

CONTACT INFORMATION
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Arizona Geological Survey
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Phoenix, AZ, 85012
602-771-1601
http://www.azgs.az.gov
inquiries@azgs.az.gov

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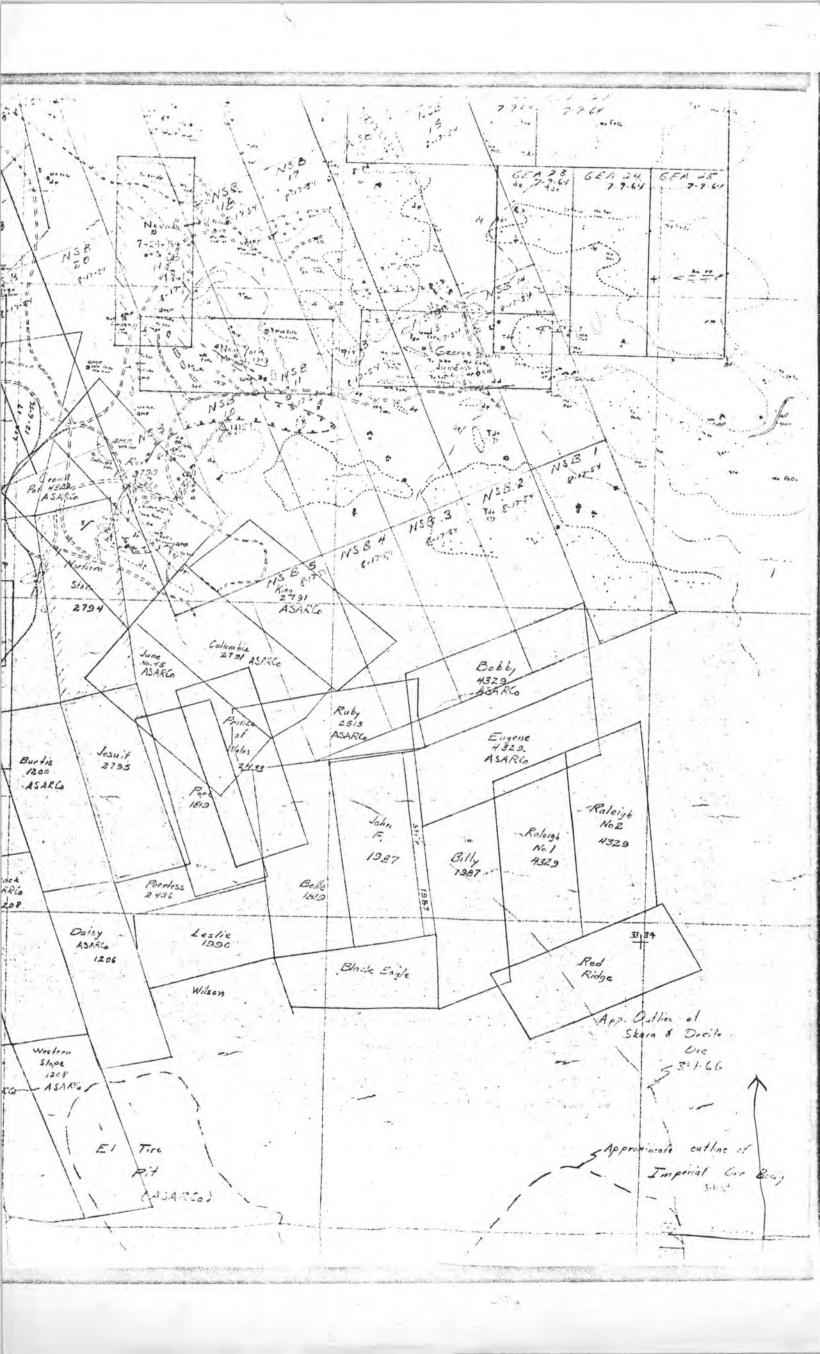
### CONSTRAINTS STATEMENT

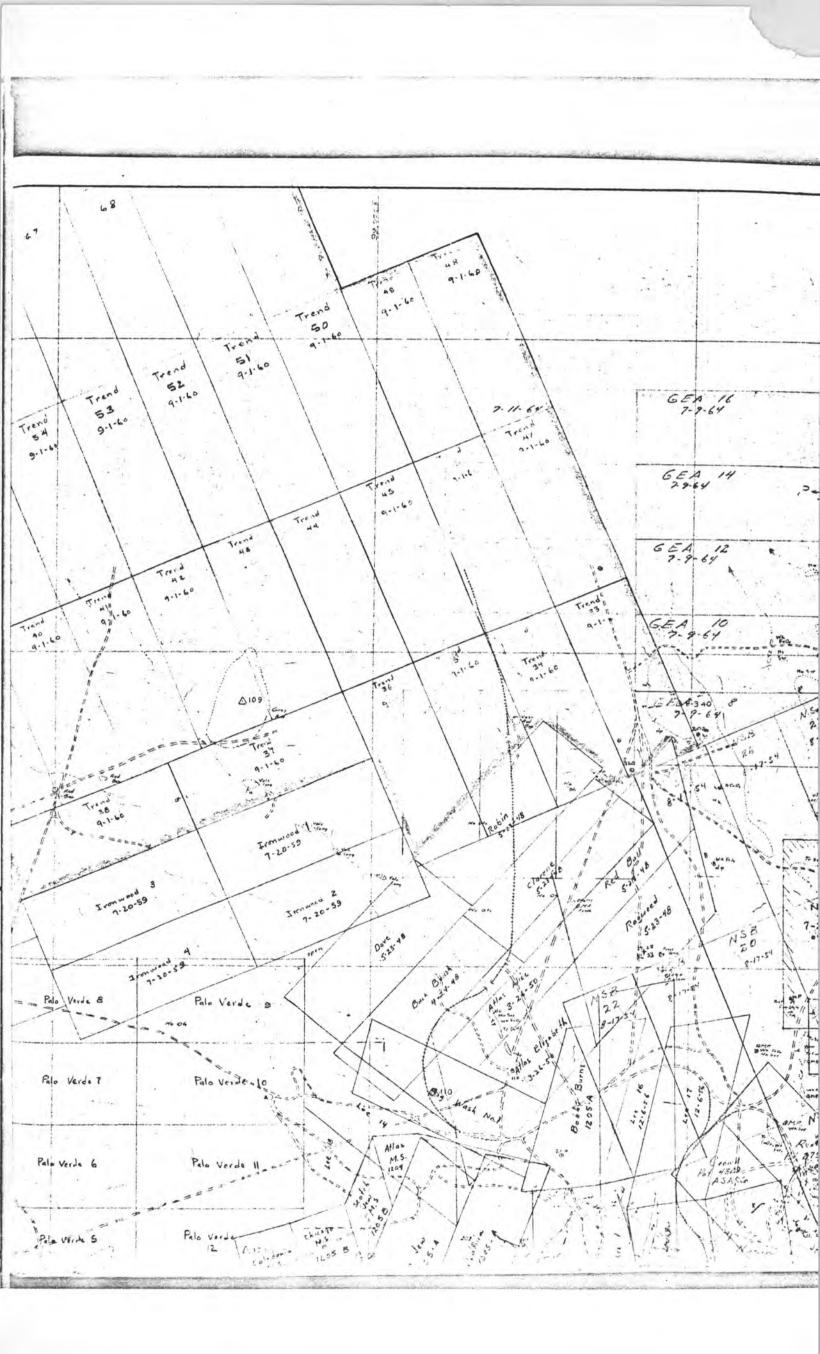
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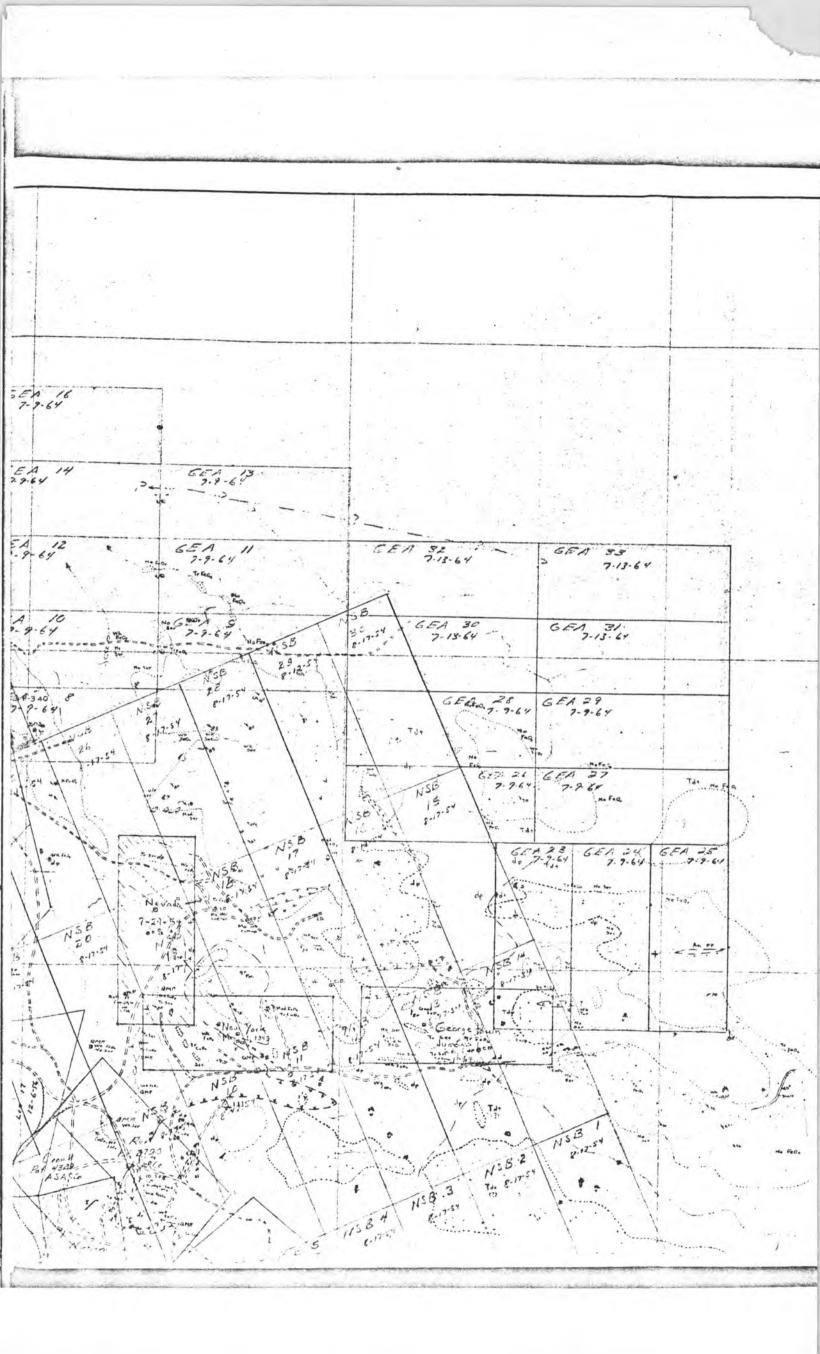
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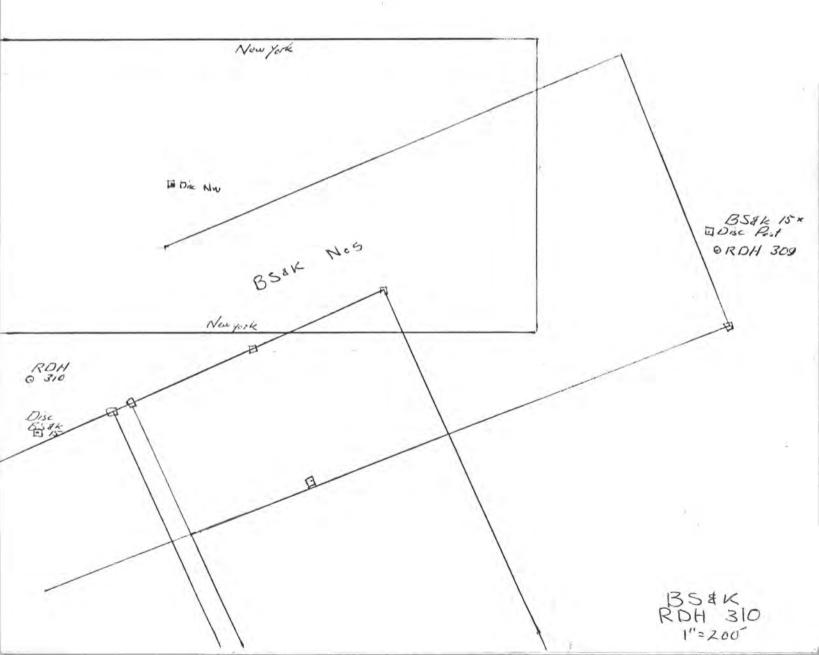
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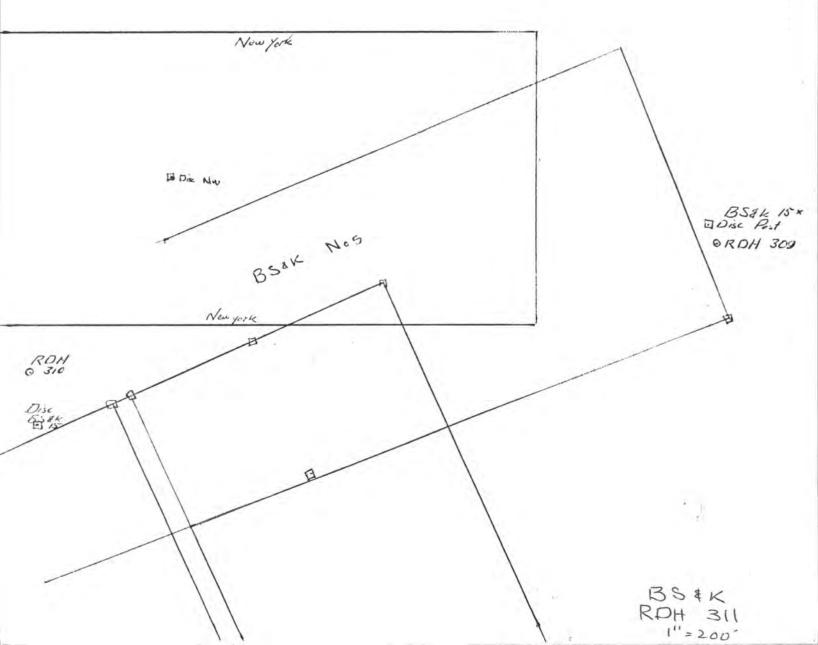


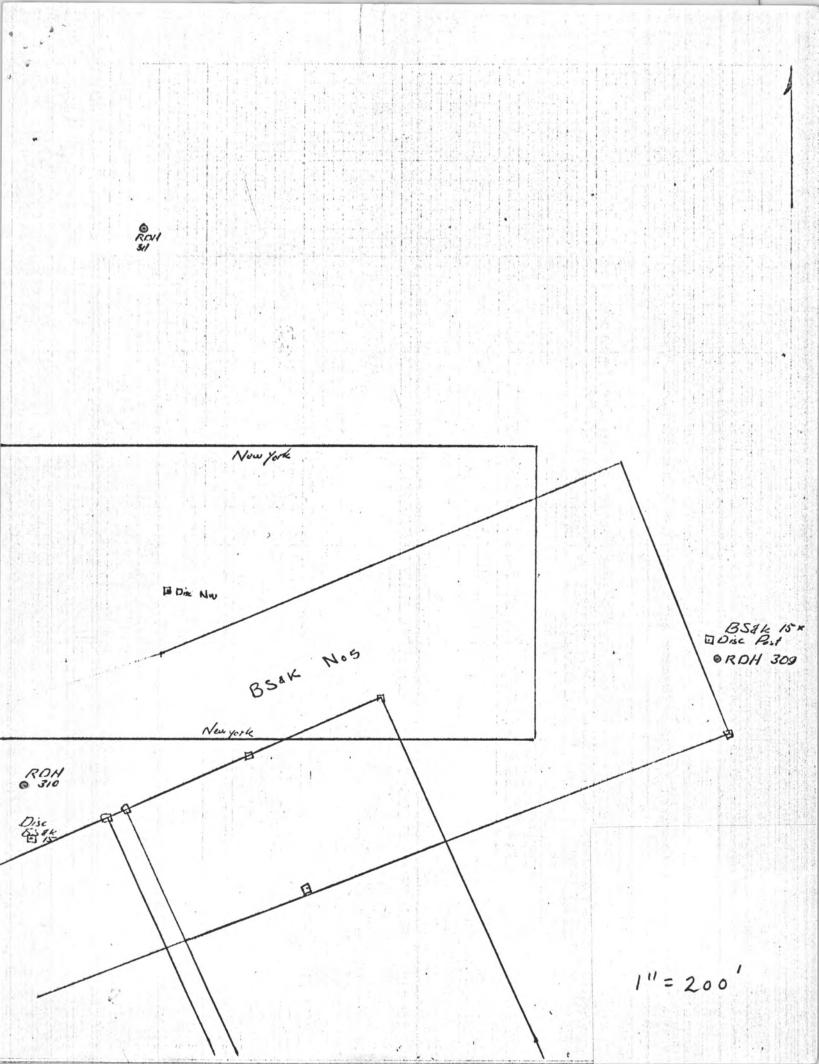


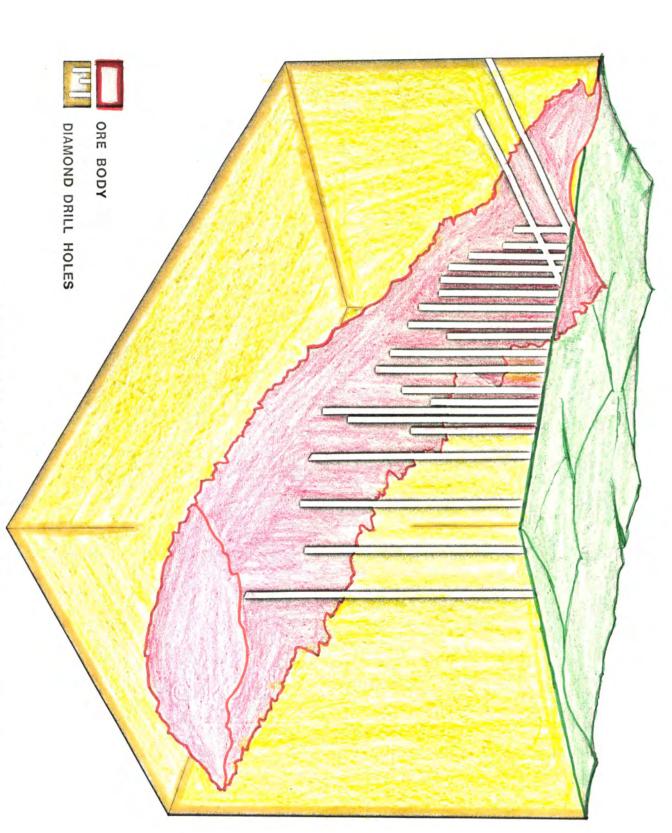
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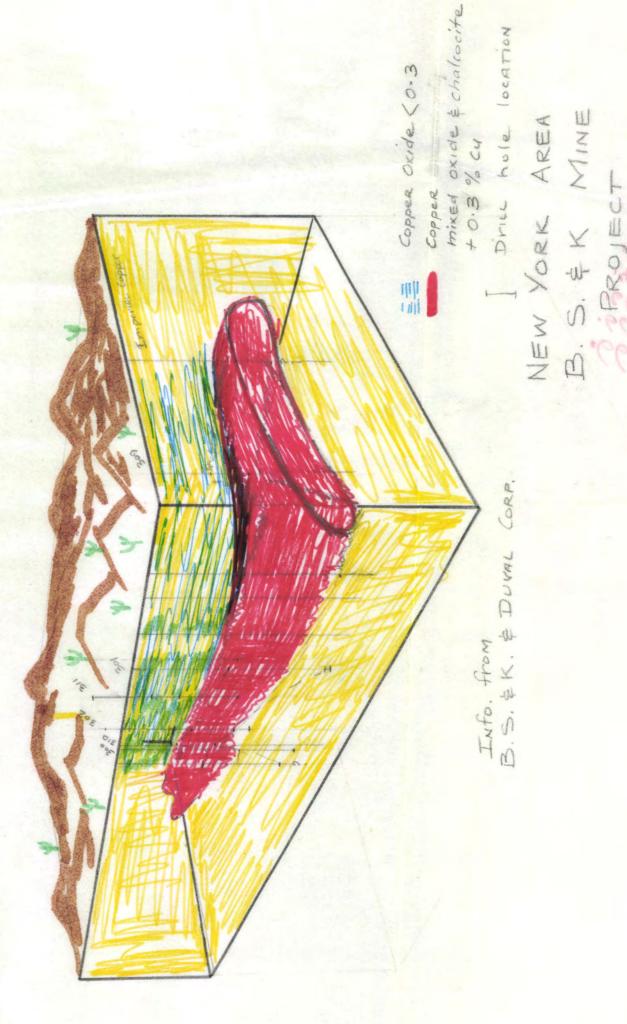
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GREAT LAKES NICKEL LIMITED - PARDEE TOWNSHIP, ONTARIO



D. S. & K MINE

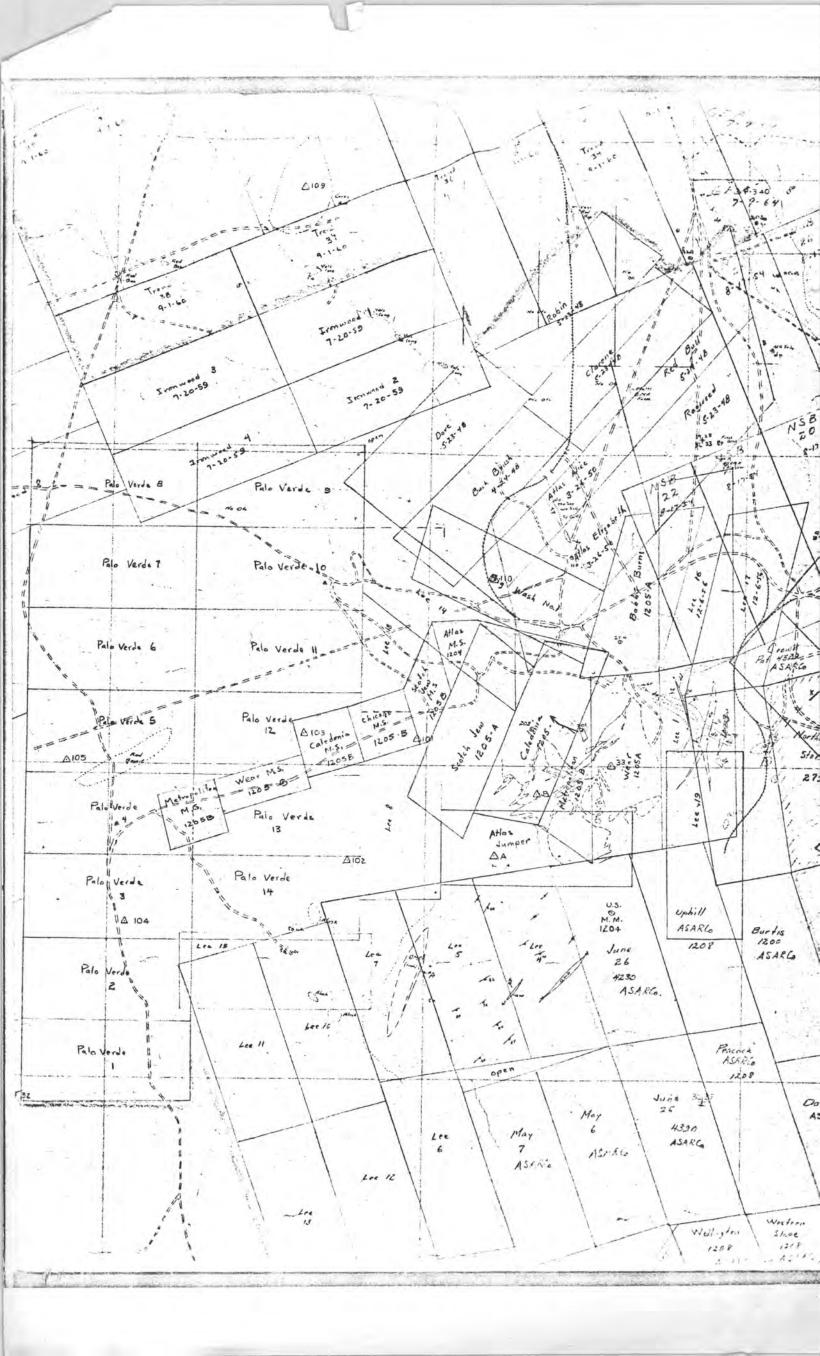
B. S. & K MINE

APROJECT

FOR STATERNATIONAL INC. hole location

GEOEXPLORAtion Co. HEINRICHS

01000





# Two Pueblo CONSTRUCTORS Suc.

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)

GEOEX

Cable: Grock

AND WOR

ROY BACK THESEN, AMERINA 85703

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

Dear Mr. Heinrichs:

Mr. Grover Heinrichs

808 West Grant Road

Tucson, Arizona

Heinrichs Geoexploration Co.

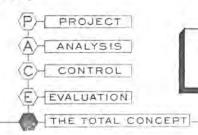
In response to your request for a budget estimate concerning the cost of stripping and mining of your B.S.&K. project in Sections 33 and 28, Township 11 south, Range 8 east, we are pleased to submit the following information.

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% of Section 29 and NE% 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. 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

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.

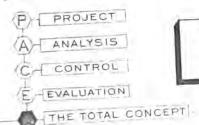
Mine and haul a distance of approximately 1.0 mile at a rate of 4,000 cubic yards per day @ \$0.99 per cubic yard.

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:

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

Heinricks Geoexploration Company March 26, 1970 Page Two CONTRACTOR OF THE PROPERTY OF 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: 1h



# M. M. SUNDT CONSTRUCTION CO.

GENERAL CONTRACTORS



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

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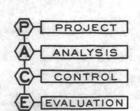
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THE TOTAL CONCEPT

# 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

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.

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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: 1h





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

.M.Willis, Director

JMW/k

GH FOM B,S. EK MAR 5.0 × 106 × 12 16 CM Mng. Co. 60,000,000 / Eu REI DOC. EMS, 1969 1.0 x 106 x 3 lbs Cu 21,000,000 / 84 Pa:: 0.85% Recovery = 6,885 x10 the recommobile an 6.885 x106 x 0.56 = 38.556 x106 \$50.949 × 106 6.885 × 106 × 0.74 = Stripping Waste 5.2 x10 x.30 = 1.560 x106 Stripping - one 12.0 × 106 × 30 = 3.600 × 106 hix Rlant - (1250 gal/Min Gasis 3.09 / h Cu) Kareling Trosourer = 3.000 × 106 ( Ton Evelange - electrowining. Of enoting Cost - Rasis E/MI-Dre 1969 - Law 8.374/ To 16.15 \$/# - Pouls Towers utilities-Roagent Bot-habor & over head) = 11.126 × 106 819.286×106 oper hed) \$31.663×106 919.270×106 3.785 x 3.0 x 1250 = 14,193.75 = 31.3 x 1440 = 45,072 45,072 x 340 = 15.324 x 106 annual Randuction 18.324×106 = 4.5 yrs/ Approx 231.663×106 = 7,036×10 annual Trefore Taxos - 19,270 × 106 = 4.285×106 \$4,282 x 0.25 x . 52 4.036x.85x.52 3.116x10 = 1.893 x104 22.289×106 Met after Fredwal TAXIS famually 17.667 410 " /4.5yr. \$10,650×106 State Taxes:

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



### ZEINRICHS 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. ÉK

#511

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, HEINRICHS GEOEXPLORATION COMPANY

E. Grover Heinrichs Vice President

Enclosure:

PLEASE REPLY TO -> SIGNED

DATE

SIGNED

Mr. Kent Perry TO 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

Dear Kent:

3/23/70

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

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Ext ESSEX

Mr. Seifet, Attorney & BS. F.K.

Ff. Mayne, Attorney Alaska Met. Elyde Dooml. Vait of.
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Essex 3/18/70 Howard Lamer Called Walt - Le: BSEK. Evaluations - exonomic evaluation. Geologist - 2nd Grussets.

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ESSEX INTERNATIONAL B.S. & K. MINING CO. ATLAS MINE & VICINITY PIMA COUNTY, ARIZONA Approx. full & partine 120 dains Approx. Mine Mine ARIZONA .36 4/1.4% 25,326.00

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OWNERSHIP-

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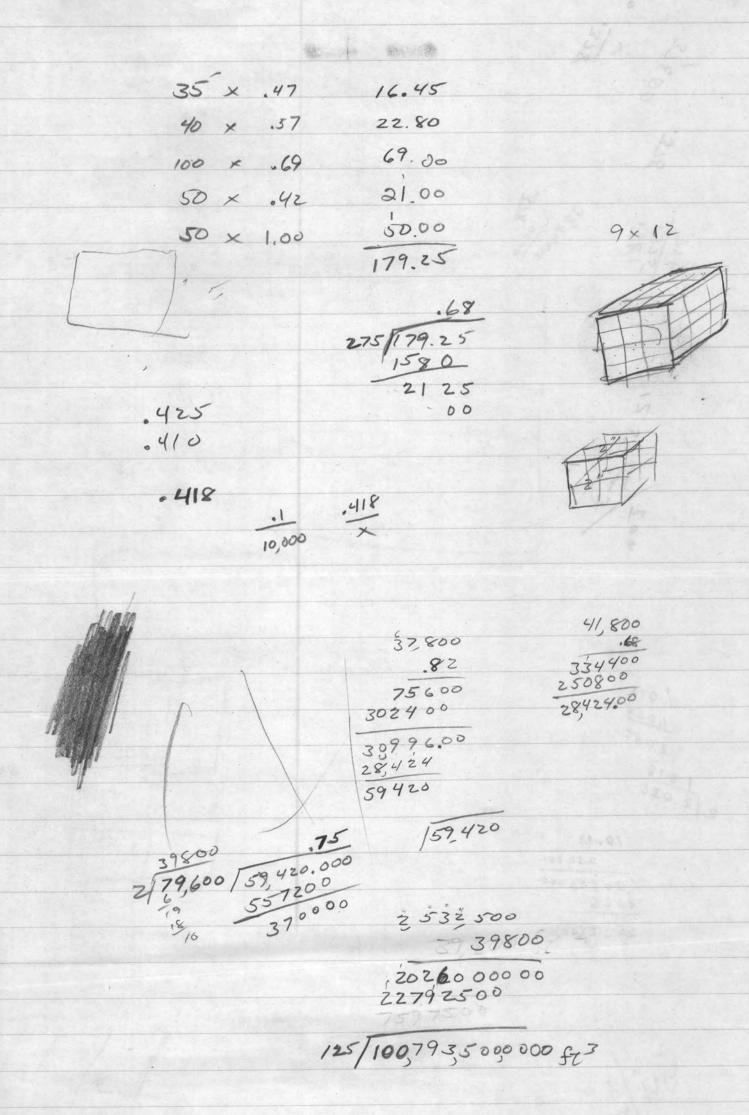
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B. S. & K. Mng. CORP. (ARIZONA) KALIF, Willis OsboRN, E.G.H. 160-170 Claims 160 - 170 c/aims >300 Stockholders Cosh \$200,000 & over next 3 years Browler Quarity Feasability study

B.S. EK O \$ 200,000 1 Three you content (3) \$300,000 monthly installments alvance royalty expense ON or before 3yr. pend must be plant producing
30,000 lbs / day copper LIX or?
based on 300 working days per When the plant comminences suduetion advance royalty terminales Essex acquires 51% rikest in the property Decover all advance voyelly pryments

BSEK MINE 1/26/70 Viscussions for Essex Abe Kalif of B.S.K. Clyde OsboRN of Essex EGH of Genex for Essex Vic Hollister of Dyune All materiac of Durac torred over to or available to becex Received from Abe Kalif. (3) Drice Logs (A) Plan Map of claims

Side lights
Vic Hollister mentioned interested in
Wis Alywood Charpion 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
- Dove, Robin, Buck Brush, Clarene, Atlas Alice, Red Bull, Atlas Elizabeth, Wash No. 1, Ragweed, Atlas Jumper.

#### 7. PATENTED CLAIMS

# 8. MILL SITE CLAIMS PATENTED

Atlas	Survey	No.	1204		-
Chicago	"	11	1205	В	
Caledonia	11	11	11	11	
Wear	**	11	1205	11	-
Metropolitan	11	11	11	11	•

# 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

THE B. S. AND K. MINING COMPANY

ESSEX INTERNATIONAL INCORPORATED

**MARCH 1970** 

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

## ARIZONA



#### HEINRICHS COMPANY GEOEXPLORATION



AUSTRALIA

U.S.A.

Post Office Box 5671 Tucson, Arizona 85703 Phone: (602) 623-0578 Cable: GEQEX, Tucson

# TABLE OF CONTENTS

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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:

- 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 occuring 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 GEOEXplopation Company

E. Grover Heinrichs, Vice President

Approved

Walter E. Heinrichs, Jr., President

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a 2 lante	te(?) . Abund	32	20 -	+1000	.20	277	. 028	90 1 190 10 198	15	18.4				
Same Li	ne diss sulfial	3, 32	30	+1000	.28	41	.004		16	44.5				
Very poo	7 676	34		+1000	Vac V	+300	5.32 30		17	71.3				
340-400: D.	scife porphyny	33	50	+1000	.37	+300	.044	A Section	18	61.3				
23 182-	323 but is present	36		+1000	,21	282	107.00	Me is	19	92.1	A Supremental			
Chlorite	about 1"	37	70	+1000	./8	272	.027	91863	20	94.0	HATE THE PARTY OF			
cholcop	about 1"	38		+1000	.15	178	.018		21	80.5				
Ullo		39	96	+1500	.20	256	.026		2.2	95.2				
			1	14.00		As we are	909	2247	W. 17-3		1			
			20	ditte	,227	4 - 0 W	.024	1 1 5	1000	56.8	AVERAGE REC'Y			
			18	1	.3.18	3437		Not like	4.16		Egu. Ci-Mo			
			3	. 5	13.70	- New York		4(1)	11.1					
The state of	100 M Car			10.00	Sec. 18	NAME OF	1 34	ul (C)	16.146	To all the				
Total		580	1 14	- 1 Ax	Ca.	avibà.	100	- M S 4	Asiz.					
Page 18 Aug		1 1 1 1		Mary.	1206	1,00,00	9/19/3	100		1 111 1				
				4.07	100		7/19/4	N.V.	1.14					
			-	COLUMN TO	100000	100	35.00	245 145	7 Vy (444)	1 10 20 51	1 2 图 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			

FORM # 355 REVISED 10-62

PROJECT Atlas Mine, BS&k Mining 6., BS&k No 3 Claim

Coord, : N				BEA	RING	Very		A STATE OF	COLLAR ELEV.				
START 8-6-65 COMPL.				Mc.	Cox	0 50	c.	urie.	DEP	TH	182 feet		
DESCRIPTION	18/	3 3	/c/R	% C ix	% Mo	%	%	oz.	Van C	EQUIV.	GROUPING - RMKS.		
- 90 Dacite Porphyry, Brow	TV .	0	56	.08	002		10	1	9 7s V	Joseph .			
e grained, soft, porsharitie		1	16		232		Que,	1.40.41	Sept St	147.			
bly fractured, numerous	140	10	70		.002		3 5	WI C	1813	11726			
s veinlets, Arg. Alteration		20	10	,05	.0.2	14/03	W 19 191	CONTRACT.		100 July 18			
guiel Sulfide was t 3%,	E 9	20	11/2	, et 1/100	3. N	A	Villa II	ACE.	大変別	, a <sub>2</sub> .			
rely in fractures, Core		30	68	.09	:007		44 SIA	1000	4	148			
en or blue copper		1	6	in.	+ Jah	1 1	Q.	5 0.					
nevals livisible, Hough		30	76	.14	.001	186	LOD I	113,51	12.2		average		
tive section is oxide		i dy	İ	-26	1234			1 W	K.		oxide is		
	N T	40	86	14	.003	7	100	15 624		5.56	.13 Ca		
		50		155,0		1130	No. of	2.0		34 P	,,005 Me		
	17	53	0	11		Series 1		Lat. N		2 NG	for		
		50	90	./6	. Oc 17	tio.	A said	2 5 2 6 7 A	1200 s	10	, 90 feet		
	+	7	X.Y.	7 34		7.1	0 1600		100	MINERAL SERVICE			
		70	26	.15	009	7.	Part of		100	TO STATE OF			
		r <sup>o</sup> ls -		100						1.0			
		30	85	.16	.006	11 840,	4 23 4 6 1	2000	WAS				
			1.9	li.	1		1500			150			
		88	87	17	.609	N. T	551	80.7	100	100			
		45			1007		23	31.4	F1 10		oxide		
-95 Davi Pornigry GE	41	90	Co .	1000	100	12.18	4.97	7.7.20	24	370	Mixed		
ed lorger and sulfide.		95		.99		15 10		That.	100	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Supergene		
+ parpaul e, ing		150	8.6	.79	.015	4 40		7	14.5		Sulfide		
- At y nume is 9t3	3	105	83	.5/	:010	AL E	15	1508L		1746	Avenge grade		
aletanico en cours as	1 5	105	80	160	1.00	A. A.	10	i di	17		Mixed and .		
	SITE	110	8	1.24	.000	11		W)	T. A	N.	is 35		
128 side Parpagry		115	(2)	./2	(20)	100	18	19.5	16	A) that is	.47 Cu		
in the Gray sof	1	134		.11	17.10	-	284	/ yll at	April 1	13.14	.013 Mo		
our occurs as chalmoile.		129	1	1000		1		111111	16	- 11	DATE 8-8-65		

Sheet 1 of 2

Coord, : N			BEAL	RING	V	ert			E Nº	301 LEV.	
	8-10-6	5	11102	•				DEP		206	
DESCRIPTION /		C/R	<sup>%</sup> Cu	%Mo	%	%	OZ	02	% EQUIV.	GROUPING - RMKS.	
100 Dacite Porphyry - own - oxide zone ft, strong Argillic Alt.,	10	20	.12	.006						0'-30' .16 Cu .09 Mo	
phyritic, fine grained. Iginal Sulfide was # 4%, % in fractures, 10% diss. ace sericite lining	10 20	50	.20	.01						.09 NO	
attures. Qtz veinlets re. Some green Cu stain sible.	20 30	67	.17	.01							
	30 40	80	.18	.00	9					30'-50' .17 Cu .011 Mo	
·\$-	40 50	85	.16	.014						1	
00-110 Dacite Porphyry   xed Oxide and Sulfide  rown, Soft, fine grained,	50 60	80	.11	.01	.6					50-80 .12 Cu .016 Mo	
orphyritic, Wk sericite and trong Arg. Alt. Copper ccurs as Malachite and malcocite, Core badly	60 70	1000	.12	.016	5						
nattered.	70 80	90	.13	.01	,					80'-100'	
	90	87	.24	.010	)					.17 Cu .009 Mo	
	90		0 .10	.00	)						
10-125 Dacite Porphyry upergene Sulfide zone	10	590 5								100'-125' /83 Cu	
erk gray, soft, weak ericite and strong Arg. It. Copper occurs as haleocite with weak pyrite,	11	0 586	1.74	L						.018 Mo	
estly in seams. Core badly coken.	12	082		.00						(	

\* FORM # 355 REVISED 10-62

PROJECT.

Sheet 2of 2

Coord, : N					RING				HOLE Nº Spo				
START COMPL.			_	INCL			-		COLLAR ELEV.				
START COMPL.	7:	13	./	%	1%.	%	1%	OZ.		1H	344, 510,542	78.5	
DESCRIPTION	13/		1	%Co	140	1		Jil- Mari	4	EQUIV.	GROUPING	-RMKS.	
170 Dacik Brainy	10	133	0.3	. 18	.010	100	15		14	- 15-1	1		
ogene gone, Gray, Soft,		130	8%	.14	.028	- 1	120	No.	25.0	1.3	Avera	6.18.34	
physitic. Copper occurs in	145	73				18	Tree.	2771		100	Hypo	gene	
ins and vointes as crush	12	13,	(1)	,/2	.011	-w <sup>C</sup> 207		7.25	77	140	grade	ìS.	
leopyrite, with pyrite.		164	76	.11	:01	,	11/4	177	Will	tr.	.18	Cu	
uncross gots reinlets.			70	.11	.010	Mil	1763-5	72.	A VI	等	015	Mo	
with pyrile in scame is unched and Livie. Total	7	450	75	. 12	.015	73	Jan 1	201	影响	100			
Me is 40 Sulfide	14	133	to						7.0%	TWI.			
90% in seams, with in diss.		150		,16	.018	- Supi		SAC A	54/40	AN A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
Serion square.	12	14.4	85	./2	300.	V10 - 1		ALC:	C. Maria	arte		1	
192 Dacite Por Line Guy	T.	130	79.	.15	031	N2. 2	1		10	Mil	14 - 14 N		
Bagene of no Soft		12:	75	,30	011	17,201	Ep.	36.9	TANK.				
willie the property is.		175		162	-		Leg V	1/3/3	7.4	200	7 - 14		
yer access chalopying		1/85	74	1600	0,7			10 S	WA E	200		716	
pyrit To le sulfide			1	. *	1	0.11	P.44	ne rodti	1	7(1)		ant.	
37, 30	l . l				1	1.4	1.5	1000	S(6) 1	1			
as and gages and 20%			0	779	1		W.2			Life time			
Lisa. Att some to verste	1 1	-		1 - 1		J.M		- 1 ads	Trest of	LE Y			
to is requirely evistor		*		5/		11111	2.0	4653			e i ka Nila	14-17:00年の 第二次第二	
22 W2 Sene 2 My	2 1	-		55.	- 17	57. 91	,	100	the s	599			
one, with Molybdenite				2	1	-10 <sup>1</sup>	16		ile	74			
sle in quaits veril				5		15(0)	-	124	1,71	6.		1	
set weinlet is 2 8's				Xml	1	100	1 h =	133	10.0	专			
rite - chalcopying	12	-		-11	QCC.	\$ D	interest	SATEL	134	2.55 (c)			
7. This reinlet also has	x			7785		110		100	17.4	2.4			
cas of chalcacite,	00		VA.	100	11.51	N. A.	17.12		**		1		
	3	1	ly lin	-	150	1	100	ATT.		4			
	0	-	1	V II	1178	N 63	- Ayrica	(D. 18)	1 South	DA V	(4) (4) (4) (4) (4)	1 in	
		-	- 70	- 1	7	200		1.1		- 100	5.4		
	10			190	(1	Va I	W2.3	11 1	12.00	11.77			
COLUMN SOL SOLD WAS ATTRESTED AT A STATE OF THE SOLD A STATE OF THE SOLD AT A STATE OF THE		1	1	X.	TA SAN	Mar.	14	1-14 19 15	1				

FORM # 355 'REVISED 10-62

Sheet 2 of 2

PROJECT\_\_\_Atlas Mine HOLE Nº Coord. : N BEARING COLLAR ELEV. INCL. E DEPTH COMPL. 206 START 02· % % 3 3 /c/R Cu Mo EQUTY. GROUPING - RMKS. DESCRIPTION 125 125-206 Dacite Porphyry 13080 1.21 .005 125'-150' Supergene zone as above 130 .74 .009 Mo 135 90 .70 .008 135 140 85 .65 .009 140 145 70 .39 .015 146 150 65 .76 .009 150 150 \*- 175 \* 155 56 .47 .013 .49 Cu 155 .027 Mo 160 72 .38 .043 160 .024 165 80 .36 165 170 85 .51 .040 170 175 86 .72 .014 175 175 -200 180 85 .50 .010 .69 Cu 180 185 85 .57 .052 .018 Mo 185 190 80 .88 .011 190 195 90 1.12 .013 195 200 92 .40 .004 200 206 85 .19 .006 End of hoes Average Mo for Hole is 0.0158 Mo. Average from 105 to 200' is .72% Cu .018 Mo DATE 8-10-65 VFH

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PROJECT\_\_Atlas Mine, BS&K Mining Co., BS&K

Sheet 1 of 2

Coord. : N				RING		mt			E Nº			
START 8-11-65 COMPL.	8-12-	65	INC		V	ert		DEPTH 151				
I START G-ZZ-03 COMPL.			1%	1%	1%	1%	l oz		1%	131		
DESCRIPTION	13/3	-/c/F	Cu	%Mo	/*	/**			EQUIV.	GROUPING - RMKS		
-63 Dactte Porphyry	100	45	07	000								
ride zone, Brown, fine	10	43	.07	.009								
rained, porphyritic, strong							1 4 4					
rgillic Alt. with trace	10	1			-	-	-					
ricite. Core badly fractured iginal Sulfide content	20		.06	.012					1 1			
s est. 5%. Some Malachite												
sible 20' to 68'	-											
	20		.09	006								
	30	04	•09	.000	-	+-	-		-			
							1					
	30		1 70									
	40	70	.07	.004					1			
"	100			-			1 1 1					
	40				-	-	-		-			
to real real real real real real real real			.07	.009								
-70 fault zone. Core crushed												
						-		-				
-90 Quartz Monzonite Porphyry	50		.10	.009								
own, Oxide zone, Granitic,	00	03	*10	.005	-	+	1		$\vdash$			
locrystalline texture. ak Argillic Alteration,				200			1.2					
th No sericite. Fracturing	60			10.75			1					
ry strong at 70° gradually	70	50	.19	.00	7							
akens down the hole.												
neralization fades with	70		-		-	+-	1	-	1-1			
acturing.			.11	.012					1 1			
	-00											
	90	60	.20	.01	6							
05 0	70	00	•40	404	-	+-	-		-	3		
-95 Quartz Monzonite Por.										1		
pper occurs as chalcocite,	90			TV C								
th limonite.			.66	.010		-	1			1		
	95	085	.66	.01	6					1		
	10		.00	*01		+-	+		-			
-135 Quartz Monzonite Por.		5 8	.61	.005						1		
pergene zone fracturing	10			72.3								
akens with depth. Some	1 1	0 9	.44	.013								
ly visible in rare	11	1	5 57	.006								
arts weinlets.	11		21	.000	-							
		0 9	54	.004								
	1.2	0										
	12	5 9	1 32	.005	1							

No. of Contract of

# PROJECT\_\_\_Atlas Mine, Drill Hole for Hevada Claim

Sheet 1 of 2

Goord, : N		-	$\overline{}$	INCL	RING	Ve				E Nº	
	8-20-65		1	, 01		-19	a.t.	1, 1	DEP		109
			19	Ču	Mo	%	1%	or.	_	% EQUIV.	
DESCRIPTION		0	7 m	-		-	+-	+		LEGUIV.	GROUPING — RMK
15 Dacite Porphyry.		0 4	0	.02	.021						
rphyritic, fine grained.			1								
iginal sulfide content											
4%. Strong Arg. Alt.;		.0		le de							
ser.	2	0 7	0	.02	.017				-		
	2	0	+								
			0	.04	.009						
-25 Quarts Monsonite		5									
wa, oxide zone, soft	3	0 9	0	.09	.001						
locrystalline, Est. 2%											
iginal sulfide. Wk			+				1	-		-	
g. Alteration.		0 7	0	.28	.001						
		0 1	0	. 20	.001		-		-		
		0			Toy J						
San Comment and Comment of the	9	8 08	9	.29	.009						
-60 Quarts Monsonite											
ay. Supergene zone	-	50	+					+	-	-	
locrystalline. Est 2% lfide. Chalcocite occurs			00	.16	.008						Average from
fractrues. Weak Arg.		,0	-		\$00a		1	+			30 to 50 1s
t. No sericite.			1								.28% Cu,
120 22 22 22 22 22 22 22		0									.005 Mo.
	1 2	0 9	0	.13	.015						
-109 Quarts Monsonite	1   1	70	+	_			-	+			
ay as above. Hypogene			100	.11	.003						
ne. Est 2% sulfide, in								4		1	
actures. Trace of											
alcopyrite.		30									
	1   12	90 9	90	.12	.003		+-	4			
	111							1			
	1	90	+				1				
			90	.07	.007						
		00									
		9 9	95	.00	-	-		-		-	
		-	+	-		-		-	1		
7		+	+				_				
							00000	BY	VFH		DATE 8-20-6

Sheet \_\_of\_\_\_

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

Coord. : N		_	-	BEAR		Ver				HOLE Nº 306 COLLAR ELEV,				
E START8-21-65 COMPL.	0.2	2-65		HVOL		ver		11			TH	100		
START8-21-65 COMPL.	/ 5/	7 3 7	7.	%	%	%	19	6	OI.	0	EQUIV.	GROUPING - RMKS.		
DESCRIPTION	/ 3/		/C/M	Cu	Mo	1	+	-			1 1	ONCOT THE THINKS		
-30 Dacite Porphyry		0	30	0/	.00	1								
Brown, fine grained, soft.		10	30	• 04	.00	1	1							
riginal sulfide now entirely														
xidized. Original sulfide wa	0 177	10										A LOCAL CONTRACTOR		
% of rock. It occurred entir	ery		4.5	.05	00							Average from		
n fractures. Arg AH., No		20	+5	.05		-						01-301		
ericite	11											.06 Cu,		
		20	1									.027 Mo		
			55	.10	.07									
80 0 T		1			-	-	-			-	1			
4 0	-	30										Average from		
30-50 Dacite Porphyry		40	75	.20	-0	30	-	_		+	1	30' to 70' is		
Mixed Oxide and sulfide zone											1	.29% Cu		
Fe Ox and Pyrite, with traces	of	-	-		-	-						.015 Mo		
chaloocite. Rock as above.		40	ha	2/	100					-		.015 110		
		50	90	.34	-00	9				1		1		
		50	+									1		
2 100	11		90	38	.00	a								
m.		00	10	.50	-00									
W			1		-									
4		60	1											
				.23	-01	1								
50 CO Desite Dembran			1	-										
50-60 Dacite Porphyry Supergene zone Chalcoite	-1-1													
coatings on pyrite. Rock as		70												
above.			90	2	1 .0	16			_			-		
above.														
			1						-	_	-	-		
		8	0											
60-100 Dacite Porphyry		9	0 9	0 .16	1	002		-	-	-	-	-		
Hypogene zone. No chalcocite														
Rock as above.		_	-	-	1	-		-	-	-	_	-		
			0											
		10	0 8	5 .10	1	206		+	+	+	_	-		
		-	+	+	-	-	_	+	-			-		
and the		1 -	-	-	-	-	_	-	_	_				
1/4										-				
		1	+	+	-	-	-	+						
		1 -	+	-	+	+	_	-	-					
		1	+	+	-	-	_	7		1				
	1							_				DATE8-23-65		

Sneet 1 of 1

PROJECT\_\_\_\_B. S. & K.

Coörd, : N		INC	ARING V	erti	ca1			E Nº	
START 22 Mar. 66compl, 22 M	the second second second						DEF	TH	110
DESCRIPTION /3	1 7 = /01	% Cu	% Mo	%	%	01	0.1	% EQUIV	GROUPING - RMKS
ILVERBELL DACITE - argillically ltered and siliceous, medium	1.0	N.S.							
ardness but very abrasive, tz. sulphide strgrs. w/ very	20	.07	Nil						
eakly developed sericite ear strgrs., thin capping:	30	.08	Tr.						
m. after py. w/ secondary a.derived from py.	40	.08	Tr.						
lphide zone @52'	50	.07	.001						
Tpillde Zolle (9)2	60	.44	Tr.						
	70	.40	Ni1						
	80	.44	.001						
	92	.38	.001	ì					
	100	.29	.001						
	110	.22	Ni1						
			1 3						
								==1	

# ASSAY-GEOLOGY COMPOSITE DRILL LOG

Sheet 2 of 2

Coord, : N  E  START COMPL.			BEA	RING	Ver	t			E Nº	
DESCRIPTION /	1 3 3 5	7 E/C/R C	%	% Mo	%	%	or.		% EQUIV.	GROUPING — RMKS
35-151 Quartz Monzonite	125 130								EQUIV.	GROUPING - RMKS
ypogene zone, Holoxline, eak argillic Alt. Pyrite nd trace chalcopyrite	130 135			.009						
paringly occur in rare	135			.005						
ractures. Estimated total	140									
ntirely as fracture filling.	145	90	.20	.004						
	151	95	.21	.003		-				
		END	OF	HOLE						
	in T									
		1								
		+			_	-			$\vdash$	
		1								
		$\forall$			-					
		+	-		-	-	-		-	
		1								
1										
		+	_					_		
1		+								
					T					
		1	_							
		+	-		-	-			$\vdash$	
		-				+				
		-				-				
4										

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DATE\_

\* FORM # 355 REVISED 10-62

Sneet 1 of 1

Coord, : N		BEA	RING \	ler tri	ea1		HOL	E Nº	HOLE Nº RDH 310 COLLAR ELEV, DEPTH 140'			
START 22 Mar. 66COMPL. 2	2 Mar. 66'				-		DEP	TH	140'			
DESCRIPTION	13/3/2/61	Cu	% Mo	%	%	01	01	% F.QUIV	GROUPING - RMKS.			
QUARTZ MONZONITE PORPHYRY												
Argillically altered, "average"									5 g (			
							2/	0.00				
Sulphide zone @55'	55	N.S.				1	- 4					
	60	.82	.004									
Some dampness 60 - 70'	70	.82	.009				1/4					
ger and the second seco	80	.65	.037					44.5	University			
Moisture increase @ 89'	90	.30	010			thr	2.5					
Increase qtz. @ 90½'	100	.26	.009			15						
	110	.29	.010		-		- [					
	120	.32	.023				12					
	130	.26	011			1	m.	72				
	140	.23	.006									
				;				W				
						14						
						65	1	71				
					فلي	1		134				
		1						TV T	L. R. A. A.			
			-		20		-	P War	1 1 1			
				, e , 's	7 8	F	1 3	- e).	diam'r.			
		-					-	1				
				-	-		14	1				
				-			+	-				

BLW

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FORM # 355 REVISED 10-62

Sheet 1 of 1

PROJECT\_\_\_\_\_B. S. & K. RDH 311 HOLE Nº Coord, : N BEARING INCL. Vertical. COLLAR ELEV. 1501 DEPTH START 23 Mar. 66' COMPL. 23 Mar. 66' 3/ 3/ 5/c/R Cu EQUTV. GROUPING - RMKS DESCRIPTION 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 @ 48121 50 N.S. .002 73 60 Mixed oxide & sulphide @ 62' 70 20 .001 26 Tr. All sulphide @ 80' 80 23 .033 Fines from dust 90 Collector bin 90-100') Cu .38%, 100 22 002 Mo. 004% 110 23 .005 Minor Cave @ 100-110 120 23 .002 130 22 .003 140 22 .003 150 28 .002 Some dampness @ 150' DATE\_ 23 Mar. 66' BLW

LOGGED BY\_

Total Sulfide is 2 2%. From occurs as pipite.

PROJECT Attack to BSSK Mine S., BSSK 163 Class HOLE Nº 300 Coord, : N COLLAR ELEV. START 8-6-65 COMPL. C- -EQUIV. GROUPING - RMKS 0-90 Dacide Porsing, Srow. 10 56 .08 002 fine granied, soft, porsharitie, highly fractured, numerous .002 70 ,05 2.05 gis reinlets, A.z. Alteration, Eximist Sulfide was 1 3%, 68 entirely in fractures, Core 09 .007 very body brown. No green or like copper average ,14 minerals visitle, wough 76 .001 oxide entire sortion is oxide .13 Cu 36 14 .008 ,005 Mo Lor 11 90 90 feet .16 . 004 86 .15.009 .16 , 006 27 .17 .009 Oxide 90-95 Ducite Porphyry, See Nixed Mixed oxide and suffice. .94 .025 Supergene Soft surphyritie, Strang .79 .015 Sulfide arg. Alt., numerous of .51 .010 Average grade of veinlets. Copper occurs as Mixed and Supergore .60 oxide and chilencite. 009 is 35 feet of 87 .008 95-125 Die Garplyny .47 Cu .12 .011 .013 Mo Supergene 3 mil. Gray, said .11 1.013 copper occurs as abduente. LOGGED BY W. 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 E START 8.9.65 COMPL.	8-10-6	rs	INCL	RING	Ve	re re		which have been a	E Nº LAR E TH	501 LEV. 203
DESCRIPTION /	13/3/3		<sup>%</sup> Cu	%io	%	%	or.		% EQUIV.	GROUPING - RMKS.
100 Decite Forrhyny - onn - orlde sene Et, strong Argillic Alt.,	10	20	11 11 14	.006						0'-30' .16 Ga
rphyritic, fine grained.  iginal Sulfide was 7 4%,  % in fractures, 10% dies.  ace sericite lining	10 20	50	.20	.012						.09 Mo
actures. Qtz veinlets re. Soms green Cu stain sible.	20 30	67	.17	.010						
	30 40	80	.18	.009						30'-50' .17 Cu .011 Mo
· ·	40 50		.16	.014						
0-110 Decite Forphyry med Caida and Sulfida	50 60	60	.11	.01	5					50-30 .12 Cu
own, Soft, fine grained, rphyritic, Wk scricite and rong Arg. Alt. Copper curs as Malachite and	60 70		.12	.016						.016 Mo
alcocite, Core badly attered.	70 80		.13	.017						80°=100°
	80 90		.24	.010						.17 Gu .009 Mo
	90 10		.10	.009						
0-125 Dacite Porplyry	10 10 10	00	.15	.013						100'-125*
ricite and strong Arg. t. Copper occurs as aleocite with weak pyrite,	11	035 536		.040						.018 Mo
stly in seams. Core badly coken.	120	082	1777	.003						1

Sheet 2 of 2

PROJECT\_\_\_ Atlas Mine 300 BEARING HOLE Nº Coord, : N INCL. COLLAR ELEV. DEPTH 203 START COMPL. \$ 3 5/c/H Cu Mo EQUIV. GROUPING - RMKS. DESCRIPTION 15 125-206 Dacite Porphyry 13080 1.21 .005 125'-150' Supergene zone as above 130 .74 .009 Mo 1.35 90 .70 .003 135 140 85 .65 .009 140 145 70 .39 .035 140 150 65 .70 .009 150 150 -175 .013 1.55 56 .47 .49 Cu 155 160 72 .38 .043 .027 No 160 265 80 .36 .024 265 270 85 .51 .040 170 175 86 .72 .01/ 175 175 -200 180 85 .50 .010 .69 Cu 130 .018 Mo 185 85 .57 .052 185 190 80 .88 .011 190 195 90 1.12 .013 195 200 92 .40 .004 200 205 85 .19 .006 End of hold Average Mo for Hole is 0.0153 Mo. Average from 105 to 200' is .72% Cu .018 Mo DATE 8-10-65 VFH

LOGGED BY\_\_\_

The second secon

FORM # 355 REVISED 10-62

Sheet Lot\_1

Coord. : N E START 22 Mar. 660CMF	INC	RING L. Y	/erti	ca1	HOLE Nº RDH 310  COLLAR ELEV.  DEPTH 140'				
DESCRIPTION	13/3/3/2011	% Cu	% Mo	%	1%	ox.	01	% EQUIV	GROUPING - RMKS,
JARTZ MONZONITE PORPHYRY									1.
gillically altered, "averaged ardness."	age"								
								44	
alphide zone @55'	55	N.S.							
	60	. 82	.004						
ome dampness 60 - 70°	70	.82	.009						• 5
	80	.65	.037				11		2
disture increase @ 89'	90	.30	.010						1000
crease qtz. @ 90½'	100	.26	.009						
	110	.29	.010				1		1
	120	.32	.023						
	130	.26	.011						
	140	.23	.006						
£				i					
									Ty-
									3 49
74 7	in the second of the second								
									1.0
.2.									DATE 22 Mar. 6

Sheet 1 of 1

PROJECT\_\_\_\_\_B. S. & K.

Coord, : N E		BEA	RING	Vert	ical			E Nº			
START 22 Mar. 66compl. 22 Ma	ar 66!			VCIL	LUAL		DEPTH 110'				
DESCRIPTION / 8	1 7 5/01	% Cu	% Mo	%	1%	63	o i	% EQUIV	GROUPING - RMKS.		
ILVERBELL DACITE - argillically altered and siliceous, medium	10	N.S.									
ardness but very abrasive, tz. sulphide strgrs. w/ very eakly developed sericite	30	.07	Nil Tr.								
near strgrs., thin capping: lim. after py. w/ secondary nm.derived from py.	40	.08	Tr.								
ulphide zone @52'	50	.07	.001								
dipiled sone (52	60	.44	Tr.								
	70	.40	Nil								
	80	.44	.001	-							
	92	.38	.001		1						
	100	.29	.001								
	110	.22	Ni1								
									-		
	4										
		-	-	-			-	-	-		
	-	-	-	-	+		-	-			
				-	-	-	+		-		
				-	-	-	-				
									1,6		
				_			-	-			
		_		-		-	-				
				-	-			-	4		

Sheet \_\_of\_\_1

PROJECT\_\_\_\_B. S. & K.

Coord, : N		RING				HOLE Nº RDH 309				
E	- 661	INCI		Vert	ical_		DEPTH 110°			
START 22 Mar.66COMPL. 22 Ma	7 00:	1%	% Mo	%	1%	01	01	1%		
DESCRIPTION / 8/	\$ 5/01	Cu	Мо		-			EQUIV.	GROUPING - RMKS.	
SILVERBELL DACITE - argillically altered and siliceous, medium	10	N.S.							for a	
hardness but very abrasive, qtz. sulphide strgrs. w/ very	20	.07	Nil						- 18	
weakly developed sericite near strgrs., thin capping:	30	.08	Tr.						,	
lim. after py. w/ secondary	40	.08	Tr.						-81	
hm.derived from py.	50	.07	.001							
Sulphide zone @52	60	.44	Tr.							
1.0	70	.40	Ni1						1	
2F. 10	80	.44	.001							
TWO 2					;					
	92	.38	.001		+-	-				
	100	.29	.001	-	+-					
	110	.22	Nil	-	-			-		
			-			-	-	-		
								h		
232					1	Ü.e		6.0		
				-	+			+	1	
	-	-	-	-		-		+		
	-	-	-	-	-			-		
Management of the latest terminal to the latest terminal		-	-	-			-			
The state of the s		-		-						
									The state of the s	
and the same of th									3-3-3-4	
					ANT LE		DT	1.7	22 Mar. 66'	

LOGGED BY BLW DATE 22 Mar. 66

- BRACE W.8 V.H.2

# DUVAL CORPORATION COPPER DIVISION — ESPERANZA PROPERTY SAHUARITA, ARIZONA

### CERTIFICATE OF ASSAY

B.S. and K. - Screen Fractions April 13, 1966

BEAKER NOS.	MARKS. E	TC.	SAMPLE GMS.	% TOTAL					JE Street
	2		GMS.	Cu	Cu				
	RDH-309 20'-30'	+10 Mesh		.042	.019				
		+20		.042	.019				
	HEAD SAMPLE	+35		.055	.023				
	DISCREPECY	+48		.049	.026				
- 1		+65		.049	.030				
		+100	To the	.054	.033	4			
		-100		.084	.060			100	
	70'-80' +10	+10		.253	.064				200
		+20		.330	.074				
		+35		.382	.083				
	*-	+48		.467	.095				
	T i	+65		•550	.122				- 1
		+100		.567	.161				0.5
125	-100			.637	•190				
	310-120'-130' +10			•192	.009				100
		+20		.188	.007			1	
		+35		.200	.008				
		+48		.218	.009				3
* (	4.	+65		.214	.011				
	+100 -100			.217	.013				1 1 1 1
1				.327	.022		*		
7	311-90'-100'	+10 Regul	ar	.170	.023				
	211 /2 134	+20		.164	.023		17 - 8		
		+35		.152	.023				
-		+48		.155	.027	1	-		
		+65		.178	.030				
		+100	1.5	.217	.031				
		-100		.455	.072				
- 1		+200 Fine	G	.202	.026				
		+325		.411	.046				
		+400	71-	.673	.060				
-					.097				The second
-		-400 !		•537	.097	-			(A. a. e. San - 18 to

FORM SII M.L

It.

# DUVAL CORPORATION COPPER DIVISION — ESPERANZA PROPERTY SAHUARITA, ARIZONA

# CERTIFICATE OF ASSAY

SPECIAL FOR GEOL. DEPT.

April 1, 1966

BEAKER NOS,	MARKS, ETC.	SAMPLE GMS.	% TOTAL	% Mo_	-			
	309-10'-20'		.07	Nil				
11.	201-301		_08	Trace				9
	40 1		.08	Trace				
31-2	501		.07	.001	:			
,	601		-44	Trace				
E - 1	701	in a	.40	Nil.				
	801		.44	_001				\$4. C. A
	901		.38	.001				- 4
7-10	1001	(4 b)	29	.001				- 2
	1101		.22	Nil				7%
7-1	311-50'-60'		.73	.002				9
7	701		.20	001				The second of
	801		.26	Trace				
	901		•23	.003				
	90'-100'Regular		.22	.002				
	90'-100'Fine		•38	.004				1 - 141 - 1
	100 -110 1		.23	.005	· ·	-		
	1201		.23	.002				e le
	130'		.22	.003			7 15	1 11 7 2 7
	140		.22.	.003				1,51
	1501		.28	.002				
	310-501-601		.82	.004				
	701		.82	_009				
	80'		.65 .	.037				
	901 **		.30 .	.010				
1,73	1001	1 - 5	. 26	.009				
	110!		.29	.010				
	120		.32	.023				
	1301	L	-26	-011				
	1401		.23	_006		2.		
			1					
				,				The state of

FORM # 355 REVISED 10-62

Coord.: N E START 22 Mar.66@CMPL.22	INC	ARING L. Y	/erti	.cal		HOLE Nº RDH 310 COLLAR ELEV. DEPTH 140'			
DESCRIPTION /	i/ i   i / i	/R Cu	% Mo	%	%	02.	02	% EQUIV.	GROUPING - RMKS
UARTZ MONZONITE PORPHYRY					Ť			13	
rgillically altered, "average" ardness.							1 7		
						1	. 7.		100
ulphide zone @55'	55	N.S.		,					
	60	.82	.004						C/19-55
ome dampness 60 - 70°	70	.82	.009						
With the second	80	. 65	.037					= 1	
oisture increase @ 89'	90	.30	.010			1			
ncrease qtz. @ 90½	100	.26	.009						
	110	.29	.010						
	120	.32	.023						
	130	.26	.011					- 1	
	140	.23	.006						
				;					
AV A									
								X	
Control of the contro									
									24.0
									arrive yes

FORM # 355 REVISED 10-62

PROJECT Atlas Mise, BS&k Missing G., BS&k 163 Claim

Coord, : N		EARI		Ţ.		HOLE Nº 300				
START 8-6-65 COMPL. 8-8	110	C.	Ter			DEPTH 182 400				
START Y-G-GS COMPL.	1 3 51	/ %	1%	Mo %	1%	oz.	°z' % EQUTV.			
	0		14	1			I LQUIV.	ONOUPING NIMES,		
-90 Dacitle Porphyry, Brown	10 5	6 .6	0 80	02						
grained, soft, porshquitie,								0.0		
alu fractured, numerous	10,	70 .00	5	002						
aly fractured, numerous, veinlets, Are. Alteration,	20.	,0,	5.							
givel Sulfide was 1 3%,										
ire v in fractures, Core	30 6	8.0	9.	002						
y badly broken. No en or blue copper										
en or blue copper	30 -	-	11					2		
neials visible, though	40 1	6 ,1	7	001				average		
live section is oxide.								is		
Our Arch		6 1	4.	800				.13 cu		
THE PARTY OF THE P	50							,005 Mo		
Principal Control of the Control of			_					for		
1.10	50 9	0 .1	6	.004				90 feet		
								1 1 1 1 1 1 1 1 1 1		
Y Y	60	76		-0				The state of the s		
4	50 8	36.	/3 -	009	-			1000		
	70	85 ,	16	006						
12,000	t <sub>o</sub> a	7			-	-				
200	50	37 ,	/7 .	509			1			
								oxide		
- 95 Dacite Porphyry, Gara	ac	90 .	all	226				Nixed		
led oxide and sulfide.	in in					-	-	Supergene		
+, porphyritie, storing	100	16	79	015				Sulfide		
- Alt., numerous gt3	100	83	51.	010						
nlets. Copper occurs as	INC		600a					Average grade		
de and chalcocité.	100	80 3		.009	-	-		Mixed and so		
125 D 14 D 12		87.	21	.808				is 35 f		
-125 Dacie Porphyry	175	80.	12	.011				.47 Cu		
pergene 3 and. Gray, soft	150	88 .	11	.013				.013 Mo		
per occurs as chalcocite. L	157		.,			1	1 - 11	DATE 8-8-65		

Sheet 2 of 2

PROJECT\_ Coord, : N BEARING HOLE Nº PAO INCL COLLAR ELEV. START COMPL. DEPTH \$ 5/C/R EQUIV. GROUPING - RMKS DESCRIPTION 125-170 Dacie Brolury . 18 .010 Average Hypogene 3 sm, Gray, Soft, 130 .028 Hy pogene 135 Forphyritie. Copper seems in 80 .12 grade is seams and veinlets as crushed 140 chalcopyrite, with pyrite. .18 Cu .011 Numerous of to veintets. Much pyrite in Seams is .015 MO .010 150 150 crushed and black. Total . 12 .015 sulfide is 40%. Sulfide 155 16.016 13 95% in seams, 10% in dies. 160 12 ,008 170-182 Dacies Porphyrite, Gray 163 ,15 031 Hypogene Zone Soft, Argillie Alt. porphyritis, ,30 011 copper occurs a chalcopyrile 162 017 with pyrite Total sulfide 15 33. Sulf. 15 80 % in secure and ganges and 20% as aiss. Many goto veinlets Pyrite is frequently crushed black , We sericite on v seams, with Molybdenite visible in guarts veinlets. Largest veinlet is 2" gtspyrite - chalcopyrite at 177'. This veinlet also has traces of chalcocite.

LOGGED BY 18 FT-HALL DATE 8-8-65

i.	BEARING		Coord.	N E					HOLE N	o Grand	
	BS&K =3								DEPTH	Ana.	
DESCRI		18 / S / S	CR° Cu	° As Cu	% Mo	%AsMo	%EQIV		E REC'9	GROUPING - RMKS.	
182-32	23'	182	+ 1000	.14	+ 300	. 045		1	69.6		
K. Dacito	e porphyiy	190	+1000	. 15	165	.016		2	82.8	1,00	
made o	of rounded eyes avel h feldspers	200	1000	.10	114	.011	7	3	91.6		
quartz	eyes avel	2/6	+1000	.//	238	.024		4	80.4		
in gra	y siliceous	226	+1000	.14	245	.024	121	5	79.2		
matrix	y siliceous	230	+1000	.12	171	.017		6	42.3		
Alt.: Thin	w/ rims of	250	+ 1000	.34	+300	.04-2		7	46.1	n	
consend a	ny orthociasc	256	+1000	.20	193	.019		8	23.1		
Moderate	e projetization	260	+1000	.14	205	,020		9	14.1		
Chalest	write of moly,	270 280	+1000	.16	101	.070	1	10	21.2		
in 9131	ns slang 9+2	286	+1000	.17	214	.021		11	25.6		
Veins.	pyrite of moly, ins slowg 972 Minor diss.	290 300	+1000	.24	174	.017		12	54.1		
Surfiars	2	3/0	+1000	.31	139	.014		13	21.6		
3-340: str	te (?) . Abund	3/0	+1000	.16	+300	.034		14	50.0		
at lanite	offer biotite.	326	+100n	.20	277	.028		15	18.4		
Some fin	ne diss. sulfia	37. 340	+1000	.28	41	.004		16	44.5		
very poo	1 6000 1110	34.0	+1000	.91	+300	,032		17	71.3		
0-400: D:	seite porphyn	/	+1000	.37	+300	.044		18	61.3		
25 /82-	323', but is present about 1" yrite vein	360	+1000	.21	282	. 628		19	92.1		
of 348'	about 1"	370	+1000	./8	272	.027		20	94.0		
cholcopy	yrite vein	380	+1000	.15	178	.018		21	80.5		
Circle 11		396 400	71000	,20	256	.026		22	95.2		
				,227		.024			56.8	AVERAGE REC'S	
				.318						Egu. Ca-MU	
										1	
										-	

# DUVAL CORPORATION CC. PER DIVISION — ESPERANZA PROPERTY SAHUARITA, ARIZONA

### CERTIFICATE OF ASSAY

August 10, 1965

BSCK

BS&K						
MARKS, ETC.	SAMPLE GMS.		% Mo			
Hole-300-10	:		.002			
						*
		4	.002			
			.001			
			\$003			
60		.16	.004			
		.15	.009			
80		the second second second second	.006			
		.17	.009			
95		.94	.025			
		.79	.015			
		.51	.010			
110		.60	.009			
115		.24	.008			
		.32	.077			
		.77	.013			
130		.18	.010			
135		.14	.028			4
140		.12	.017		-	
14,5		.11	LIO.			
		.77	.010			
155		.12	.07.5			
160		.16	.016			
		.12	_008			
		.15	.037			
		.30	.017			
182		-62	.017			
	MARKS. ETC.  Hole-300-10  20  30  40  50  60  70  80  90  95  100  105  110  115  120  125  130  135  140  145  150  155  160  165  170  175	MARKS. ETC. SAMPLE GMS.  Hole-300-10 20 30 40 50 60 70 80 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170 175	MARKS. ETC.    SAMPLE   Total   GMS.   Cu     Nole-300-10   .08     20   .08     30   .09     40   .14     50   .14     60   .16     70   .15     80   .16     90   .17     95   .94     100   .79     105   .51     110   .60     115   .24     120   .12     125   .11     130   .18     135   .14     140   .12     145   .11     150   .11     150   .12     160   .16     165   .12     170   .15     175   .30	MARKS. ETC.    SAMPLE   Total   Mo   GMS   Cu	MARKS. ETC.    SAMPLE     Total     Mo   Cu	MARKS. ETC.    SAMPLE   Total   Mo   No   No   No   No   No   No   No

FORM # 355 REVISED 10-62

PROJECT\_

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

Sheet 1 of 2

	Coord. : N			BEAL		Ve	rt		HOLE	Nº.	302 LEV. 206
1	E	0.10		INCL	·	VE	34 6		DEPT	ARE	206
	START 8-9-65 COMPL.	8=10=		%	% 1	%	1%	OX.	OZ-C		
2 - 1	DESCRIPTION	18/3	E/C/R	<sup>%</sup> Cu	%Mo					QUTV.	GROUPING - RMKS.
-100 1	Dacite Porphyry -	10	20	12	.006						2.3
rown .	oxide zone	10	40	.14	.000		-				0,-30,
	strong Argillic Alt.,							7 = 3			.16 Cu
orphy	ritic, fine grained.	10	+			-	+				.09 Mo
	al Sulfide was 1 4%,	20		.20	.012					1	1 - 1 4 × E
	fractures, 10% diss.	1	-	,			1			_	
	sericite lining										
	res. Qtz veinlets	20	1								1.6
	Some green Cu stain	30	67	.17	.010						
sibl	.0										3
											30*-50*
1 - 5	Eq. ( ) ( )	30									.17 Cu
1	210	40	80	.18	.009						.011 Mo
il ve	4								- 1		
1	4 4 4	1 2 2				-	-	-	- 1		
148.00		40		.16	.014					- 30	
1400	No.	50	185	0 4.0	* 070		+	-			
4	- X8										1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
4	Ny	50	)			_					The state of the s
	O Dacite Forphyry	60		.11	.01	5					50-80
	Oxide and Sulfide		1	-			1				.12 Cu
	Soft, fine grained,								1:		.016 Mo
orphy	ritic. Wk sericite and	60	)							4	
trong	Arg. Alt. Copper	70	86	.12	.016					_	
	as Malachite and		$\top$								1
	ocite, Core badly		1							- 'l	CAR TANK
hatte	ited.	70									1/44
164 -		80	90	.13	.017						1 - W
1											80°-100°
154		753						-		37.	.17 Cu
- 3		90		.24	.010						.009 No
-1	77 7 Q Q	90	01	044	*010		-	+			Frankling vo
Your J.			100							1	a San Aller
	27	90	-	-	-		-	-		- V	1 20 - 12 -
11			00 9	10	.009					- 1	
		-	7	****	.003		_	+		1 3	The state of the s
			1 2						10 pt	\$15°	The same of the sa
100	1	1.0	10	1.0							1
	25 Dacite Porphyry		590	.15	.013						1001-1000
	gene Sulfide sone	10	)5	-	1	-				1.51	100'-125"
	gray, soft, weak			1.31	.040						/83 Cu .018 Mo
	ite and strong Arg.	1.7		30							.010 800
	Copper occurs as	1.1	586	1.74	.019						Copie princes
	ocite with weak pyrite,	17		17:22							
	y in seams. Core badly		2082	.49	.008						
roker	44	12	0	2	000						The Contract of the Contract o
		1.2	2587	.45	.013			-			8-10-6

Sheet 2 of 2

PROJECT\_\_\_Atlas Mine Coord. : N BEARING HOLE Nº 300 INCL. COLLAR ELEV. DEPTH START COMPL. 205 02 % GROUPING - RMKS. DESCRIPTION EQUTV. 125 125-206 Dacite Porphyry 13080 1.21 .006 125 -150 Supergene zone as above 130 .74 135 90 .70 .008 .009 Mo 135 140 85 .65 .009 140 015 145 70 .39 140 150 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 .72 175 86 .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 .004 200 206 85 .19 .006 End of hoad Average Mo for Hole is 0.0158 Mo. Average from 105 to 200° is .72% Cu .018 Mo VFH DATE 8-10-65 LOGGED BY\_\_\_\_

# DUVAL CORPORATION CG. PER DIVISION — ESPERANZA PROPERTY SAHUARITA, ARIZONA

### CERTIFICATE OF ASSAY

BS&K Drills

August 13, 1965

BEAKER	MARKS, ETC.	SAMPLE	% Total	% Mo			1=
NOS.	MARNS, ETC.	GMS.	Cu				
	# 301-0-10'		.12	.006			
	201		•20	.012			
	301		.17	.010			
	401		.18	•009			) =
	501		.16	.014		1	
	601		,11	.016			
	701		.12	.016			
	801		.13	.017			
3- 111	901		.24	.010			
	100'		.10	.009			
	1051		.15	.013			
	110'		1.31	.040			
	115'		1.74	.019			
-	1201		.49	.008			
	1251		.45	.013			
	130'		1.21	.006			
1	135†		.70	.008	.72	7. Cu,	
	140 *		.65	.009	.018	Mo	,
	1451		•39	.015			
	1501		.76	.009			
	1551		.47	.013			
	1601		.38	.043			
	1651		.36	.024			
	1701	*	.51	.040			
	175 1		.72	.014			-
	1801		.50	.010			
	1851		.57	.052			
	1901		.88	.011			
	1951		1.12	.013			
	2001		•40	.004			
	2061		.19	•006			

7 SAM 311 M.L.

aEB

Samples collected from BSEK Hole 302

PO DAM 95-100 0.71% 100-103 0170% 83 0.76 65 125-100 0,95 110-115 169 115-120 0,67 70 120-125 0140 41 125-130 0.50 105 130-135 0128

Hole 300

0.78

194-300

245-300

0,38

149

117

0.035-9

120-175-10.30 175-12 D.62

-	12 / 12 / 12 / 12 / 12 / 12 / 12 / 12 /	MA CO	3 Sic. 1	Y. M.	
	B5+	K HO	10 302	ours	Me Bs
1 .6an	ples (ic	316) 95	100	1.71	166
	(.0	100) 100	105	.70	A COLUMN TO A COLU
	(.0)	13) 105	110	.76	.44
( )-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1	(.00	6)110	115	195	.57
	(.00	4) 115	120	.67	.54
A A SPAI	(.00	5)120	125	140	32
	(.00	9) 125	130	,50	.43
		) 130	135	1.28	140
	1	Callange -		we bed	1
	BSEL	r	11797	of the last	B5 \$
	100	1616.0	JF 30.0		Cu
	100		15-10-6		100
11 - 11 - 11 - 11	Lake	153-4		1334	De la
	-		Property.	10000	
J			1.00	14 61	A. I.
	4. 14. 1	1200	$d_0 = 1$	Service,	1 0.1 1
	Hilliam Cole	2.100	a had at	LINDER	
		0.15	1.	ty while	33.16
	Air Jan 12	Control of	A Alexander	314824	4.1.
	1-1-16-7	3 % P.		H 100 7	Hand Son
10 10 11	1.91	E AM	1.11	1	
			1 2 V	- Vigo Vi	2 yr
2				10 - 14 - 15	Take 1
		170		75.3	

Ar a W	BEARING		C	oord.							0 BS&K 301
	INCL.				E						ELEV.
TAKE .									D	EPTH	The state of the s
DESCRI	PTION	\\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	CR	°Cu	° As Cu	% Mo	% AsMo	%EQIV		Title .	GROUPING - RMKS
107.1	danite line		1 17	1			0			300	and the second second
gry lineanit	dacite hor.				1		-				
11-12 Way	1). Occas 11tc										
etain :	along frace, poss										
hed Cu ox	Chigh py : cholog	24	-		-	-	-		-		
10		1 1 1		13			- 1				
45.5- 48	1.4; strongly broken										Expression
	COTO		-	-	-	-	-				
core is st	roughly fracted. Low	v	-								
re recov.	A ST TO THE			-		5				7	The state of the s
206'			-	-	-	-	-				
24 decile	por . Mod arg,										A V
cak seve	& chiorice										
pleneite	alova frecs,		-		-		1			112	3.7
of fine py	some chalcopy	1							6	400	400
Dianaite	2/30 In Spors										
inely dis	s. Core strongly		-	-	-					To the	C. 18
broken fi	ongular chips			7						13800	
hoor core	recovery?)								le d'	-	
6 : chalcoci	slovy frace shows		-	_	-		+				The second second
The hours	y has pink								16.0	1. 1	
exs, pos	s. ortho								1 8 111	100	
At depth	most calcocite is		_		-	_	-	-	-	- 1	
2long V	thin irreg fracs									= 1	
and not	diss .								121		
x 100K3	tershow of		_		-		-			on J	
bottom.	10.1		-							1	
1 P. 1 PH.			1							0.75	
			_					-		1.0	
200									1	7 1	
12			-	1	1		1				1989
STATE OF	1		_							-750	
11-11-5	100				7.1				0.7.5 %	177	
STATE IN			1					1	100	7	
			_						-	100	
Court to	( de la constante de la consta							10.1	100	T. F.	
			-	1	+	-	+			1000	
1 1				. 10					10	Mary Co	
2 THE A								1	7 100	197	
1.83			-	-	+	-	-	-	1	The state of	1 270
									(t =	100	
1 844									- 3		
			-	-	-	-	1	-		.100	- WARREN
A PARA									1	- 1917	
1.80					1		1			1	
30			-	-	+	-	-	-	-	-	
			1		1		1	100		100	

ASSAY- GEOLOGY COMPOSITE LOG Sheet of 4.6CE # HOLE NO BEARING Coord. : N COLLAR ELEV. 7/2 INCL. DEPTH S F CR ° CU ° As Cu % Mo ASMO EQIV GROUPING - RMKS. DESCRIPTION 245-255 DACITE D. SUL. 25% <12 - NO VIS, Cu. - excorise (some) 540-550 200172 4 - suc Est, <19 - SPARSE CAYFON

VEINS

860-870'

NO SUE.

1030-1040

a.

1185-1195

- SUL. < 0.5-9

Ge & 0119

SERP, CHE, GYP.

1365-1375

- RECRYSTACCIZED CV. - SIME CHCORITE - SPARSE SUL.

EXP. Y ANAVORITE

- some encorite

- SICICIFIED LS. (RED)

Some GNI GARNET

< 0,50 9 542.

- spass cay in

50 me cheamine

072 V. . < 0.19

DACITE P.

BEARING		Coor	d. :							300	
INCL.		-		E					LAR E	LEV.	
								DEPTH			
DESCRIPTION	13/4/2	CR	u	OAs Cu	% мо	%AsMo	%EQIV			GROUPING - RMKS.	
(could not find boxe.	5		-					+			
Pink gry- greenish decike por w/ thin show irreg frees filled w/ bru Immenite (from sulf).				8 7							
Alt, mod to strong arg, some felds seems											
present Toward better	u	$\vdash$	-					-			
poss from CUCO3.  The core is broken in big over freqs (good core recov.?)											
from 95-100 is smissing) max decite felis por Alto a arg. w/ diss calcocite									W.		
ting slang trees (- 2%								-			
trongly traces.											
all core 13 tell the could be logged ?)  to logged?)  him atz-brick units (2)	101		$\dashv$					+			
hick photopy is present but very									1.50		
The prakish color could	áe.	+							40		
K-felds olderstram ?  12: Gray clacite per w/											
nc. 2 long gtz veins +											
The estimated visual rade will be shout 0.3%		$\vdash$							5		
			u	HMC	Мо	BSK					
2-AK-300= 170-175 2-AK-300= 175-182			.62	0.38	6.017	0.011					

FORM # 355 REVISED 10-62

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

Sheet \_\_of\_\_

		_			RING					E Nº		
E				INC	1	Verti	cal_			LAR	ELEV.	
START8-21-65 COMPL.	8-22									PTH	100	
DESCRIPTION	18/	1 1	C/R	% Cu	% Mo	%	%	OX.	03	EQUIV.	GROUPING - RMKS	
30 Dacite Porphyry		0				7 3 7		3025	50°,0°	1000	And the second	
own, fine grained, soft.	20	10	30	.04	.00	7	1.00	L. 1990	MG.			
iginal sulfide now entirely						0.726	1 2	1 1 10		617		
idized. Original sulfide was						8.77		1 - 50		100	A TANK	
of rock. It occurred entire		10			1 7	1	To acti	12 mps	200	1000	Carles (ATT)	
fractures. Arg AH., No		20	45	.05	.004		Lyn	7.48	Halp y		Average from	
ricite		19	00		9-1	100	13.7	F .		12.00	0 t - 30 t	
		20			-			47.	_		.06 Cu,	
		20		10	070		11			1.	.027 Mo	
		30	55	•10	.070				_	-	Parties of the Parties of	
						1		17	-		and the state of t	
		30		-			-			1		
-50 Dacite Porphyry		40	75	.20	.030				1	187	Arranges from	
xed Oxide and sulfide zone				B for V							Average from 30° to 70° is	
e Ox and Pyrite, with traces of haloocite. Rock as above.								2		176	.29% Cu	
		04						777	1.1	1.	.015 Mg	
		50	90	.34	.009	10.1	- 11		713		The state of the s	
		11						(a)		100		
			-		_	-			1		10 Carlot 1	
	1 1 6	50						100	1	100		
		50	90	.38	.009					7,70	The second of	
								1	L The			
		50						1				
			85	.23	011			100			100 miles	
-60 Dacite Porphyry				A Paris						and I		
pergene zone Chalcoite							100			A.		
atings on pyrite. Rock as		0				- 17				17.00		
ove.		30	90	.21	.016					V -	A.W.	
		-	-			1.3						
		80							24	_00		
-100 Dacite Porphyry		90	90	.16	.002	-				-	1.00	
pogene zone. No chalcocite.						2			1.0	leia.	1 9 4 4 4 4	
as above.		90							77	1		
	1		85	-10	-006					A JES		
					-							
									-(-	i Ili	101 700 700	
		-					- 10	23	0.1	138		
		_						18,	-	-		
						- 5		10.0		1		
		-	-		-			-	-	-		
								rap 1		. 29,	1 - 1 - 1 - 1 - 1	
		-	-	_	-		- 5-			-	N. M. W. C. S. C.	
						9 -						
		-		-						7.4	H Library Charles	
		- 1	- 1				1 5 1	1.2		19(6)	A	

FORM # 355 REVISED 10-62

Sheet 1 of 1

B. S. & K. PROJECT\_\_\_\_ RDH 311 BEARING HOLE Nº Coord. : N Vertical COLLAR ELEV, INCL. 1501 DEPTH START 23 Mar. 66' COMPL. 23 Mar. 66' S Z C/R Cu 01. % EQUTY! GROUPING - RMKS DESCRIPTION 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 @ 482 50 N.S. .002 60 .73 Mixed oxide & sulphide @ 621 .20 .001 70 26 Tr. All sulphide @ 80' 80 Fines from dust 90 23 .033 Collector bin 90-100') Cu .38%, 100 22 .002 Mo. 004% 23 .005 110 Minor Cave @ 100-110 23 .002 120 130 .22 .003 22 140 .003 28 .002 Some dampness @ 150' 150 DATE\_23 Mar. 66'

BLW

LOGGED BY\_

Sheet Lot 7

## PROJECT PS & K - Atlas Mine

Coord. : N E START 6-25-66 COMPL.			INCL	RING	Ver	Ŧ	10	COL	LAR E	312 LEV, 1632
DESCRIPTION /8	1 3 %	/c/R	%	% .	1%	%	01	0.	EQUIV.	GROUPING - RMKS
	0-10	0								
vidiged, with week nighti	10-20	0				-		-		
Horaling He seriene, or silica.	-						-	-	-	
st. orig. sulfice to be	30	0								
1/ Parite, now all timbe.	30.	۵						1		
Vo recovery to 101 feet.	40	a								
,	50	^	~~~		-	-		********	-	
4.4	60	C	-		-	-	-			
1.3-	70	CI			-	-	-	-		
. 14	70	11								
11	90	0								
114	90	0					1			
- 1	101	-			-	-	-	-		
-110' Dacite, Gray, Perptyritis	110	50	.10	Nil		-	-			
vergene blanket, with weak	120	80	.09	,003						
illijation. No Scrieite, or Silica	120	80	04	Tr						
re well jointed with some	130	95	.02	Tr						
rite in joints. Est 4% Py is	140		.06	-1-			-			
to, with 3% or joints and 1%	100	_	.00	11	-	-	-		-	
diss Pyrite has supergene	150 160	80	.03	.002						
centing	170	75	.07	. 001		1				
	170	60	.04	Tr						
1- 250 Docte, white prophysit	180	80			-	1				
pagene Zane, No semile en	190	-	. 03	Tr	-	-	+	-	-	
joints No white chilegrow	190	87	04	N,1						
moly 6 donite. No biotite on	210	90	. 07	Tr						
Phoelose	210	95	06	Tr						
	220	90	03	Tr						
	230		-	-	-	-	-	-	-	
	240	95	-	1-1.1	-	-		-		
	250	90	0.2	Tr						

# PROJECT ESER - Atlas Come

Coord. : N		BEARING \						HOLE Nº 3.1%				
E COMPI		INCI		10	1		DEPTH					
START COMPL.	3.7	%	1%	1%	1%	01	Committee of the Commit	And the last of th				
DESCRIPTION /8/	# E/C/R	(u	% 1-16					% EQUTV	GROUPING - RMK			
(A - 8 C C 20 V C 2	260 80	, 03	N:1									
0-358 Decite gray, Porplan	260 00	,05	1313	-			-					
posene Bulfide zone. Core well	270 70	102	Tr									
inted, but no seriede, biolite,	270	, at	Tr									
Proclase or silica Fet 3%	280	1.50	1 1			-						
mite, nearly all on joints.	290 10 290 85 300 85	, 02	17									
cec chalenpyrile.	290 85	:01	.001									
	300			Comment of the				1				
1.1	310 75	,02	Tr	)	-			-				
1.11	320 55	.01	Tr		214							
	320 76	.01	Tr									
1 11		,01	11				-					
10.141	330 75	.08	Tr									
	350 15	.09	Tr									
8- 457 A   1   1   B	350			-	-		-					
8-455 Quarty Haymile Por	360 10	,12	Nil									
of, Medium Graned, Lypogene	366 370 85	.07	Nil									
re, practically no alteration.	370		1									
othe is fresh. Pyrite is	380 80	.10	Nil	-								
s of rock, occurring on fracture	380 85	.08	Tr			1.1						
d in diss. (50% \$50%).	390	Trans	7.37									
by and Mose occur			.001		-	-	-					
cely on fractures.	400 75	. 15	,002									
,	410 95		Nil									
	420	.0.	Nil	1		-	-	-				
	430 77	.05	.001									
5-17? Dacite, white, porphyritic	430	1.9										
attaigillie afteration, fine gravies	44075	.12	,001				-	-				
Il jainted, but no sor, or,	450 97	.08	Tr									
ica or Sio. F st 3% Py.	450	.07	.001				1					
Cpy.	460 7.								7			
	470 10	.10	.006	-		-						
7-500 ats Mon. Porphyry.	470 85	.06	70									
1. #1/o suifide, mestly Pyrite;	480 0	100	-									
from joints and half is in	490 85 490 95 500 95	.06	Tr	1	-	-	-	-				
es. No Arg., Ser. or silica. Tr	500 95	08	. 001									

Sheet 3.of. 7

# PROJECT BS& K- Allas Mine

Coord, : N		BEA					HOLE Nº 312					
START COMPL.			INCL	••				DEPTH				
START COMPL.	1:1	7:1	% Cu	% M.	%	1%	OZ.		1%			
DESCRIPTION			RCu	Ma		-			EQUTV.	GROUPING RMK		
5-597. Otz Mony, Por, Gay,		Son 67	.24	.001			1			1		
ed Grained, Kard, Est 2%	1 1 1	Cin								. /		
if, as dis paide, No Argo		_	.23	.001	-		-		-			
r or silica. Rare Alumbe		520 70	.15	Tr								
joints. Core well jointed	1 1 1	530	.08	,022								
		510	1.05	,0.4	-	-	-	-	-			
		550 75	.10	.00Y								
7-500 Dacita, Gray, Lord,		\$50 70	.11	,556								
esh appearing, with 3% total		5/0	+		1	-	-		-			
Ifide as parite. core		573 73	.05	.002								
early jointed,		570 77	.07	,003								
		580 58	1									
		590	,15	,001	-				-			
00-750 Qtg. Mon, Par.		575 75 600 75	.28	.004						~		
ey, Soft, Medium grained,		600	.14	.001								
+ 20% total suffile as		610 90	-	-	+-	+	+		-	-		
rite, with 1/2 on joints and		620 95	14	.002								
on dissemination. Biotites		630 75	1.12	.001								
rest, but some some books		72.	-		+	-	1		_			
		-	.12	-	-		1.1		8	1		
A granned wice.		150 10	.14	.004			1 .					
		-	.12	-	-					1		
		660 /-	./2	1.001	-	-	-	-	+	-		
		670 77	.16	,001								
		130 13	.25	.001								
				.001	-	-	+	-	1			
		690 93	. 32	. 00	_				-			
	11	700 70	.25	,001								
		700	-	.001	1							
		717 /2	-	.000	-	-	-	-		-		
		710 /5	.11	.003								
		724	.10	.00.	,							
		750 16	-	1,,,,	-	-	-	-		-		
	+	730 75	5 ,0,	. 001								
		740 11	.09	Tr					1			

Sheet 4 of 7

PROJECT BS#K - Atlas Mine

Coord, : N		BEA				HOLE Nº 312				
E		INCL						LEV,		
START COMPL.	7 7 4 7	0/	To/ 19/	9%	02:	DEP	19			
DESCRIPTION	/ 3/ 3/ E/C/R	Cul	% Mc %	/*			EQUIV.	GROUPING - RMK		
10-520 01 Min Die 60	760 37	.17	.006							
o-534 Qto Mon. Por Grand, well	2/6			-				Average +		
minted near base of interap	110	,20	.00#	_		_		760-88		
st. 2 % pyrite in ventets	770 90	.14	.007					,27%		
1 1	772	.20	. 001							
preum and anhydrate or jour	790 790		.005							
	1,13		-	-						
	Sto. 95	1.14	.001							
	810 820 90	.40	.001							
	820 93	.10	.002							
	851				-					
1-894 Sierry green fine	840 75	-	,00%		-					
ined, hard. Mostly garnet pside facies. Some Choles veinlets near base of	- 75" 75	, 54	,001							
pside facies. Some Cholas	. 87	,07	.003							
tercept. Est 2% suffice.	1.0-	. 12	.001							
ercepit est & 10 summer.	02.	-	. 004			-				
	810 10	.68	. 007		-					
	280 90	. 12	.005							
	900 95	,10	.=05							
	900	10	.004							
1-977 Otz. Monz. Forp.	910 97	.12	1,00	-	-					
ushed, Gray, Mid. Gras.		-11	,004							
ft. Est 2% MINE,	1 24 13	.10	100.							
ostly in joints. Some gypin joints.	930		.001							
icinis,	940 70	1		-	-	-	-			
	950 35	.10	.001		-	-	-			
	950	.10	.002							
	930 78	.11	C225							
14-982 Storm, green, Lard,	97.									
e grants as above	120 77	1,00	.008		-	-	-			
a Are right a Mart	990 75	.14	.003							
82-1000 Qtz. Mon. Dor. gray. ft, crusted, Est 2% prite.	915	.20	. 005					4		
re social Est 9% curite.		1		LOGGED	-	-	1	DATE 8-1-66		

Sheet 5 of 7

## PROJECT BS&K - Attac Mine

Coord. : N			RING			HOL	E Nº	317
E		INC				COL	LAR E	LEV.
START COMPL.						DEP	TH	
DESCRIPTION /6	# 1 /c/R	%cu	%Mo %	%	02	01	% EQUIV.	GROUPING - RMKS.
0-1250 Of Non Para Gray	1010 75	.12	,002					Average fr
he motion grained, well force	1050 80	.10	.004					600'- 1300'
h anhydrite and superior in hits. Est 2% pricites	1020 87	.09	Tr					, 15 % Cx
ell in wiss. Race flakes	1040 90	+ 09	.002					
lena and sphelorite visible, secully forwards base of trought.	1050 95		.003					
creept,	15.5720		.00]			-		
	106090		Tr					**
	1070	.10						
	1080 97	1 100		-		-		
	137: 92	= 75	.002					
	1100 75	.13	.003					
	1110 75	.09	.00/					
	1110 97	.08	,002					
	11.20	./3	,007					
	1190 92	.09	.001					
	1172	18	.003					
	1150 87	.08						
	1169 07	.08						
	1170 9.	.12						
	1180 90	10000	.002	_				
	1190 85	.10	. 003	-				
	1200 85	.09	. 001					
	1310 75	.10	.003	-			-	
	1220 70	. 10	Tr					
	1230 80	.09	.00/					
	1230 85	. 19	.0030					
	1250 90	, 23	. 0076					

LOGGED BY VFH DATE 8-8-66

PROJECT BS&K-Atlas Mine

Coörd, : N  E  START COMPL.			INC	RING			C	OLE Nº OLLAR E EPTH	
START COMPL.	7.7	3.7	1%	1%	9/0	%	02:	02 %	
DESCRIPTION	00/	\$ E/C/F	2u	%	% 7.11			EQUTV.	GROUPING RMKS
56= 1270 St /		125 98	- 26	,0011					/
50-1279 Skarn, brown,		1.316	100				-	-	composit fr
parce growned, hard. Minerals		1274 99	200.000	, 547E	-				1250 -
re Garnet (+50%), with		1270 97	.08	,0020					Assays .13
eldspar, dropside, wollastonite, und minor sulfide. Est		1000	12.3	1					,co7
		1290 95	(80.70)	,ruts			-	-	Tr
% total sulfide - Py &		1300 98	,13	1800.					,03
py.		1301 90	100	.002					
19=1282 Qtz Mon Por.		1310 10	1907				-		
resh, hard, no mineral.		131099	,03	.003					
82-1306 Skarn, as above.		1330 99	.03	,004					
Start, as the		1330		.021					
06-1350 at Mon. Por		1340 98		1.021	-		-	-	
30-1342 Storm, as above		1350 97	.07	M:1	.20				
		1350	.06	Nil	.10				
az-1368 Dolomite, gray, are grained, soft, Tr Cpy		1360					-		
18-1373 SKAYN, as above		1870 98	,03	.001	Nil				
3-1400 Dolomite, gray,		1370 17	.02	.040					
as above		1380 20	.02	.001					
		1390 97	,,,,	1000		-	-	-	
00-1446 Skarn, as above		1400 99	.13	.001					
out ( )		1410 70	.16	.002					
· · · · · · · · · · · · · · · · · ·		1410							
grained, with carbon on joints, to cpy		1420 95	.08	.011			_		
grained, with the Car		1420	.01	, 012					
21, 323,		1430	132	. 011					
		1440 9.9		,		-	-	-	
		1450 99	,42	M.I					
		1450 19	.08	.015					
		1460	. 59	+					ĺ
		1470 99	-	11		-	- 5		-
		1480 98	. 28	.007					]
		1486 99	. 07	.002					
		11/80	-	100			-		
		1500 99	, 07	. Tr					DATE_VFH

PROJECT BSEX - Atlas

Coord. : N			RING		HOLE Nº	
E		INCL			COLLAR E	LEV,
START COMPL.					DEPTH	
DESCRIPTION	1 3 E/c/R	%cu	% Mo %	% 02.	EQUIV	GROUPING - RMK
1632 Dolomite fine graties,	1500 95		.003			
ded Black and while, Bands					_	
40° to core, Numerous joints	1520 90	.09	.005			
k soft. Rare bards of	1520 85	,07	.020			
1572 Dolomite Medium granied,	1530		.080			
kgray. Beds 60" to care,	1545 90	1.50		<del>1-11</del>		
k soft, numerous joints	1550 95	.04	.027			
- 1602 Dalomite fine grained	1550 97	.01	,003			
f gray with Numerous carbon ed joints - rare py & cpy.	1570 98	.01	.001			
	1570	7				
	1563 99	4	.003			
	1590 100	.03	,oa '			
	1590	,03	061			
-1608 Stearn Coorse grained,	11.00		-			
un, hard, hearly pare garner,		.04	.003	1,-1		
ace sulfide.	1620 97	.07	,003			
- 1680 Delamite white fine	1624	.07	.003			
-1680 Dolonite white, fine wird, with numerous carbon me. Bedding 40° to corcuit	1630 74	1.15				
ms. Bedding 40° to corcuit	1640 100		.002			
10. Rore suifile		-16	.003			
	1853 95	.20	.004			
- 1750 Sharn Medium	1662 97	1				
and brown, Lord, garner,	1673	. 25	.005			
ined, brown, Lard, garnel, dote guests dominates. Rom	160 100	.19	.00)			
the image that the	1500 150	.1/	.007			
	1690	-				
	1700 100	.07	.010			
	17:0 95	,09	. 608			
110	1710 07		.003			
0	1720	-				
1111		-19	.006			
1	1730 73 1730 97	.08	-05			
2.13	1740 180	110	.013			
	1150 100		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			

Sheet 8 of\_

# PROJECT Atlas Mise - BSAK

Coord, : N			RING		-			LAR E	3/2
E		INC					DEF		LCV.
START COMPL	1:13:1	1%	1% 1%	1	%	10		1%	
DESCRIPTION	/ 3/ 3 E/C/R	100	100					EQUIV.	GROUPING - RMK
50-1927 Abrija Fin	1 1750								
arn, hard, Medium queinics	1 1760 190	.00	.037	_			-		
arn, hard, state	1780 100	01	014						
ely garnet with miner	1774			-		-			
cite, epidote, chlorite.	17.50 120	.03	.011						
richt binord fexture.	1782 100	.05	:005						
re to min sufices,	1 2225						-	-	
1	100.00	.07	-014						
rayest near 1900-120.	1820	10	008						
, visible.		. 08	.008						
	1600	.09	006						
7-2000 Qly, Mon. Por.	182.5						-		
d, Medium grained, fresh	133 75	.12	005						
d, realist glatite and	1 1 2 2	,10	007						
pearing, with biolite and	10,77	-	-	_				-	
thoclase phines weak	1885 100	.09	.006				5.1		
the Att, No series	1532 150	-4	004						
st. Total sulfide at 1%	1 1750	.04	,00					1	
the pyrite dominating	1862	.10	,005						
	12,24	1	1						
e badly broken	100 100	.09	,004						
	100 95		-022						
	1275		-Cet		-		-	-	
	1200 97	OLI	,003						1
	1921 97								
		.10	00 3						
	1912 10	46	.006						
	200 P	530						+	
	101	)	.615						
	133	. 15	,006						
	73	1,12	,000		-	-	-	-	-
	130	30	.008			P= -			
	1855	-		-					1
	34. 25	.15	005						-
	13.0	18	004						
	5-0	1	-				-		1
	19	.15	.003					A 6.	
	(2, 2								
	77.1.70	100		-	-	-	-	-	-
	( ) ( ) (b)	13	002		-				

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DATE 11-2-63

PROJECT Atlas Mine, BSEK

Sheet got\_

Goörd, : N				RING	_	-		HOLE Nº 312 COLLAR ELEV.				
START COMPL.			INC		-			DEF		L.E.V.		
1 3 TAKT OOM E.	18/3	47	1%	1%	1%	1%	01		1%	4		
DESCRIPTION	13/ 3	C/F	- Sec	1-40	-	-	-		EQUTV.	GROUPING - RMKS		
10-2066 City. Mon. Hard, Medicin	200	95	80,	.001					1 1			
ined, no alteration, very c veintets cpy, no pyrite to total scelfide as total scelfide as weintets.	201	-	-	-	1	-			-			
re veinlets apy, no pyride	202	-	.09	.003								
of total Scalfide as	200	100	.06									
ve weakly broken.	203	-	-	.002		-	-	-	1			
11 21 11 11 11 11 11 11 11 11 11 11 11 1	204	-	.07	.003								
	204	1.00	.05	003								
	2050	-	-	-	-	-	+	-	-			
	201		.06	-001								
	2060	100	.04	.003								
	201		_	1	+	+	1	-	-			
	≥08	0 100	-	-								
es- 2105 Andesite Perphyry is h, port mineral, fine granied it feldspor phenocrysts. Rock unjointed, gray and accive.	208	150	,04	1001								
is his port mineral, fine grained	209		1	100	+-	-	-	+				
uniointed, gray and	210	100										
accive.		0 110										
	211	9			1	+	-	-	-			
os-2242 Quarty Moizmile phenocrysts, hards medium aincd, no alteration. Practical sulfide	212	120										
phenocrysts, hard, medium	217	97				1						
since, no alteration, tractical	213	٥	-	1	+-	-	-	-	-			
sulfide	Sint	99				¥						
	214	2.5										
	315:	-	-	-	+-		+	-	-			
	216	12.)										
42-2250 Andeside Porphyry- esh, Block, soft, fine grand	214											
est, Black, soft, time grande	217		-		+	-	+	-	-			
sulfide, no structure.	316				į							
	218	1										
	219		-	-	-	-	-	-	-			
	22.1	120										
	220											
	221	-		-	1	-	-	-				
	221											
	222	0						1				
	223	-	-			-	-	-	-			
	223	0100										
	221				1			1				
	52.5	00 100		'	1		1		1	DATE 4-25-6		

PROJECT Allas Miss & S &K

Sheet 12 of\_\_\_

Coord. : N				BEA	RING				HOL.	E Nº	312
E			-	INCL					COL	LAR E	LEV.
START COMPL.		V							DEP	TH	
	13	1 3/1	7.1	%	%	1%	1%	OI.	02	%	GROUPING - RMK
DESCRIPTION	/ 3/			(c)	113 %					EQUIV.	GROUPING - RMK
50-2315 Qtz Monzonite mitic Yesture, No alterati		2250	an								
ativ Yesture No alterati	04	2260	100			1	V-s				
		2260	100								
Limate 1/2 % total sulfid the .05 % cu No structure veinlets, no nothing.	6	2274	10			-	-				
the .05 % Cu No structur	5	2270	95								
visiblete i nothing		2/80	,0			-	-			-	
ocivicis, No manny		2280	97							1 1	
		22.80 22.90 22.90 23.00				-					
		2300	100								
		17.700		THE PERSONS		-		-	-		
		2310	(FC)								
		2310	100								
		2310	100								
			1								
							1				
					-		-	-	-	-	
		-	-		-	-	-		-	-	
							1				
						-					
			-	_	-	-	-	-		-	
										1	
		-	-		-	-				-	
					1		1				
	44					-					
					-	1		-			
					-	-	-		-	-	
							1				
	11	-			-	-	-	-	-	1	
							1				
											•
								-	1		
									1		
					-	-		-	-	-	
					1			BY			



PROJECT\_\_Atlas Mine, Drill Hole for Hevada Claim

Sheet 1 of 2

Coord. : N		-		RING	Ve				E Nº	
START 8-19-65 COMPL. 8-20	mfs/ft		INCL	2	Vo	K.G	AND DESCRIPTION OF THE PARTY OF	COLLAR ELEV. DEPTH 109		
START GOLDON COMPL. 6-20	:/ 3/1:	7	%_	%	%	1%	OX.	-	1 %	
DESCRIPTION / &		C/R	Cu	Mo					EQUIV.	GROUPING - RMK
15 Dacite Forphyry. rown, Oxide cone, coft, orphyritic, fine grained.	10	40	.02	.021						
iginal sulfide content s 4%. Strong Arg. Alt.; ser.	10 20	70	.02	.017						
	20	80	.04	.009						
-25 Ouarta Monzonite rown, oxide Eone, soft locrystalline, Est. 2%	25		.09	.001						
riginal sulfide. Wk	30 40	78	.28	.001						
WI CONTRACTOR OF THE PROPERTY	40	on.	.29	.009						
-60 Quarta Monzonita ray. Supergene sone	50	09	647	2003						
olocrystalline. Est 2% olfide. Chalcocite occurs o fractrues. Weak Arg. ht. No sericite.		90	.16	.008						Average fro 30 to 50 is .28% Cu,
te. No sericite.	60 70		.13	.015	5					.005 No.
0-109 Quarts Monsonite ray as above. Hypogene	70 80	98	.11	.00:	3					
one. Est 2% sulfide, in ractures. Trace of malcopyrite.	80		.12	.00	3	+	+			
	90		0 4 4							
			.07	.00	7				+	
	100		.00	01.						
					-					
								VFH		DATE 8=20=

Sheet 1 of 2

### PROJECT Attas Mine - 155 \$ 15

Coörd. : N		-	BEAL		ortion	-	HOLE Nº 313				
START A 23 COMPL SENT	5 1	6	MOL				DEPT	H	00'		
/ 8/	3 %	7.	%	% %	1%	OZ.	02 9	6			
DESCRIPTION  DESCRIPTION  AZ Bedrock (Oxidized Dacife)  rilled with Trience- No  orc.  FO Otz Mon. Per. Oxidized,  rom, hard, No Arg. or Ser.  It; Rock is Med. Gravied,  Ith Sulf (none oxide)  Forgene Sulf. cost on py:  at 2 % sulf, as diss py (solid solid   Soft. Weak Arg.  It., Ne orta, bio. or Ser.  st 2% tutal sulfice,  sottay py. Most (75%)	40-4 50 50-60 60-70 70-60 100-110 110-110 110-110 110-110 110-110 110-110 110-110	50 77 85 75 82 77	1NGL %C			OZ.	COLL	AR E			
ulfide occurs on joints.	150 160 160	57 59	,15	.004					9		
	180	65	,05	.011							
	190	90	.00	.009							
	200	15	-	.014							
	210	94	.03	. 014							
	230	97	. 53	,038							
	240	95	.08	.014							
ra l	250	90	.07,	. 013					DATE 9-3-66		

Sheet Zot 2

PROJECT B.S &K. Atlas Mine

Coord, : N			BEA	RING						3   3
START COMPL.			IIVO	L-,				DEF	LAR E	500'
DESCRIPTION	18/3	1/01	R Cu	% Mo	%	%	OZ	0	EQUIV.	GROUPING RMK
0-500:= 0+3. Mon. Por.	1 125	0.1	.07	T						
on Fine Grained, soft,	26	0	80.			_	1		-	
cil jointed and locally well	2	10	-		-	-	-	-	1	
ell jointed and locally well cared. Weak Arg. All,		-	.10	,013			-	-		
Ser, or orth, Est.	1 1 1	2 70	.12	,003						
suff as pyrite. 75%	25 E	30 90	.11	.007						
pyrite ocens on jonis.	3,	0 90	.10	,009						
into have gyponn with	31		,16	.005						
pyrite occurs on joints.  ints have gyesum and  re quests veining, with	32	_		.015						
	3	30 00		1	-	+				
		10		,000	-	-	-	-		
	3	50 8	7	-	-		-	-	-	
	3:	0 1	0							
		50 75								
		70 70								
	3.	20 9								
	34									
	1 1	-	-	+-	+	+-	-	+	+	
	4	10 9		-	-	-		-	+	9
	21	20 4					-	-	-	
	1 3	30 9.	5		1					
		40 9	7							
	4	10 9:	8							
	4,	50 9	5							]
	1 1	60 9	0	+-	1			1		1
		20 20	-		-	-	-	-		-
	1 19	80 3	L	-	-		-	-		
	1 4	90 9	0					-		
		90 9	0							

LOGGED BY VFH DATE 9-6-66



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

Sheet 1 of 2

Goord, : N			BEAR	ING	_	ne t			E Nº	
Ε			INCL.		Ve	rt			LAR E	
	3-12-6							DEP		151
DESCRIPTION /	1 3 5	C/R	°Cu	Mo Mo	%	%	OZ.		% EQUTV.	GROUPING - RMKS
-68 Dacite Forphyry	10	45	-07	.009						
mide sone, Brown, fine	20	40	401	0000	_	-	-			
rained, porphyritic, strong										
rgillic Alt. with trace	10	+								
oricite. Core badly fractured,	20	50	.06	.012						1.7
riginal Sulfide content as est. 5%. Some Malachite										7
isible 20° to 68°								-		
202020 20 00 00	20		00	000						X - 4
	30	02	.09	000		-	-	-	-	
/										
	30	-				+	+	-		
		70	.07	.004						
		-		7						
The state of the s	40									
	50	70	.07	.009						
8-70 fault sons. Core crushed										
Onto restry sounds done or annual							-	-	-	
0-90 Quarta Monzonite Porphyry	50		.10	.009						31.00
rown, Oxide sone, Granitic,	60	03	*10	+002	-	-	+	-	-	V V
olocrystalline texture.										
leak Argillic Alteration,	60	_				-	-	+	1	100
rith No sericite. Fracturing		50	.19	.00	7					1.7 . 18
very strong at 70° gradually	1	-		-						Sec. 20 . 1000
reakens down the hole.			11							A 4 1 5
ingralization fades with	70			200						-17 - 1 Y
fracturing.	80	55	.11	.012	2					
										1 13 11 3 4 1
								-	-	
	03		.20	.0	h					
	90	60	.40	eV.	-	_	-	-	-	- 1
90-95 Quarts Monzonite Por.					-		. 1			1
Mixed Oxide and Sulfide,	90	-		-	+	-	-	+	-	. 1
Copper occurs as chalcocite,		70	.66	.010	0					
with limonite.	95		144	200	+				1	1
		085	.66	.0	16					1
	1.0	U.			1					
- 400 A Warranton Warr	10		5 .61	.00	5					2 13
95-135 Overts Monsonite For. Supergene sone fracturing	10	5	1.0							
weakens with depth. Some		0 9	0 .44	.01	3				-	_ 3
Moly visible in rare	II	9 -	1	-	0					
cearts veinlets.	22		5 57	.00	U		-	-	-	-
	11	0 9	7 54	.00	4					
	12		1,200	***	7		-	-	-	
	12	4 0	0 .32	-00	5					
	6,6	7 "	100		_			VEL	1	DATE

FORM # 355 REVISED 10-62

Sheet 2 of 2

DESCRIPTION  ROUPING  135=151 Quartz Monzonite Bypogene zone, Noloxiine, Weak axgillic Alt. Pyrite and trace chalcopyrite sparingly occur in rare fractures. Estimated total sulfide is 2%, occuring entirely as fracture filling.  DEPTH 151  DEPTH 151  ROUPING  130 90 .43 .009  135 92 .44 .009  135 92 .44 .009  135 151 95 .21 .005  145 90 .20 .004  145 151 95 .21 .003  END OF HOLE  DEPTH 151  GROUPING  ROUPING  ROUPING  ROUPING  ROUPING	
35-151 Quartz Monzonite Typogene zone, Holoxline, Teak argillic Alt. Pyrite Typogene zone, Holoxline, Typogene zone, Holox	
bypogene zone, Holoxline, leak argillic Alt. Fyrite and trace chalcopyrite uparingly occur in rare gractures. Estimated total sulfide is 2%, occuring antirely as fracture filling.  130 90 .43 .009 133 92 .40 .009 135 140 95 .21 .005 140 95 .21 .005 145 90 .20 .004 145 151 95 .21 .003  END OF HOLE	- RMKS
END OF HOLE	

LOGGED BY\_\_\_\_\_\_ DATE\_

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PROJECT Atlas Mine - P. Stele

Sheet \_of 3

Goörd, : N		-	ING	RING Y	ertical		HOLE NO	
	L. Scot. 28		HVOL	-	****		DEPTH	625'
DESCRIPTION	/ 3/ 3/	i/c/R	%	% 1%	%	OI.	POUTV	GROUPING — RMK
0 No Core	7 6/ 4	T	1 000			1	L COIV.	ONCOLING TUNK
	D-1	0						
so Ducite, Tan, fine	1 20	56	.05	.001				
soft, oxidized, s	Trong		20					1
Argillie alteration E	014 50 014		, 25	,003		-		
Orig 5/0 Sollar	en 30	60	.10	,010				
Orig 3% sulfile, 1 Fear Core shing 250 Dacite, Gray, fire	Grain 50	72	.09	.003				M
set sulfide zone	. 50	-	-					
Strong availlic +	1+, 60	80	, 09	.008		-		en En
Care badly shee	red. 76	76	,05	.010				
Soft, Sulfide zone Strong avgillic / Core badly show Est 3% Sulfid	70	1/2	.08	\$50.				
mostly on joints	80	7.1	.01	.004				
	90	-			-	-		
	100	10	109	.009		-		
11	110	85	.13	.270				
	110	1 600	.05	.014				
	120	-						
	13:	_	,07	.02%	-	-		
	146	200	.07	.010				
	141	95	.09	.003				
	150	1		-		-		
	160	_	. 6 ?	.012		-		
	160	176	100	.012				1 1 1 2 2
	17.6	120	100	.002				
	180		1					
	193		.17	.001		-		
	20	Cr.	14	.003				
	544	164.2	.17	.001				
	210		1			-		
	22	0 95	.14	.00/		-		
	23	1011	.12	.003				
	23· 24		10	.009				
	24	-	-	+		+-		
	25		,08	. 002	LOGGED			DATE 9-30-

FORM # 355 REVISED 10-62

PROJECT Atlas Mine B. S. 4 K

Sheet 2 of 3

Coord. : N			RING				314		
START COMPL.		INCL				DEPTH 32 \			
	1 3 3 5/01	% C.,	% No 1%	1%	OZ:	°z' % EQUIV.			
1-320 Davide, while, file	240 85	1	1 10		1	I IEQUIV.	- GROOFING KIIIKS		
gravid, soft, wh	260 70	.09	.003		-				
grained, solt, wh	2.70 85	109	.005						
steering; est. 2%	270 00	112	.001						
py no shears	290	1		-	-				
316 Sty More Gray, fri	290 70	, 11	. 003		-				
grained, soft, weak	300 92	. 07	.003			1:			
And Att. Mary Sury, frie grained, soft, weak Arg. Att., strong strong strong	300 94	,07	,002				f <sub>0</sub>		
Steering Est 3/2	310 9 V 310 9 V 320 90	02							
Py, mostly on short			.004		-				
	320 87	.06	.015				_		
	330 87 330 9: 340	.07	,001						
6-411 Darite, as above	340	.07	.001				1		
419 Ota Move as above	250	-	.001	-	-		1		
4/9 2013-112	360	.09	.002				1		
		000	Tr						
	370 86	30.	,002				1		
, so perite as about	380				+	-	-		
	390 9	5 . 67	Tr		-		-		
	400 9	2 .07	.002						
	400 90	01.10	. onv						
	(Jup)				_		10.0		
	420	.07	Nil		-		-		
	430 9	1.10	N:1						
	430	1.07	N.7						
	440	-	1177						
	450 9	0 . 10	1002				-		
	460 91	5 . 13	Nil				4		
	460 9	7 .09	Tr						
	470	d 63	TI						
	480 9	8 .01	-		-	+	-		
	490 9	1.14	7,				4		
	490 5009	0 . 17	.001		112				

Sheet 3 of 3

PROJECT\_\_ 314 HOLE Nº BEARING Coord, : N COLLAR ELEV. INCL. DEPTH START COMPL. equiv. % 1 3 2 /c/R "Cu No GROUPING - RMKS DESCRIPTION 500 5110 500-625 Danie as above 510 85 510 520 530 530 540 540 550 550 560 560 90 570 94 580 580 96 590 590 98 601 600 95 610 610 .04 N:I 90 620 620 85 Tr .04 625 LOGGED BY 1/+++ DATE 10-11-66



# DUVAL CORPORATION COPPER DIVISION — ESPERANZA PROPERTY SAHUARITA, ARIZONA

### CERTIFICATE OF ASSAY

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

Oct. 3, 1966

	(B.S.&K.) (V.H.)					
BEAKER NOS.	MARKS, ETC.	SAMPLE	Cu	Mo		
NOS.	MARKO LIG	GMS	%	8		
	314-10-20		.05	.001		
1	30		.25	.003		
	40		.10	.010		
	50		.09	.003		
	60		.09	.004		
	70		.06	.010		
	80		.03	.008		
	90		.09	.004		
	100		.09	.009		
	110		.13	.010		
j	120		.08	.014		
	130		.07	.026		
	140		.09	.010		
	150		.09	.003		
	160		.09	.012		
	170		.08	.012		
Ì	180		.09	.002		
1						
1						
			-			
			-1			
_						
			7			
FORM 311	<u> </u>			'		-

#### DUVAL CORPORATION COPPER DIVISION -ESPERANZA PROPERTY SAHUARITA. ARIZONA

(V.H.) CERTIFICATE OF ASSAY SPECIAL FOR GEOL. DEPT. Oct. 6, 1966 B.S.&K.

BEAKER NOS.	MARKS, ETC.	SAMPLE	Cu	Мо		
NOS.	MARKO, ETO,	GMS.	%	%		1
	B.S.&K. 314-180-190'		.17	.001		
1	200		.14	.003		4
- 5	210		•19	.001		V. W
	220		•14	.001		
	230		.12	.002		10 10 10
	240		•10	.009		
91	250		.08	.002		1
	260		•09	.003		
	270		.09	.006		
	280		•12	.001		
	290		.11	.003		
- 16	300		.07	.003		
	310		.07	.002		-
	320		.07	.004		
- 1	330		.06	.015		100
	340		.07	.001		
	350		.07	.001		The state of
	360		.09	.002		
-	370		.08	Trace		
	380		.08	.002		81
	390		.07	Trace	14	*
	400		.07	.001		
	410		-10	.004		
- W	420		.07	Nil		
17.5	430		•10	Nil		- 1 B
	440		.07	Nil		
	450		.08	.002		
	460		•13	Nil		
	470		.09	Trace		
	480		.09	Trace		
	490		.06	Trace		
	500		.07	.001		
1	610-620		.04	Nil		
FORM OI	1 - 2 - 4 - 4	9-1	•04	Traco		215

Sheet Lot 5

PROJECT 35 \$K

Goord, : N				BEAR	RING	lere	eal			E Nº		
E				INGL. Variated					COLLAR ELEV.			
START 5/23/67 COMPL. 7	1111	57							DEF	CV HTS	13.7	
DESCRIPTION	100	1 3	/c/R	%	%	%	%	01	01	EQUIV	GROUPING	- RMKS
0-10'- No Core	V.	10	Core									
0'-102' Dacies Perply:/-		20		T+	0.605							
To Graned Grandmass Silve	N	30-		001	0,05							
Thenocryses, Hard, Est. Org.		33-						ilie i				
ompletely Oxdized. Alteration		40-	1		0.000							
De India Include Weak Seren	1	50		Ti	0.002	-	-	-	-			
n Frac. Facus, No Bistite & No Dechoclase, Some Clay. This	1	60		0.02	0.00	-	1		-	-		
I leach of Capping. 6.		70		0.04	0.000							
1 7 T. 366/Mod-LX	M	73.		0.00	0.00							
bun Limonite Fras. Fillings Res	1	0.00			0.003							
	P	70					1					
To For The Langeh of The 102	10	10	3	0.00	2.005			-	-			
ntire Hole.	010	110		0.04	0.00	4	+	-	+-			
	N	12	5	0.03	5.00	1		1	-			
02'-1043.7' Quarez Menzon 40	1	/2: //3:		0.03	0.00	1						
enphysix, Fr. Grand Grand	M	750 12		0.00	0.00							
Nod Booken, Argillic Ale Med, Vines Series to Along Form Summer		14:	)-									
	1 1	150			0.00		+		1			
		16		0.03	0.00	3	+	-	+	1	1	
Set Consinus actions In Minor	1	17	2	0.18	0.00	2	-	-	4	-		
Francisco Mossey	1	17.	2	0.25	0,00	3						
La Crave de l'est l'arme		19		1.04	1.00							
Frace. To The 302 45' Range Some Mines Ames of Calate		19		1	0.00							
11 Facione Inchair	1	7.	22.									
Ppy That Is Present Occurs Top That Is Present Occurs Westly As Conveys on Pyrite.		21	0-		- 0.0		-		-		1	
V Pare Mas Lec. 7		22	20	00	1 0.0	12	-		-		-	
11 0	,	2	33	0.0	5 1.3	5			-		-	
Xelling Cost mys Alama Frace	2		40	0.04	- 0.0	05		9		Ť		
Express Seems A Mina Mod Fix-		24	50		400		1					

Sheet 2 of 5

## PROJECT BS & K

Coord, : N E START 5/23/67 COMPL. 9/11/67			RING Ver			HOLE Nº 3/5			
			Vere			OLLAR E	LEV.		
				-		DEPTH /043.7			
DESCRIPTION	1 1 1 1 1 1 1 1	1/R Cu	% %	%	01.	equiv	GROUPING - RM		
	250.								
	240	0.03	0.002	-	-				
	270	0.03	0.001						
	276-								
	233	0.05	0.004						
	270	0.05	0.002						
*	310	0.04	0.035						
E	300	-							
	334 370	0.08	1,343						
	320	0.05	0.017						
	320	0.04	Tr						
	330								
	340	0.04	0.005						
	340-	0.63	0.005						
	350								
	360	17.00	0.651						
	370	0.03	0.006						
	370	0.09	NI						
1*1	360								
	V V	0.10	N.I				b		
	390	0.11	0.002						
_ *	400		NI						
	410								
	420	0.10	0.001						
	420-	0.07	0.001						
	430		Nil						
	440	17.01	1411		-	_			
	44.0 45.0 45.0	2.09	0.05						
	450		0.005						
	470	0.08	3 0.004			-			
Crons	179 14 14 14 14 14 14 14 14 14 14 14 14 14	2.10	0.001						
6			0.006		-				
		5.13	0.004		1				

Sheet 3 of 5

PROJECT B 5 & K.

Coord, : N E START 3/23/67	COMPL. 9/12/67	BEARING VOEL	HOLE Nº 3/5 COLLAR ELEV. DEPTH / 043.7
DESCRIPTION	13/ 3/ 1/6/	P C / // 0 % /%	equity GROUPING - RMKS
	510 510 516- 525	0.15 0.015 C.10 0.002	
	523 523 533	0.09 0.004	
	525	0.10 0.001	
	557 550	0.10 0.002	
	570	0.10 0.003	
	5% 5% 5%	0.030.001	
	600	0.02 0.002	
	610 610- 620	0.030.005	
	620-630	2.04 0.001	
1	623- 623-	0.020.002	
	650	0.040.002 0.040.002	
	Gypsu 533 Fise Filler 573	0.05 0.002	
	680 680	0.09 0.05	
G :0.5	690	0.07 0.008 0.03 0.001	
	Amount of 700 710 710 710	1).05 0.002	
1	To B. c. H. 720 720 730	J.02 0.001	
	740	0.03 0.001	
	740	0.02 0.001	BY F. Mare DATE

Sheet A of 5

f

PROJECT B5 &K

BEARING Ver HOLE Nº 3/5 Coord, : N INCL. Vert COLLAR ELEV. START 8/23/67 COMPL. 9/11/67 DEPTH 10 43.7' 1 3/ 3/ 1/c/R Cu 1/10 EQUTY! GROUPING - RMKS DESCRIPTION 760 0.03 5.001 760 770 0.020.602 770 -783 0.05 0.00 780 0.04 0.001 800 0.050.002 876 0.04 0.002 0.051.003 820 820 830 0.01 5.002 830-840 1.01 1.601 0.050.001 0.090.001 0.02 0.003 0.13 0.001 0.02 0.001 0.03 0.003 0.09 0.002 910 720 0.04 0.001 720 0.010.002 930 930 94: 0.06 0.001 0.05 0.00= 950 950 0.05 5.012 960 0.07 0.00 0.10 3.002 990 1.06 1.001 1.6 0.002

Sheet 5ot 5

PROJECT B5 & K

	[ 0 . 0 . 4 . N					BEA	RINGV				HOL	E Nº	515.	
	Coord, : N					INCI	RING				COL	LAR E	LEV.	
	START 8/2	3/67	COMPL. 9	/14/	167				+		DEP	TH/O	13.7	
	DESCRIPTION			18/	3/2/61	R Cu	% Mo	%	%	01	CI	% EQUIV.	GROUPING	- RMKS
					1000		0.002							
					1010	0.04	0.002		-			-		
			-	N	1g 20	0.00	0.001					-		
					1030	010	0.003							
					1030-									
					1043	10.10	0.003	-	-		-	-		
			B.OH.	3	1040	0.06	0.001							
			10.5.12		-									
					-	+	-	-	-	-				
										1 = 1				
					-		1		-					
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	¥						-			1			1	
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					1									
											1	1 1	DATE	

Sheet Lof 5

## PROJECT 35 &K

Goord, : N E START = /25/67 COMPL.	3/11/1	44		RING				COL	E Nº	LEV.
	13/	# 2 /c/R	%	%a	%	%	01		EQUIV.	Land Control of the Control
-10'- No Core	N.	3 - N.								
-/8 - Na Care	20.0	10 Ca-2			-			-	-	
1-102 Dacies Party-/-		20	To	0.005						
- Grand Groundmars Die	- 1	20-	10.21	0,535	+					
henorysus, Hand, Esc. Chig		30								
sulphil @ 1% Now Mosely omplecely Oxidized. Alcerous		40-	Tr	7.03	3	+		1		
Duduces Include Weak Seven		50	Ti	0.00	1					,
To France No Bigeite &N	. 17	50-	10/2	0.00	4					
Sen - L124.	Sile	60-								
1 / 20 1 (277.09.	2-1	70	0.04	-0,00	6	-		-		-
)xide Zone To +61/Mod-Lar box Limonte Frac Fillings Rove	1	70- 80	0.08	30,00	4					
		80	0 07	2.00	2				1	
	5 5 V	90						-	4 =	1
y War	, °¢,	100	0.53	5 0.33	5	-	-	+-		
7. Is The Length	52'-67 ?	113	0.0	10.00	1					
eners Hole.	1	110-	00	30.0	01					
02'- 10437 Quz-12 : 11 en 7 an 10		/20	1			111				
Scalarer Fr. Grand Grand	-	130-	0.03	0.00	34				-	
Mad Com Dille, Genses	17	140	0.02	- 0.0	2			-		
Not Robert Learlice Fit Maa	. 11	140-	0.0	30.0	01		9			
Vines Series of Wing Francisco	1 1	153							4	
7		160-	0.0	5 0.0	03	-	-	-	8	
The state of the s		175	0.13	300	02.					4
Some Gener Lee. However In Mines Ames, France Angles Massely V. Stor		173-	113	500	131		4			
1 - C - 10.1 c+ 1 -		180								7
1 302 45 Kangs		190	0.0	4 0.0	01	-	-			-
- 11		190 204	0.0	1 0:0	002					_
Mong France Santara, Tamban	1. 1	200	0.0	1 0.	201					
. / //	1 1	210	1							
C V Ram M.D. 200.		220	03	110	002	-				
11 11. O As V. L.		230	0.4	030.0	205			-		4
1/1 = 4.7.7		230 240	00	1 0	205		4			
Kelling Congrad Allara Des 2 12 Venler Day Search Des Capper John A. Mina Med Fox	1	240								
Gypsen Source Decree 30	14	250	2.6	14)	001					OATE

FORM # 355 REVISED 10-62

Sheet 2 of 5

PROJECT BS &K

	Coord. : N			BEAR	ING V	ert				E Nº		
-	Ε			INCL.	Var	4				LAR E		
		COMPL. 9/11,	167								13.7	
	ESCRIPTION	/ 3/	1 2 C/R	% 9	/\\o `	%	%	OI.	01	% EQUIV	GROUPIN	G — RMKS
			250.	0.030	1 007							
			2:0									
			275	0.03	0.001			<u> </u>		$\vdash$		
		]	230	0.05	0.004							
		M	293- 290	C.C5								
			270	0.05	2.002							
	6	= >> (*)	310	0.04	2.025				_	-		
	Gons	207	8:50 3/3	0.08	1.003							
		- 1/7	3/3-									
			820 820-	0.65	0.017		-		-			
			233	O.CL	Tr					1		
			340	0.02	1.005							
			E40									
		- //	320	0.02	0.125		-		+-	-		
			360	5.:3	0.001							
		1	360	0.03	2006							
		· \	370									
	4.3		380	5.07	NI		-	-	-	-		
		1	390	0.10	Nil.							
	~	1	390	0.11	4 000							
			-				1		1			
	(1)	11	470	0.09	NI	-		-	-			
			410	0.10	2.001							
			420	0.07						- 1		
	8 74	1.1	430						1			
			440	0.09	Nil		-	-	-	-		
			440	0.09	0 665							
		. \	450	3.37								
	- 4		460			1	1.		1			
3		470	460 470 470 480	0.03	5.301	-		-	1	1		
	G	470' 5-	480	2.10	3.301	1						
	4	- (7	490					11				3
			490	0.12				-	-	-	1	
			500	0110	1.33	-						

. Sheet 3 of 5

## PROJECT B5 & K

Coord.	: N			BEAR	RING V.	art.				E Nº		
1000	E			INCL	. Vort				COL	LAR E	LEV.	
START	3/23/67 COM	PL. 9/11/2	,7						DEP	TH / O	43.7	
DESCRIP	TION	/ 3/.	# 2 C/R	%Cu	100 %	9	%	01:	01	% EQUIV	GROUPING -	RMK
			501· 510	0.0								
		1 1	510-	0.15	0.035					-		
		M	520	2.10	0.002							
		M	530	100								
		- 1/1	532	0.09								
		N	520	0.10	0.001	_				-		
	-	545	540	0.11	0.004							
	Gouge	551	250						-			
191		M	560 560	0.10	0.002	-						
		IV I	575	0.10	0.053							
			577-	200	24.1							
		///	533 53.	005	0.001							
		1.1	5%	0.03	1,001							
			600	0.02	4.002						1	
	100	1/ }	600-									
			610-	0.06	0.365							
			626	0.03	0.332							
			రేజు- కవిం	2	0.001							
			C30-			×						
	100		225	0.02	0.002				-	-		
		1	650	13.01	0.102							
			357. 643								,	
	Sec	-1 00	030.	0.04	0.3:2	- H			-	-		
	Fiz	F. (1.2)	270	0.05	0.CCZ -							
			680		3.65							
			680							1		
	6	699	690	0.07	200.0			-	-	-		
	Gauge	2	690 700	0. 03	0.001							
	(De:	201 22	700								1	
	5 Ed T. 8	Lar.	710	1).05	11.110			-	-	-		
	τ. 2	L.C.A.	720	0.02				_	-			
			720	1.03	N.1							
	1 1		730				1		1		1	
	4	1	740	0.03	3.54		-	-	-	-		
T		1/-1	740	0.00	20.001							

Sneet 4 of 5

PROJECT B5 &K

Coord, : N BEARING Vant HOLE Nº3/5 INCL. Vart COLLAR ELEV. DEPTH 10 437 START 8/23/47 COMPL. 9/11/67 3 3 1 C/R Cu 1910 92 %
EQUTY GROUPING - RMKS DESCRIPTION なる 760 0.03 0.001 750. 770 0.020.002 770-700 0.050.00 791 0.04 0.001 790. 800 0.050.002 810 0.04 0.002 820 0.051.003 820 830 0.01 1.002 840 3. 01 3. 501 0.05 0.001 0.090.001 860 0.02 0.003 0.13 0.001 0.02 0.00! 0.03 0.003 900 0.09 0.002 0.04 0.001 . 0.01 0.007 930 0.06 0.001 940 0.05 0.002 950 2.05 5.002 960 2.07 0,002 0.10 0.002 980 0.06 0.001 990

0.05 0.002

Sheet 5015

PROJECT B5 &K HOLE Nº 3/5 Goord, : N BEARING Yere INCL. Yeri COLLAR ELEV. START 8/23/67 COMPL. 9/14/67 DEPTH /013.7 ez % EQUIV. \$ \$ 1 /c/R Cu No GROUPING - RMKS. DESCRIPTION 1313 0.04 0.002 1515 120 0.060.001 1020 0.10 0.003 1030 ٠ بشرن 0.10 0.003 1040 B.O.H. 1 loud 0.06 0.001 1050 1043.7

LOGGED BY F. Mack & DATE Vie Holliser

Dear Abe I was only in Juism for a Lew days before being sent up to see Pollyanna. But I did see the assays on # 315 to +5 00', They show a significant and statistically important increase in copper as depth is gained. I was dismayed to hear that the hale was to be stopped at 1000' for budget reasons, regardless of what was excountered. 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 Loing? I haven't seen him for 3 wells. See you next weak -

ASSAY-GEOLOGY COMPOSITE DRILL LOG LOCATION 7.

Mine abset Mining Co., Location Hole for BSEK 14.

Sheet 1 of 2 PROJECT\_\_Atlas Mine -BS&K Mining Co., Location Hole for BS&K 14.

Goörd, : N			-	RING	Voz	-		HOLE Nº 304 COLLAR ELEV.			
E CONTRACTOR OF CONTRACTOR	0.00.00	_	INC	-	Ver	33				LEV.	
START 8-16-65 COMPL.	8-18-65		100	Tot	10/	Tai			HT	162*	
DESCRIPTION	18/3	-/c/F	% Cu	% Mo	%	%	OZ.	03	EQUIV.	GROUPING - RMM	
-40 * Quarta Monzonite	0									100	
orphyry, Erown, Onide zone	10	25	NII	.001							
orphyritic, hard, silicified,											
ith trace sericite. Original	20	-		-		-					
ulfide content was 5%, mow	20	50	W. a 50	ETI							
ntirely oxidized. No Copper,		20	N11	Tr	-	-	-	_	-		
inerals recognized. Fracturing			1						1 1		
s very strong, with original	20	+	-		-	-	-	_			
ulfide confined to fractures.		80	N11	NIL							
C. 70 County November	00	120	610.0	8100		+	-				
0-70 Quartz Monsonite										19 -10	
orhyritie, hard, strongly	30	1				1	_		$\vdash$		
ilicified, No sericite.	40	90	N11	.003							
einlets of pyrite and										*	
immite with rare quartz.											
o copper visible. Rock	40							-		- 1	
adly shattered but healed	50	85	.02	.001							
ith pyrite veinlets.										11/6	
	50	_								1977	
1	60	90	N11	.002						1	
										1 12	
	60	-	-								
	60	95	.03	Tr						100	
	/0	93	.03	45		+			-	100 T P	
0-162 Quartz Monzonite For-											
ray, Sulfide zone, Soft.	70	-				+			$\vdash$		
orphyritic, strong Argillic	1 7	90	.04	N11			-			5 (V) 2-7s	
lt, trace sericite, no			-				1				
rthoclase, Tobal Sulfide						1			- 21		
entent is 7%, mostly	80										
yrite, 80% of Sulfide	90	95	.03	N11						4.00	
cours in fractures, 20%										7 7 1	
s in dessemination. No										A COMP	
u visible.	90								00		
	100	90	.02	Tr					-	2.0	
						-		177		1-1 40	
	9.252									180	
	100	90	.02	Tr				R		m 7 do - 7 h	
	270	DO.	444	45		-	-			1000 500	
				1						0.00	
	110	-				-	-	_		, N	
	120		.03	.001							
	200		100	6004	_		-				
	120				7	1			$\vdash$		
	130		.02	Tr				1.3		6.0	
	200	- 0	2000	do see		_	1	-	H	DATE 8-18-65	

FORM # 355 REVISED 10-62

Sheet 2 of 2

PROJECT_	Atlas	Mine	
1110000			

Coord, : N				BEARING						HOLE Nº 304 COLLAR ELEV.				
	START	COM	0 .	L8 <b>-</b> 65		INCL		-		00	PTH	162		
	START	COMI	/. 0=.	7 3/	7	%	%	1%	%	OZ-	0z- %	104		
	ESCRIPTION		/ 3/	1 1 1	C/R	Cu	% Mo				equiv.	GROUPING - RMKS		
												100		
					-				+-+	_				
Aller In				130	00	.02	NT.							
				140	90	.02	Ni		1					
	36		11	140										
				150		.04	.00	_						
					_			-	+	_	-			
12.00				150 162	00	.02	Ni 1							
				1.02	90	-0/2	LLKI		1					
				П				1 - 1						
						Enc	of 1	поте	+		-			
0.79														
				$\vdash$				1	+-+					
15			1.1									1 No. of The		
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# ASSAY-GEOLOGY COMPOSITE DRILL LOG LOCATION 7

PROJECT Atlas Mine, BStk Mines BS&k #4 Claim Sneet Lot 2

Coord. : N		_			RING						303
START 8-15-65 COMP	PL. 8-1	6-6	7	INCI		Ver	1	-	DEP	LAR E	LEV.
31441 2 3 8) COMP	/ 3	131	:/	1%	%	%	%	02	ox.	%	
DESCRIPTION		1	/C/R	CH	%		-			EQUTV.	GROUPING - RMKS,
0-15 Dacite Parphyry - Yel	You	0-10	10	10	.007						
eide some, Strongly silicit	ied,	-		107						-	1 11
dy broken fine graine	4										
the quarts phenocrysts. Or	rigin	10	40	.10	.014						
I fide contact was 3%, e	ntire 4	10					+				
fractures. No gts vein	15.										
serie He . , ?		20	55	.14	.005						
20 fault your	.,	3.0		-			1				
- 90 Grants Mongonite (c	XICE										
own, Holocrystalling Med gran	ne a,	30	72	.09	,012						
rong Supergence 9/15/Ve		78		1-1	-		-				100
ricite. Original sultid	e		1				1				
as 2%, entirely in framous all sulfide is one	ctures.	110	85	.16	.026						
on all sulfide is one	1300	50	2014	10.13	2.15			-			100
re badly broken.											35.6
		50	67	.17	.007						
		60	0								
-120 Quarta Monzonite			-								111
y, Mixed oxide, suifide	200	70	80	.15	.006						
placrystalline, Medium Gra		10						-			7.7
ft, badly broken Cor	e 1										
Hains streaks of eq.	م محرد	70	1/6	,19	.012						100
neral Cholcocite and		RO				-	1				7.5
lachise with very rare											4.4
tive copper). Est origi	mil	90	80	.28	.002						9 6 6 6
I fide content was 2%.		10		,				-			400
tiely fractures.				1						-0.0	
y tractures.		90	90	.12	.012						
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		100	85	.13	,012						4.0
		105	80	41	.033		-			1.30	From 100 to 10
0-170 1 1 11	.,	105					-	-			
0-170 Quarty Mongon	1140	110	70	.37	.026		-				of .36
pergene gone, day, s	Const.	110	65	.28	. 010		1				.018;
re badly broken cha	1100114	115	-		-	-	-	-	-		
cars with pyrite in sea.		120	60	. 35	.011				1		
tol sultide is 300,9	10%	120		.33							1895.36
it is in fractures, 10	2.	125	1		l'			!			12 3 147 1

FORM # 355 REVISED 10-62

PROJECT\_Atlas Mine

Sheet 2 of 2

Coord, : N E	A 17 21	BEAR		V.		CC	LLAR E	LEV.
START START COM		1	6/	0/	16/		PTH	170
DESCRIPTION	13/ 3/ 1/01	'R "C	%	%	%	oz.	equiv.	GROUPING - RMKS
	125 65							
	130	1.23	. 2 1	_	-			
	135 60	.23	.617					
5-170 Quarte Honomis	4 730							
ay, Holserystalline, soft,	143 10	.16	.010					)
7, 75,000,15,000	100 25	.16	,019					
odly broken, Weste	140							
condary or Bookse +	150 70	15	.025			-		
	150 86	3 .21	.016					
otite the sericite.	120				-		-	
st 300 mg silling .	160 /3	.18	.008					
yil & = py. 922 in		200	.010					
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active	165 55	.15	.028					
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# DUVAL CORPORATION CC. PER DIVISION — ESPERANZA PROPERTY SAHUARITA, ARIZONA

## CERTIFICATE OF ASSAY

BS&K August 18, 1965

	BS&K					- 0		3077
BEAKER NOS.	MARKS, ETC.	SAMPLE GMS.	% Total	% Mo				
	2000 0 70			202				: 10,1-1,1
	303-0-10		.09	.007				-1 11 11 11
0.4	20		-10	.014				5335 335
52.03	30		.14	.005				
	40		.09	.012				THE RESERVE
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	60	-	.17	.007				1
- 1	70	-	.15	.006				
- 11	80		.19	.012				790
	90		. 28	.008		_		φ - 1 · · · · · · · · · · · · · · · · · ·
- V-5-	95		.12	.012				
	100		.13	.012				0. 400-4
- A - 1	105		.41	.033				10 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -
	210		.36	.026				
A MO	115		.28	0.00				
113	120		•34	.011			-	***
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	135		.23	.017				- N 1995
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FORM 31				1	1	1	1	

## DUVAL CORPORATION CC. PER DIVISION — ESPERANZA PROPERTY SAHUARITA, ARIZONA

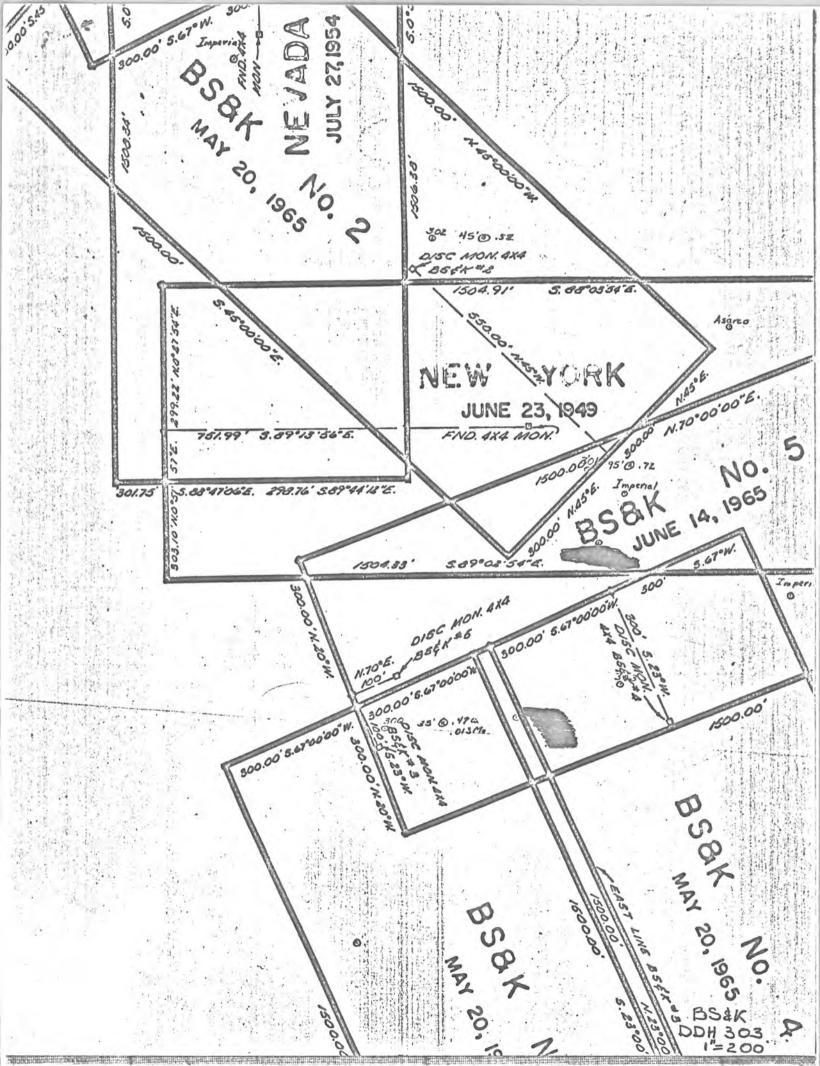


## CERTIFICATE OF ASSAY

August 18, 1965

Can.

BS&K SAMPLE % Total % Mo BEAKER NOS, MARKS, ETC. GMS. Cu .16 .010 303-140 .16 145 .019 150 .16 .025 .21 .016 155 .18 160 .008 165 .19 OLO .15 .028 170 ... FORM 311 M.L.





Sheet \_lot\_2

PROJECT Atlas Mine, BS& K Mining Co., Drill hole for BS&K 13

Coord, : N				BEAL	Andrew Property	Ver			HOLE Nº	And in contrast of the last transfer of the last tr
START 9-8-65 COMPL.	9-10	0-65			x win	The Party Name of Street, or other Designation of the Party Name o			DEPTH	167
	/ 8/	1 4 4	7	%	% M		1%	02.	02. %	The same
DESCRIPTION	/ 8/					_	-		EQUTV.	GROUPING - RMKS.
- 80 Dacite Porphyry, Red		10	67	. 03	.017		,			from 0-90
ide zone, Hard, Porphyritic	1 1									
ie grained, Originally 47.	11	10				_	-			Average
tal sulfide 80% in stras,		20	85	.03	,009			-		for Oxide
To in diss. Very vare	11									:05 Cu,
ricite. Some traces Mose	11	20	02	,03	.009					.007 Mo
40.		30	72	103	,0-7		-			
							4			
		30	95	.03	.008					100
-105 Dacite Porphyry, Gra	4	40							77 1 1.2	44000
red oxide + sulfide , me		0.5					-			TO THE WAR TO
rd, porphy itie, fine grain	1	50	100	.04	.002					
iginally 5 % sulfide, 80%	70				1					The State of the
strge, 20% as dies,		50	-			_	+-			
ride for our lygs, some		60	90	.07	.004				1. 1. 1.	sulf to off
Se visible in stras.					4.			*	11.7	Average 90
<b>分級 1.</b>		60	27	16				- 15		5 July 10 10 10 10 10 10 10 10 10 10 10 10 10
-167 Dacite Porphyry, Gra		70	18/	.06	.001	-		-		167' 15
pogene zone, Hard, fine	1									,05 Cm
ined, porphyritic, 47.		70	80	.05	Tr		1 3			-1. Park (v.J. 829)
tal sulfide. Traces chalcoei	4	80	-				1		3	
pyrite, Mosz vicible in	11	-	_			2	-			
trys; strongest at 103-105'		80	90	.07	.011				( P) E	
		1						-		
1	=	90	-					7	- W	-
The state of the s	14	95	90	.07	,028		9	-		X San
		150	95	.07	.018	7		1	15-17	
		106	0.		.080				of the later	
		105	175	,08	,000	-	-	-	1	
V-300		110	90	.07	,010					1464
		115	82	. 05	.003					
		115	1	-		-		1		
7	1	120	80	.05	.016	_				
	4.	120		.05	.003		T.			

FORM # 355 REVISED 10-62

Sheet Zof 2

PROJECT\_BS&K

Coord. : N		BEA	RING			HOLE Nº 308							
START COMPL.									COLLAR ELEV.				
									DEP	TH			
DESCRIPTION	/		C/R	%cu	%Mo	%	%	62	02	% EQUTV.	GROUPING - RMK		
		130	87	. 64	,017		8						
	_	130		.04	.013					$\vdash$	no de la companya de		
		135			_		+				P 0 1260		
		146	50		.065		-			-			
W.		145	100	.04	.016	- 4,					100		
		172	80	.06	.007								
		150	90	.04	, 023								
		122		106	,003								
	1	160	9:	.04			1		_		The House		
		167	12	1.1	.001		+	-		$\vdash$			
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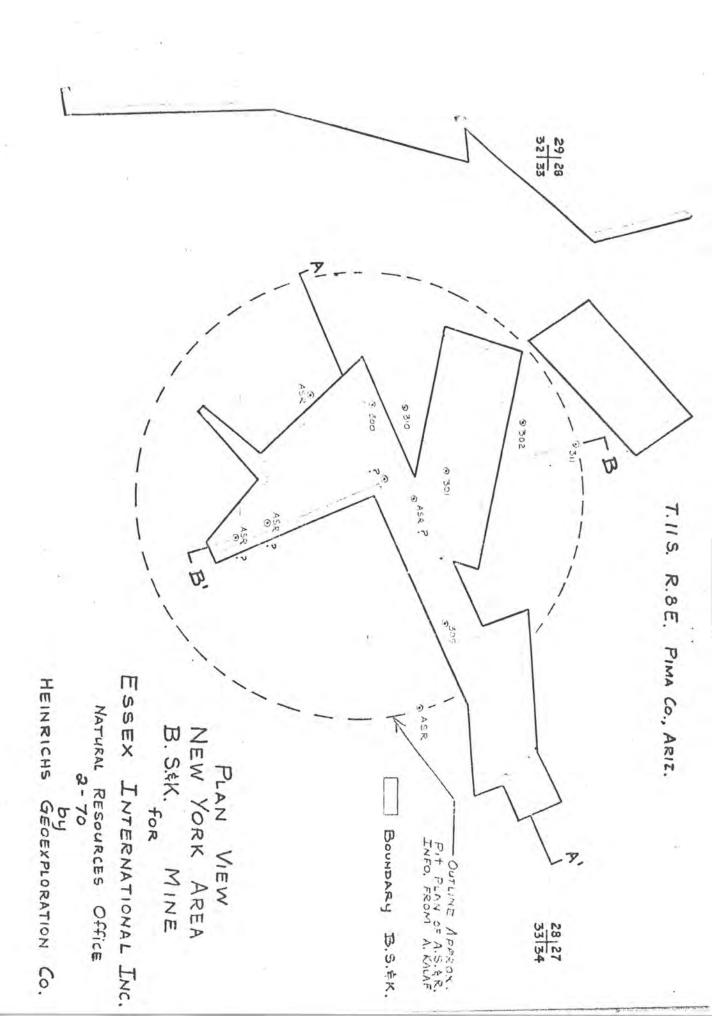


PLATE 1

Total sulfide is 2 3%

#### ASSAY-GEOLOGY COMPOSITE DRILL LOG

PROJECT Alle Win BSSK Miles A. BSSK VS COOK Coord, : N BEARING HOLE Nº .300 START 7-6-65 COMPL. F. GROUPING - RMKS 0-90 Dacitle Porchary, Stown 0 56 .08 .002 five granied, soft, parolapitie, lighty fractured, numerous 10 70 ,05 .002 org reiniets, A. Alteration, Exignize Sulfide was 1 3%, 58 .09 .6:2 entirely in fractures, Core green or blue copper average minerals visible trough 76 14 .001 entire entire is oxide. oxide .13 Cu 00 86 ,14 .008 ,005 Mo Lor 5,0 90 16 .004 90 feet 86 .15.009 ,16 , 606 \$3 87 .17 .009 Oxide 90-95 Soile Parplyin, Son Mixed Miria or de and molice. 9: .94 .025 Supergene Sort corphyeities Strong ,79 .015 Sulfide arg. Alt., numerous of 33 .51 010 veinlets. Copper orage as Average grade of .60 sinte and interior Mixed and Supergone is 35 feet of 87 .37 .008 95-125 Dacie Horphyry .47 Cu 80 .12 .011 Supergene 3 and Gray, soft .013 Mo 1013 copper occurs as chalmile.

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

FORM # 355 REVISED 10-62

PROJECT\_\_

Atlas Mine, BSSK Mining Co., New York Claim

Sneet 1 of 2

Goörd, : N			BEARING Vort					HOLE Nº 501					
START 8mgm65 COMPL.	8-10-0	55	The second secon						COLLAR ELEV. DEPTH 205				
			% Cu	1%, 19	%	1%	or.		1%				
DESCRIPTION	/ 3/ 3/3	/c/	Cu	Fib					EQUIV.	GROUPING - RMKS			
-100 Dacita Forthwry -		20	12	.005									
orna ordido cono	===		9 44.00	.000		-				0'-30'			
ft, strong Legillic Alt.,			11-11-	- 1		H 11				.16 Cu			
rphyritic, fine grained.	10								-	.09 Mo			
% in fractures, 10% diss.	20	50	.20	.012						1 -			
ace sericite lining													
actures. Qtz veinlets	70							-	-				
re. Soma green Cu stain	20	67	.17	.010									
sible.	30	97	. 1/	.010		-							
	30				_		-			30'-50'			
	40	03	.13	.009						.17 Cu			
	1 1									.011 No			
	40	-								4			
			.16	.014						7			
<b>X</b> ,	1 30	0.5	020	.02.7		-	-	-		1			
4.			11.							1			
0-110 Dacita Porphyry	50		7										
ed Caide and Sulfide	60	03	.11	.016						50-30 . .12 Cu \			
wn, Sort, fine grained,				-						.016 Mo			
phyritic, Wk sericite and	60	-	-				_			.020 120			
cong Arg. Alt. Copper			.12	.016						- 10			
curs as Malachite and alcocite, Core badly													
ittered.													
3337	70	00	20	017									
	00	90	.13	.017		-							
										80°-100°			
	80						-		-	.17 Ca			
	90	37	.24	.010						.009 Mo			
				-						X			
	90												
		90	10	.009					1	1			
	1 200		***	.00,						1			
									3	- C 1			
-125 Decite Forphyry	Too					-				1			
organo Sulfide came	105		.15	.013						100'-125			
k gray, sort, weak	105		1 21	010						/83 Cu			
ficite and strong Arg.	110	כני	1.31	.040		-				.018 Mo			
. Copper occurs as		36	1.74	.019			-						
leocite with weak pyrite,	115		~ • • • •	.027					-				
tly in seams. Core badly	120	32	.49	.003			//						
oken.	120									4			
	125	37	.45	.013						1			

FORM # 355 'REVISED 10-62

Sheet 2 of 2

Coord, : N			BEA	RING				HOL	E Nº	300	
E	INC	L.					COLLAR ELEV.				
START COMPL.								DEP		205	
DESCRIPTION	1/3/3	17	%	1%	1%	1%	1 62	01	1%	The second of th	
DESCRIPTION /			Cu	Mo					EQUTV.	GROUPING - RMKS.	
206 Dacite Porphyry	12										
ergene zone as above		080	1.2	1 .00	5					125*-150	
	130		100							.74	
			.70	.00	3					.009 Mo	
	135										
			.65	.00	)						
	140			3.1			-	-			
		70	.39	.01		-					
	140			1.5							
	1.50	65	.70	.009		-	-	_			
	150								1	2.50	
			.47	.013					-	150 -175	
	155									.49 Cu	
	160		.38	.043	-	-	-		-	.027 Mo	
			.36	.024							
	165			1120			-		-		
			.51	.040						-1	
1	170		- Adh	* (1%)			1			100	
	175		72	-01/			1.00				
	275						1			Y	
1			.50	.010						175 -200	
	180		-5.07							.69 Cu	
	185	85	.57	.052						.018 Mo	
	185			100						1777	
1111	190	03	.83	.011							
	190										
111			1,12	.013							
	195	00		001							
	200	94	.40	.004			-				
(1)	200	05	10	.000							
	2.00	03	. 1.9	.000	-	-					
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1411			• •			20.	20 2	.00		3 Mo	
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		_	-			position.	-				
								111			
1 16.00											

FORM # 355 REVISED 10-62

Sheet 1 of 1

PROJECT\_\_\_\_B. S. & K.

Coord, : N						HOLE Nº RDH 309				
ır 66!	INC		vert	ical		DEPTH 110'				
	% Cu	% Mo	%	1%	01		1%		- RMKS	
10	N.S.									
20		Ni1								
30										
40	.08	Tr.								
50	.07									
60	.44	Tr.								
70	.40	Nil								
80										
			;					*		
100										
110										
							-			
									1	
									100	
									1	
	******			-						
				-		-				
				-						
	10 20 30 40 50 60 70 80 92	INC ar 66!  10 N.S.  20 .07  30 .08  40 .08  50 .07  60 .44  70 .40  80 .44  92 .38  100 .29	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	INGL.   Vert	INCL.   Vertical	INGL. Vertical ar 66'	INCL.   Vertical   DEP	INCL.   Vertical   DEPTH   DEPTH   DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH   DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH     DEPTH	INCL.   Vertical   COLLAR ELEV.   DEPTH   110	

FORM # 355 REVISED 10-62

B. S. & K. PROJECT\_

Sheet 1 of 1

Coord, : N	BEA	ARING	rtical		HOLE Nº RDH 310					
START 22 Mar. 660CMPL. 22	Mar. 66		L. VC	LLICAL	-	DEPTH 140'				
	3/ 3/ 1/6		% % Mo %	1%	01-	° 1 % EQUIT				
		1				FIEWOI	GROOPING - RMKS.			
QUARTZ MONZONITE PORPHYRY		-								
rgillically altered, "average"							1			
ardness.										
							1			
							1000			
ulphide zone @55'	55	N.S.					* * * * *			
	60	.82	.004							
							.5			
ome dampness 60 - 70°	70	.82	.009	-						
	80	.65	.037							
oisture increase @ 89'	90	.30	010							
		1 300								
ncrease qtz. @ 90½'	100	.26	.009	_			+			
	110	.29	.010							
	120	.32	.023							
	130	.26	.011	-						
. )	140	.23	.006				1			
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			1	LOGGED I		BLW	DATE 22 Mar. 6			

#### BS&K

#### HEINRICHS GEO-EX

#### DEEP EXPLORATION APPRAISAL

by

John E. Kinnison

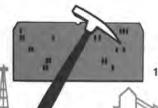
Chief Geologist

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 revisted 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



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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.

 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



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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.



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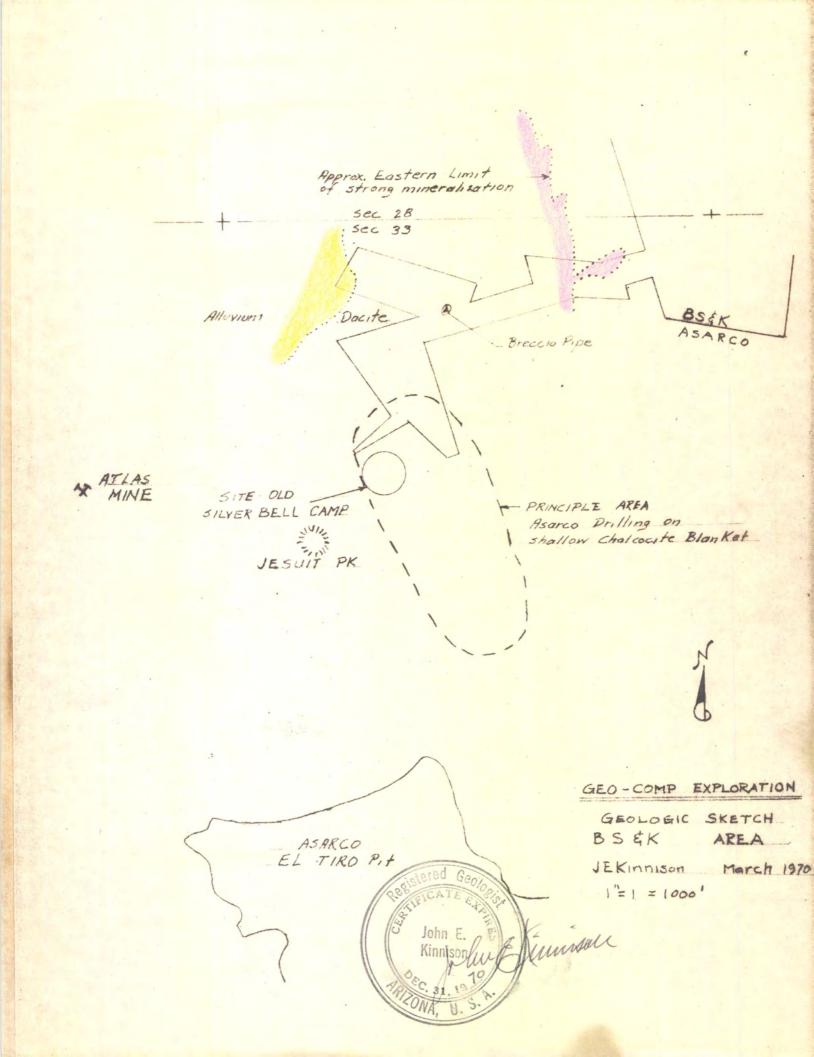
I trust that this letter will satisfy the purposes of your client.



Chief Geologist

Geo-Comp Exploration, Inc. Registered Geologist No. 4822 State of Arizona

JEK:cc Attachments



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 catagories:

- 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.

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 supervison 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, Southwestern 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

#### 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.)	Cpchise 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

Nos. I through 5 are first in priority.

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.

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.

For loader, or shavel, and trucks + drelling & blasting Production / man shift 125 Tons. (high) (80Tons) 4000 the mining operation 3000/ day/ mon. 30 x 32 24\$ / ton for labor

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

HEINRICHS
GEOEX PLORATION CO.

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

PRELIMINARY EVALUATION

FOR POSSIBLE ACQUISITION

AND

OPERATION

OF THE

B. S. & K. MINING COMPANY PROPERTIES

INTRODUCTION

### THIS REPORT WAS PREPARED BY

CLYDE E. O: BORN, E.MET. Professional Engineer

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

Tucsor, Arizona

This is a preliminary report submitted as a guide for management in making a decision on how to proceed with the project. Certain state—ments were accepted as to the tonnage and grade of one 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.

igned Clubs F. Osbarn F.M.

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 wwaste 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 incl es of draw down.

### Power

A 3 phase 14,400 Volt power line supplies electric power to the mine. The B.S.& K. Mi ing 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 conf rm 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, Ar. 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 one body and confirm one 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 of an 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 c e 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

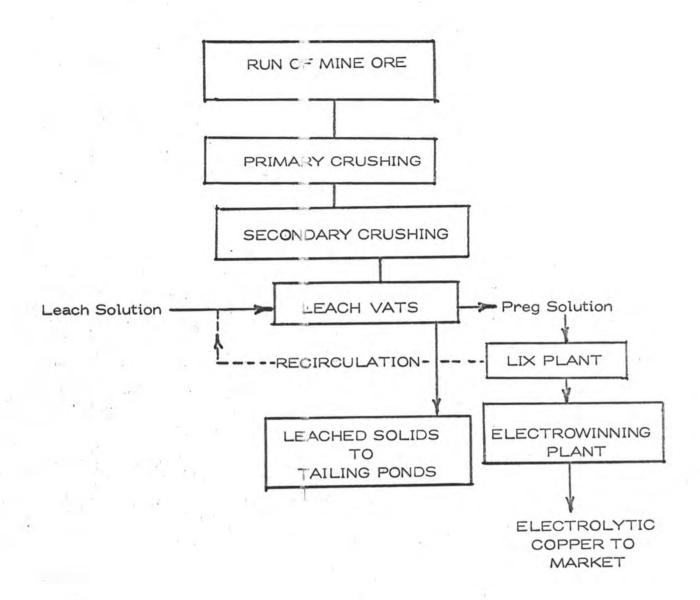
# Milling Operations #2

electro winning.

In the absence of actual test cata 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.
- Upward percolation will prevent gases and slimes from blinding and/or short circuiting the ore in the vats.
- 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 <u>dumps</u> 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

Method	Advantages	Disadva tages	Application
1. Heap Leaching	Minimum capital investment. Little ore preparation. Low operating cost.	Low recovery. High reagent consemption. 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.	0	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 invest- ment. 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

Crashing Equipment		
1-42"X48" Jaw crusher complete with 200 HP Motor and drive	\$90,000	
1-Hopper & feeder complete	12,000	
1-El-Jay 54" Cone Crusher complete with motor and drive	55,000	
2-El-Jay 54" Fine core Crusher complete with motor and drive	120,000	4.
Miscellaneous screens, conveyers, chutes etc.	150,000	
Ground storage with receovery equipment	50,000	
Total	\$507,000	
Installation (24%)	120,000	
TOTAL		\$627,000
Leaching Vats with False Floors		
10 vats, 80 ft.wide X120 ft.long X12 feet deep 5500 cu.yds reinforced concrete	4	650,000
Loading conveyors & Loading Bridge instal	led	420,000
Unloading equipment		210,000
Misc. pumps, pipes, valves, tanks & sump installed	os	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		\$516,000

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	300,000	
@ 5047 2011	350,000	
Total actimated Mine		\$866,00

# 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 Mire & Processing

\$5,273,000

Add 10% contingency

Add preliminary investigation

\$5,800,000

100,000

Add initial payment to B.S.& K.Mining Co.

200,000

Total Investment Capital

TOTAL

\$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

<sup>\*</sup>See notes on following page.

# NOTES ON CAPITA \_ REQUIREMENTS

In this type of operation there is considerable pre-production expense before any income car 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)

Overhead & Supervision

0.5¢/# Cu.

1. Waste Stripping 5,200,00	tons @ 30¢/ton	\$	1,560,000
-----------------------------	----------------	----	-----------

2. Mining, hauling and dump ng 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 2,000,000

\$6,300,000

\$

259,000

·	ТОТ	TAL		
Processing Crushing Ore for Vat Leach (30)0	tons/day)	¢/to	n	-
Labor		15		
Supplies		6		
Maintenance		12		
Total	al	33		
5,000,000 tons @ 33¢/ton			\$	1,650,000
Leaching Vat Operation (3000 tons	/day)	¢/to	n	
Labor		13		
Maintenance & Operating Suppli	es	6		
Ferric Sulphate		8		
Sulphuric Acid		44		
То	tal	71		
5,000,000 tons @ 71¢/ton			\$	3,550,000
LIX-Electrowinning		¢/#C	u.	
Power		1		*
Labor		3		
Organic Solvent	<u>¥</u> )	2		
Miscellaneous		1		
	otal	7	1.0	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1
51,800,000 lbs. Cu @ 7¢/#		2	\$	3,634,000

## Estimate of Operating Cost \$2

## Recap of Operating Costs

Mining		\$6,300,000
Crushing		1,650,000
Leach Vats		3,550,000
LIX-Electrowinning	9	3,634,000
Overhead & Superv	ision	259,000
	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.

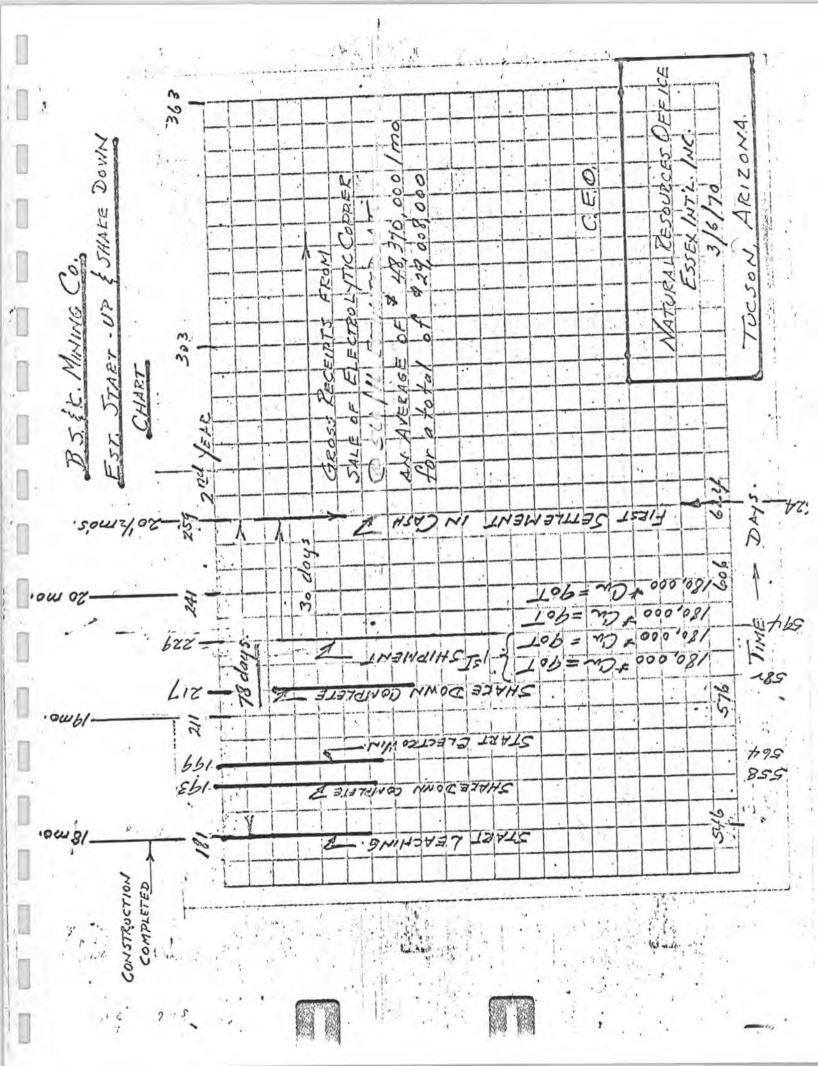
CASH FLOW

## 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.



STATEMENT

OF

INCOME AND EARNING

# B.S. & K. MINING COMPANY PROJECT

# STATEMENT OF INCOME & EARNING

Ir	10	0	m	e
_			_	_

Sale of 51,800,000 lbs. of coppe	r @ 56¢/#	\$29,008,000
Cost of Production		
Mining Crushing Leach Vat Operation LIX-Electrowinning operation Overhead & Supervision Total Production Cost	\$6,300,000 1,650,000 3,550,000 3,634,000 259,000	\$15,393,000
Capital Cost		
Mining Equipment Pre-Mining Cost Crushing Equipment installed Leaching Vats installed LIX-Electrowinning plant install Total Add 10% Contingency Total	\$ 516,000 350,000 627,000 1,530,000 ed 2,250,000 \$5,273,000 527,000 \$5,800,000	
Add preliminary investigation Add initial pay't B.S.& K.Mine. Total Capital Cost	100,000 Co. 200,000	6,100,000
Total Investment plus Open	eating Cost	\$21,493,000
Gross Profit before provision for payme interest on Investment and before provision.	ent of sions for	\$ 7,515,000
Provision for interest on Investment		1,970,000
Net income before provision for taxes of	on Income	\$ 5,545,000
Provision for Federal Income Tax		1,414,200
Net Income		\$ 4,130,800

## Statement of Income & Earning #2

## Annual estimated taxable incorne

\$1,109,000

## Estimate of Federal Income Taxes

Total tax	\$	282,840
Surtax 22% on \$554,500-25,000		116,490
Normal 30% on \$554,500	\$	166,350
U.S. Federal Income Tax		
Taxable income	\$	554,500
Less percentage depletion allowed		554,500
Taxable income before depletion	1	,109,000
50% Taxable Income (maximum)		554,500
15% -percentage depletion		870,000
Base for applying depletion	\$5	,800,000
Gross annual sales	_	,800,000

Net income as a percent of sales  $\frac{4,130,800}{29,008,000} = 14.24\%$ 

Tile

G. A. Girard

V. F. Hollister

Please make yerot corries Janeie

November 22, 1965

All Concerned

thesoy

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

#### Abstract

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  $\underline{\mathbf{T}}$ .  $\underline{\mathbf{ferrooxidans}}$  having a population of  $1 \times 10^8$  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-SO4 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

		1			
SAMPLE NO.	1	2		3	4
Assayed Head, % A-S Cu			.174		
" % cc Cu					
" % cpy Cu			.091		,
" % Total Cu			.535		
Calculated Head, % Cu	.510			.481	
Residue, % A-S Cu	.022	.026		.023	
" % cc Cu	.048	.048	- 7	.045	.050
" % cpy Cu	.046	.046		.046	.043
" % Total Cu	.116			.114	.121
Copper Extracted (#/Ton)	7.90	8.71		7.33	7.92
#H2SO4 Consumed) (Total	17.0	18.1		- 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	22.5	21.5		23.8	23.9
#H2SO4 Consumed) (Recovered	2.2	2.1		-	-
Per #Cu ) (Available	1.7	1.6		-	_
	87.5	85.1.		86.8	84.0
% A-S Cu Recovered	82.2	82.2		83.3	
% cc Cu	49.5	49.5		49.5	52.7
% cpy Cu	47.5	42.5		15.00	).

<sup>\*</sup> 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

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 I vo

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 or the consumption of acid by oxidized ferrous ion and the net acid consumption by the ore. The total acid consumption is the actual acid recessary 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:

$$Fe_2(SO_4) + 6H_2O_{pH} 2.7_{2Fe}(OH)_3 + 3H_2SO_4$$

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 Fe(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 asymtotically 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, 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

chalcopyrite. These prior results we'e regarded with suspicion and attributed to inconsistancies in the analytical protedure. Since a recovery of about 51% occurred with this mineral species, it was dec ded 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 chalcopyrite. These test results were in agreement with each other and those first reported.

It was then thought that this chalcopyrite 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 separacion. A microscopic examination of the chalcopyrite particles at 450 power revealed intimate intergrowths of chalcocite replacing chalcopyrite.

A 48 mesh particle of chalcopyrite, 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 chalcopyrite is greatly increased as leaching proceeds.

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

A microprojection of a typical chalcopyrite 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 chalcopyrite 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,

Process Chemist

GAG:jfg

cc: R. W. Livingston (2)

R. W. Flagg

C. H. Curtis

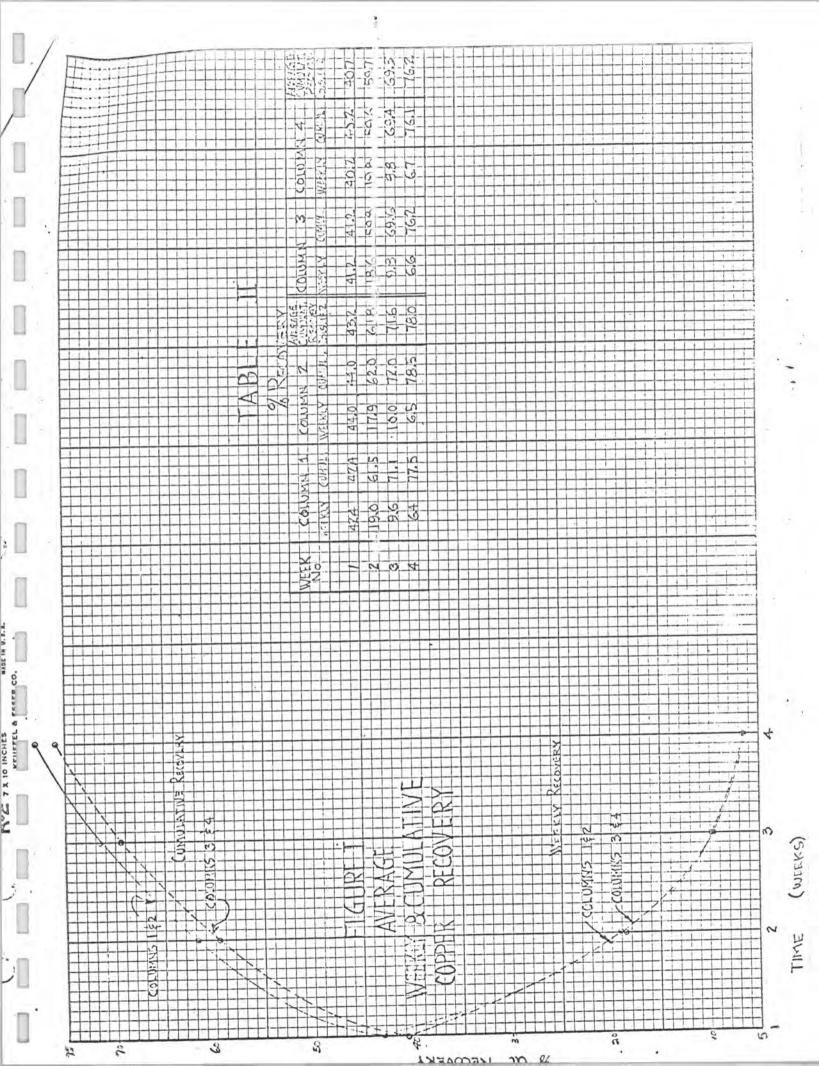
G. E. Atwood

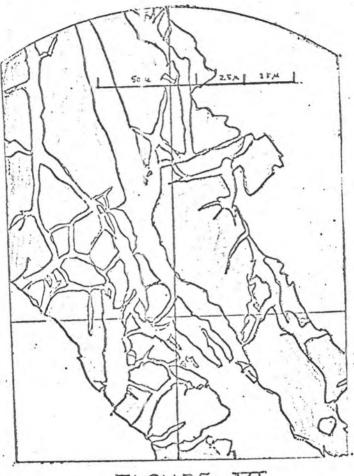
J. E. Frost

E. K. Drechsel

R. R. Nelson

D. J. Bourne





MICROPROJECTION TRACING (530X)

OUTLINE SUMMARY

ECONOMIC GEOLOGY, ORE RESERVES
AND
PROPERTY STATUS

THE B. S. AND K. MINING COMPANY

for ESSEX INTERNATIONAL INCORPORATED

**MARCH 1970** 

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

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## 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:

- Average thickness of chalcocite blanket 40.0 ft.
   (See drill logs and assays of Duval Corp.)
- 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 occuring 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

BEARING		örd. :			-	HOLE Nº 30 Q- R			
INCL. VERT.	The second liverage and the se		E		10.00		130	DEPTH	Acc
185\$K #3	1////	0 0	0 10	2/2	0/2	%	SAMPL	E REG'Y	CARCADOM TOTAL
DESCRIPTION	18/5 / E/CR	°Cu	<sup>o</sup> As Cu	% Mo	%AsMo	EQIV	CMC	4.0	GROUPING - RMKS.
182'-323':	182	+1000	.14	+ 300	.045	1 627	17	69.6	
K: Dacite porphyry	190	+1000	.15	165	:016	14.00	2	82.8	
made of rounded	200	1000	.10	114	.011		3	91.6	9 0
ausytz eyes avel	2/0	+1000	.11	238	.02.4	1	4	80.4	Provide Aug
pin Kish feldspars	226	+1000	.14	245	.024	-cus	13	79.2	
in gray siliceous	230	+1000	.12	171	,017	off), (21)	6	42.3	
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	306	+1000	.31	139	1.014	P6, 73	13	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
3-340: strongly aftered	3/0	+1000	.16	+300	.034	130 100	14	50.0	
allowste offer biofite	326	+1000	.20	277	.028		15	18.4	4
Same Line diss. Suific	70, 320	+1000	.28	41	.004	V 7/1	16	44.5	1
Very poor core	340	+1000	.91	+300	.032	1	17	71.3	
10-400: Dacite porphy	350	+1000	276	+300	.044	The second	18	61.3	
25 182-323, but	360	+ 1000	1.72	282	. 628		19	92.1	
chlorite is present	370	+1000	100	272	100	1600	20	94.	1
10-400: Decide porphy 25 182-323, but chlorite is present At 348' about 1" Chalcopyrite vein	380	+/000	during	178	.018	mill aut	21		
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		in the	1		1 286	1. 1. 1	3478 P	45 YEAR	
		1530	10.	100	10.	1 3 3	Pour	1114 1 3 4 1	
	a Print	dia.	AL SEL		177	81			4
	10 10 10	The second	1	1 - 15	The second	9	1	17/4	

FORM # 355 REVISED 10-62

PROJECT Atlas Mine, BS&k Mining 6., BS&k Mo 3 Claim

Coord, : N	BEA	RING	Vor	Ť		HOLE Nº 800					
START 8-6-65 COMPL. 8-6	P-65			Col	0 51	, e.		165,	DEP		182 feet
DESCRIPTION		i/c/R			%	%	111	OZ.		% EQUIV.	GROUPING - RMKS.
90 Dacite Porphyry, Brown	0	56	.08	002	73/3	10	2	1-19		181	
grained, soft, porologistic,					PAY English	1	- 1				
fractured numerous	10		.05	.002			, S	200 200 200 200 200 200 200 200 200 200	V.		
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nol Sulfide was 13%;	20	68	10	.00	(4)	+	T y	200	di i		and the second s
ly in fractures. Core badly broken, No	30	00	.09	17			-	7	*		
n or! blue copper	30	-		113	-	-		NAME OF THE PARTY	W175	70/07	2 12 2 2
evals Visible, though	30	1/62	.14	.001		94	18/1		9/1	130	average oxide
in section is oxide.					18.41	, C	Y 6	1 12	11.0	1 383	is .
	50	00	,14	,003	15	49	100	J.	18.42	V = 4	.13 Cu .005 Mo
				1		H	147	11.00		14.1	
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		1	1	Via	gi21-	N/A	io.	PANE TO	S	T. L.	
	70	2 8 4	, 16	- 5				111	W- 1	100	
	3	٨	, /6	. 60		7 3		3	13.70	1 300	
	0	3 4.	1-		100	+		4	7	1 500	-
	34	9 3.	1.17	.609	111	+	- 1	17	V. h	10 to	-
95 Dar Parity Gry		^	100	1					to 3.5		oxide Mixed
1 oxide and sulfide.	9		.99	1.02	5			1 1 3	W.	100	
para unite, rong	9	20	.79	:015	10		1	ordar.	14.46	100	supergene, sulfic
Alt., numer as gts	15	3 3	.57	. 010	* Fr	*	12.3	1	17	16.7	
et Court recurs as	10	10 8	.60	.00	59 5		5-7			T a	Average grade
ha conte.		13 8		1 .00				41			is 33
25 Like Porplary	1	50		1.00	1		i,	10		, Ph	.47 Cu
orbital some, Gray, Soft		20 "	-	1. 10		1	718	10	183		.013 M
w occurs as chalcocite.		25 0	5 11	100		14-6		1	1/6	- 11	DATE 8-8-65

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

Sheet 1 of 2

Coörd. : N E			_	NGL	RING	Ve	rt			E Nº LAR E	301 LEV. 206
START 8-9-65 COMPL.	8-10-	5/	/8	Cu	%Mo	%	%	OI.		% EQUIV	GROUPING — RMKS.
DESCRIPTION		₹/c.	/ M	-	120		+		-	EQUIVI	GROUPING - KMKS.
100 Dacite Porphyry -	10	20	) .	12	.006						0'-30"
own - oxide zone											.16 Cu
ft, strong Argillic Alt., rphyritic, fine grained.				- 4							.09 Mo
iginal Sulfide was ± 4%,	10			00				1			
% in fractures, 10% diss.	20	50		20	.012		-				
ace sericite lining											
etures. Qtz veinlets	20	5	+				1				
re. Some green Cu stain	30	67		17	.010						
sible.											
			1								30'-50'
	40		0.	18	.009						.17 Cu
	1   1	+		10	.003	-	+	-			.011 Mo
					1.1						
		0									i
	5	0 8	5 .	16	.014				1 1		1
17											1
1	1	0	+			_	+			-	
0-110 Dacite Porphyry		0 8	0	.11	.01	5				-	50-80
xed Oxide and Sulfide											.12 Cu .016 Mo
own, Soft, fine grained, orphyritic, Wk sericite and				6.6							.010 MO
rong Arg. Alt. Copper	1 1 1 -	0		• •	016						
curs as Malachite and	1   /	0 8	6.	14	.016		-	+	-		
alcocite, Core badly								1			
nattered.	7	0			16.5			1		1 1	10
	8	0 9	0.	13	.017		1				
3										1	80'-100'
	1 3	0	+			-	+	+	-	-	.17 Cu
			7 .	24	.010						.009 Mo
	1		-								4
											1
		00		* 0							
	1	.00	90	.10	.009	-	+	-	-	1	,
	1 1 1				1 7 1			1			1
		.00	+	_							1
10-125 Dacite Porphyry	1 1 1	.059	0	.15	.013						100'-125"
upergene Sulfide zone		.05									/83 Cu
ark gray, soft, weak ericite and strong Arg.			5 1	.31	.040		-	-	-	-	.018 Mo
lt. Copper occurs as		10	6 1	74	.019				1		
haleocite with weak pyrite,		15	0 1	. / 4	.019	-	+		1	-	1
ostly in seams. Core badly		208	32	.49	.008			1			
roken.	1   1	.20									i -i
	1 1	1258	7	.45	.013	1					

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Sheet 2 of 2

LOGGED BY 1/ FITHINDATE 8-8-65

PROJECT\_ HOLE Nº 500 Coord. : N BEARING COLLAR ELEV. INCL. START COMPL. DEPTH \$ = /c/R % C. EQUIV. GROUPING - RMKS. DESCRIPTION 125-170 Dacik Brokury 82 .18 .013 Average Hypogene 3 on, Gray, Soft, .14 .023 Hy pogene porphyritic, Copper occurs in ,12 grade is ,011 Seams and vaintels or crushed chalcopyrite, with pyrite. 8 1 L .01 .18 Cu Numerous and, veinlets. .015 Mo 70 Hack purite in scame is .010 crushed and block Total 12 015 Sulfide Is 40 Sulfide 16 .015 13 75% in seams, 13 % in diss. Uk Serion seaws. ,000 170-182 Dacite Por Juite Gray 15 031 Mypagine in Horrist day good synthe, 011 75 ,30 Carper aces is a chalappin 162 017 sunta pyrit To I sullide 15 373, Su Somes and 9 get and 20% as dies. Allega the winter Prive is regardly crush Jacks 1/2 com to to seams, with Molybdenite visible in quarts vainlets. Largest veinlet is 2"gtsparite - chalcopyrite at 177', This veinlet also has traces of chalcocite

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1 0	ord. : N					BEAF	RING					E Nº	300	
100	E START COMPL.				INCL					COLLAR ELEV.				
ST											DEP	TH	206	
			13/3	7 3/	C/R	Cu	% Mo	%	%	or.	01	% EQUIV	GROUPII	NG - RMKS.
V	CRIPTION	77. A-3		125	T	-	- 1							11,000
5-206 D	acite Porph	YFY		1308	30	1.21	.006	5.00						125'-150
pergene	zone as ab	ove		130			100							.74
				135	90	.70	.008			_				.009 Mo
				135										
				140	85	.65	.009			-		-		
				140		-	011							
					70	.39	.015							
				146	65	.76	.009							
				150	03	./0	.009							
					56	.47	.013							150'-17
				155	20	•71								.49 Cu
				160	72	.38	.043							.027 Mo
				160										
					80	.36	.024							
				165										
				170	85	.51	.040							
				170										
			1 1 1	175	86	.72	.014				-	-		Ĭ.
				175		2.0								175*-20
				180	85	.50	.010	-	-	-				.69 Cu
				180	0.5	-	000							.018 Mo
				185	85	.5/	.052						5-	.020 1.0
				185	00	.88	.011			= =				
				190	ou	•00	1022							
					90	1.12	.013							
				195		(==1)	112							
					92	.40	.004	4					1.0	
				200			1.74							
						.19	.006				-	1	100	
							UT, IK					1		
						Er	d of	hoèè			-		1	
					-			1				0150	Ma.	
					-	_ A	verag	e Mo	for	nole	18 0	.0158	29 0	
						1	verag	e fr	om 10	to	400	LS .	2% Cu 18 Mo	
									-	1	-	-	TO LIO	
							1							
							100							
													1	
													1	
,									-				1	
												-		
					1			1					1	

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

Sheet 1 of 2

Goord, : N	Coord, : N							HOLE Nº 302				
E			INCL		Ve	rt		COLLAR ELEV.				
STAILT TO THE STATE OF THE STAT	3-12-(							DEP		151		
DESCRIPTION	1 3 3	C/R	<sup>%</sup> Cu	%Mo	%	%	or.	02	% EQUIV.	GROUPING - RMKS		
-68 Dacate Porphyry	10	45	- 3									
rained, porphyritic, strong	-	1										
rgillic Alt. with trace	10	- 1	- 1	-	_			-				
ericite. Core badly fractured, riginal Sulfide content	20	50	.06	.012								
as est. 5%. Some Malachite			1									
	20 30	62	.09	.006								
18	30	70	09	004								
	40	70	.07	.004		+						
	40					-	-					
			.07	.009								
8-70 fault zone. Core crushed				£ 1	1 -				1			
0-90 Quarta Monzonite Porphyry	50 60		.10	.009								
rown, Oxide zone, Granitic, olocrystalline texture.												
eak Argillic Alteration, ith No sericite. Fracturing	60		17.5			1						
ery strong at 70° gradually	70	50	.19	.00	/	+	-					
makens down the hole. Eneralization fades with	70		_				-	_		a ,		
racturing.			.11	.012		-						
	80	60	.20	.01	0							
0-95 Quarts Monzonite Por.		-		3.55			1	1		1		
ixed Oxide and Sulfide, opper occurs as chalcocite,	90									1		
ith limonite.	95		.66	.010			+	-				
	10	085	.66	.01	6				1	/		
5-135 Quarta Monsonite Por.		5 8	5 .61	.005						1		
upergene cone fracturing	11		0 .44	.013								
weakens with depth. Some	11	0					1					
martz weinlets.	11	\$	5 57	.006		+	-		-	1		
	12	1	7 54	.004	-	-	-	+		-		
	12		0 .32	.005				VFH		8-12-6		

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Atlas Mine, Drill Hole for Mevada Claim

Sheet 1 of 2

Coörd, : N	Coörd, : N E							HOLE Nº 305				
START 8-19-65 COMPL. 8-2	20-65		INCL		Ve		-	DEPTH 109				
DESCRIPTION		C/R	<b>්</b> දීස	% Mo	%	%	OX.		% EQUTV.	GROUPING - RMKS		
-15 Dacite Porphyry.	10	40	.02	.021								
covn. Oxide some, soft, orphyritic, fine grained.			10	7.								
riginal sulfide content	10											
r ser.	20	70	.02	.017		+						
100	20					-						
30"		80	.04	.009								
5-25 Quarta Monzonite rown, cuide sone, soft	25	90	.09	.001								
olocrystalline, Est. 2%												
riginal sulfide. Wk	30									1.1		
	40	78	.28	.001		-			-	1 1		
V												
	40 50		.29	.009								
5-60 Quarts Monsonite												
ray. Supergene sone olocrystalline. Est 2%	50									Assessed from		
ulfide. Chalcocite occurs n fractrues. Weak Arg.	60	90	.16	.008						Average from 30 to 50 is .28% Cu,		
Rt. No sericite.	60									.005 Mo.		
1- 6	70	90	.13	.015		-	1					
Talk a salah Asa	-				_	4	+	-				
0-109 Quartz Monzonite ray as above. Hypogene	70 80		.11	.003	3	-		-				
one. Est 2% sulfide, in rectures. Trace of									-			
halcopyrite.	80		.12	.00	3							
	90			-						10		
	100	90	.07	•00	-		+-	-	-	1-		
	100	-	-		-		-	-	-	-		
		9:	.0	01					-	1		
		1										
	-	+	-	+	+	-	1			1		
								VFH		DATE 8-20-6		

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Sheet\_of\_\_

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

	Coord, : N	4 7 100				ING Ve			OLE Nº 306					
	E				INCL.	Ve	rti	cal_		COLLAR ELEV.				
START8-21-65 COMPL. 8-2											DEPTH 100			
_	T STANTO DE OS	/ 8/		/ %	C	% Ma 9	6	%	OZ.	OZ	EQUTV.	GROUPING - RMKS.		
	DESCRIPTION	/ 3/		-/ n	Cu	Mo								
0-30 I	Dacite Porphyry_		0	20	0/	007		1						
Brown,	, fine grained, soft.		10	30	.04	.007	-	-			1			
Origin	nal sulfide now entirely	7												
oxidia	zed. Original sulfide v	ras	125	-	-	-	-							
3% of	rock. It occurred ent:	rely	10			001						Average from		
in fra	actures. Arg AH., No		20 4	5	.05	004	_	-				0'-30'		
Serici	ite											.06 Cu,		
		1 1		-	-		-	1	-			.027 Mo		
			20			070						. UL / FIU		
			30	5	.10	.070	_	-	-					
				-				1	1	1				
			30			-			1		1	Average from		
30-50	Dacite Porphyry		40	5	.20	.030	_	-	+			30' to 70' is		
Mixed	Oxide and sulfide zone											.29% Cu		
Fe Ox	and Pyrite, with trace	s of		-			-	+	+	1	1	.015 Mo		
chalo	ocite. Rock as above.		40			000						.015 FIG		
			50	90	.34	.009		-	+	+				
						4								
				-			_	+-	1	+		1		
			50		"leter	0.55								
			60	90	.38	.009		-	+	-		1		
								-	-	+	-	1		
			60			75.5								
			70	85	.23	.011			-	+	1			
50-60	Dacite Porphyry													
Super	gene zone Chalcoite						-	-	-	+	1	1		
coati	ngs on pyrite. Rock as		70			T. V.								
above			80	90	.2	.016	-	-	+	+	-	1		
					11							1		
							-	+	-	+		1		
			80											
60-10	00 Dacite Porphyry		90	90	.16	-002	-	-		-	-	-		
Hypos	gene zone. No chalcocit	e.					1							
Rock	as above.			-		1	-	-		-		-		
1			90			1 200								
			100	85	-10	.006	-	-		+		-		
												1		
				-	-	-	+	-	-	-		7		
1														
M.			_	-	-	-	-			-	+			
						1								
-						-	-	-	-	-	-	-		
				1										
V.						1	1	_		-		-		
										-	-			
			1-1											
1								1 30 44		171	H	DATE 8-23-65		

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Sheet \_of\_1

PROJECT\_\_\_\_\_B. S. & K.

Coord, : N		BEARING INGL. Vertical						HOLE Nº RDH 309 COLLAR ELEV.				
START 22 Mar. 66compl	. 22 Mar	r 66'	11401						TH			
DESCRIPTION		7 = /c/w	% Cu	% Mo	%	%	01	01	% EQUIV	GROUPING - RMKS		
LVERBELL DACITE - argillic		10	N.S.		1							
tered and siliceous, medium rdness but very abrasive,	1	20	.07	Ni1								
z. sulphide strgrs. w/ very	7											
akly developed sericite ar strgrs., thin capping:		30	.08	Tr.		-						
m. after py. w/ secondary .derived from py.		40	.08	Tr.								
lphide zone @52'		50	.07	.001								
iphilae Botte (32		60	•44	Tr.								
		70	.40	Ni1								
		80	.44	.001								
		92	.38	.001	į							
		100	.29	.001								
		F.										
		110	.22	Ni1			-					
		15.					1717	·				
		-	-	-		-						
		-		-	-		-					
				-		-	-	-				
			-	+-		-						
										DATE 22 Mar. 6		

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Sheet 2 of 2

PROJECT\_ Atlas

Coord, : N			RING	Ven	ct		HOLE Nº 302					
Ε			INC	L				COLLAR ELEV.				
START COMPL.								PTH	151			
DESCRIPTION		/C/R	%	% Mo	%	%	01.	eQUTV.	GROUPING - RMKS.			
	125		Lu	MO			_	L GOIV.	ONCOPING NIMES.			
35-151 Quartz Monzonite	130	90	.43	.009								
lypogene zone, Holoxline,	130	-										
Weak argillic Alt. Pyrite and trace chalcopyrite			.40	.009								
paringly occur in rare	135											
ractures. Estimated total	140	95	.21	.005		1 1						
sulfide is 2%, occuring	140											
entirely as fracture filling.	145	90	.20	.004								
	145			1								
	151	95	.21	.003	_	+	_	-				
		TO NO.	0.00	MOT E								
		EN	O.F.	HOLE				1				
							-					
[1]												
				-	_	-						
		_	_	-	-	+	_	-				
				-		1						
		1										
			7 7 7									
1												
1												
				-				1				
1												
				-		-	_	-				
						1						
P												
1					1							
				-	-	+	_	-				
1												
. 1			-	-	-	+	_	_				
				-	-	1		1				
							7 1					
						-						

LOGGED BY\_\_\_\_\_

DATE\_

FORM # 355 REVISED 10-62

Coord.: 1 E START 22 Mar.66COMPL.22	Mar. 66	INC	ARING L.	Vert	ical		HOLE Nº RDH 310 COLLAR ELEV, DEPTH 140'			
DESCRIPTION /	13/3/26		% Mo	%	%	01		EQUIV	GROUPING — RMKS	
QUARTZ MONZONITE PORPHYRY										
Argillically altered, "average"										
			I							
ulphide zone @55'	55	N.S.	1							
	60	.82	.004							
ome dampness 60 - 70'	70	.82	.009		-					
	80	.65	.037		-					
oisture increase @ 89'	90	.30	010							
ncrease qtz. @ 90½'	100	.26	.009		-					
	110	.29	.010							
	120	.32	.023							
	130	.26	011		-					
	140	.23	.006					-		
				1						
		-					•			
	-	-								
		-								
		1								
		-								
		-			-					
		-								
		-								
									DATE_ 22 Mar. 6	

## ASSAY-GEOLOGY COMPOSITE DRILL LOG

FORM # 355 REVISED 10-62

Sheet 1 of 1

Çoʻord, : N	BEAR			-1		HOLE	E Nº RDH 311			
Ε	INCL	Ve	rtic	al		COLLAR ELEV, DEPTH 150'				
START 23 Mar.66 COMPL. 23 Ma	%	%	%	%	01	01.0	% 1			
DESCRIPTION /3	3 = C/R	Cu	Mo					EQUTV.	GROUPING - RMKS.	
LVERBELL DACITE - argillically tered and siliceous, medium rdness but very abrasive, z. sulphide strgrs. w/very akly developed sericite ar strgrs., thin capping: m. after py. w/secondary. derived from py. lphide zone @ 48½! xed oxide & sulphide @ 62!	50 60 70 80 90	N.S73 .20 .26 .23	.002					I COUNT	Fines from dust Collector bin (90-100') Cu .38%, Mo. 004%	
	120	.23	.002						Minor Cave @ 100	
	130	.22	.003							
	140	.22	.003							
2 250			.002							
me dampness @ 150	150	.28	.002						1	
	-				+		-		1	
			-	-	-			-	-	
								-	1	
					-				7	
		-	-	-		-	-		1	
		-		-	-	-	-	-	-	
								-	4	
									1	
				1						
						BY_	BLW		DATE 23 Mar. 66'	

REPORT ON THE

INDUCED POLARIZATION SURVEY for B. S. & K. Mining Company, Arizona Part II June-Nov

McPhar Geophysics Limited

### 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 or 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 solutionmetal 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 chalcopyrite, 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 Polarisation 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. I	P 2771-1
Line A	300 foot spreads	Dwg, I	P 2771-2
Line A	200 foot spreads	Dwg. I	P 2771-3
Line 2 + 00N	300 foot spreads	Dwg. 1	IP 2771-4
I ine 10 + 00W	300 foot spreads	Dwg. 1	P 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 feet spreads to confirm
the anomaly. Parallel lines were then run 200 feet to the north and
south to trace the sone 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 O or between O 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, Geophysicist.

Dated: November 8, 1960.

2

3

420

# Pa12 TT (MF) a 36 19 3E 317 157 0 SURVEY 90 GEOPHYSICS LIMITED 98 3 W 59 37 INDUCED POLARIZATION AND RESISTIVITY 46 6 W 19 9 % 14 141 12W 103 B 98 74 15W 89 93 McPHAR 18W 49 38 21W 24W ELECTRODE CONFIGURATION 300 27W -X-X-X-X 30W 4 - Z N 3 · Z N - 2 - Z . 4

**LINE NO. 2N** 

B.S. & K. MINING COMPANY

COUNTY-ARIZONA Feet Scale - One inch = 300 PIMA

NOTE LOGARITHMIC CONTOUR INTERVAL

POSSIBLE ANOMALOUS ZONE

ANOMALOUS ZONE

SIGNAL / NOISE TOO LOW

(10) DOUBTFUL READING

Z

Z

Z

DATE 100. 2/60. DATE SURVEYED JUNE/60 APPROVED RAB. FREQUENCY 25 -2.5 C.P.S.

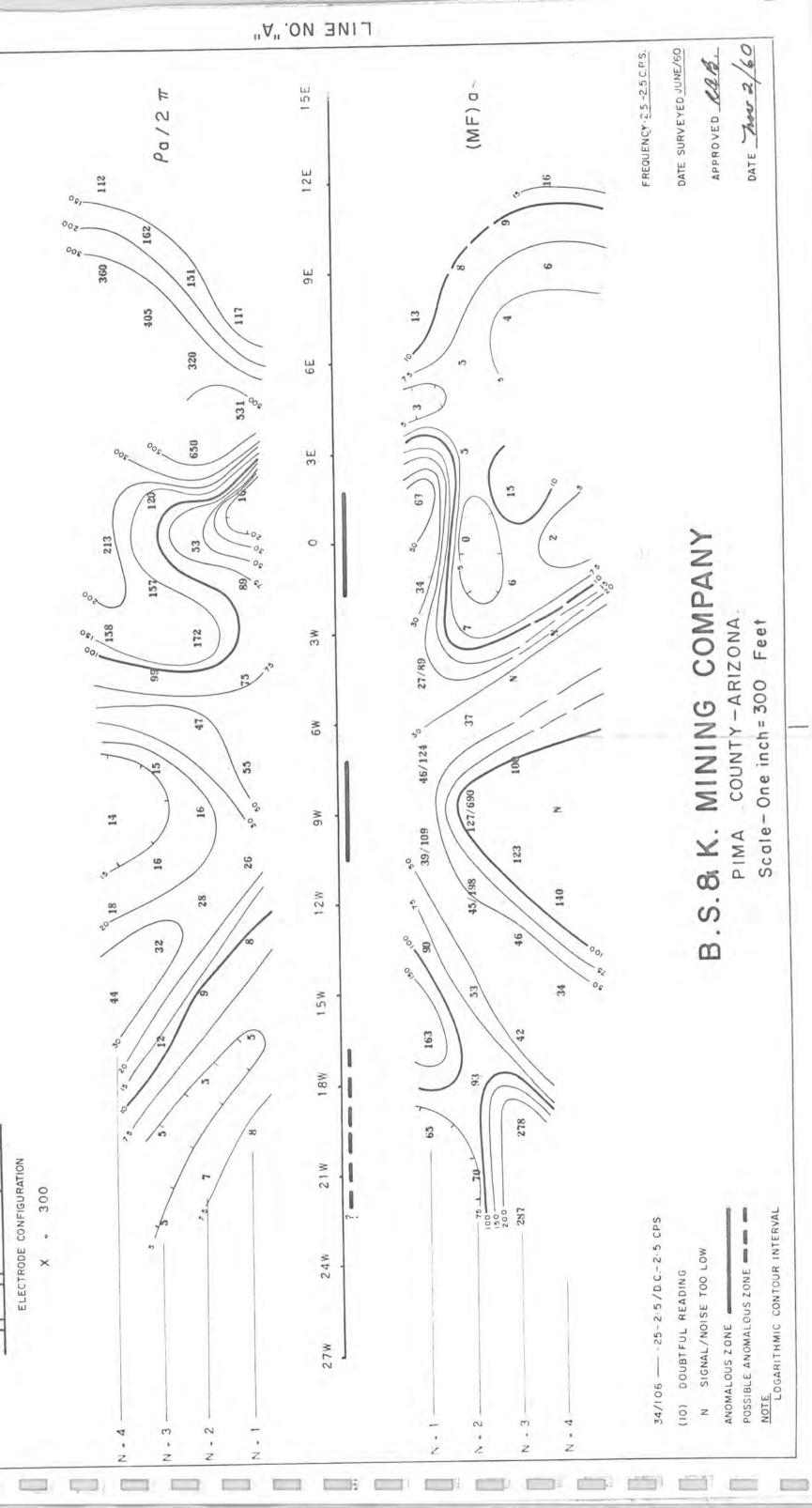
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# MCPHAR GEOPHYSICS LIMITED

INDUCED POLARIZATION AND RESISTIVITY SURVEY

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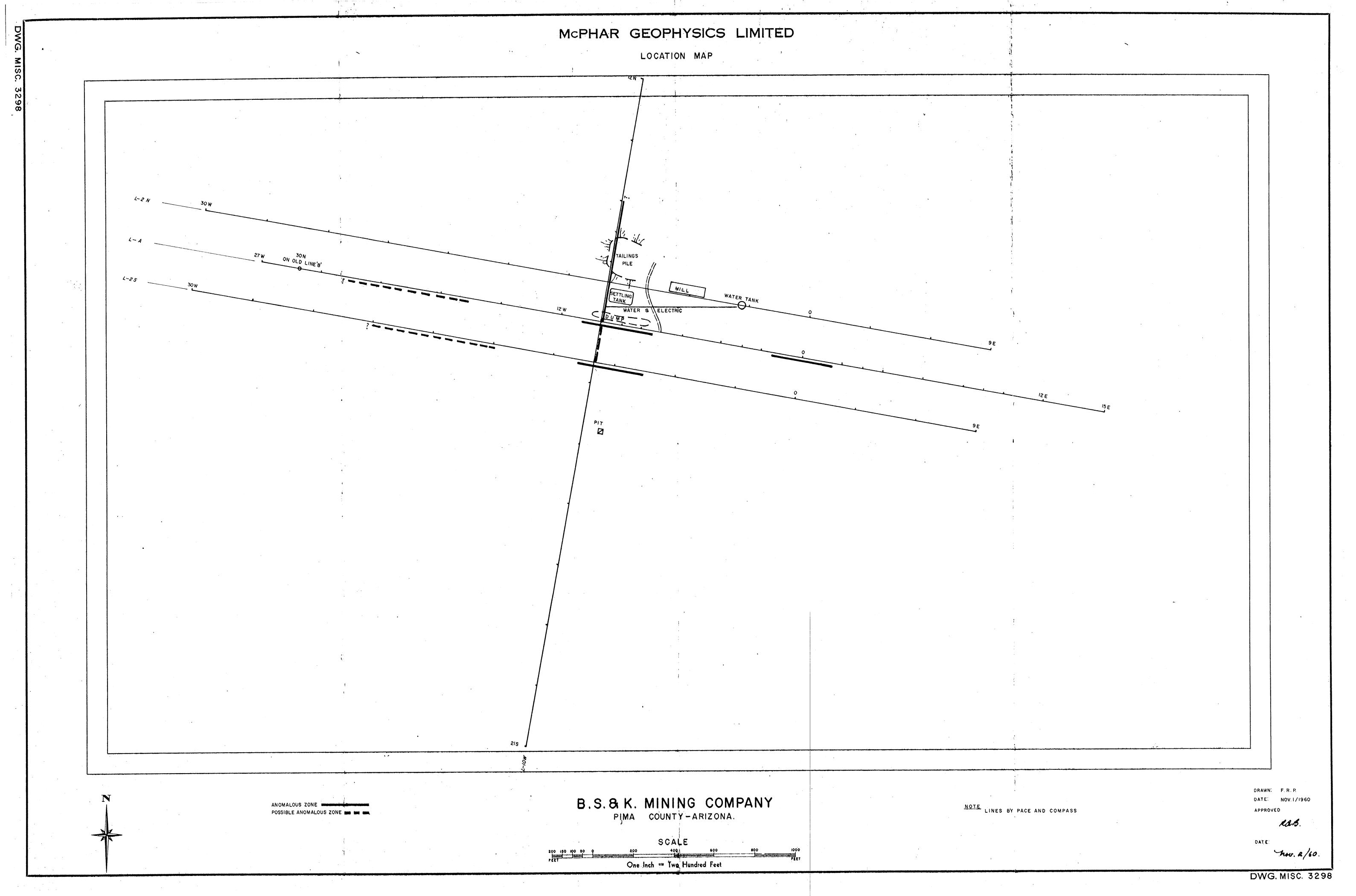
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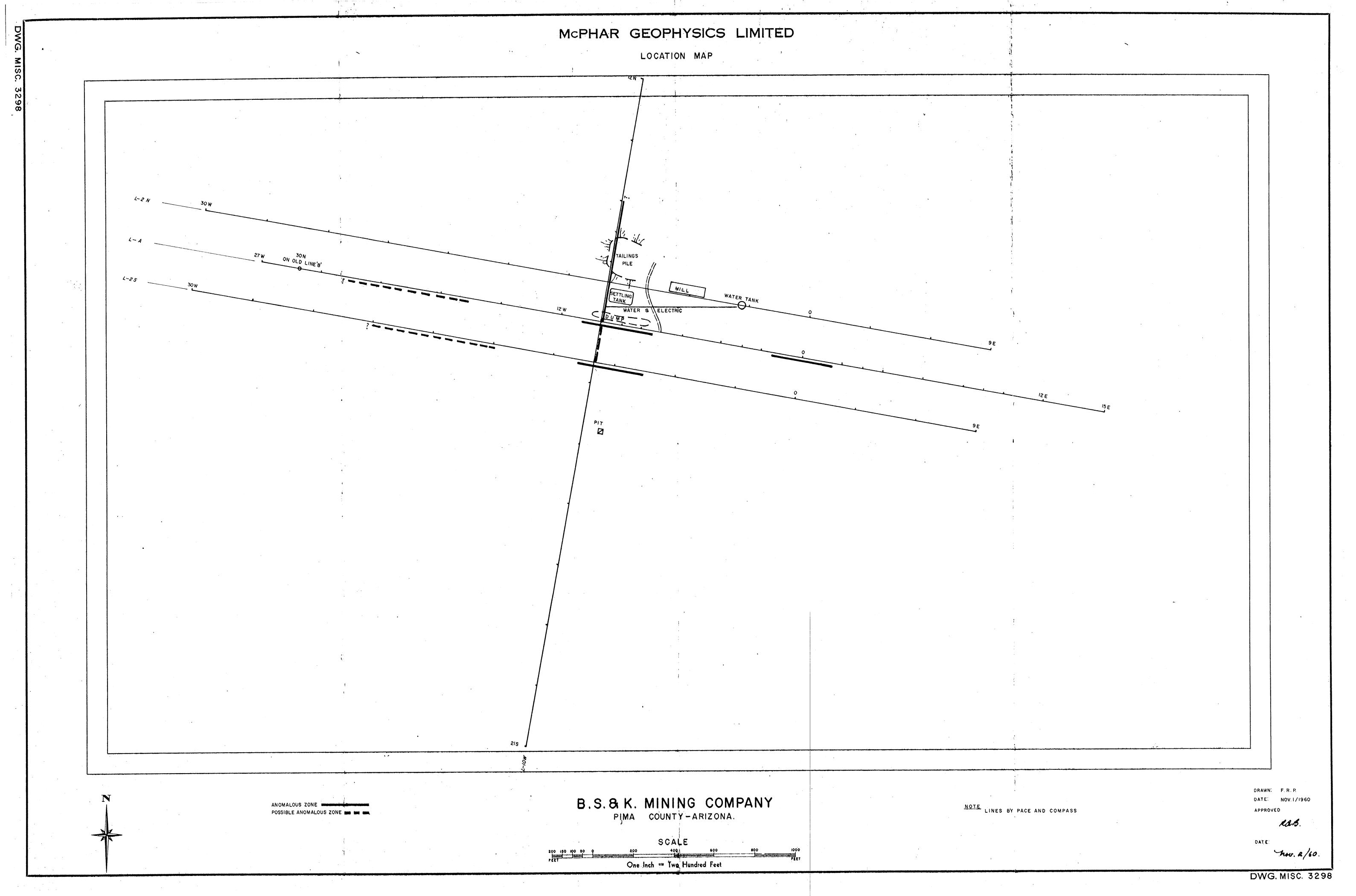
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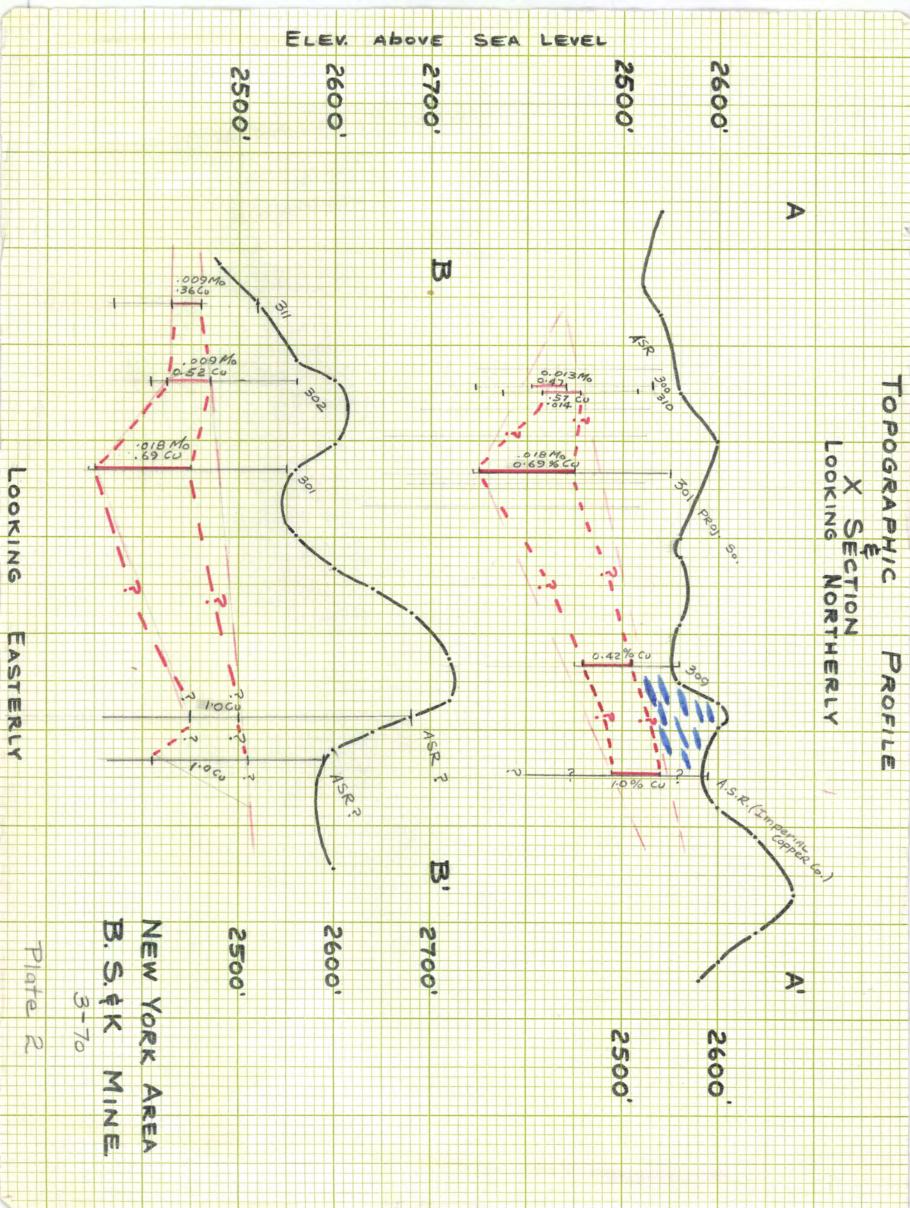
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ESSEX INTERNATIONAL, INC.

NATURAL RESOURCES OFFICE

\$316 E. BROADWAY #104, TUCSON, ARIZONA 85711 + PHONE (602) 326-2459

March 14, 1970

J. M. WILLIS

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 incentive 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

.M.Willis, Director

JMW/k enc FORM # 355 REVISED 10-62

PROJECT Attack BSSK Policies G., BSSK 163 Clark

Coord, : N		-	INCL		7			HOLE Nº 300			
START P. C. COMPL. F.				r*	. 01	2.72		DEPTH A			
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yper occurs as chalmonite.	171	19	0 .1	1 ,0	1						
tal sulfide is 1 2%						, 0000	n pv	11.	1. 1	DATE 8-8-65	

FORM # 355 \*REVISED 10-62

PROJECT\_\_\_\_ Atlas Mine, BSSK Mining Co., New York Claim

Sheet 1 of 2

Coörd. : N E			INC	RING	V	ort	74 5 7 0 1 <b>93</b> 0 0 0	HOLE Nº 301 COLLAR ELEV. DEPTH 200			
START 8-9-65 COMPL.	8-10-0		100	Tai.	127	12					
DESCRIPTION	18/3	1-/c/1	% Cu	cll"	%	%	OX.		% EQUIV	GROUPING - RMKS	
-100 Decite Porphyry - rown - oxide rone oft, strong Argillic Alt., orphyritic, fine grained. riginal Sulfide was 7 4%,	10	20	.12	.006						0'-30' .16 Cu .09 Mo	
70% in fractures, 10% diss. Frace sericite lining Fractures. Qtz veinlets Fare. Some green Cu stain Frisible.	20		.17	.010							
	30 40	80	.18	.009						30'-50' .17 Cu .011 Mo	
	40 50	85	.16	.014							
O-110 Decite Forphyry ixed Oxide and Enlfide	50	60	.11	.010	5					50-80 .12 Cu	
orphyritic, Wk scricite and trong Arg. Alt. Copper cours as Malachite and halcocite, Core badly	60 70	86	.12	.016						.016 Mo	
hattered.	70 80	90	.13	.017						80°-100°	
	90	3 <b>7</b>	.24	.010						.17 Cu .009 Mo	
	50 100	90	.10	.009							
10-125 Decite Pourhvry	100 205	90	.15	.013						100'-125'	
ark gray, soft, weak ericite and strong Arg. it. Copper occurs as maleocite with weak pyrite,	110 110 115		1.31	1000						/83 Cu .018 Mo	
ostly in seams. Core badly roken.	115 120 120 125			.008							

FORM # 355 'REVISED 10-62

Sheet 2 of 2

PROJECT\_\_ Atlas Mine Coord, : N BEARING HOLE Nº 300 INCL. COLLAR ELEV. START COMPL. DEPTH 205 3 5 C/R Cu DESCRIPTION Mo GROUPING - RMKS. EQUIV. 125-206 Dacite Porphyry 1.3080 1.21 .005 125 -150 Supergene zone as above 130 .74 135 90 .70 .003 .009 Mo 135 140 85 .65 .009 140 145 70 .39 015 140 150 65 .76 009 150 1.55 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 .01/ 175 180 85 .50 .010 175 -200 180 .69 Cu 185 85 .57 .052 .018 Mo 1.85 190 80 .83 .011 190 195 90 1.12 .013 195 200 92 .40 .004 200 206 85 .19 .006 End of hold Average Mo for Note in 0.0158 Mo. Average from 105 to 200' is .72% Cu .018 No

VFH

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\_ DATE\_ 8-10-65

FORM # 355 REVISED 10-62

Sheet 1 of 1

DATE\_ 22 Mar. 66

BLW

LOGGED BY\_

PROJECT\_\_\_ B. S. & K. Coord, : N BEARING **RDH 309** HOLE Nº Vertical INCL. COLLAR ELEV. 22 Mar. 66compt. 22 Mar 66! 110 DEPTH % Mo 8 7 E/c/n Cu 01 0 DESCRIPTION EQUIV. GROUPING - RMKS SILVERBELL DACITE - argillically 10 N.S. altered and siliceous, medium hardness but very abrasive, 20 .07 Nil qtz. sulphide strgrs. w/ very weakly developed sericite 30 .08 Tr. near strgrs., thin capping: lim. after py. w/ secondary 40 .08 Tr. hm.derived from py. 50 .07 .001 Sulphide zone @52' 60 .44 Tr. 70 .40 Nil 80 .44 .001 92 .38 .001 100 .29 .001 .22 Ni1 110

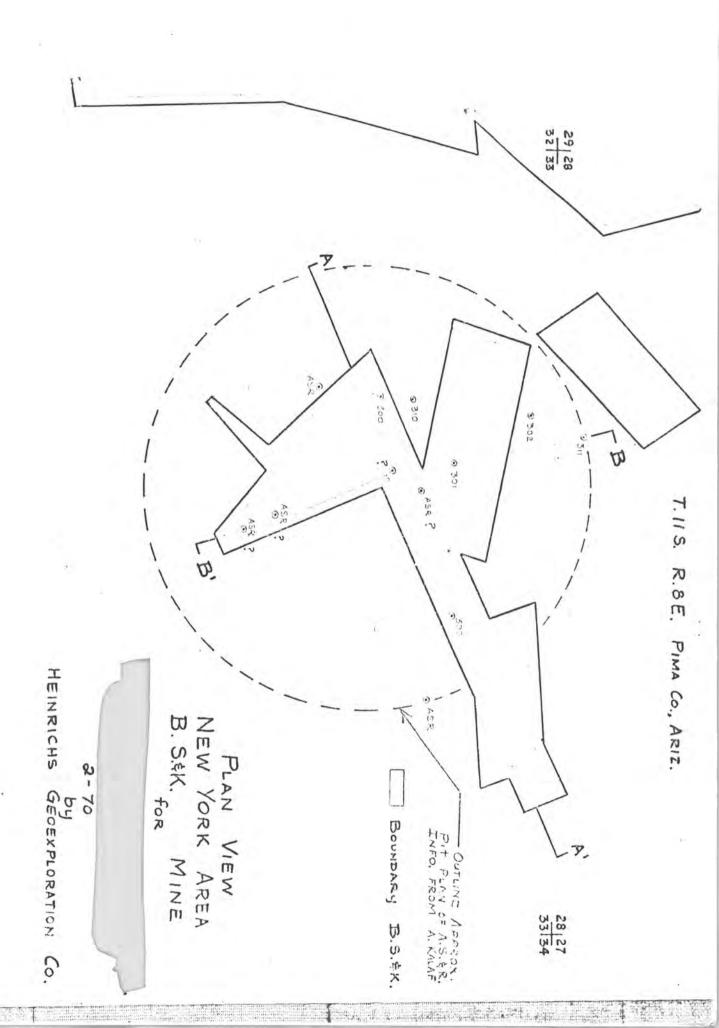
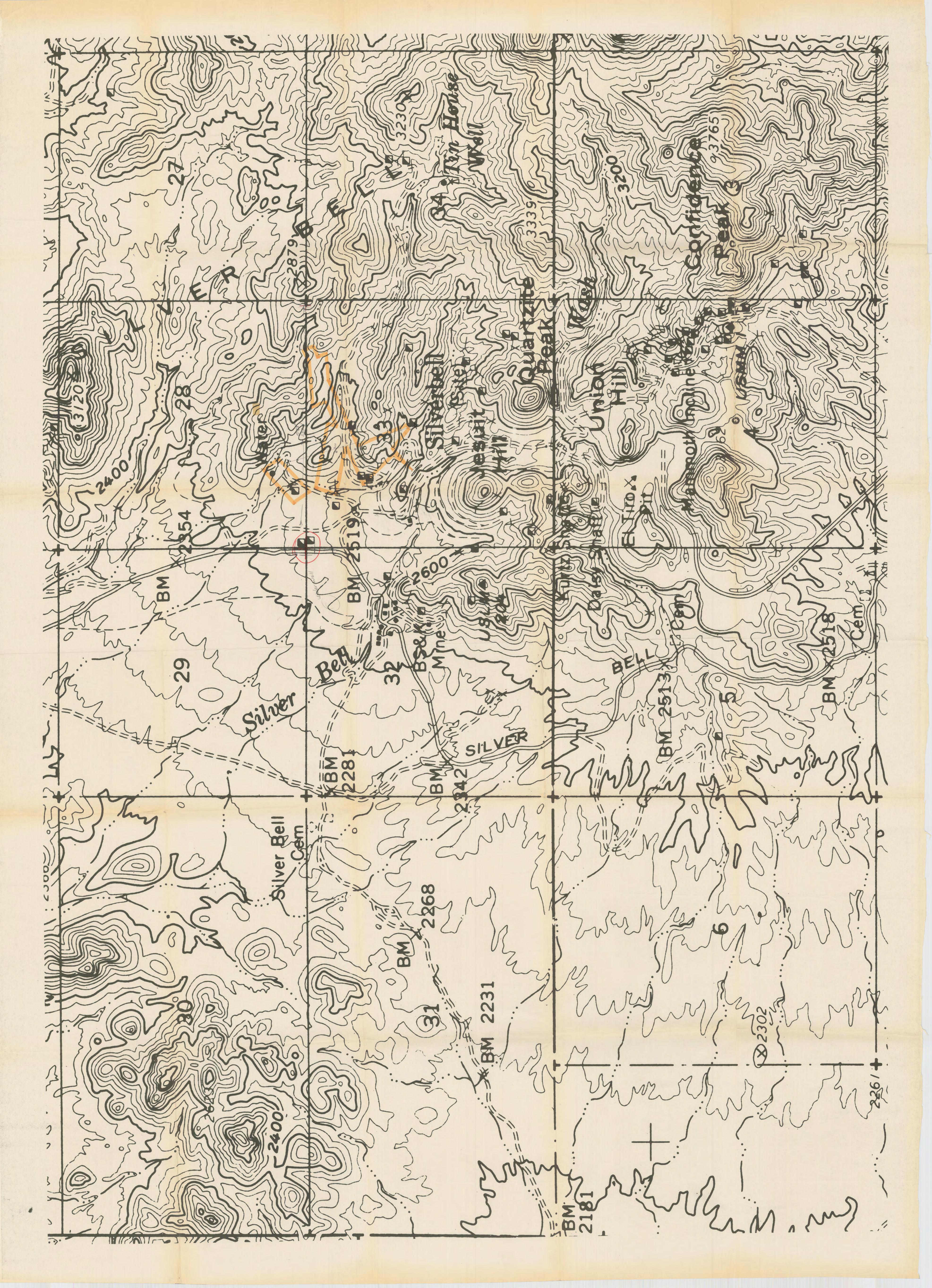
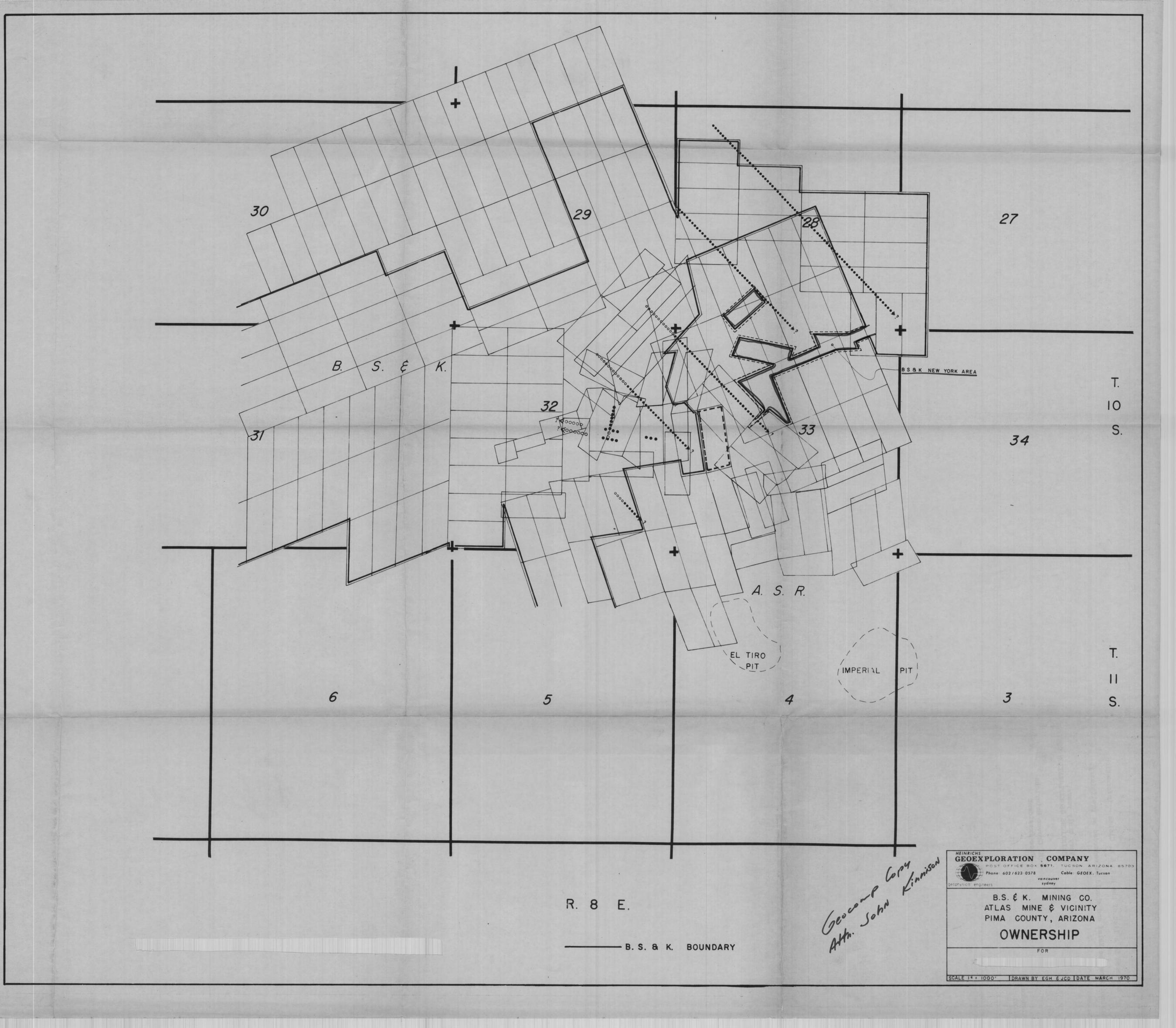


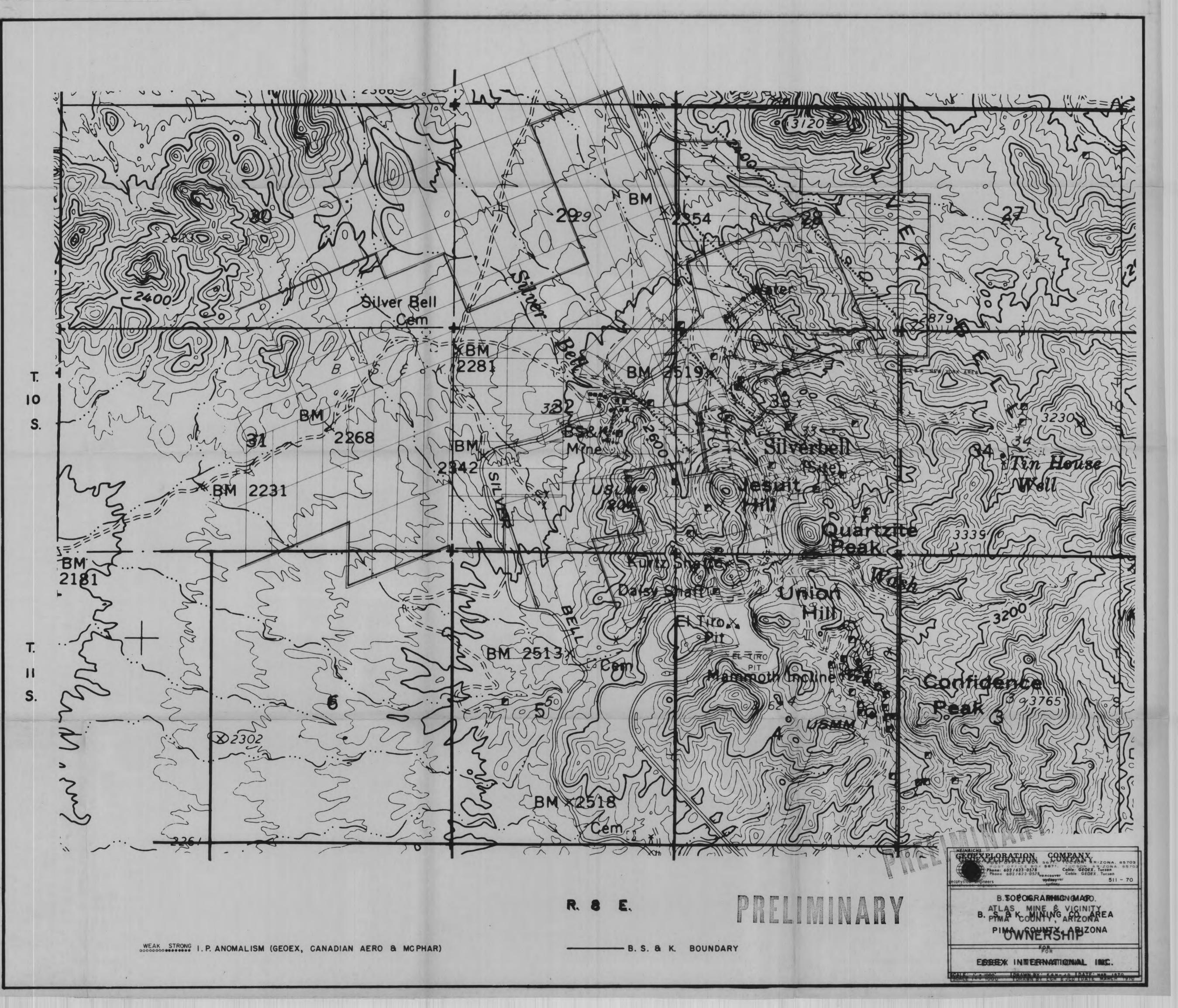
PLATE 1

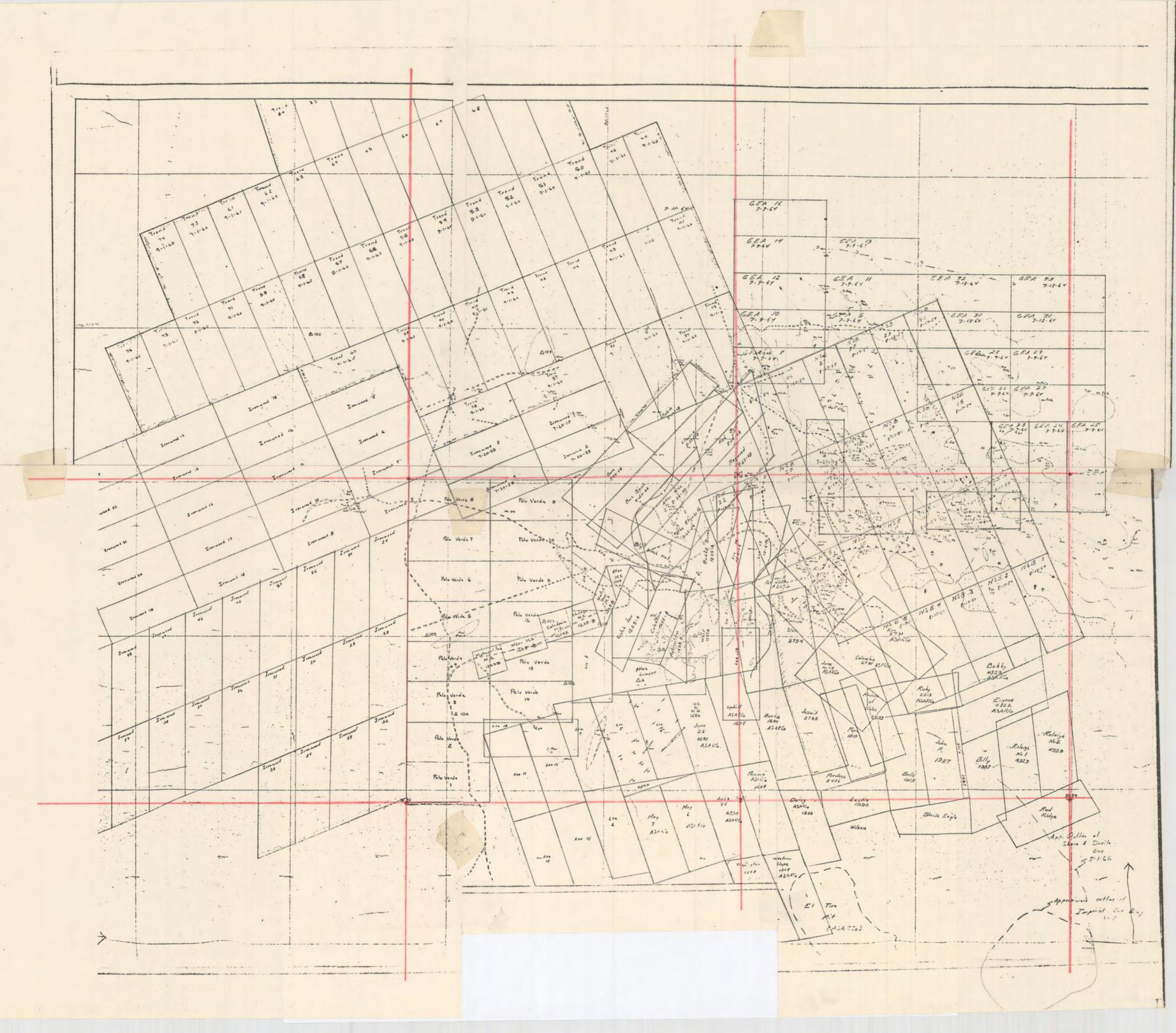


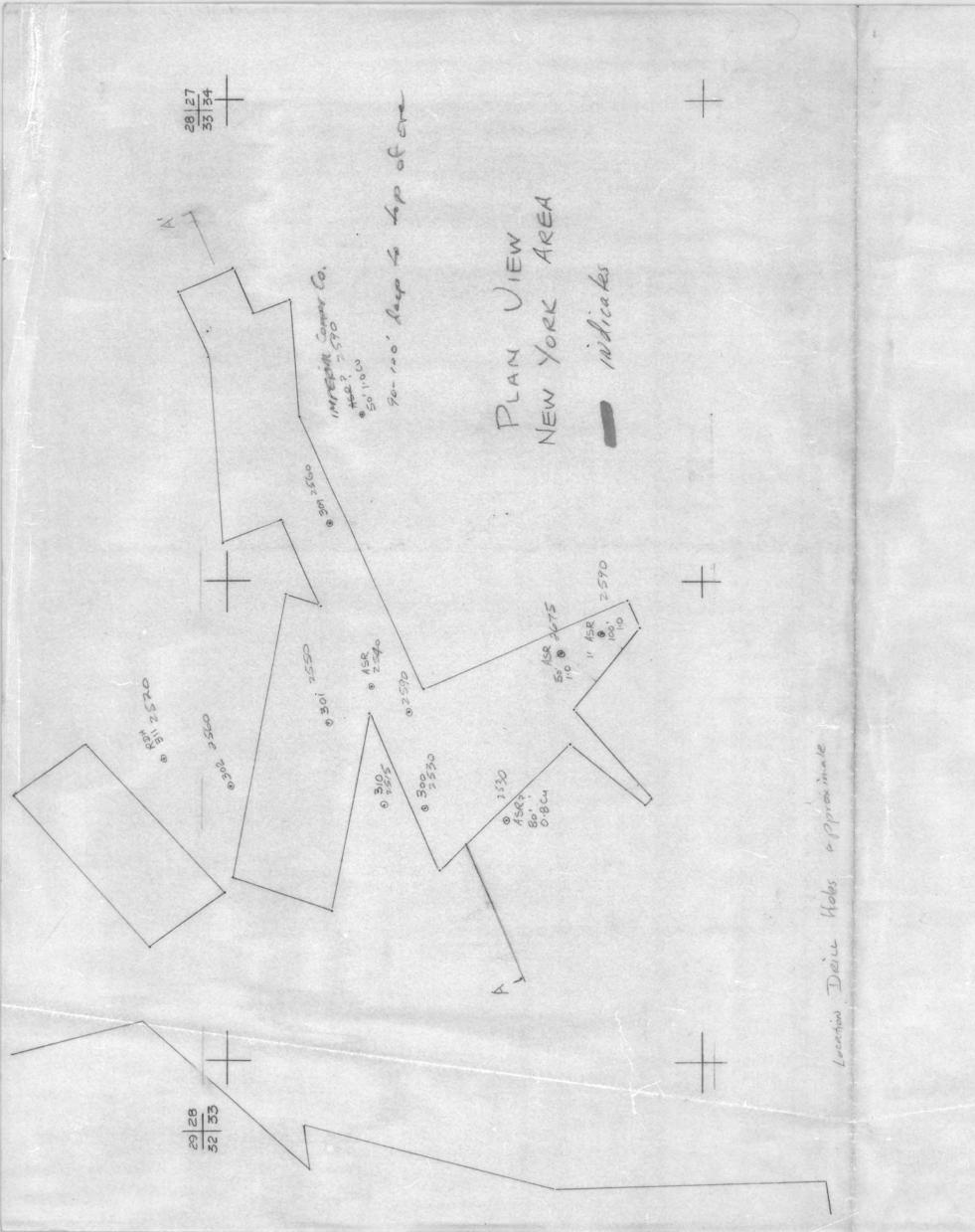


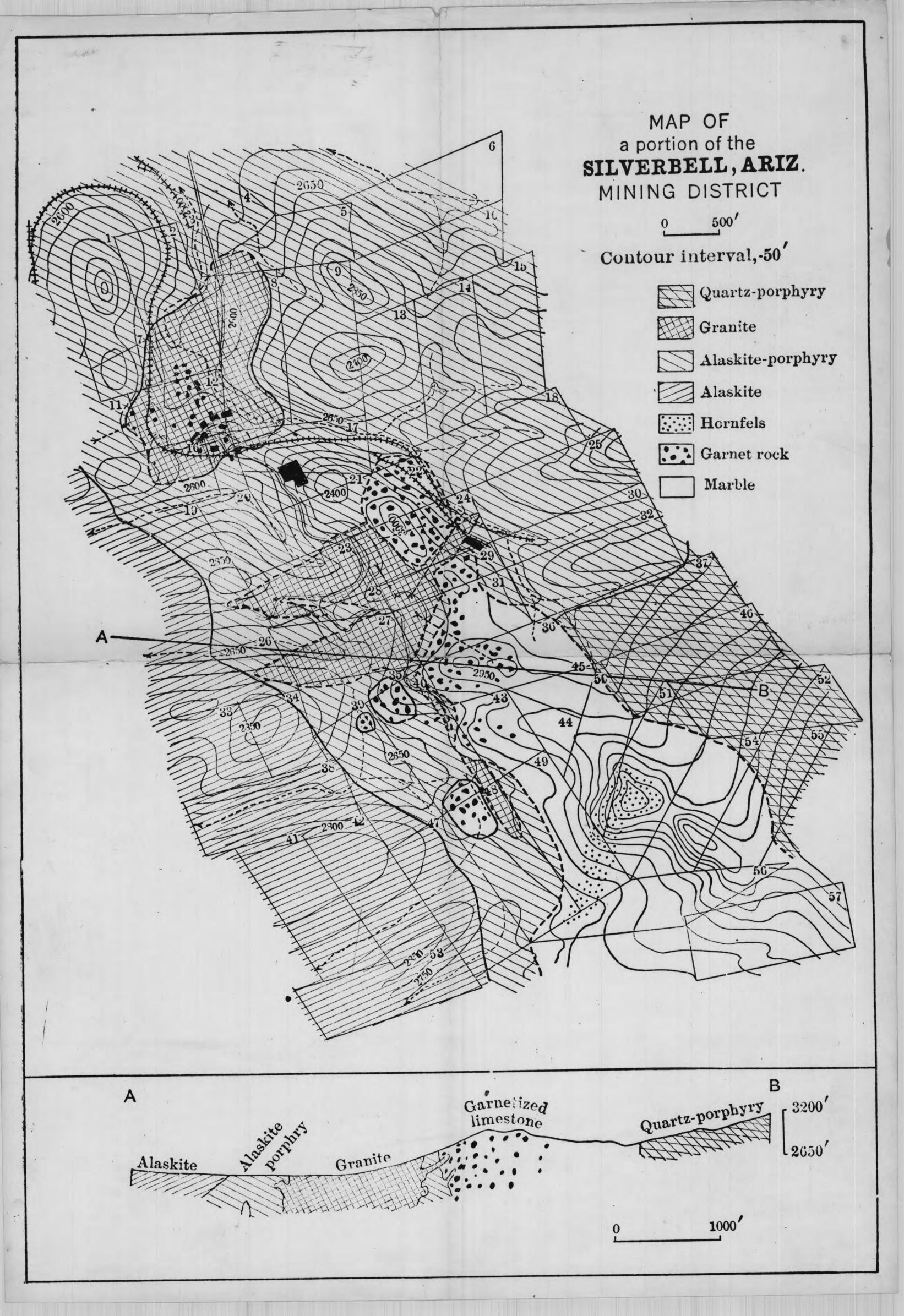
Essex 3/23/70 B.S. & K. Project Conference TAIK to John Kinnison Geo Comp Vie Hollister of DUVAL TUCSON CALL Kent PERRY HAZEN Research 207 Room RAMMOA Meet John Kinhison 3/34/10
" Jack Shie 3/34/10











PROPOSED DUMP & LEACH AREA NEW YORK CLAIM GROUP AERIAL PHOTO MOSAIC

of

B. S. & K. MINING CO. PROPERTIES
T 10 & 11 S. R 8 E
PIMA COUNTY, ARIZONA
for

FSSEY INTERNATIONAL AND POST OFFICE BOX B671. TUCSON. ARIZONA. 857
Phone: 602/423-0578
Coble: GEOEX, Tucson
vancauver
sydney ESSEX INTERNATIONAL INC. Scale: 1" 4 1000 13 March 1970

PLATE 1

