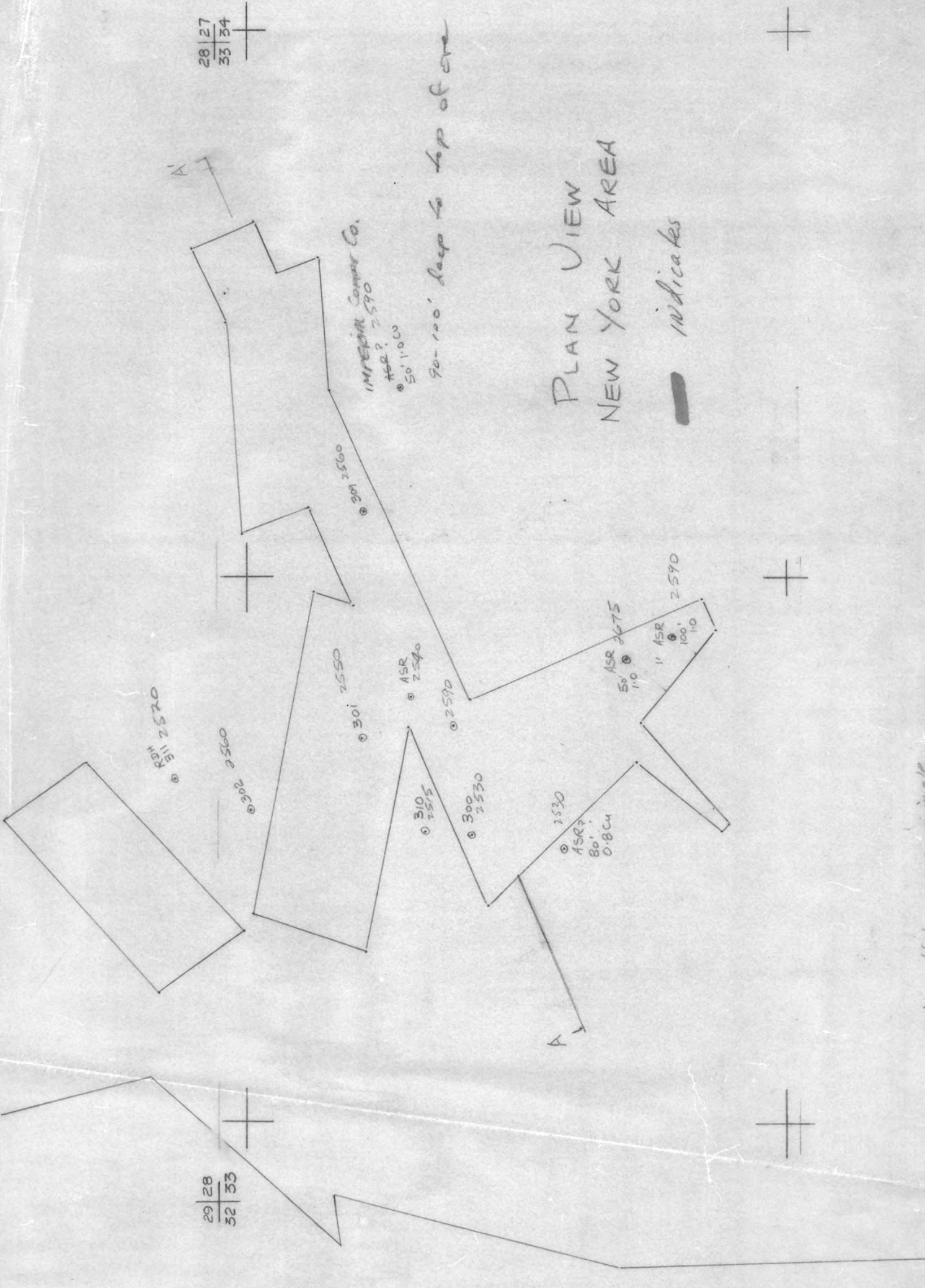
*Geocomp Copy
Attn. John Kinnison*

| | |
|--|--|
| <small>HEINRICH'S</small> GEOEXPLORATION COMPANY <small>POST OFFICE BOX 5671, TUCSON, ARIZONA 85703</small> <small>Phone: 602/623-0578 Cable: GEOEX, Tucson</small> <small>geophysical engineers vancouver sydney</small> | |
| B.S. & K. MINING CO. ATLAS MINE & VICINITY PIMA COUNTY, ARIZONA OWNERSHIP <small>FOR</small> | |
| <small>SCALE 1" = 1000' DRAWN BY EGH & JCD DATE MARCH 1970</small> | |



29 | 28
32 | 33

28 | 27
33 | 34



PLAN VIEW NEW YORK AREA

indicates

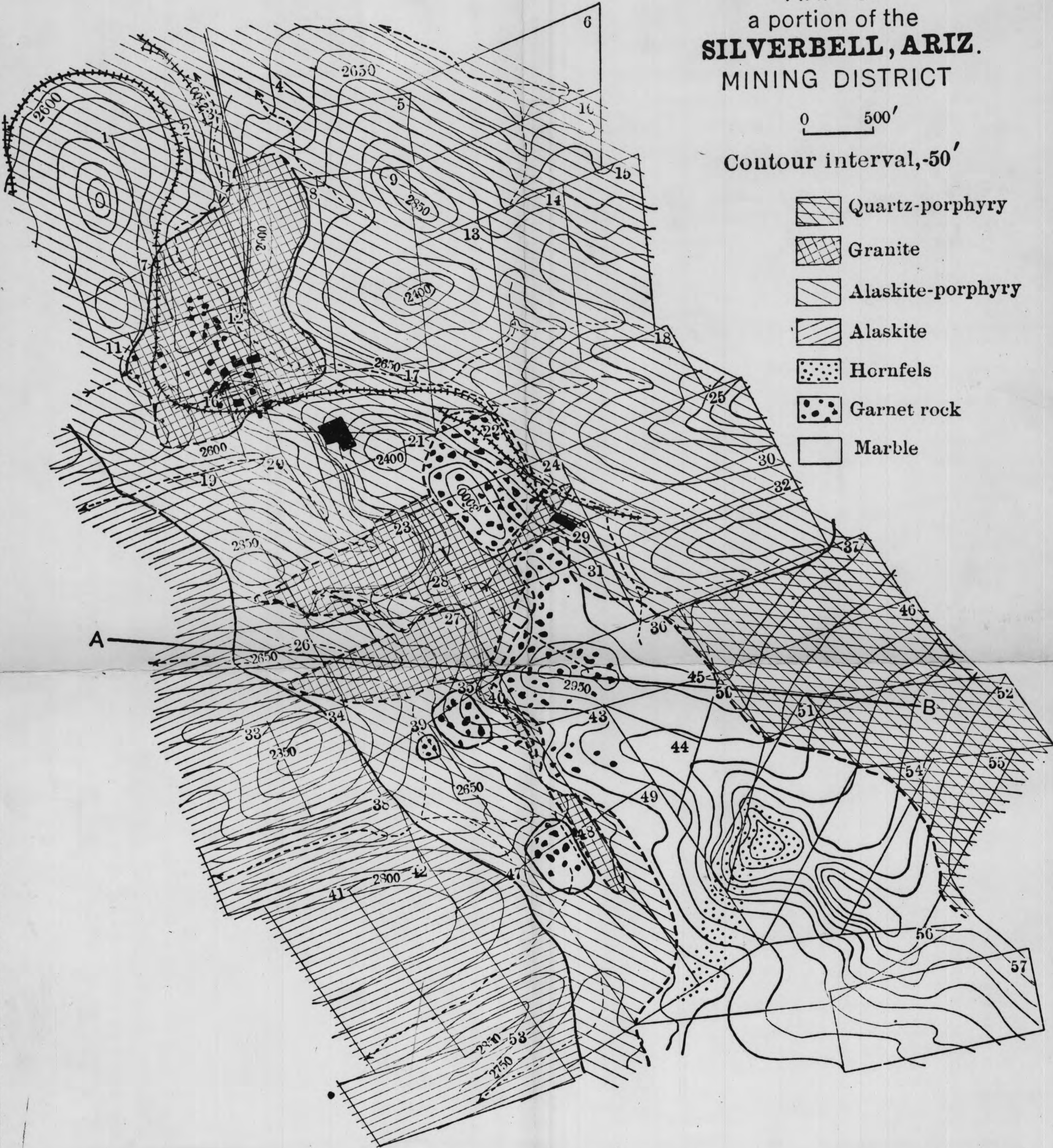
Location Drill Holes approximate

MAP OF a portion of the **SILVERBELL, ARIZ.** MINING DISTRICT

0 500'

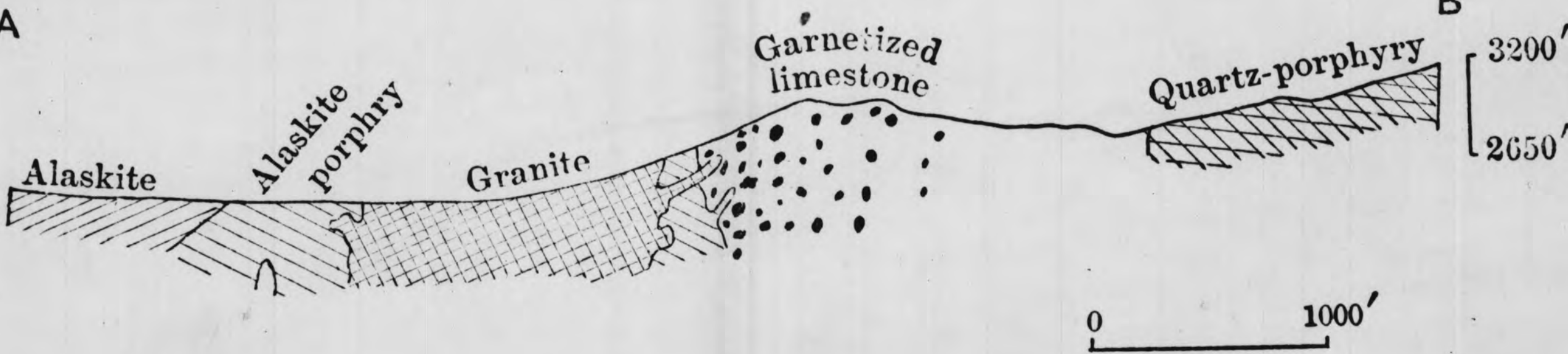
Contour interval, -50'

- Quartz-porphyry
- Granite
- Alaskite-porphry
- Alaskite
- Hornfels
- Garnet rock
- Marble



A

B



PROPOSED DUMP & LEACH AREA

ROUTE 2

ROUTE 1

NEW YORK CLAIM GROUP

ATLAS MINE

2/3 B.S. & K.
1/3 Steinfeld

EL TIRO PIT

IMPERIAL PIT

HEINRICH
GEOEXPLORATION COMPANY
POST OFFICE BOX 8671, TUCSON, ARIZONA, 85703
Phone: 602/623-0578 Cable: GEOEX, Tucson
geophysical engineers vancouver sydney

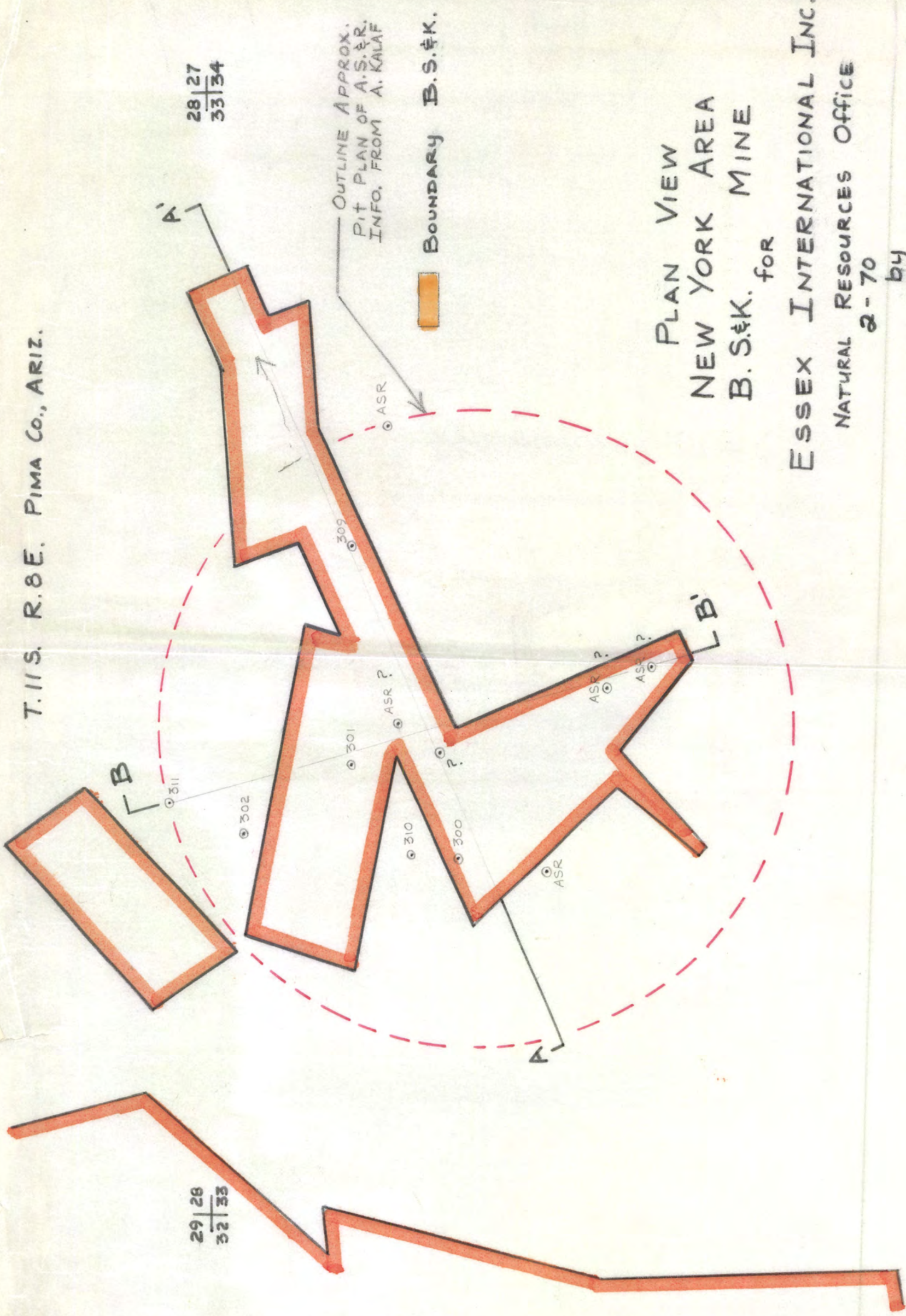
AERIAL PHOTO MOSAIC
of
B. S. & K. MINING CO. PROPERTIES
T 10 & 11 S, R 8 E
PIMA COUNTY, ARIZONA
for
ESSEX INTERNATIONAL INC.

Scale: 1" = 1000' 13 March 1970

T.11S. R.8E. PIMA Co., ARIZ.

29|28
32|33

28|27
33|34



PLAN VIEW
NEW YORK AREA
B. S.&K. MINE
for

ESSEX INTERNATIONAL INC.
NATURAL RESOURCES OFFICE
2-70

by
HEINRICHS GEOEXPLORATION CO.
Scale 1" = 500' approx.

