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PRIMARY NAME: BRIAN LODE

ALTERNATE NAMES:

MARICOPA COUNTY MILS NUMBER:539

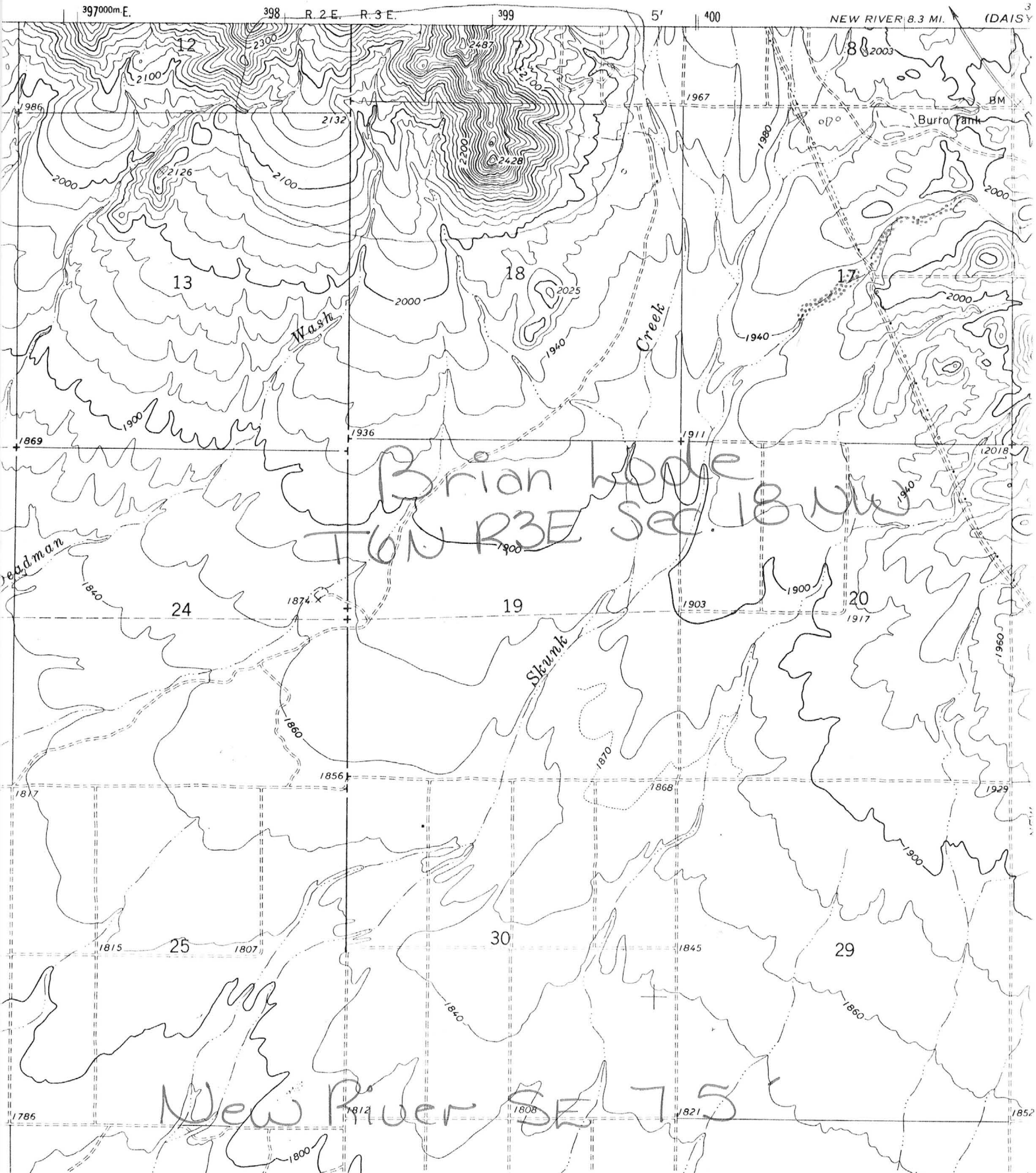
LOCATION: TOWNSHIP 6 N RANGE 3 E SECTION 18 QTR. NW
LATITUDE:N 33DEG 51MIN 53SEC LONGITUDE:W 112DEG 05MIN 27SEC
TOPO MAP NAME: NEW RIVER SE - 7.5 MIN

CURRENT STATUS: EXP PROSPECT

COMMODITY:
SILVER-PRIMARY
COPPER-COPRODUCT
GOLD-(M)LODE-BYPRODUCT
CALCIUM-(M)OXIDE-BYPRODUCT
SILICON-BYPRODUCT
ALUMINUM-(M)ALUMINA-BYPRODUCT
IRON-BYPRODUCT

BIBLIOGRAPHY:
ADMR BRIAN LODE MINE FILE
BLM MINING CLAIM FILES AMC 10354 & 10356
AZ STATE MINE INSP 1976 MINE START FILE

TED STATES
T OF THE INTERIOR
GICAL SURVEY



KAP WR 3/10/77 cont: made of the claim before much more was done. Some grab sample assays in the test pits were also recommended.

NJN WR 9/19/86: Austin Carter (c) visited and reported that his Brian Lode (f) Maricopa County property is now involved in an exchnage from Federal minerals to State and that the State is selling the property to Lake View Property, a private developer. The BLM is not going to conduct a validity exam on the claims, but rather is exchanging the property conditional to the developer buying off the mineral claiments.

Cont. GW/WR 12/17/73 - Neither of the veins exceeds 16" in width and average about 4". From the wider portions a few (2 or 3) carloads have been shipped a number of years ago.

GW/WR 3/15/74 - Austin Carter, New River, Called to say Inspiration Cons. Copper Co. had turned down both his and Jim Boyles Cu Prospects 7 miles South of New River on the basis of 25 geochem samples. He thinks he has a vanadium deposit and wanted Union Carbide Corp. address in Bishop, California.

Paydirt 12/23/74 - is soliciting expl. Co. interest.

Mr. Carter & Lloyd Williams have gold prospect in Sec. 18, T6N, R3E, New River District, on the SW side of Daisy Mountains, South of New River.

KAP/WR 11/6/74 - Box 133, Black Canyon Stage, Phoenix, 85020, owner of Brian Lode Mine, is soliciting Expl. Co. Interest.

KP/WR 8/1/75 - Newmont, Inspiration & El Paso Natural Gas (file) all looked over the property & turned down any sort of an option based on the unlikely potential of a large orebody (copper).

GW/WR 3/1/76 - Austin Carter called re: geophysical anomaly found on his claim by Mr. Gear of El Paso National Gas Company. He said he dug down to the deposit indicated and found it was about 6 ft. thick and rather soft (altered). Mr. Gear sampled it. It is about 200 ft. N. of his previous diggings on a ± 6" streak of Au-quartz.

KP/WR 3/10/77 - Glenn & Cliff met Mr. Carter who guided them north to a diamond drill hole site on his claim Brian Lode #1, on the SW side of the Daisy Mtns. south of New River. Looked at a number of test pits dug by a front end loader. Country Rock exposed was alledgedly called dacite porphyry and andesite breccia by a petrographer. The vertical NX diamond drill was down 108'. Drill core recovery was good. Water was being lost in the lower part of the hole. The hole had been put down on a minor IP anomaly. One N-S IP travers had been made by Phoenix Geophysics. The core was mainly a siliceous Festained felsitic textured rock with a trace of pyrite. No other metallic sulphides were in evidence. Mr. Carter said that he would continue the hole to 125' then split the core and have it assayed for precious metals. A cursory Geiger counter run on the core showed nothing over background count. We recommended that a geologic map be

FTJ/WR - Mr. Carter has lode claim near New River, the surface is state owned and minerals is federal. Surfaces is leased to rancher who placed a gate across road of access which he locked. Mr. Carter wanted to know what to do. Suggested he talk to the rancher and either post bond or perhaps he could obtain a key to locked gate. If not successful he should hire an attorney.

GW/WR - 1/8/73 - Mr. Carter, New River, called for an appointment to examine his mining claims near New River. It was suggested he call again next Friday as I will be out of town Wednesday & Thursday.

GW/WR - 1/13/73 - Visited Austin Carter & Lloyd Williams Au prospect t in Sec. 18, T6N, R3E, on the southwest side of Daisy Mountains, south of New River. Here a dozer cut about 40' long and 4' deep reveals a quartz vein ranging in width from 2" to 8". A sample sent to Inspiration Copper Company on October 24, 1972, gave the following results; 12.22 oz. Ag, 0.54 oz. Au, 0.23% Cu, 73.4% SiO_2, 2.8% Al_2O_3, 8.3% Fe, 2.2% CaO. Another sent to AS&R on December 19, 1972 gave 2.05 oz. Au, 29.6 oz. Ag, 0.6% Cu, 50.0% SiO_2, 9.8% Al_2O_3. AS&R refused purchase of the ore but Inspiration offered to pay $46.00/T N.S.R. The purpose of my requested examination was to determine whether or not the ore could be mined at a profit. Due to the deposit being a lens in shist its horizontal extent is limited to about 50 feet and due to the relief being only 6-8 feet, it would be necessary to mine the deposit underhand. It was therefore, suggested that they rent a backhoe and small compressor and dig a trench $\pm$ 10 feet deep along side the quartz then "peel" it off as cleanly as possible. If this method and the resulting ore proved profitable and the quartz vein widened and retained or bettered its value then they would have to consider sinking a shaft; which would be quite expensive particularly in view of their inexperience. Both partners are electronic engineers for Sperry-Rank Company.

GW/WR 12/17/73 - In company with Mr. Gus Leth, New River, and Mr. Von Beck, geologist for Inspiration Consolidated Copper Co., visited the copper-gold claims of Jim Boyle and Austin Carter about 7 miles SE of New River. Mr. Boyle has staked 4 more claims than he had a couple years ago when last visited. On them there are some quartz lenses containing oxide copper minerals in the schist. Mr. Von Beck appeared to be impressed with the showings on the State lease land and mentioned they would likely conduct a geochemical survey of the area. On Mr. Carter's claims a considerable excavation, perhaps 200 ft. long, has been made along the 2" quartz vein containing silver. About 500 ft. SE of this open-cut he has discovered another vein containing mainly limonitic gouge. This structure strikes almost at right angles to the silver vein and dips about 40° east. More trenching should be done here to determine whether or not the two veins will intersect. Mr. Leth then took us to his Daisy copper-gold mine on the Daisy Mtn. about 3 miles south of New River. Here at least two roughly parallel veins are traceable by old diggins several hundred feet.

Phelps Dodge Corporation Western Exploration Office, Drawer 1217, Douglas, AZ 85607 • (602) 364-8414

June 7, 1977

Mr. Lloyd E. Williams
2201 E. Acoma Drive
Phoenix, Arizona 85002

Dear Mr. Williams:

I have completed an examination of your Brian lode claims. While we recognize the merits of the property, I regret having to inform you that Phelps Dodge Corporation is not interested in this type of property at this time. I am enclosing the reports you sent us and the analyses we performed on samples from your property.

Thank you for allowing Phelps Dodge to consider your property. Please contact us again if you have other properties of possible interest.

Very truly yours,

John D. Forrester
Senior Geologist

JDF:s

Enclosures

300 Park Avenue, New York, NY 10022 • (212) 751-3200

6-3-1

T.R.S

SPECTROGRAPHIC ANALYSIS

DATE RECEIVED Apr 1 '77 LOCATION New River S.E. Qd 369 Az GEOLOGIST Forrester

4-6-77 LA

NO.	PULP #	LOCATION	Bi Arc	Ni Arc	B Arc	Pb	V Arc	Cu	Zn	Co Arc	Be
1	1538	369-6-5-18-1 F				F	25	15	F		
2	1539	2				F	22	15	F		
3A	1540	3a	31		68	M	23	15	F	39	
4A	1541	4a		15		F	120	15	F	13	
4B	1542	4b				F		15	F		F
5	1543	5		21	69	F	120	15	F	12	

ALSO CHECKED FOR: Be As Te P Hg Sb Ge Pt Au Tl Sn Th Os Ir Li In Cd Ta Pd Rh Ru Re

F = Faint S = Strong ☐ Complete Spec

4-12-77

GEOCHEMICAL ANALYSIS

Date Received 4-1-77

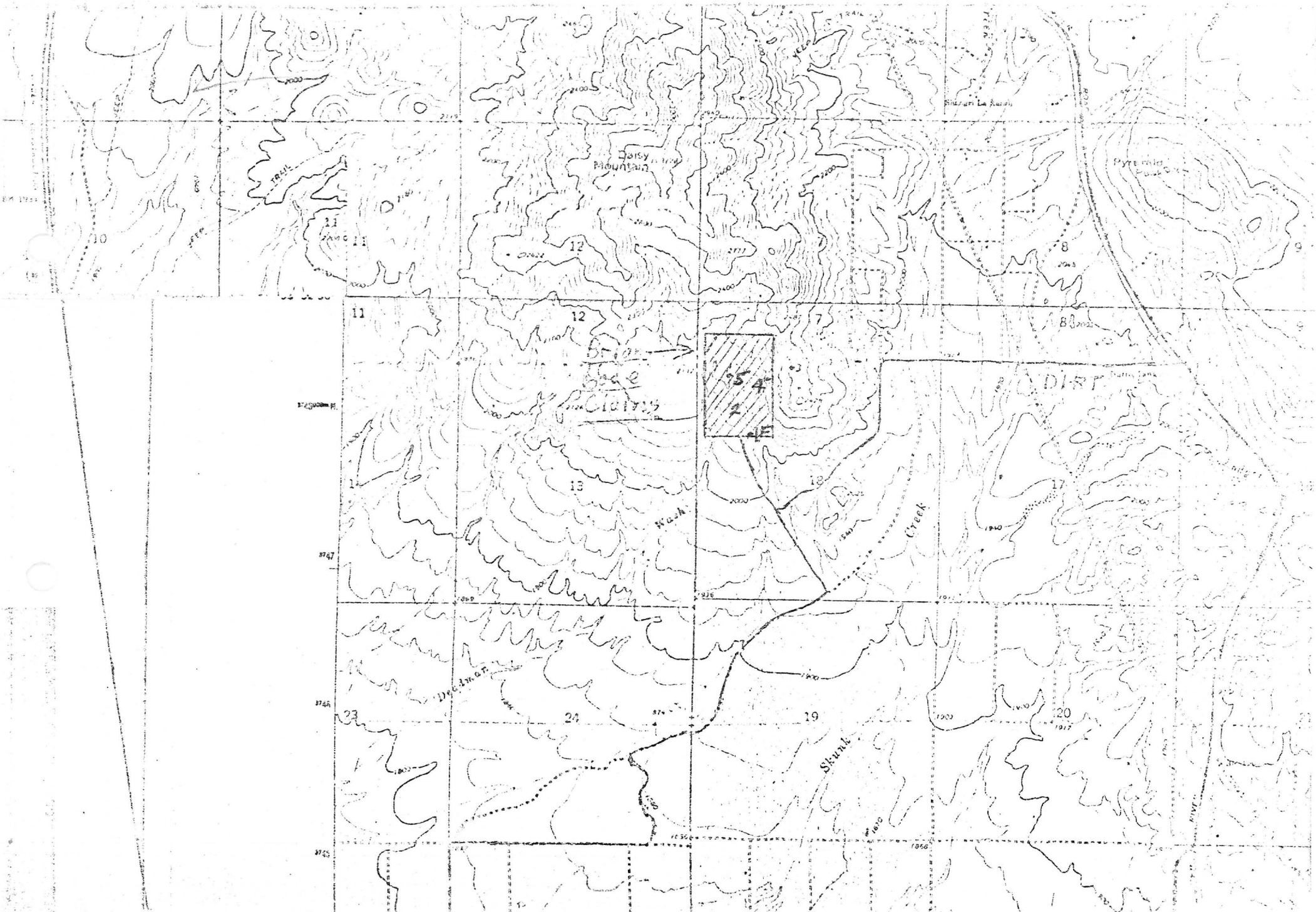
Location Brian Lode claims New Rivera SE 269

Em. Spec. 4-6-77 X-Ray 4-7-77 Chem.

Geologist Forrester

Pulp No.	SAMPLE NUMBER T. R. S. IDENT.	Mo P.P.M.		Pb P.P.M.		Zn P.P.M.		Cu P.P.M.		Ag OZ/TON		Au OZ/TON					
L1538	6-3-18-1F				X		X		X								
	SOUTH CLAIM	ES	3		50		70		105	ES	ND						
1539	2				X		X		X								
	4/25	ES	ND		60		65		135	"	"						
1540	3A				X		X		X								
	MOPER HOPE	ES	9		25		65		180	"	"						
1541	4A				X		X		X								
		ES	ND		35		85		105	ES	.20						
1542	4B				X		X		X								
		"	"		60		40		60	ES	.035						
1543	5				X		X		X								
	EM ANAMOLY	"	"		85		100		145	ES	ND						

1 Troy Oz/Ton = 34.28 PPM: ES = Em. Spectrograph X = X-Ray A = Atomic Absorption C = Colorometric O = Other


Daisy Mountain
Pyramid Peak
Brian Bale Claims
54
2
4E
DIRT
Wash
Creek
Deadman
Skunk
TRAIL
10
11
12
7
8
9
13
18
17
23
24
19
20

ORIGINAL

GEOLOGICAL REPORT

For: Austin B. Carter, of Brian Lode Mining Co.
Box 133
Black Canyon Stage,
Phoenix, Arizona, 85020

Field Work during July-August 1973

General Geology near Brian Lode, New River area:

Hydrothermal veins in the New River area are intruded into complexly folded, foliated, greenschist grade Archean andesitic volcanics and volcanic sediments. No Paleozoic or Mesozoic rocks are found in the vicinity of the Brian Lode, but Cretaceous rhyolitic volcanic necks occur to theNortheast of New River. Cenozoic activity is expressed as Tertiarybasalt flows to the North and East, which at one time capped the New River greenstone complex. Normal faulting has caused the formation of tilt-block mountains, some of which are capped by remnants of the basalt cover. The presence of a late joint set in the Brian Lode vein which is not present in the basalts(and is present in the greenstones) indicates that the Brian Lode, and possibly the other hydrothermal occurrances in the area, are pre-basalt, and may be related to the Cretaceous and Early Tertiary rhyolitic volcanics.

Other than normal faulting and long wavelength-low amplitude folding of the basalt units and their intercalated tuffs and lacustrine sediments, structures of any significance are confined to the Archean greenstones. Folds on scales of one meter to 200 meters are found in the mapped area, and if indications in other Archean rocks in the vicinity are correct, folds with wavelengths on the order of 1000 or more meters should exist. Smaller folds appear parasitic on larger ones, their axes being parallel to subparallel. Foliation has developed parallel to the axial planes of these Northwest-trending folds.

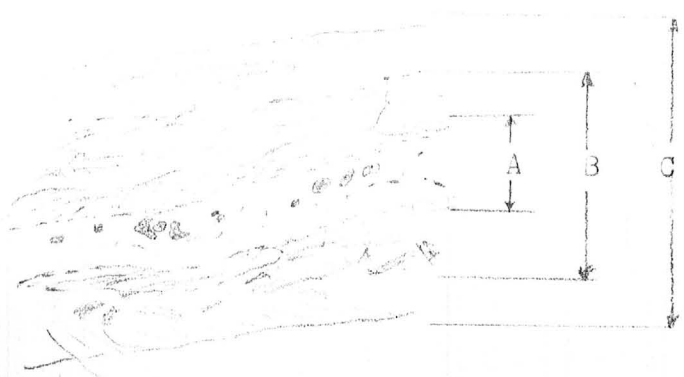
Cross-folding, trending slightly East of North, is of the order of hundreds of meters, and has left a less well-developed clevage along its axial plane. A late regional jointing, spacing on the order of ½meter, trends Northeast, cuts both Precambrian rocks and hydrothermal veins, but is not apparent in the basalts.

Precambrian rocks in the Brian Lode area are difficult to map because of theextent of folding and degree of metamorphism, and do not in any case relate to hydrothermal veins in the area. They are useful, when mappable, on a local basis to locate discontinuities which may be, or may cut off, hydrothermal features.

The Brian Lode:

The Brian Lode consists of a late hydrothermal vein consisting of quartz, siderite, ankerite, hematite, pyrite, with an alteration envelope rich in clay minerals and possibly sericite. Thickness of the vein itself varies from 2-15cm, and that of the "aluminous" envelope, from 15-60cm. Overlapping of vein material can occur, and with the pinch-and-swell nature of the vein itself may indicate some fault movement during its emplacement. (See sketch) Little net horizontal movement is discernable in the adjacent rocks, however.

Cross-section of vein



A-qtz, Fe-Ca, Mg carbonate, hematite. To 4" thick. "CORE"
B-siderite-ankerite halo about A. Total thickness to 3", incl. A.
C- Sericite-clay "aluminous" halo, containing some Fe-carbonate. to 2' thick.

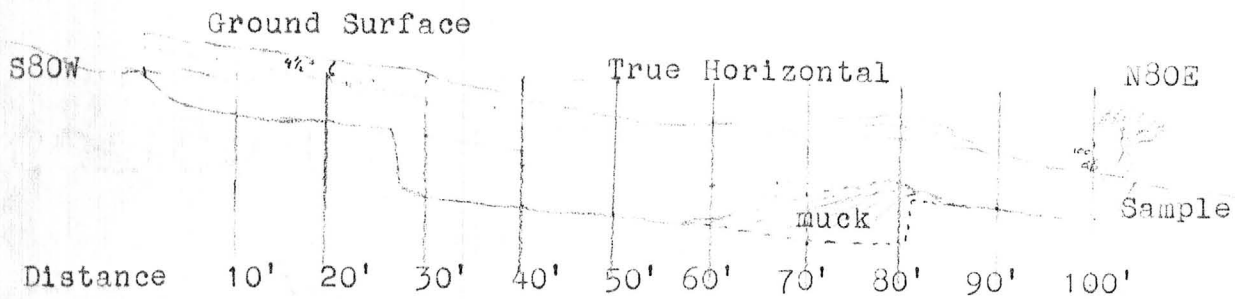
Both gold and silver occur in the quartz-carbonate interior portions of the vein, in association with hematite replacement of pyrite. Some silver is present in the "carbonate halo", as indicated by Sample A-4, but insufficient to warrant its retention as ore.

Assay Information and Conclusions:

Trench samples, July, 1973. Ten samples were taken along the length of the Brian Lode vein, of which 8 were assayed. The method used was a combination of trench and spot sampling, ie., over a 10' interval, samples were taken at 2' spacings, beginning at 1' into the interval. The samples included both vein core material and a portion of the "aluminous" halo. (See sketch)

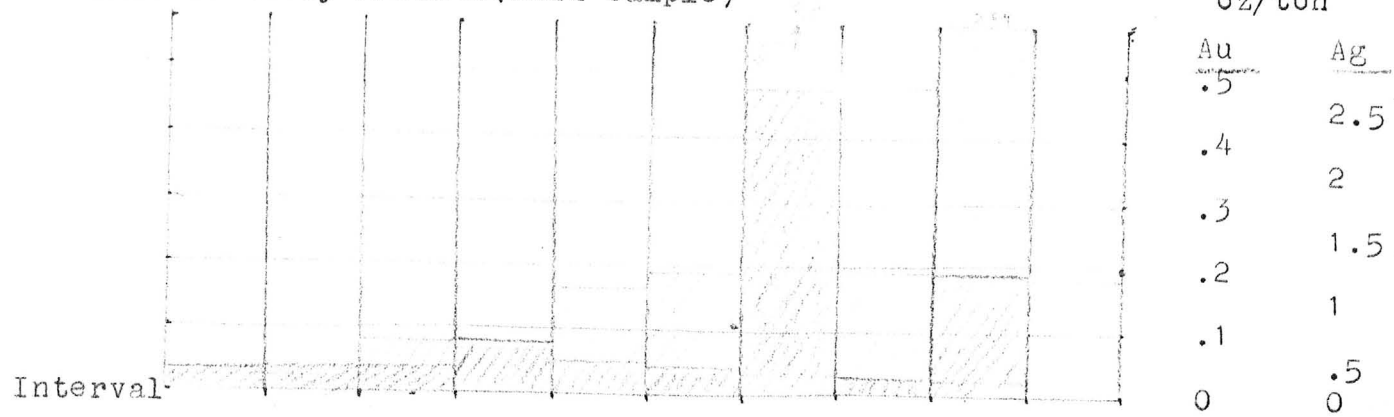
Method of sampling

Cross-section, indicating depth of sample perpendicular to vein

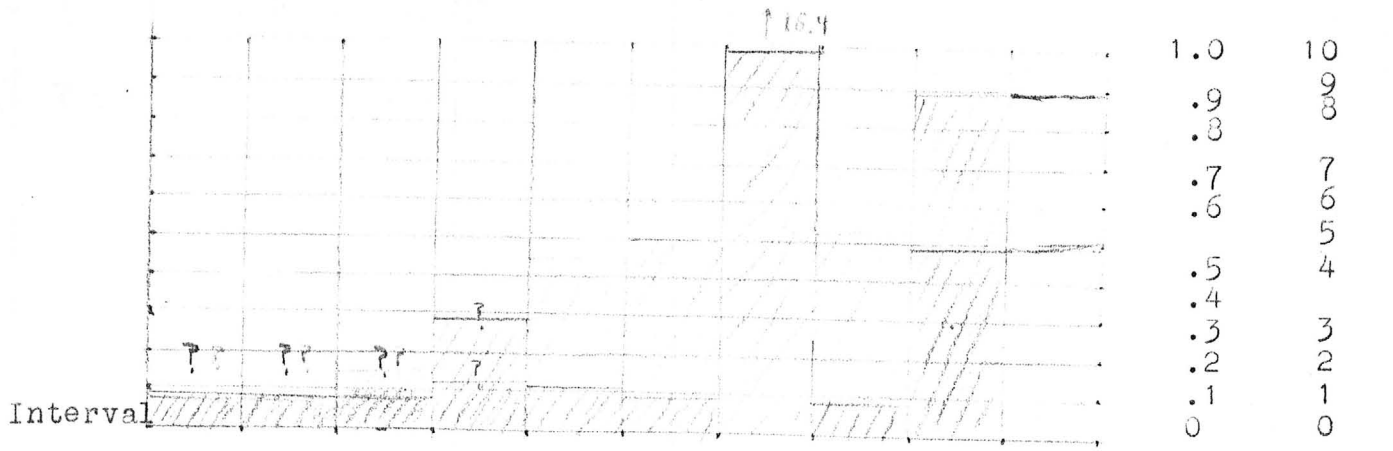


view looking N10W, perpendicular to trench

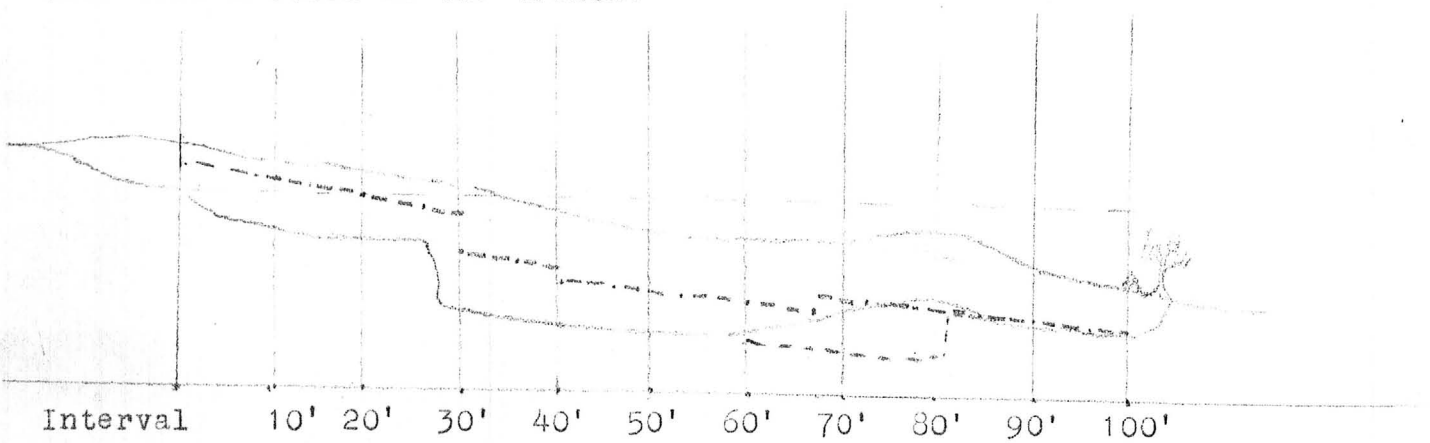
Plot of Assay Results(Bulk sample)



Samples taken of vein core material versus vein envelope indicate that all values lie within the core zone, and may reach, as in A-2, 2.78 oz/ton Au, and 63.36 oz/ton Ag, while only traces appear in the adjacent aluminous material. Core grades may be approximated by considering the proportion of "alumina" in the bulk sample, assuming its grade to be 0, and therefore, that all values came from the core, and multiplying the bulk grade by the appropriate factor. For example, if ¼ of the bulk sample were alumina, then 3/4 would be core material, and thegrade should be upped by 4/3(133%) Those estimates are plotted as follows:



Sample locations and elevations are shown here with respect to the side view section of the trench:



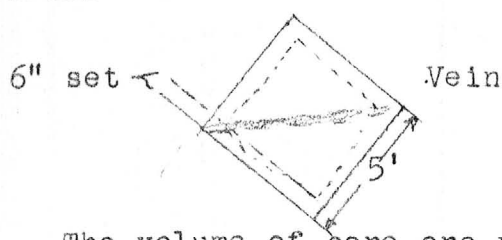
Evaluation of Mining Method: shaft and stoping versus slusher

With appropriate assumptions, one can estimate mining costs compared to money recovered as ore sold to smelter. The assumptions are listed as follows:

(1) Shaft, square set, 5' on a side: \$50/foot.50 foot depth.
(2) Slusher, \$50/day, at 50 yd^3/day.(The # of yd^3 could likely be doubled, and possibly tripled. Slusher trench 4' wide.
(3) Average vein thickness 2"
(4) Average core grade, (4.1- 1.00oz Au/ton, 20 oz Ag/ton)
(4.2- 1.50oz Au/ton, 50 oz Ag/ton)
(5) No diminution in grade with depth
(6) Only 80' length, along current trench, considered. More ore exists on either side of the 80', but its extent is unknown.
(7) Gold, \$100/oz. Silver, 2.75/oz. (Smelter price for ore)
(8) Specific gravity of core ore, 3g/cc=5063 lb/yd^3
(9) Labor cost=0, but only for Brian Lode Personnel.

Shaft:

By orienting the shaft as diagrammed, the entire diagonal length would produce ore, in the ratio 7:5 over a shaft with the vein parallel to its sides.



The volume of core ore per vertical foot on such a shaft is .043yd^3 which has a mass of 218 lb, or .109 tons, giving values recovered per foot of shaft to be; 4.1-169/foot, 4.2- \$313/foot, neither of which can pay for the cost of the shaft. Stoping is less expensive, and at \$20/foot to tunnel and stope parallel to the vein, costs per cubic foot of ore removed= \$120/y, where y=the # of feet stoped out (upward).

Volume of stoped ore per lineal foot = y/6. At (4.1-\$14.50/ft^3, 4.2-\$22.00/ft^3) values of ore,the minimum stopage to pay for just the tunnelling is (4.1- 8.3ft, 4.2- 5.5 ft).

To break even on a \$2000 initial investment, with a loss in sinking the shaft of (4.1- \$1650. 4.2-&850.), would require an optimum horizontal tunnelling vs. upward stoping combination. Let 10' upward stopes be all that is practicable to remain within the \$20/ft tunnelling+stoping cost. Then, for Case 4.1, the minimum horizontal distance to traverse in order to break even would be \$3650(total cost)/\$4.10(profit per foot)= 890 feet. This os, of course, impracticible in view of the assumptions made. Increasing total stope height would halve this amount of horizontal distance (stope height=20', including tunnel height of 6'), but greater costs per lineal foot of tunnelling would also ensue. Even with assumption 4.2, to break even would require 40' of stoping for a tunnel length of 125', which also is prohibitive.

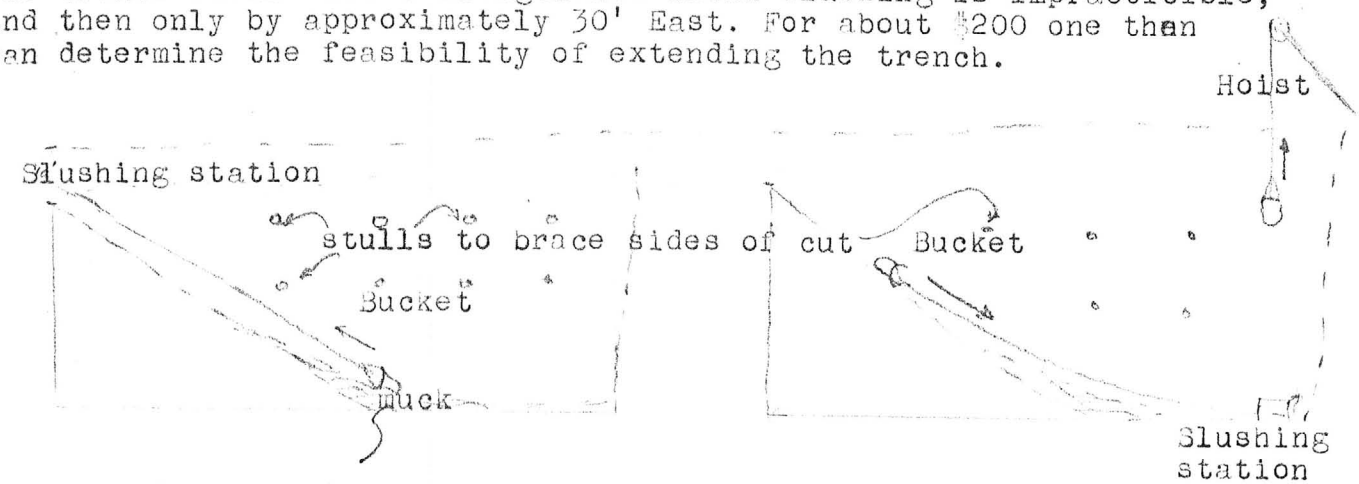
With a slusher, operated at $50/day, one could expect to move on the order of 100yd^3/day at a conservative minimum, for a cost of 50¢/yd^3. Currently exposed in the trench is approximately 80ft^3 of vein material, which should require only one-half day's work to blast and remove. Valuations for the recovered material are: (4.1)- $1160; (4.2)- $1760, which could immediately be realized to compensate part of the cost.

A 4' width to the trench would result in a net downward gain of about 2.5 yd^3/ day, if slushing progressed at 100yd^3/day, and the entire 100' length of trench were cleaned out. This would expose on the order of 115 ft^3 of vein material(100 to be conservative), worth:(4.1)- $1450 ; (4.2)- $2200. In either case it is clear that to break even would require less than one yard additional trench depth.

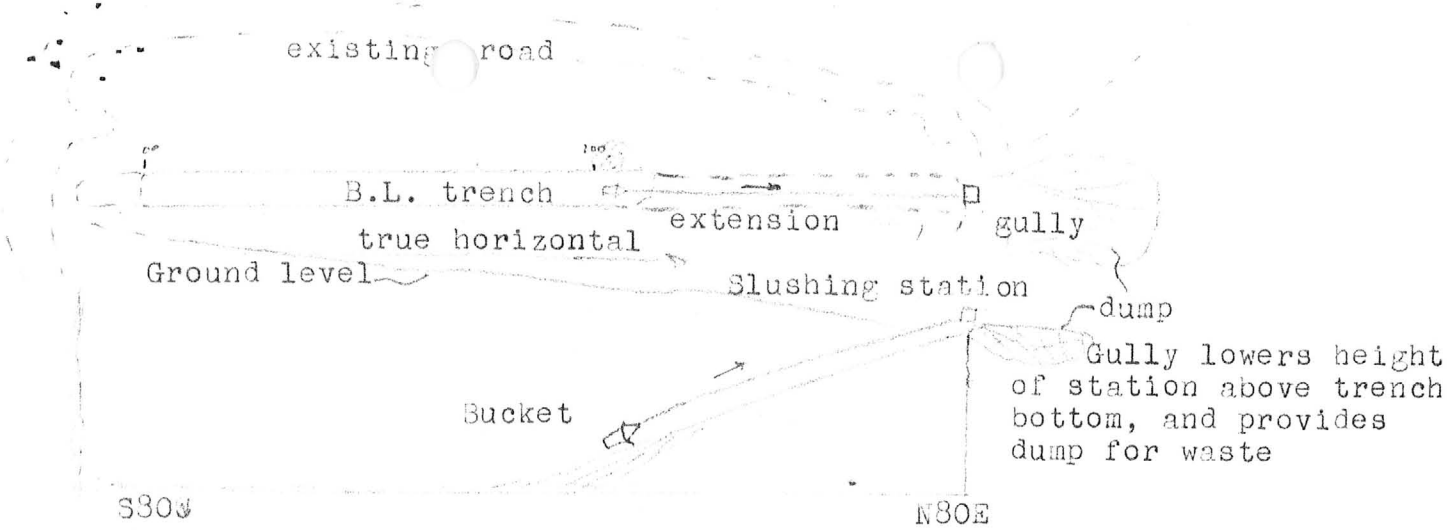
When considering costs and gains, it would be desirable to list values gained per unit depth increase of the tranch for each 10' interval. This would make concentration of work on a specified set of intervals less complex.

When a significant depth of trench is reached, it will be impossible to develop the entire length equally(Sketch 2), but by setting up hoists in tha manner shown, it should be possible to continue slushing operations. However, to extend the present trench 120' farther eastward would cost only $800/ 10' of depth. Slushing from the surface would then be possible for the entire trench length to a depth significantly greater than could be achieved without extending thetrench. This serves the additional purpose of uncovering more ore in the direction that appears to have the better grades. Costs will be further reduced by the sloping topography to the East of the current trench. (Sketch 3)

Recommendation: slush the currently existing trench, concentrating principally on the eastern end. Attempt, if possible, to keep ore from different sections of the trench separate. This will allow a sample from a given section of vein to be taken and its worth evaluated without expending the labor required to separate what may be low-grade vein ore from waste. Further, it will prevent dilution of high-grade ore by low-grade material. The trench should not be lengthened until slushing is impracticible, and then only by approximately 30' East. For about $200 one than can determine the feasibility of extending the trench.



The second sketch describes a method which avoids slushing up a slope, but additional cost is necessary to hoist ore out and to provide sufficient space for the station.



Sketch 3

Conclusion: The Brian Lode is mineable, and an effort should be made to mine it. Further exploration in the area should be continued, but the most intense effort should be at the Brian Lode.

With the exception of the Blister Lode, none of the other veins in thearea are interesting, as the appended assay list shows. Even the Blister Lode is of interest primarily because of the presence of small amounts of vanadium, which may indicate the presence of uranium inthearea.

Joseph F. Leising, Jr.

Consulting Geologist

Sample Description

A-4: quartz-rich "core" portion of Brian Lode vein, from section 60'-70'

A-5: siderite-ankerite portion of Brian Lode vein with some'aluminous" material

A-6: Sample from 4" quartz-calcite veinlet to West of Brian Lode

A-7: sample from 2" siderite-ankerite veinlet to East of B.L.

A-8: thin, vuggy quartz-tourmaline-carbonate veinlet on ridge near highway #17

A-9: thick(3") quartz-tourmaline-carbonate vein, adjacent to A-8

A-10: andesitic fragmental, from near A-8. Also a thin section sample, BLTS-3

IRON KING ASSAY OFFICE

ASSAY CERTIFICATE

BOX 14 — PHONE 632-7410
HUMBOLDT, ARIZONA 86329

ASSAY MADE FOR
AUSTIN B. CARTER JR.
Box 133 Black Canyon Stage
Phoenix, Ariz. 85020

August 23, 1973

DESCRIPTION	oz/ton Au	oz/ton Ag		% Fe	% Pb	% Zn	% Cu
A-4	1.304	46.48					
A-5	Tr	1.14					
A-6	Tr	0.22					
A-7	.010	0.21					
A-8	Tr	0.20					
A-9	Tr	0.14					
A-10	Tr	0.10					0.02

7

CHARGES 28.25

ASSAYER

Noranda Exploration, Inc.
2601 N. 1st Ave., P. O. [illegible]0326
Tucson, Arizona 85705

noranda

Tel.: (602) 623-2505

February 9, 1977

Austin B. Carter, Jr.
Box 133, Black Canyon Stage
Phoenix, Arizona 85020

Dear Mr. Carter:

I apologize for not responding sooner after our review of your Brian Lode Mining Claims. However, the samples I sent in for assay were delayed and I just recently received the geochemical data. The data are presented below for you to ponder and use as you desire. Sample #1 is from the sheared andesite on the south contact of your main vein. Sample #2 is of the vein itself and Sample #3 is taken across the shear zone northeast of the main vein.

Sample	Au ppm	Ag ppm	Cu ppm	Pb ppm	Zn ppm	U_3O_8 ppm
BLM-1	0.04	0.4	105	25	105	<2
BLM-2	38.	285.	1100	3900	2500	5
BLM-3	0.11	0.8	60	35	90	

I submit I am impressed with the gold and silver values from the Brian Lode Vein, but am forced to conclude that the mineralization is extremely local and consequently too small for Noranda to pursue further. I see no reason to discourage your further pursuits at the property. However, I do not discount the possibility that the high silver values are merely surface vestiges of supergene enrichment and that grade may not persist at depth.

Thank you for the opportunity to review your property, and good luck on the future of your claims.

Sincerely,

Gregory A. Hahn

Gregory A. Hahn
Geologist

GAH:gld

AMERICAN SMELTING AND REFINING COMPANY
SOUTHWESTERN ORE PURCHASING DEPARTMENT
P. O. BOX 5747, TUCSON, ARIZONA 85703

A. J. KROHA
MANAGER

1150 NORTH 7TH AVENUE
TELEPHONE 602-792-3010

December 19, 1972

Mr. Austin B. Carter, Jr.
Brian Lode Mining Company
P. O. Box 133, Black Canyon Stage
Phoenix, Arizona 85020

Dear Mr. Carter:

Our El Paso plant has assayed the handsample of ore left by you and reports the following results:

Oz. per Ton		Percent:			
Gold	Silver	Copper	Zinc	Silica	Alumina
2.05	29.6	0.6	0.6	50.0	9.8

Our smelting capacity at our western plants is limited due to stringent air pollution regulations, and as a result we are not able to accept new offerings of material at this time.

Yours very truly,

A. J. Kroha M.H.

A. J. KROHA

Statement Sept. 24 - 1978

Mobilization and demobilization	$475.00
Rock bit 8ft 5" @ $8.50	72.25
surface Casing 8ft. 8inches @ $3.00	26.40
Core drilled w/NXCL Core barrel @ $13.30 - 119ft	- 1,582.70
Casing time 1hr. 55min @ $32.35	50.14
hole Condition 4.5 hrs @ $32.35	145.58
Cement activity 3.5 hrs @ $32.35	113.23
Core boxes 12 @ $1.35	16.20
BX Casing 125ft @ $1.50	187.50
BX Casing Cap @ $2.00	2.00
Total	2671.00
less tractor bucket	- 500.00
	$2,171.00

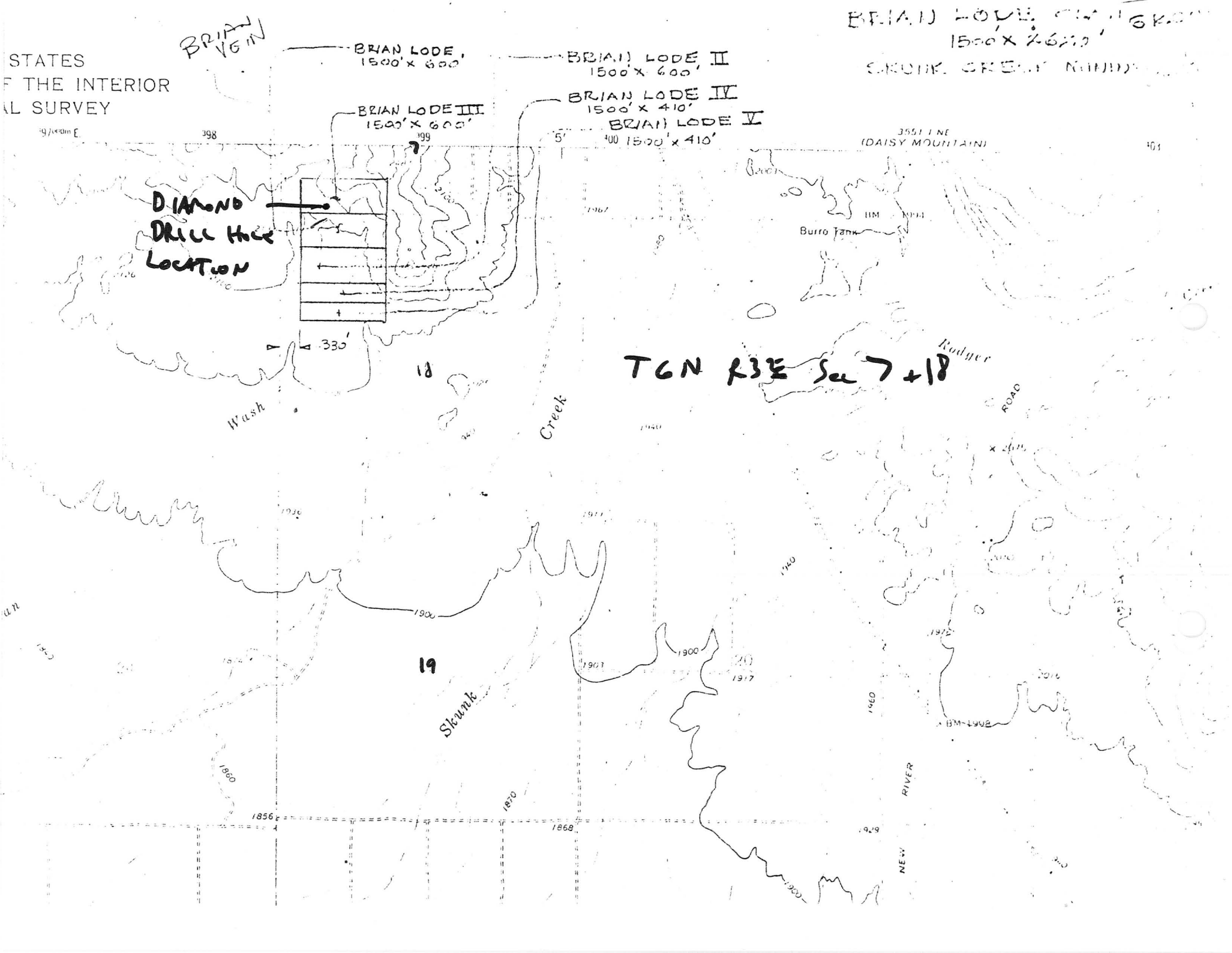
Guy Maney

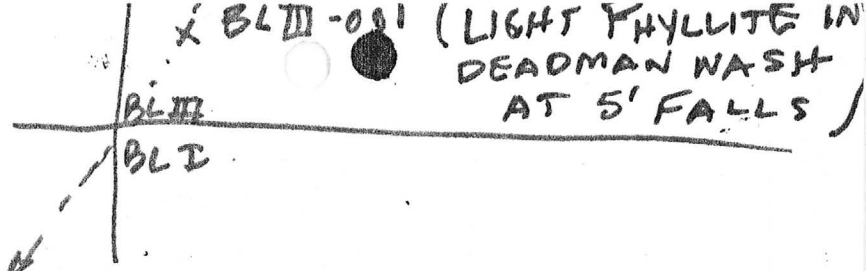
CORE AVAILABLE UNSPLIT AS OF 9/86
PSN

PAID BY CHECK NO. 3225 for $2171.00
26 SEPTEMBER 1978
CASHED OCT 4 1978

RECEIVED BY

1 EACH WAGNER TUBULAR STEEL
CONTROLS 3 HYDRAULIC CYLINDER
SER. NO. FARM TRACTOR FRONT LOADER
H805 9


STATES
F THE INTERIOR
AL SURVEY
BRIAN VEIN
BRIAN LODE, 1500' x 600'
BRIAN LODE II 1500' x 600'
BRIAN LODE IV 1500' x 410'
BRIAN LODE III 1500' x 600'
BRIAN LODE V 1500' x 410'
DIAMOND DRILL HOLE LOCATION
330'
18
19
Wash
Creek
Skunk
Rodger
ROAD
RIVER
NEW
Burro Tank
(DAISY MOUNTAIN)
T6N R3E Sec 7 + 18



BL - III - 001

The original rock was a volcanic, perhaps a dacite crystal tuff that was reworked. It has been converted to a phyllite by epi-mesozonal synkinematic metamorphism.

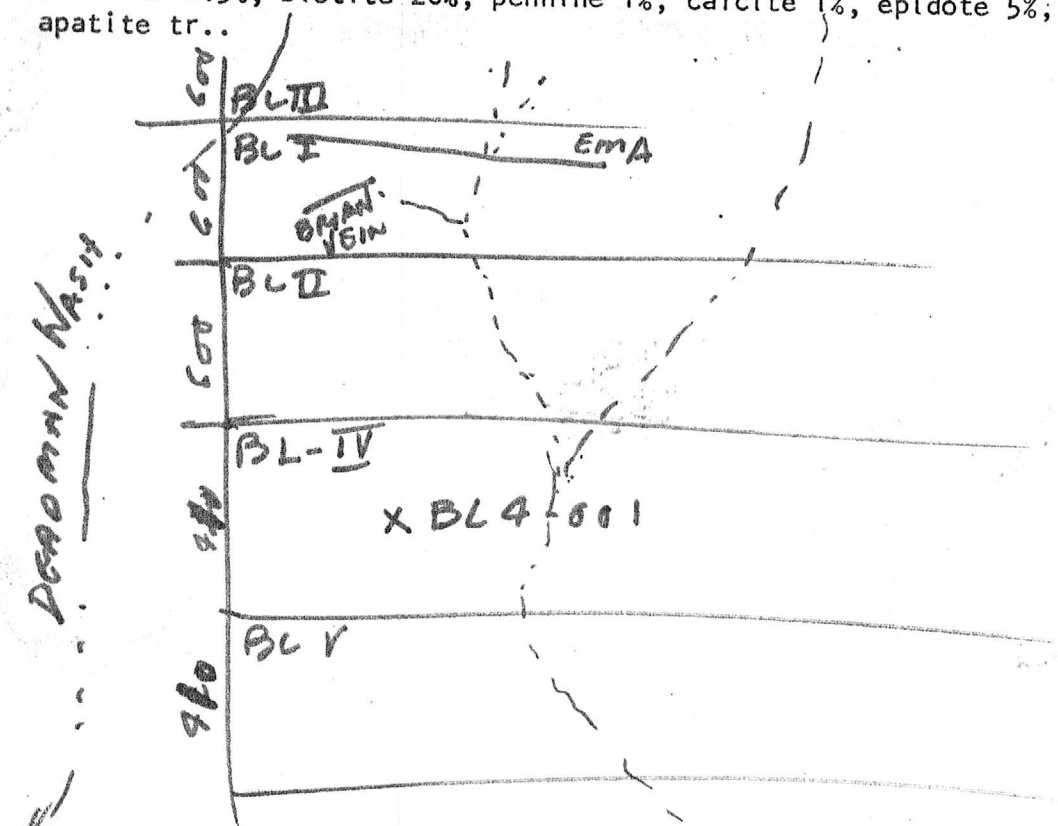
Scattered clasts of β quartz and plagioclase are often broken or strained. The quartz, however, shows later overgrowths that envelop sericite from the matrix. The matrix is composed largely of microgranular quartz and well foliated shreds of sericite. Former mafites are represented by scattered clusters of biotite flakes with accessory apatite, leucoxene, and hematite. The rock has been mildly brecciated, with slip zones filmed by sericite. Coarse granular calcite fills these zones and irregular pods; hematite occurs with it.

BL4 - 001

The specimen is an andesite with numerous plagioclase phenocrysts. These are stubby laths with rounded corners arranged in a matrix of randomly oriented plagioclase laths, hornblende, and interstitial glass. Glassy patches are also commonly enclosed by the phenocrysts. The rock has been metamorphosed in the low mesozone.

Plagioclase is flecked with sericite, calcite, and epidote, yet remains generally fresh. Hornblende is wholly altered to a dense scaly mush of biotite as is all glass. This biotite may encroach upon mearby plagioclase. Stringers of retrograde pennine and epidote, or granular quartz fill late fractures.

The following mineral percentages are estimates: plagioclase 63%, sericite 0.5%, biotite 28%, pennine 1%, calcite 1%, epidote 5%, quartz 1%, apatite tr..



EMA x BLI-001
BLI-002

BRIAN VEIN

BLI - 001

The specimen is an andesite with numerous slender, sharply-defined prisms of hornblende as phenocrysts. Skeletal phenocrysts of plagioclase are far less common; most plagioclase occurs as slender laths in the matrix with accessory magnetite. The flowage structure is rigorously obeyed. The rock has been epizonally metamorphosed.

Coarse epidote stipples the plagioclase phenocrysts; in one instance it is accompanied by calcite and a trace of (altered) sulfide. Sericite dusts all plagioclase equally. Hornblende is occasionally penninized but most remains quite fresh. Hematite replaces the magnetite.

Mineral percentages are estimated as: plagioclase 65%, hornblende 21%, epidote 1%, hematite 4%, sericite 4%, calcite 2%, pennine 2%, leucoxene 0.5%, hisingerite tr..

BLI - 002

The specimen is an andesite almost identical to BLI - 001 except that this specimen lacks the skeletal plagioclase phenocrysts. All occurs as slender laths showing good flowage alignment. Well-formed hornblende prisms are also common, sometimes as small phenocrysts. Some larger crystals have common cores and basaltic rims. The rock has been moderately altered in the epidone.

Hornblende remains remarkably fresh and is rarely attacked by chlorite and calcite. Accessory magnetite is oxidized to hematite. Plagioclase is uniformly and quite heavily dusted with sericite and minor amounts of calcite.

Minerals are present in the following estimated amounts: plagioclase 47%, hornblende 20%, sericite 26%, calcite 3%, hematite 3%, leucoxene 1%, prochlore tr..

BLI - 003 BRIAN VEIN BLI-003

The original rock was a dacite with large isolated or clustered phenocrysts of plagioclase set in a matrix of ragged plagioclase grains and interstitial quartz. Small biotite flakes and accessory magnetite also occurred in the matrix. The rock has been mildly deformed and moderately altered in the epizone.

Biotite is wholly penninized and sometimes stained with hisingerite. Plagioclase is often deformed, with granulated borders, and tends to be clouded with innumerable flakes of sericite and small ragged calcite grains. Matrix quartz shows negligible growth although quartz also occurs in veinlets with calcite and hematite.

Volume percentages are estimated as: quartz 8%, plagioclase 52%, sericite 27%, calcite 8%, pennine 2%, hematite 2%, apatite tr., leucoxene tr., hisingerite 0.5%.

BRIAN VEIN

BLI - 004 X BLI-004

The specimen is an amphibolite derived from a basic volcanic, perhaps a basalt, by upper mesozonal metamorphism. The original rock was severely chilled and locally glassy with numerous elongated cognate xenoliths.

Plagioclase phenocrysts and devitrified patches of glass are replaced by a mosaic of sodic plagioclase lacking twinning and showing complexly sutured grain boundaries. The intervening areas are replaced by dense microcrystalline hornblende stippled with ragged calcite crystalloblasts. Coarse epidote and minor sericite attack some larger plagioclase grains. Epidote also occurs in synmetamorphic veins and pods. These may also carry coarsely crystalline calcite, orthoclase, hornblende, and salite. Delessite may fill the interstices.

BLI - 005 THIS IS BRIAN VEIN

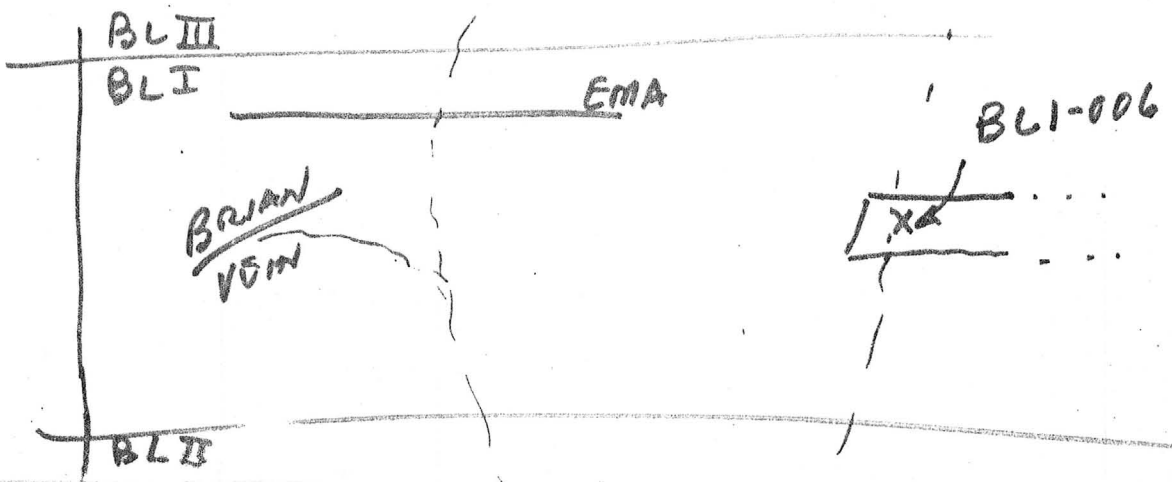
The rock is vein matter composed originally of coarse quartz. The walls also consist of similar quartz but it is occluded with stringers of sericite foliated parallel to the vein walls. Sulfides were very coarse grained and included pyrite, chalcopyrite, and galena. Strong oxidation was enhanced by shearing.

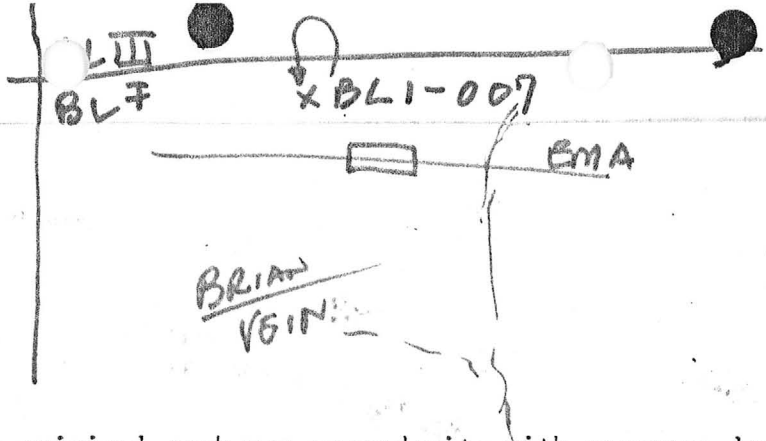
Sulfides are altered in situ to cellular masses of fibrous goethite. These pseudomorphs are laced with thin, parallel fractures filled with chalcedony and lined with opal. Supergene minerals include mottramite, which is most common, with minor cerussite, mimetite, and wulfenite. Goethite has heavily stained sericite in the vein walls.

BLI - 006

The original rock was an andesite with numerous large oval plagioclase phenocrysts as well as an occasional hornblende. Occasional chilled cognate xenoliths also occur in a dense chilled matrix of microgranular palgioclase and abundant hornblende. Flowage banding is quite well shown. The rock was matamorphosed in the epi-mesozone during moderate shearing.

Plagioclase phenocrysts are almost obliterated by dense sericite and occasional beads of calcite. The sericite is especially concentrated in thin anastamosing fractures that cut the fabric. The matrix is replaced by a dense aggragate of pennine and sericite stippled with clots of leucoxene. Pods of coarse pennine or muscovite replace certain xenoliths; interstitial quartz occurs here.





BLI - 007

The original rock was an andesite with numerous large blocky phenocrysts of plagioclase crowded closely in a seriate porphyritic matrix. Long slender hornblende prisms were the major mafite. The fabric is directionless. The rock has been metamorphosed in the epi-mesozone.

Plagioclase generally remains clear except for numerous included shreds of sericite. Some larger crystals are variously altered to dense microcrystalline epidote or coarse shreddy sericite interlayered with hydrobiotite. Coarse hydrobiotite, with retrograde pennine, also replaces hornblende. Coarse granular calcite has formed abundantly in the interstices of the matrix.

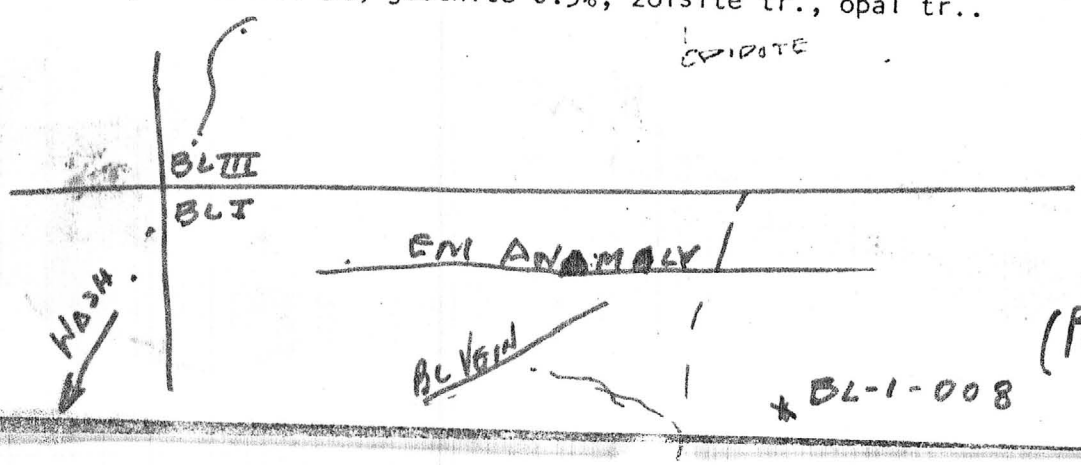
Following are estimated mineral percentages: plagioclase 38%, hydrobiotite 13%, epidote 18%, sericite 15%, calcite 10%, quartz 3%, pennine 2%, leucoxene 0.5%, apatite tr., hematite tr..

BL - I - 008

The original rock was a dacite with clusters of blocky plagioclase phenocrysts. The matrix is a jumble of angular plagioclase fragments with interstitial granular quartz and plagioclase. Small crumpled flakes of biotite and granular magnetite also occur in the matrix. The rock was brecciated prior to moderate epizonal alteration.

Biotite shows varying stages of decay to pennine, with hydrobiotite as an intermediate step. Plagioclase is quite heavily stippled with sericite, especially in brecciated zones. Coarse skeletal pyrite (now goethite) also has formed in brecciated zones. Veinlets of quartz and minor zoisite cut the fabric. Later fractures are filmed with goethite and opal.

Mineral percentages are estimated as: quartz 22%, plagioclase 52%, sericite 12%, pennine 2%, magnetite 1%, leucoxene 0.5%, apatite tr., hydrobiotite 9%, goethite 0.5%, zoisite tr., opal tr..



PHOENIX GEOPHYSICS INC.

REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY TEST SURVEY IN THE SKUNK CREEK MINING DISTRICT MARICOPA COUNTY, ARIZONA FOR BRIAN LODE MINING COMPANY

PHOENIX GEOPHYSICS

NOTES ON THE THEORY, METHOD OF FIELD OPERATION, AND PRESENTATION OF DATA FOR THE INDUCED POLARIZATION METHOD

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

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

in the rock.

The blocking action or induced polarization mentioned above, which depends upon the chemical energies necessary to allow the ions to give up or receive electrons from the metallic surface, increases with the time that a d. c. current is allowed to flow through the rock; i. e. as ions pile up against the metallic interface the resistance to current flow increases. Eventually, there is enough polarization in the form of excess ions at the interfaces, to appreciably reduce the amount of current flow through the metallic particle. This polarization takes place at each of the infinite number of solution-metal interfaces in a mineralized rock.

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

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

The values of the per cent frequency effect or F. E. are a measurement of the polarization in the rock mass. However, since the measurement of the degree of polarization is related to the apparent resistivity of the rock mass it is found that the metal factor values or M. F. are the most useful values in determining the amount of polarization present in the rock mass. The MF values are obtained by normalizing the F. E. values for varying resistivities.

The induced polarization measurement is perhaps the most powerful geophysical method for the direct detection of metallic sulphide mineralization, even when this mineralization is of very low concentration. The lower limit of volume per cent sulphide necessary to produce a recognizable IP anomaly will vary with the geometry and geologic environment of the source, and the method of executing the survey. However, sulphide mineralization of less than one per cent by volume has been detected by the IP method under proper geological conditions.

The greatest application of the IP method has been in the search for disseminated metallic sulphides of less than 20% by volume. However, it has also been used successfully in the search for massive sulphides in situations where, due to source geometry, depth of source, or low resistivity of surface layer, the EM method can not be successfully applied. The ability to differentiate ionic conductors, such as water filled shear zones, makes the IP method a useful tool in checking EM

anomalies which are suspected of being due to these causes.

In normal field applications the IP method does not differentiate between the economically important metallic minerals such as chalcopyrite, chalcocite, molybdenite, galena, etc., and the other metallic minerals such as pyrite. The induced polarization effect is due to the total of all electronic conducting minerals in the rock mass. Other electronic conducting materials which can produce an IP response are magnetite, pyrolusite, graphite, and some forms of hematite.

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 ground to be separated from the effects of vertical changes in the properties. Current is applied to the ground at two points in distance (X) apart. The potentials are measured at two other points (X) feet apart, in line with the current electrodes is an integer number (n) times the basic distance (X).

The measurements are made along a surveyed line, with a constant distance (nX) between the nearest current and potential electrodes. In most surveys, several traverses are made with various values of (n); i.e. (n) = 1, 2, 3, 4, etc. The kind of survey required (detailed or reconnaissance) decides the number of values of (n) used.

In plotting the results, the values of the apparent resistivity, apparent per cent frequency effect, and the apparent metal factor

measured for each set of electrode positions are plotted at the intersection of grid lines, one from the center point of the current electrodes and the other from the center point of the potential electrodes. (See Figure A.) The resistivity values are plotted above the line as a mirror image of the metal factor values below. On a second line, below the metal factor values, are plotted the values of the per cent frequency effect. In some cases the values of per cent frequency effect are plotted as superscripts of the metal factor value. In this second case the frequency effect values are not contoured. The lateral displacement of a given value is determined by the location along the survey line of the center point between the current and potential electrodes. The distance of the value from the line is determined by the distance (nX) between the current and potential electrodes when the measurement was made.

The separation between sender and receiver electrodes is only one factor which determines the depth to which the ground is being sampled in any particular measurement. The 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 results, model study results and theoretical investigations. The position of the electrodes when anomalous values are measured is important in the interpretation.

In the field procedure, the interval over which the potential differences are measured is the same as the interval over which the electrodes are moved after a series of potential 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 distance (X) over which the electrodes are moved each time. In the past, intervals have been used ranging from 25 feet to 2000 feet for (X). In each case, the decision as to the distance (X) and the values of (n) to be used 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 diagram in Figure A demonstrates the method used in plotting the results. Each value of the apparent resistivity, apparent metal factor, and apparent per cent frequency effect is plotted and identified by the position of the four electrodes when the measurement was made. It can be seen that the values measured for the larger values of (n) are plotted farther from the line indicating that the thickness of the layer of the earth that is being tested is greater than for the smaller values of (n); i. e. the depth of the measurement is increased. When the F. E. values are plotted as superscripts to the MF values the third section of data values is not presented and the F. E. values are not contoured.

METHOD USED IN PLOTTING DIPOLE-DIPOLE INDUCED POLARIZATION AND RESISTIVITY RESULTS

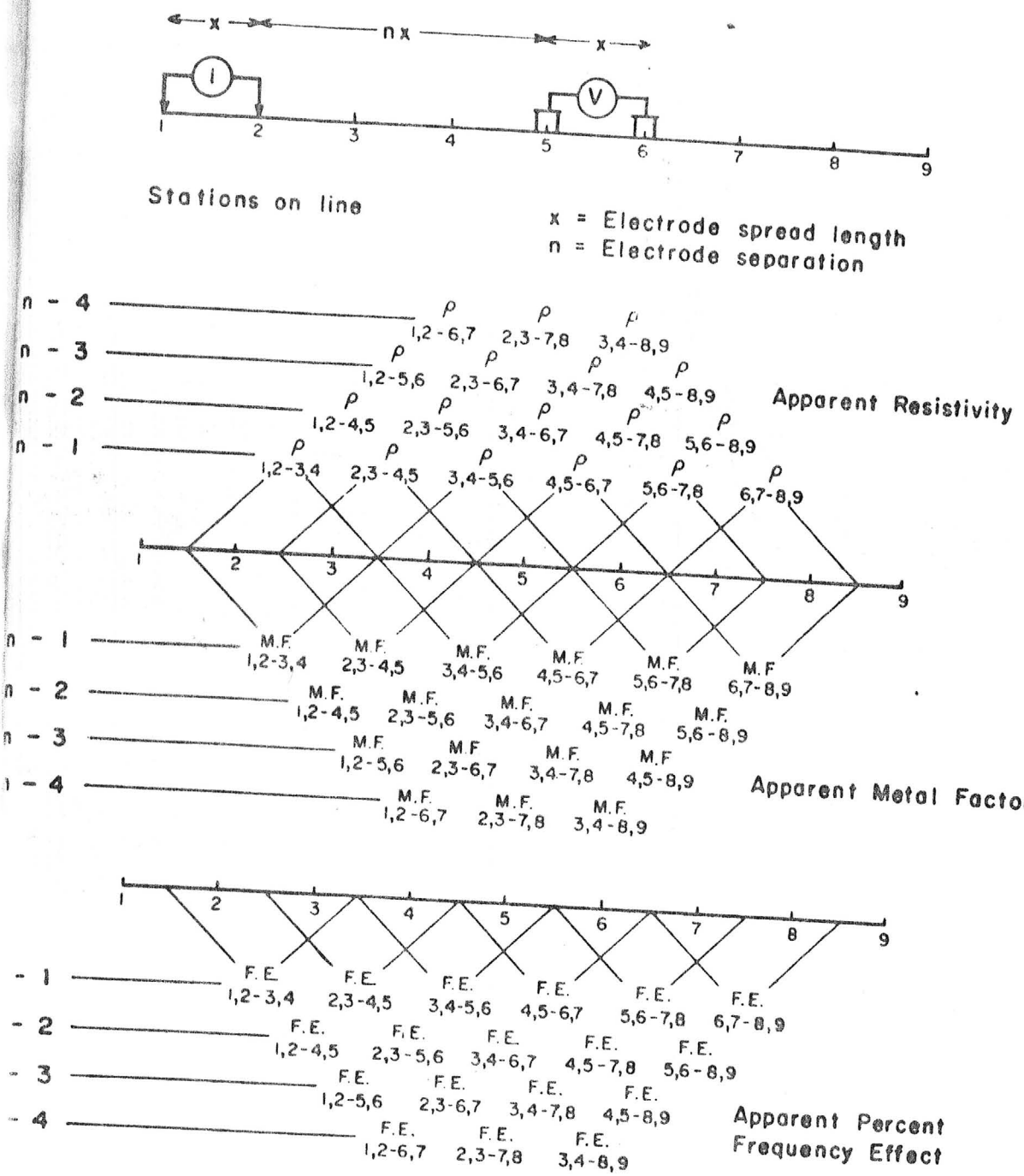


Fig. A

The IP measurement is basically obtained by measuring the difference in potential or voltage (ΔV) obtained at two operating frequencies. The voltage is the product of the current through the ground and the apparent resistivity of the ground. Therefore in field situations where the current is very low due to poor electrode contact, or the apparent resistivity is very low, or a combination of the two effects; the value of (ΔV) the change in potential will be too small to be measurable. The symbol "TL" on the data plots indicates this situation.

In some situations spurious noise, either man made or natural, will render it impossible to obtain a reading. The symbol "N" on the data plots indicates a station at which it is too noisey to record a reading. If a reading can be obtained, but for reasons of noise there is some doubt as to its accuracy, the reading is bracketed in the data plot ( ).

In certain situations negative values of Apparent Frequency Effect are recorded. This may be due to the geologic environment or spurious electrical effects. The actual negative frequency effect value recorded is indicated on the data plot, however the symbol "NEG" is indicated for the corresponding value of Apparent Metal Factor. In contouring negative values the contour lines are indicated to the nearest positive value in the immediate vicinity of the negative value.

The symbol "NR" indicates that for some reason the operator did not attempt to record a reading although normal survey procedures would suggest that one was required. This may be due to inaccessible topography or other similar reasons. Any symbol other than those discussed above is unique to a particular situation and is described within the body of the report.

PHOENIX GEOPHYSICS INC.

REPORT ON THE INDUCED POLARIZATION AND RESISTIVITY TEST SURVEY IN THE SKUNK CREEK MINING DISTRICT MARICOPA COUNTY, ARIZONA FOR BRIAN LODE MINING COMPANY

1. INTRODUCTION

At the request of Mr. Austin B. Carter, Jr. of Brian Lode Mining Company, Phoenix Geophysics has completed an Induced Polarization and Resistivity Test Survey in the Skunk Creek Mining District, Maricopa County, Arizona. The survey area is situated in T.6N, R.3E, Sec. 7 and Sec. 18.

The survey area appears to be underlain by moderately metamorphosed andesite and dacite. Disseminated sulfide mineralization occurs in coarse quartz veins and possibly along shear zones.

The purpose of the Induced Polarization and Resistivity survey was to test for possible concentrations of sulphide mineralization across an area of quartz veining previously located by trenching and to determine if any depth continuity occurs. Since the mineralization was reported to be quite shallow, an initial survey line across two trenches was conducted with 50 foot and 100 foot dipoles and readings from N = 1 to N = 5 at frequencies

f 2.5 Hz and .3 Hz. The survey was conducted by Mr. John Busby, geo-hysical technician, under the supervision of Mr. Bruce Bell, geologist.

. PRESENTATION OF RESULTS

The Induced Polarization and Resistivity Test Survey results are hown on the following data plots in the manner described in the notes ccompanying this report.

ine	Electrode Intervals	Dwg. No.
1	100 feet	IP-U-5024-1
1	50 feet	IP-U-5024-2

Also enclosed with this report is Dwg. I.P.P.-U-5024, a plan map of he property grid at a scale of 1 inch = 50 feet. The definite, probable nd possible Induced Polarization anomalies are indicated by bars, in the anner shown on the legend, on this plan map as well as on the data plots. hese bars represent the surface projection of the anomalous zones as nterpreted from the location of the transmitter and receiver electrodes hen the anomalous values were measured.

Since the Induced Polarization measurement is essentially an averaging rocess, as are all potential methods, it is frequently difficult to exactly inpoint the source of an anomaly. Certainly, no anomaly can be located with ore accuracy than the electrode interval length; i.e. when using 100 foot lectrode intervals the position of a narrow sulphide body can only be deter-ined to lie between two stations 100 feet apart. In order to definitely ocate, and fully evaluate, a narrow, shallow source it is necessary to use horter electrode intervals. In order to locate sources at some depth, larger lectrode intervals must be used, with a corresponding increase in the un-ertainties of location. Therefore, while the center of the indicated anomaly robably 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.

Metal Factor (M.F.) anomalies and percent frequency effect (PFE) are shown on the data plots. The percent frequency effect results indicate polarizable areas without taking into account the resistivity of the areas. The metal factor is obtained by combining the percent frequency effect and the resistivity. A good conductor (low resistivity) that is strongly polarizable (high PFE) will give a well defined or "definite" metal factor anomaly. Less well-defined metal factor anomalies are designated as probable or possible.

The percent frequency effect and metal factor parameters are complimentary. The relative importance of each type of information depends upon the particular geophysical environment encountered and the type of target expected. For example, a mineralized silicified zone will give a "strong" percent frequency effect anomaly, but may not give a "definite" metal factor anomaly. Alternatively, an oxidized ore zone may only give a "weak" percent frequency effect anomaly, but will give a "definite" metal factor anomaly. Since the apparent resistivity is used in calculating the metal factor parameter, topographic effects affecting the resistivity will also affect the metal factor parameter. Thus, since hills increase the apparent resistivity they will in turn decreased the metal factor, and conversely, where valleys give rise to lower apparent resistivities the metal factor parameter will be enlarged. Judicious consideration of both the percent frequency effect and the metal factor results permits a comprehensive evaluation of the geophysical environment.

The anomalies as shown on the data plots represent the surface projection of the polarizable zones. Contacts or faults inferred from the resistivity

patterns are also shown. Anomaly boundaries and fault locations should be considered accurate to the electrode interval used.

The anomalies shown on the plan map are designated apparent depths of shallow, moderate, or deep. At larger dipole separations a greater volume of rock is averaged, in lateral extent as well as depth. Thus, the source of a deep-appearing anomaly detected along a single line may be at shallow depth to one side of the line. The data plots, therefore, cannot represent true depth. Depths can be calculated from the apparent resistivity data in the case of ideal horizontal layers, but even this calculation depends on an assumed resistivity contrast between the zone at depth and the overlying rock. Although ambiguous, the simple depth designations are useful for correlating or comparing anomalous zones obtained on adjacent survey lines. Drill hole information from one or more zones frequently permits one to make a fair depth estimate for other zones. The following depth generalizations apply to porphyry copper and contact-replacement bodies:

	Apparent Depth (dipole separations)	Drill Hole Depth (in dipole lengths)
Shallow	1 - 2	1/2 - 1
Moderate	2 - 3	1 - 1-1/2
Deep	3 - 5	1-1/2 - 2+

Thus, a shallow zone is one detected at a one-to-two dipole separations and should be tested by a drill hole from a half-to-one dipole length deep.

The Induced Polarization method is a geophysical tool used to determine the electrical properties of the earth. The final evaluation of the Induced Polarization anomalies should also be based on available geologic evidence and concepts.

3. DISCUSSION OF RESULTS

The Induced Polarization and Resistivity survey of the Brian Lode

ining Company's property was designed to test for concentrations of sulphide ineralization at a shallow depth. The survey line was conducted across two renches approximately 15 feet deep and two hundred feet apart which eportedly contained disseminated mineralization.

The 50 foot dipole-dipole survey was conducted first to provide omparable data over the known occurences. Shallow probable anomalies have een located coincident with the two trenches between 1+50S to 2S and 1N to +50N. The latter anomaly occurs in an area of comparatively high conductivity hich may represent a shear plane or fault. This anomaly also appears to have etter continuity with depth than the other probable anomaly.

A definite anomalous response has also been located by the 50 foot dipole ata occurring between 0+50N and 0+25S at moderate depth. This anomaly xhibits a bulls-eye pattern which may represent an off-the-end effect, or a nall pod of mineralization beneath this line.

The 100 foot dipole data conducted along the same line has not located ny anomalous response over the south trench.

A definite anomaly at shallow depth has been interpreted between 1+50N nd 2+50N which may represent the north trench but this response does not ppear to have any depth continuity now.

The definite anomaly centered at 4+50S may extend beyond the south end f the line but even without a complete IP pattern this response appears to e the most interesting of the entire test. This anomaly is the result of ow resistivity, which may be due to shearing, and a slight increase in the FE response.

The 100 foot dipole data has not located any anomalous response that an be correlated with the definite anomaly located by the 50 foot dipole ata between 0+50N and 0+25S. It must be inferred that this anomaly is very stricted in size and probably does not warrant any additional work.

. CONCLUSIONS AND RECOMMENDATIONS

The 50 foot dipole data has located weak anomalies that appear to be oincident with the exploratory trenches. The anomalous response over the outh trench is non-existent on the 100 foot dipole data determining that his anomaly is very weak and of limited extent. However, the anomaly djacent to the northern trench appears stronger on the 100 foot dipole data nd probably warrants additional work, but this anomaly has limited depth xtent.

The definite anomaly located on the south end of the survey line by he 100 foot dipole data is the best response of the entire survey and re- uires additional work.

Since only one line was surveyed during this test and no strike length or either of the definite anomalies has been determined, it is recommended hat two short drill-holes be considered on the definite responses to deter- ne if economic mineralization occurs on this property prior to any ditional geophysics. The test holes could be located to intersect the omalous response as follows:

beneath 2N at a depth of 100 feet to 125 feet and beneath 4+50S at a depth of 150 feet to 200 feet.

If economic mineralization occurs in either drill hole, additional duced Polarization and Resistivity survey lines should be conducted parallel this line at 200 foot intervals to determine the strike length of the omalous response.

PHOENIX GEOPHYSICS INC.

Bruce S. Bell
Geologist

Philip G. Hallof
Geophysicist

Registered Professional Engineer (Geophysical)
CERTIFICATE NO.
7309
PHILIP G.
HALLOF
Date:

ted: October 29, 1976

APPENDIX
THE INTERPRETATION OF INDUCED POLARIZATION ANOMALIES FROM RELATIVELY SMALL SOURCES

The induced polarization method was originally developed to detect disseminated sulphides and has proven to be very successful in the search for "porphyry copper" deposits. In recent years we have found that the IP method can also be very useful in exploring for more concentrated deposits of limited size. This type of source gives sharp IP anomalies that are often difficult to interpret.

The anomalous patterns that develop on the contoured data plots will depend on the size, depth and position of the source and the relative size of the electrode interval. The data plots are not sections showing the electrical parameters of the ground. When the electrode interval (X) is appreciably greater than the width of the source, a large volume of unmineralized rock is averaged into each measurement. This is particularly true for the large values of the electrode separation (n).

The theoretical scale model results shown in Figure 1 and Figure 2 indicate the effect of depth. If the depth to the top of the source is small compared to the electrode interval (i.e. d < X) the measurement for n = 1 will be anomalous. In Figure 1 the depth is 0.5 units (X = 1.0 units) and the n = 1 value is definitely anomalous; the pattern in the contoured data plot is typical for a relatively shallow, narrow, near-vertical tabular source. The results in Figure 2 are for the same source with the depth increased to 1.5 units. Here the n = 1 value is not anomalous; the larger values of (n) are anomalous but the magnitudes are much lower than for the source at less depth.

When the electrode interval is greater than the width of the source, it is not possible to determine its width or exact position between the electrodes. The true IP effect within the source is also indeterminate; the anomaly from a very narrow source with a very large true IP effect will be much the same as that from a zone with twice the width and 1/2 the true IP effect. The theoretical scale model data shown in Figure 3 and Figure 4 demonstrate this problem. The depth and position of the source are unchanged but the width and true IP effect are varied. The anomalous patterns and magnitudes are essentially the same, hence the data are insufficient to evaluate the source completely.

The normal practise is to indicate the IP anomalies by solid, open, or dashed bars, depending upon their degree of distinctiveness. 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. As illustrated in Figure 1, Figure 2, Figure 3 and Figure 4, no anomaly can be located with more accuracy than the spread length. While the centre of the solid bar indicating the anomaly corresponds fairly well with the source, the length of the bar should not be taken to represent the exact edges of the anomalous material.

If the source is shallow, the anomaly can be better evaluated using a shorter electrode interval. When the electrode interval used approaches the width of the source, the apparent effects measured will be nearly equal to the true effects within the source. When there is some depth to the top of the source, it is not possible to use electrode intervals that are much less than the depth to the source. In this situation, one must realize that a definite ambiguity exists regarding the width of the source and the IP effect within the source.

Our experience has confirmed the desirability of doing detail. When a reconnaissance IP survey using a relatively large electrode interval indicates the presence of a narrow, shallow source, detail with shorter electrode intervals is necessary in order to better locate, and evaluate, the source. The data of most usefulness is obtained when the maximum apparent IP effect is measured for n = 2 or n = 3. For instance, an anomaly originally located using X = 300' may be checked with X = 200' and then X = 100'. The data with X = 100' will be quite different from the original reconnaissance results with X = 300'.

The data shown in Figure 5 and Figure 6 are field results from a greenstone area in Quebec. The expected sources were narrow (less than 30' in width) zones of massive, high-grade, zinc-silver ore. An electrode interval of 200' was used for the reconnaissance survey in order to keep the rate of progress at an acceptable level. The anomalies located were low in magnitude.

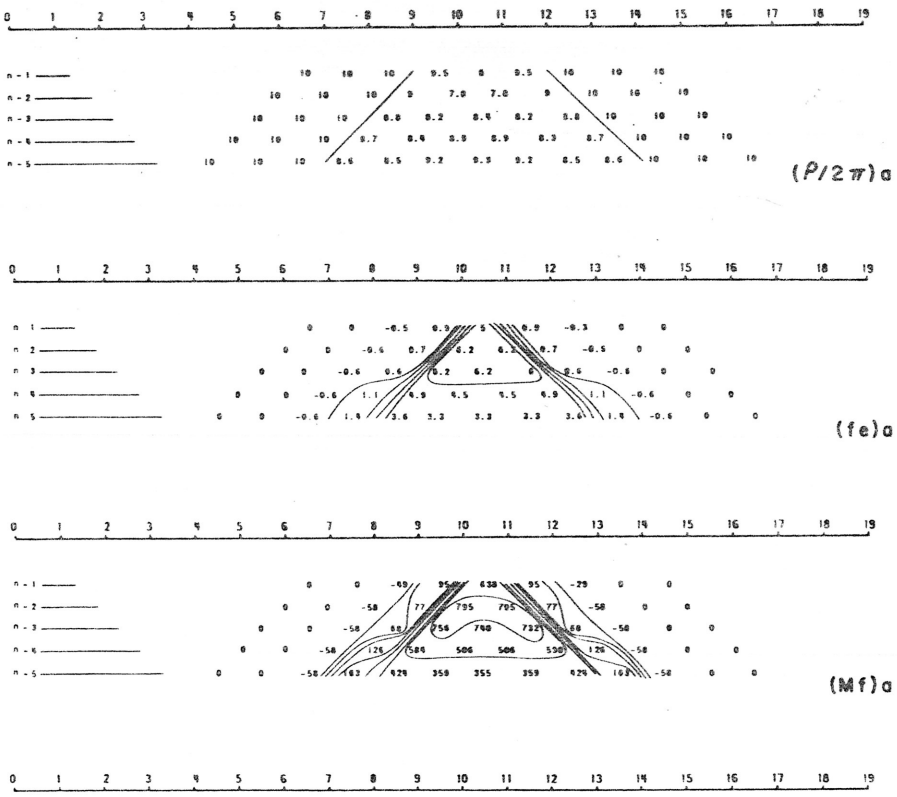
The very weak, shallow anomaly shown in Figure 5 is typical of those located by the X = 200' reconnaissance survey. Several anomalies of this type were detailed using shorter electrode intervals. In most cases the detail measurements suggested broad zones of very weak mineralization. However, in the case of the source at 20N to 22N, the measurements with shorter electrode intervals confirmed the presence of a strong, narrow source. The X = 50' results are shown in Figure 6. Subsequent drilling has shown the source to be 12.5' of massive sulphide mineralization containing significant zinc and silver values.

The change in the anomaly that results when the electrode interval is reduced is not unusual. The X = 50' data more accurately locates the narrow source, and permits the geophysicist to make a better evaluation of its importance. The completion of this type of detail is very important, in order to get the maximum usefulness from a reconnaissance IP survey.

PHOENIX GEOPHYSICS

Theoretical Induced Polarization and Resistivity Studies

Scale Model Cases



$(\rho/2\pi)_1 = 10$

$(Mf)_1 = 0$

$(\rho/2\pi)_2 = 2{\cdot}51$

$(Mf)_2 = 10000$

$(fe)_2 = 25\%$

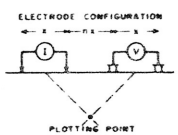
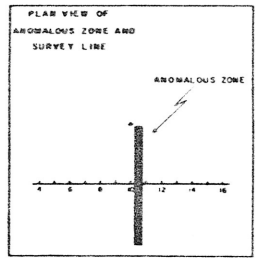


FIG 1

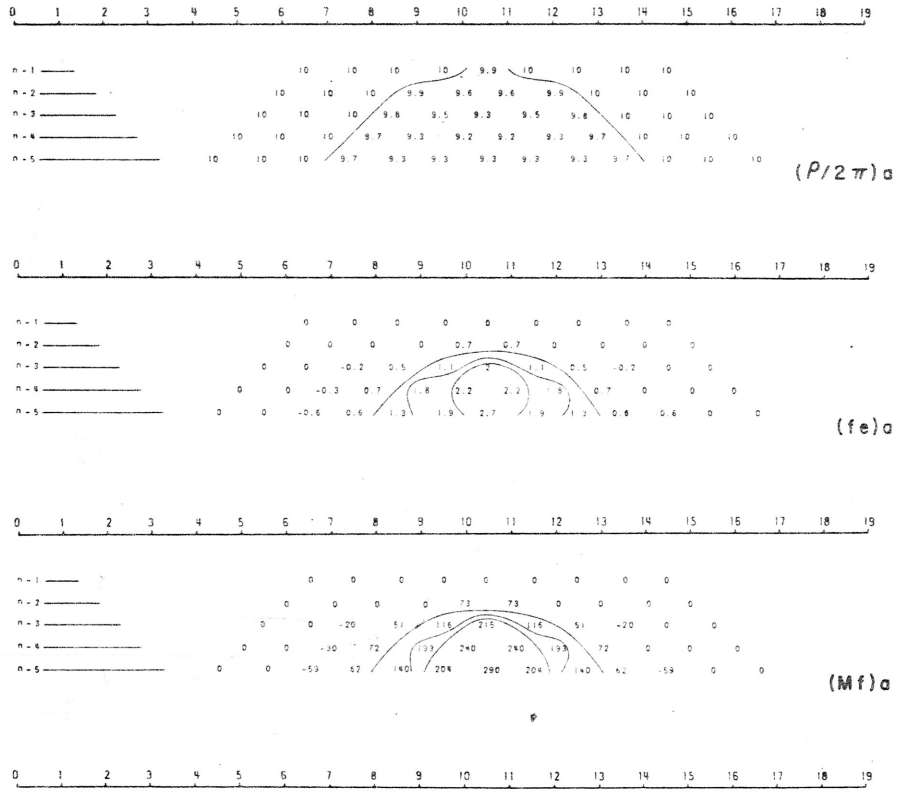


CASE II-0·5-BU-10-a

PHOENIX GEOPHYSICS

Theoretical Induced Polarization and Resistivity Studies

Scale Model Cases



$(\rho/2\pi)_1 = 10$

$(Mf)_1 = 0$

$(\rho/2\pi)_2 = 2{\cdot}6$

$(Mf)_2 = 9250$

$(fe)_2 = 24\%$

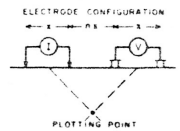
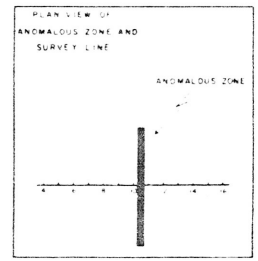


FIG 2

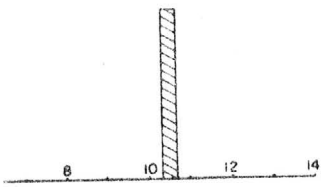


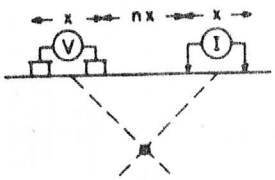
CASE II-1·5-BU-10-a

THEORETICAL
ICED POLARIZATION
AND
ESISTIVITY STUDIES

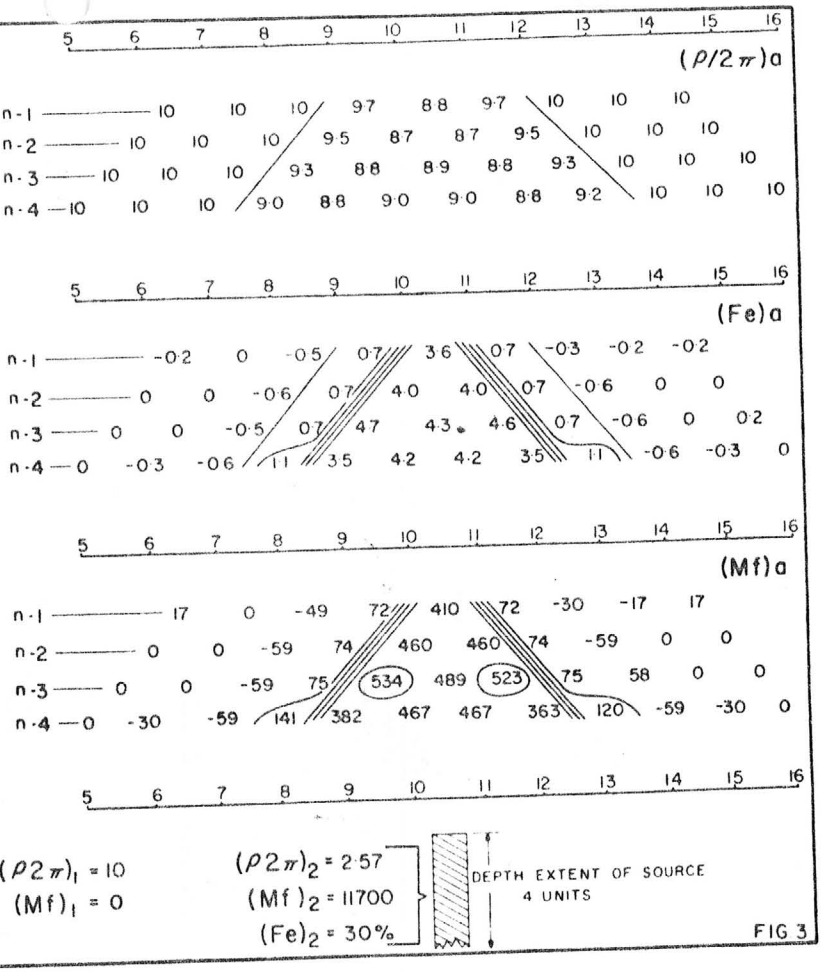
SCALE MODEL CASE

PLAN VIEW





X EQUALS 1 UNIT



$(\rho 2\pi)_1 = 10$
$(Mf)_1 = 0$

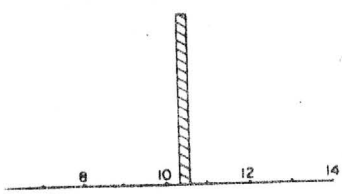
$(\rho 2\pi)_2 = 2.57$
$(Mf)_2 = 11700$
$(Fe)_2 = 30\%$

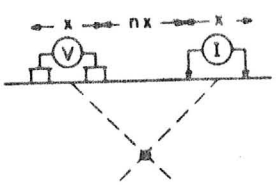
FIG 3

THEORETICAL
UCED POLARIZATION
AND
ESISTIVITY STUDIES

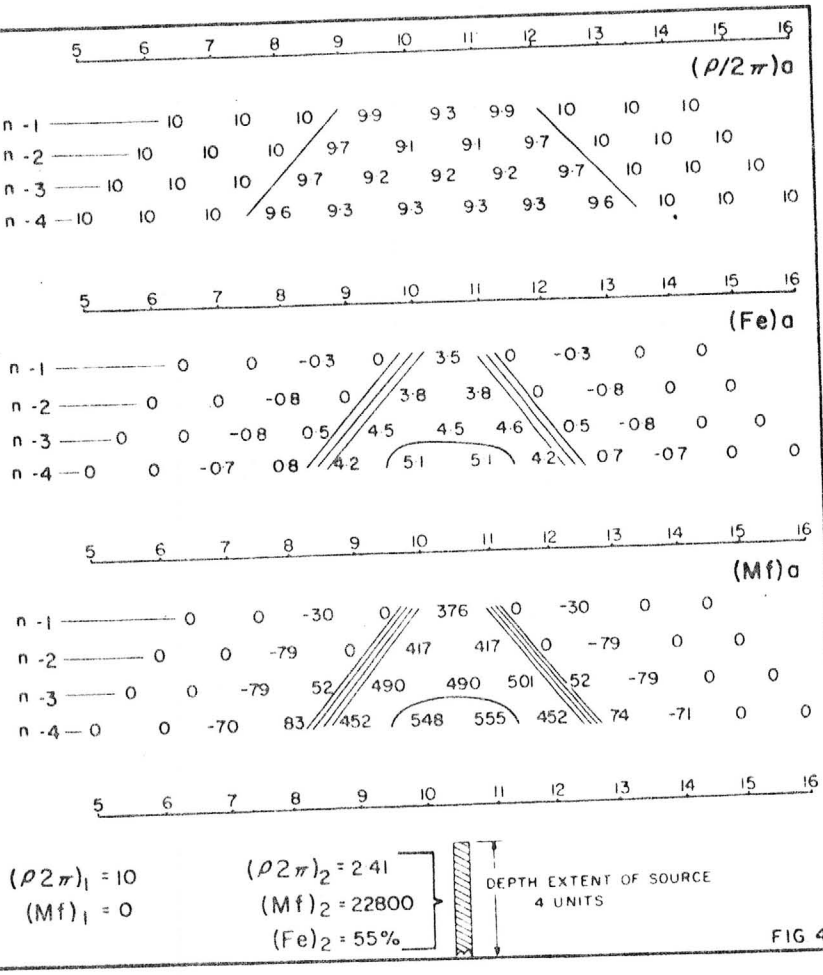
SCALE MODEL CASE

PLAN VIEW





X EQUALS 1 UNIT



$(\rho 2\pi)_1 = 10$
$(Mf)_1 = 0$

$(\rho 2\pi)_2 = 2.41$
$(Mf)_2 = 22800$
$(Fe)_2 = 55\%$

FIG 4

ASSESSMENT DETAILS

PROPERTY: Brian Lode Mining Company

SPONSOR: Mr. Austin B. Carter, Jr.
Mr. Lloyd E. Williams

LOCATION: Skunk Creek Mining District, Maricopa County, Arizona

TYPE OF SURVEY: Induced Polarization & Resistivity

DATE STARTED: 9/14/76

OPERATING MAN DAYS: 3

DATE FINISHED: 9/14/76

CONSULTING MAN DAYS: 1

NUMBER OF STATIONS: 27

DRAFTING MAN DAYS: 1

NUMBER OF READINGS: 188

TOTAL MAN DAYS: 5

MILES OF LINE SURVEYED: 0.40

CONSULTANTS:

Mr. Bruce S. Bell, 1330 W. San Lucas, Tucson, Arizona 85704

Dr. Philip G. Hallof, 200 Yorkland Blvd., Willowdale, Ontario M2J 1R6

FIELD TECHNICIANS:

Mr. John Busby, 6017 S. 75th. E. Avenue, Tulsa, Oklahoma 74145
Mr. Floyd Michaels, 1146 E. 10th St., Tucson, Arizona 85719
Mr. Mike Mathews, P.O. Box 1129, Pinetop, Arizona 85935

DRAFTSMEN:

Mrs. Janey Ross, 8060 E. Broadway, Apt. E-203, Tucson, Arizona 85710

PHOENIX GEOPHYSICS INC.

Bruce S. Bell

Bruce S. Bell
Geologist

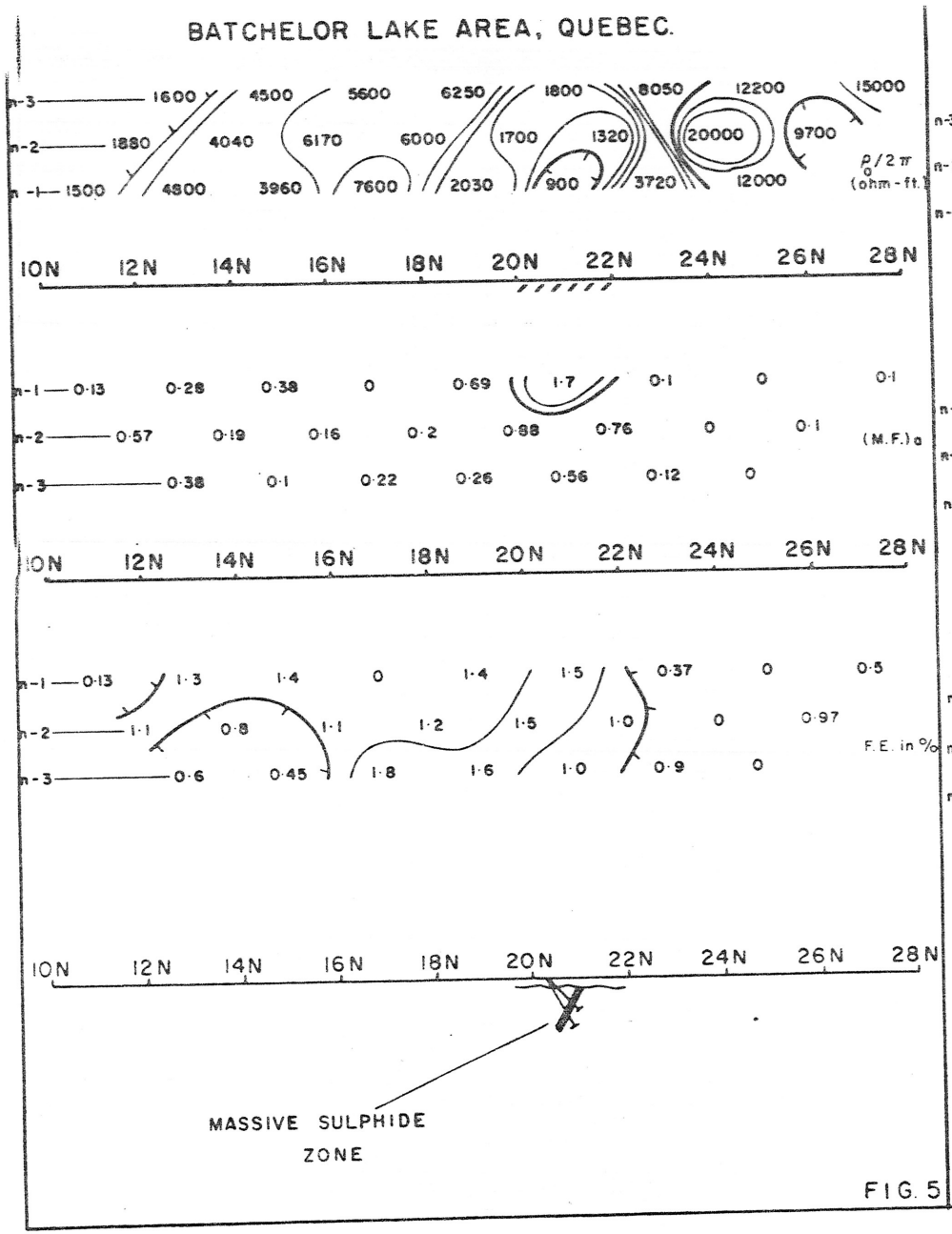

BATCHELOR LAKE AREA, QUEBEC.
n-3 1600 4500 5600 6250 1800 8050 12200 15000
n-2 1880 4040 6170 6000 1700 1320 20000 9700
n-1 1500 4800 3960 7600 2030 900 3720 12000
ρ0/2π (ohm-ft.)
10N 12N 14N 16N 18N 20N 22N 24N 26N 28N
n-1 0·13 0·28 0·38 0 0·69 1·7 0·1 0 0·1
n-2 0·57 0·19 0·16 0·2 0·88 0·76 0 0·1
n-3 0·38 0·1 0·22 0·26 0·56 0·12 0
(M.F.)a
10N 12N 14N 16N 18N 20N 22N 24N 26N 28N
n-1 0·13 1·3 1·4 0 1·4 1·5 0·37 0 0·5
n-2 1·1 0·8 1·1 1·2 1·5 1·0 0 0·97
n-3 0·6 0·45 1·8 1·6 1·0 0·9 0
F.E. in %
10N 12N 14N 16N 18N 20N 22N 24N 26N 28N
MASSIVE SULPHIDE ZONE

FIG. 5

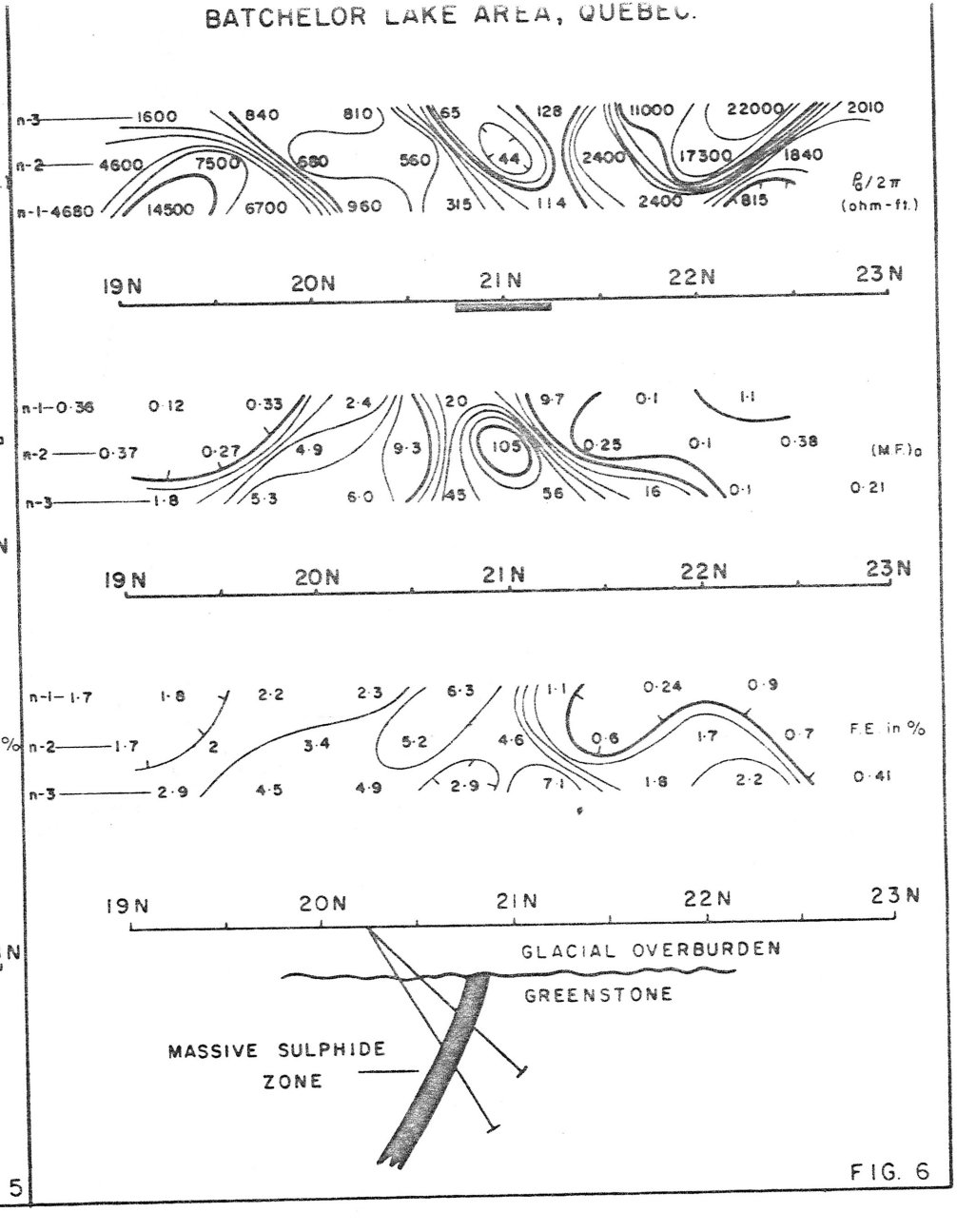

BATCHELOR LAKE AREA, QUEBEC.
n-3 1600 840 810 65 128 11000 22000 2010
n-2 4600 7500 680 560 44 2400 17300 1840
n-1 4680 14500 6700 960 315 114 2400 815
ρ0/2π (ohm-ft.)
19N 20N 21N 22N 23N
n-1 0·36 0·12 0·33 2·4 20 9·7 0·1 1·1
n-2 0·37 0·27 4·9 9·3 105 0·25 0·1 0·38
n-3 1·8 5·3 6·0 45 56 16 0·1 0·21
(M.F.)a
19N 20N 21N 22N 23N
n-1 1·7 1·8 2·2 2·3 6·3 1·1 0·24 0·9
n-2 1·7 2 3·4 5·2 4·6 0·6 1·7 0·7
n-3 2·9 4·5 4·9 2·9 7·1 1·8 2·2 0·41
F.E. in %
19N 20N 21N 22N 23N
GLACIAL OVERBURDEN
GREENSTONE
MASSIVE SULPHIDE ZONE

FIG. 6

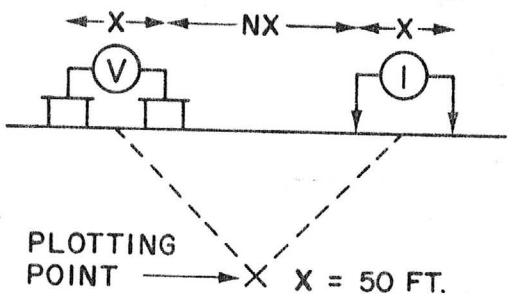
DWG. NO. - I. P. - U - 5024-2

BRIAN LODE MINING COMPANY

SKUNK CREEK MINING DISTRICT, MARICOPA COUNTY, ARIZONA

LINE NO. - 1

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 2.5 & .3 HZ.

DATE SURVEYED: SEPT., 1976

APPROVED:

Bruce S. Bell

DATE: 10/21/76

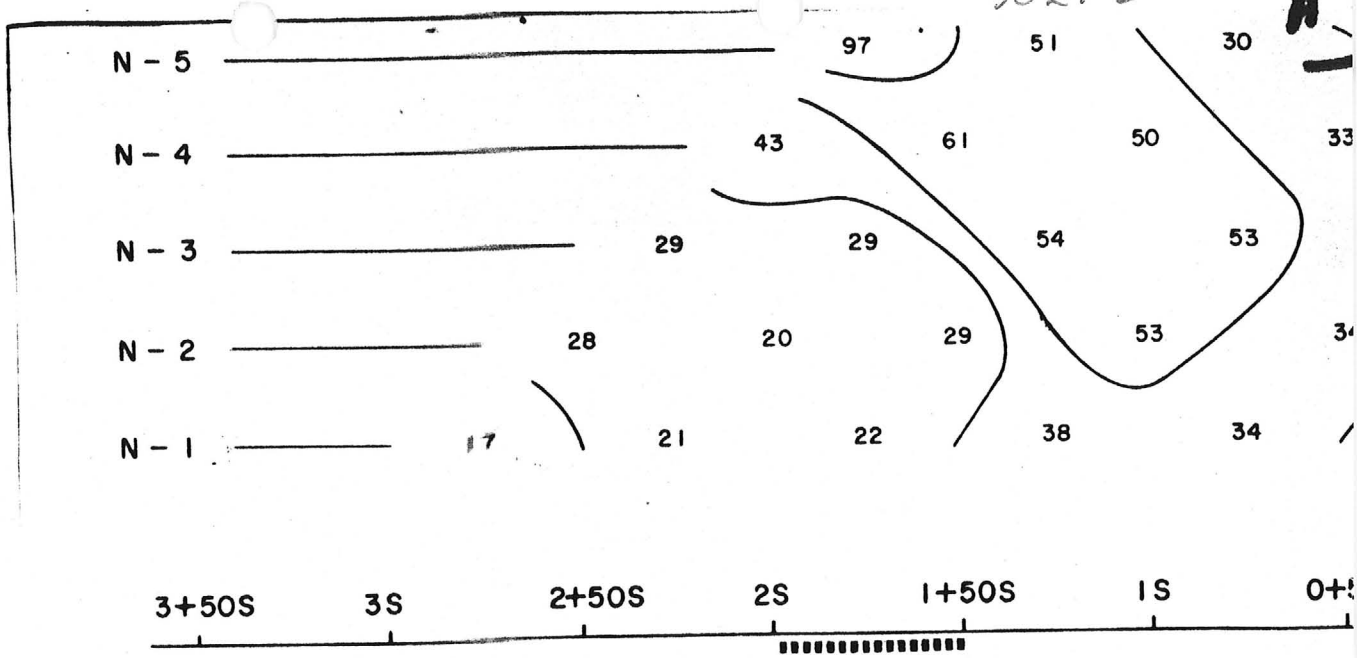
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1. - 1.5 - 2. - 3. - 5. - 7.5 - 10

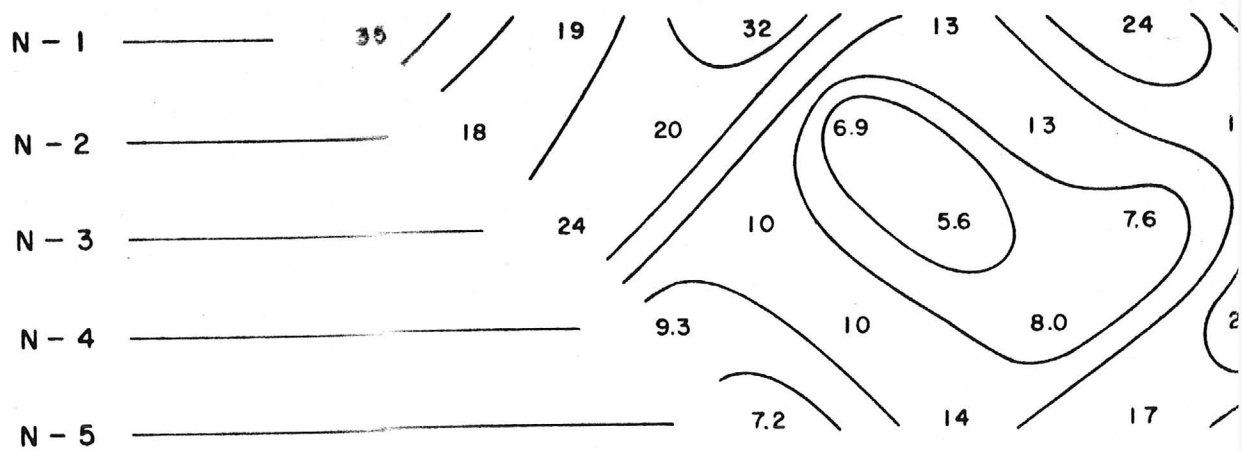
PHOENIX GEOPHYSICS

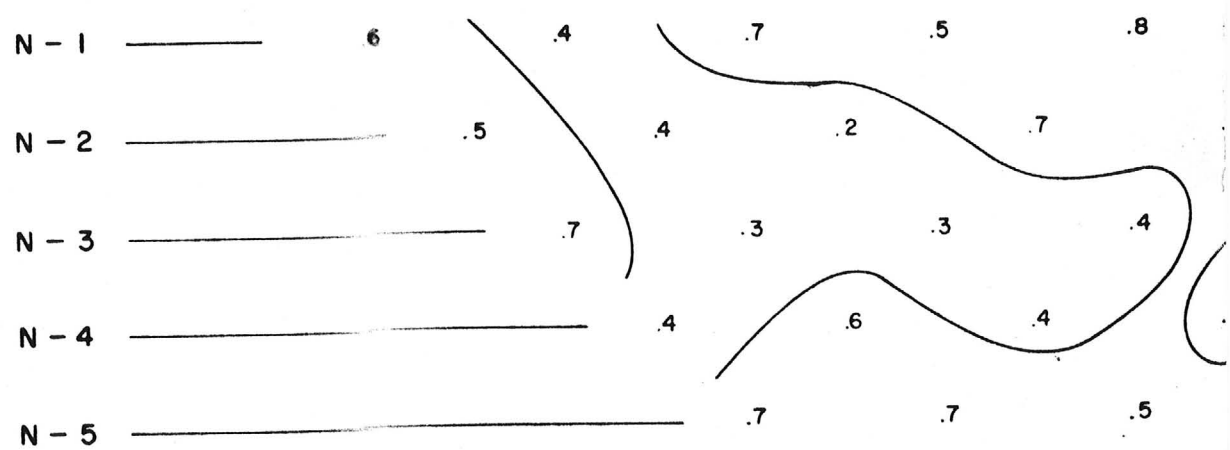
INDUCED POLARIZATION AND RESISTIVITY SURVEY

5029-2

A

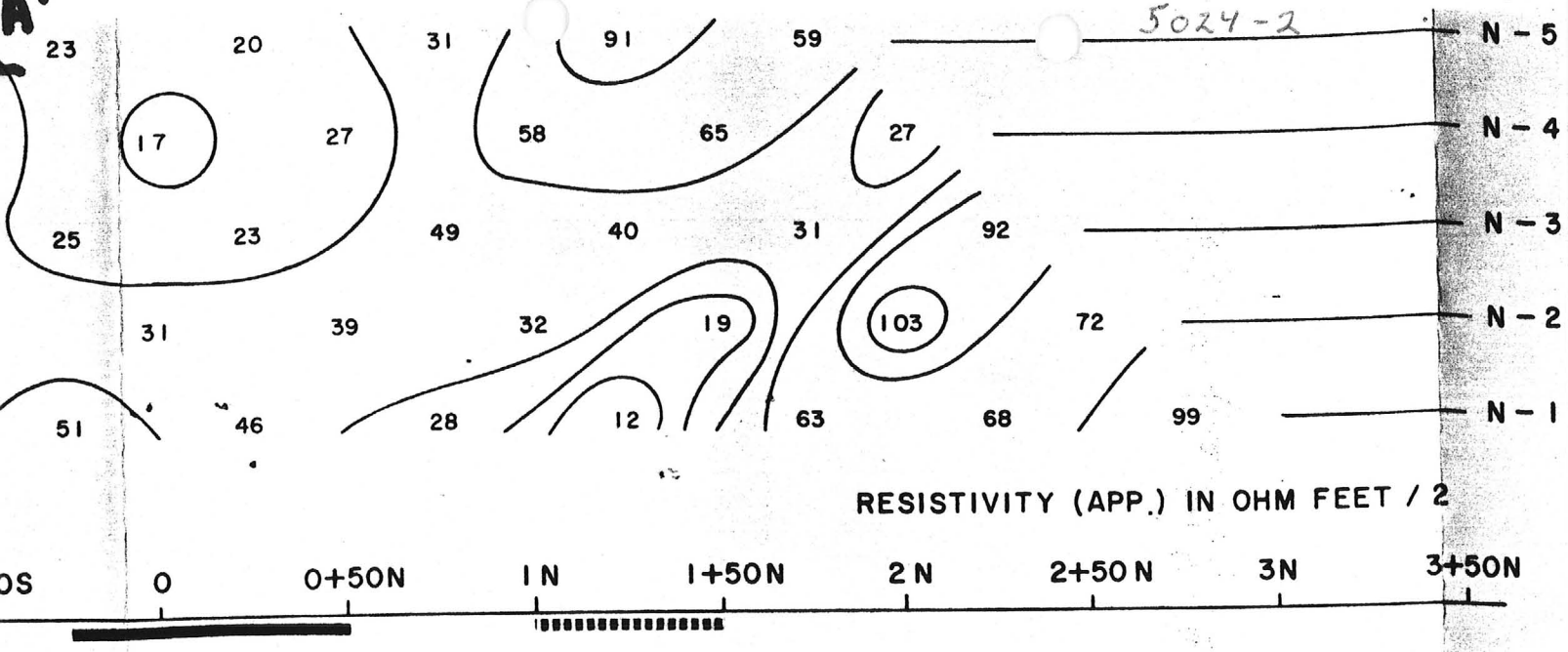

N - 5
N - 4
N - 3
N - 2
N - 1
97
51
30
43
61
50
33
29
29
54
53
28
20
29
53
17
21
22
38
34
3+50S
3S
2+50S
2S
1+50S
1S

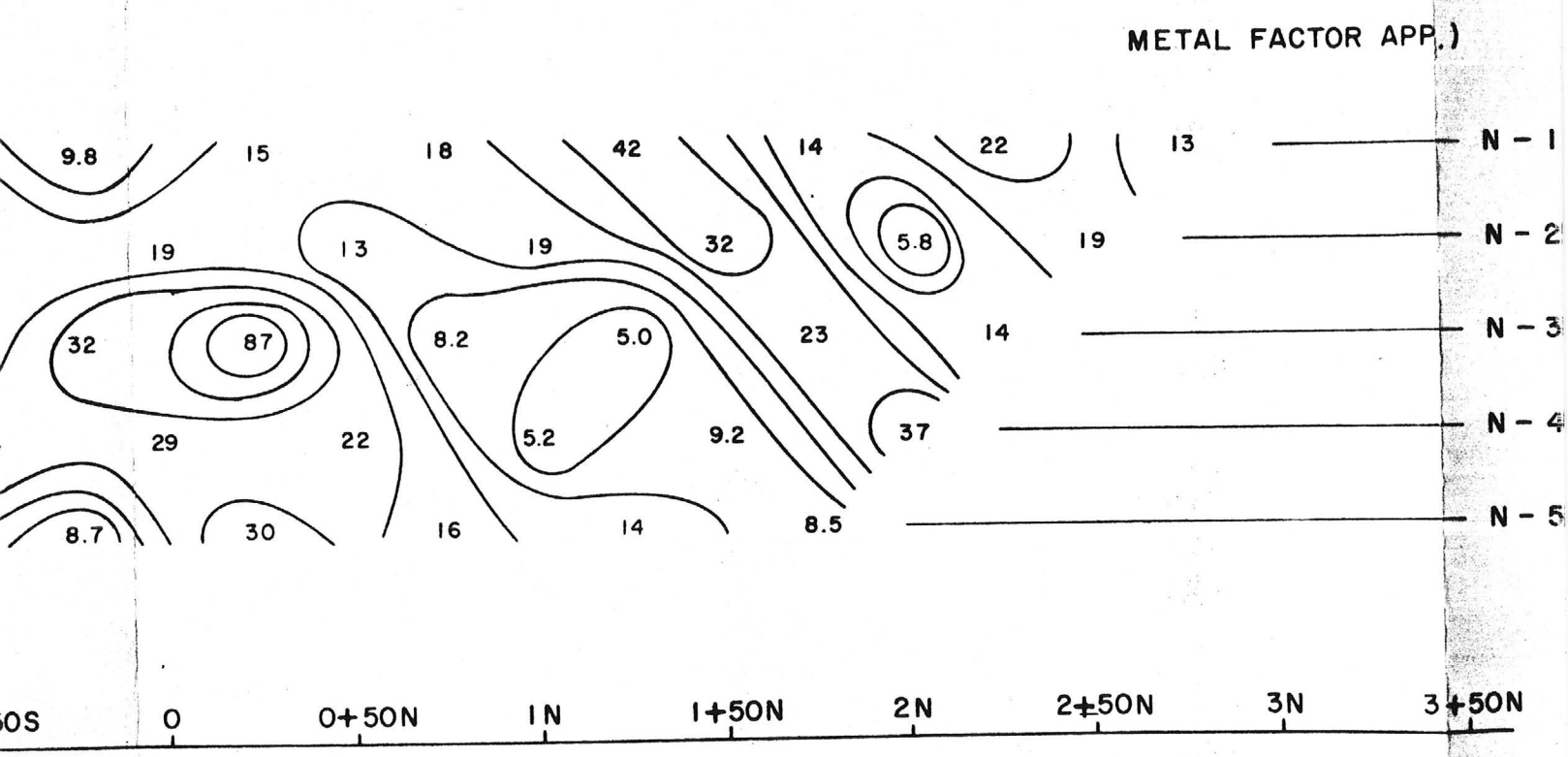

N - 1
N - 2
N - 3
N - 4
N - 5
35
19
32
13
24
18
20
6.9
13
24
10
5.6
7.6
9.3
10
8.0
7.2
14
17
3+50S
3S
2+50S
2S
1+50S
1S

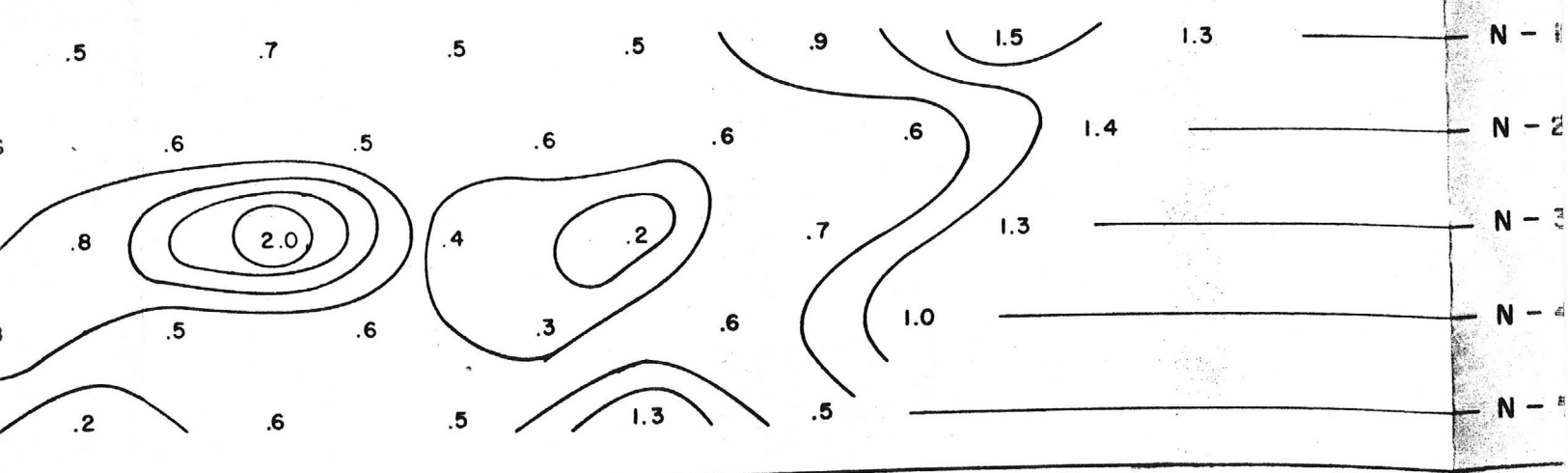

N - 1
N - 2
N - 3
N - 4
N - 5
6
.4
.7
.5
.8
.5
.4
.2
.7
.7
.3
.3
.4
.4
.6
.4
.7
.7
.5

A'

5024-2


23 20 31 91 59
17 27 58 65 27
25 23 49 40 31 92
31 39 32 19 103 72
51 46 28 12 63 68 99
N - 5
N - 4
N - 3
N - 2
N - 1
RESISTIVITY (APP.) IN OHM FEET / 2
0S 0 0+50N 1N 1+50N 2N 2+50N 3N 3+50N


METAL FACTOR APP.)
9.8 15 18 42 14 22 13
19 13 19 32 5.8 19
32 87 8.2 5.0 23 14
29 22 5.2 9.2 37
8.7 30 16 14 8.5
N - 1
N - 2
N - 3
N - 4
N - 5
0S 0 0+50N 1N 1+50N 2N 2+50N 3N 3+50N


FREQUENCY EFFECT (APP.) IN %
.5 .7 .5 .5 .9 1.5 1.3
.6 .5 .6 .6 .6 1.4
.8 2.0 .4 .2 .7 1.3
.5 .6 .3 .6 1.0
.2 .6 .5 1.3 .5
N - 1
N - 2
N - 3
N - 4
N - 5

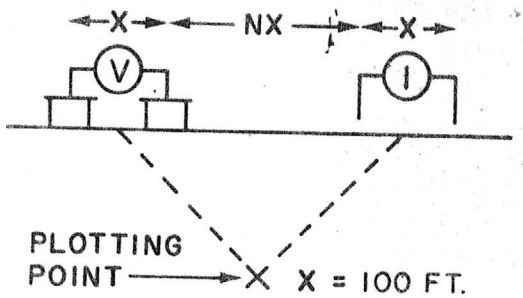
DWG. NO. - I.P. - U - 5024 - 1

BRIAN LODE MINING COMPANY

SKUNK CREEK MINING DISTRICT, MARICOPA COUNTY, ARIZONA

LINE NO. - 1

ELECTRODE CONFIGURATION



SURFACE PROJECTION OF ANOMALOUS ZONES

DEFINITE

PROBABLE

POSSIBLE

FREQUENCIES 2.5 & .3 HZ.

DATE SURVEYED: SEPT., 1976

APPROVED: Bruce S Bell

DATE: 10/21/76

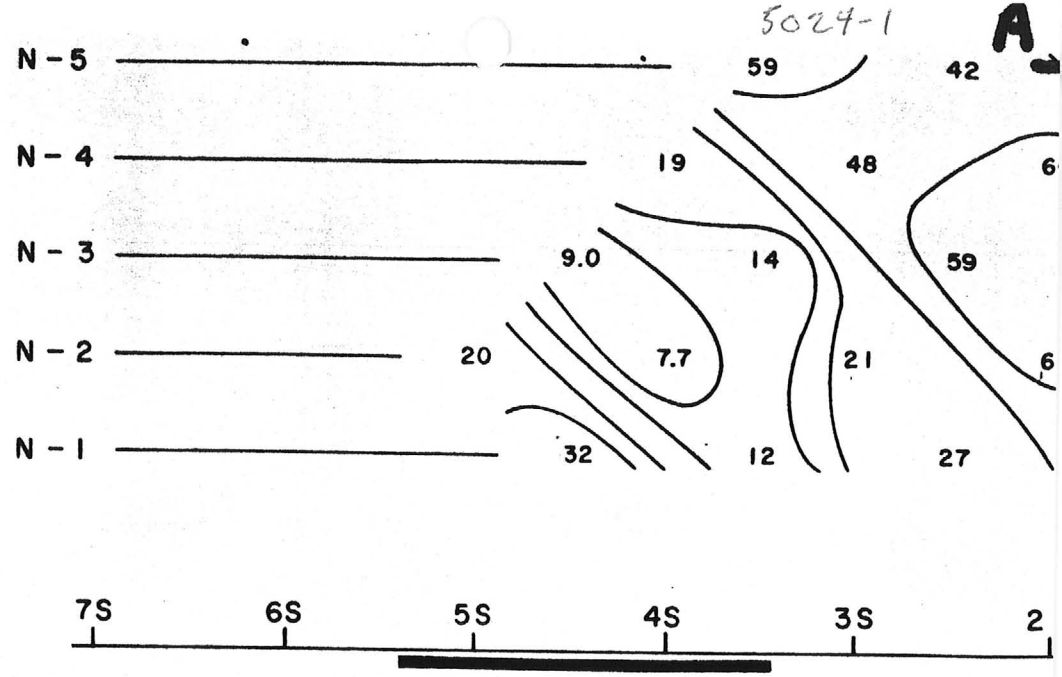
NOTE: CONTOURS AT LOGARITHMIC INTERVALS 1.-1.5-2.-3.-5.-7.5-10

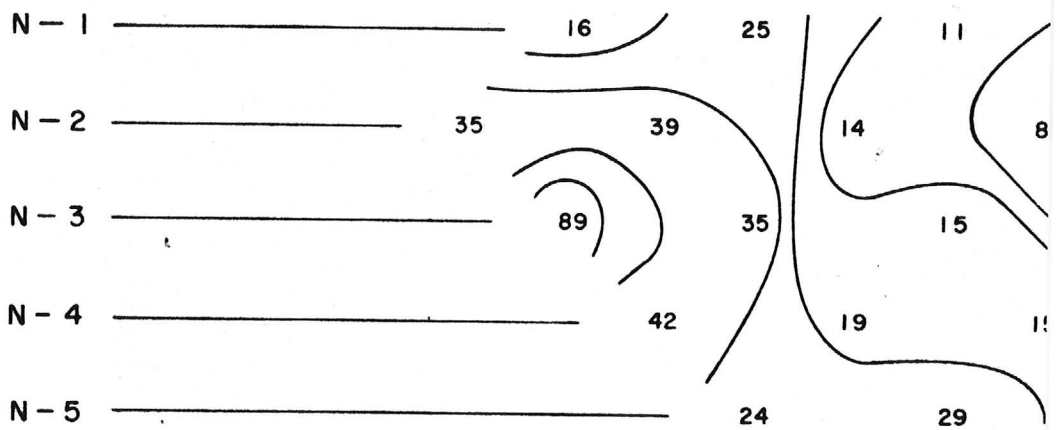
PHOENIX GEOPHYSICS

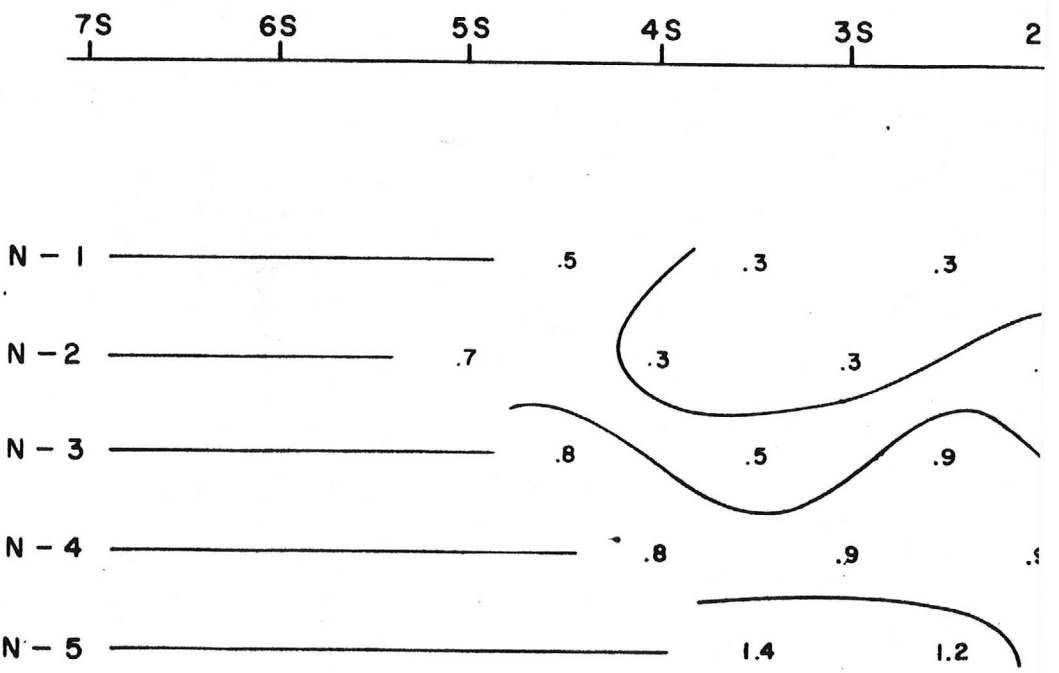
INDUCED POLARIZATION AND RESISTIVITY SURVEY

5024-1

A

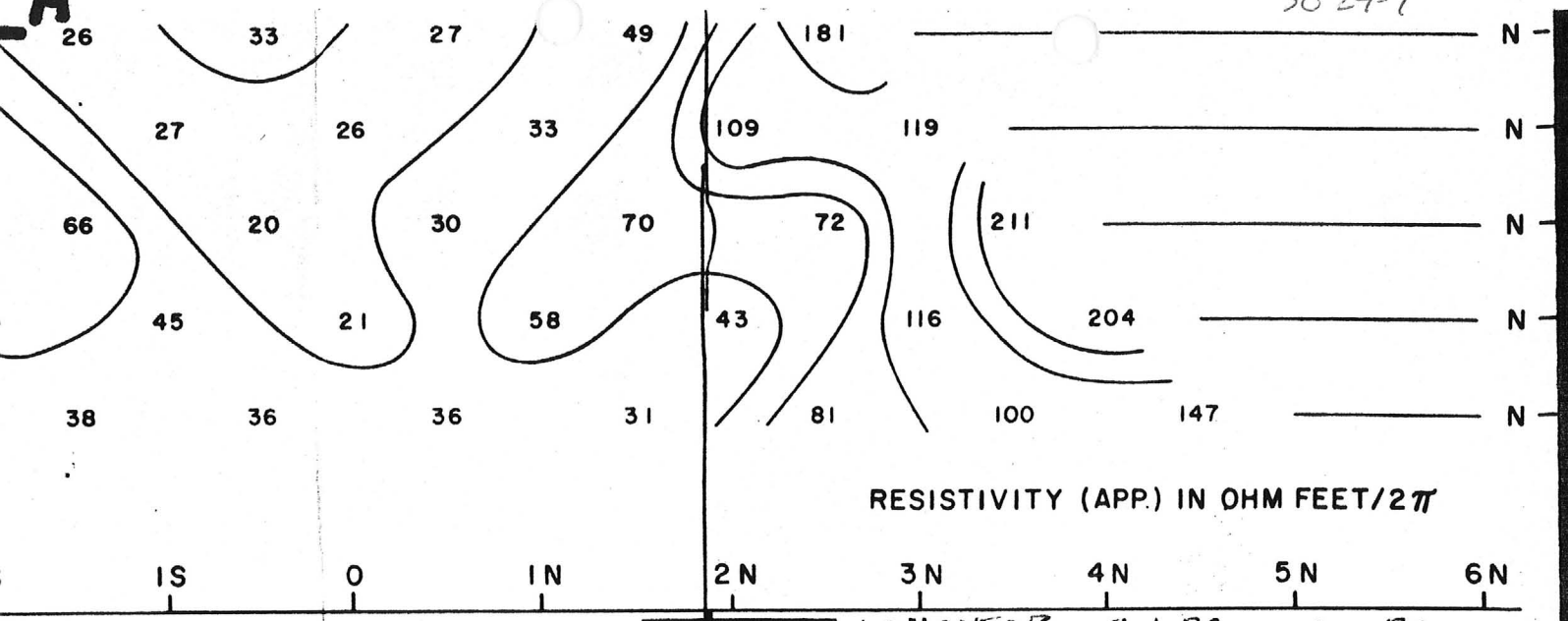

N-5
N-4
N-3
N-2
N-1
59
42
19
48
9.0
14
59
20
7.7
21
32
12
27
7S
6S
5S
4S
3S


N-1
N-2
N-3
N-4
N-5
16
25
11
35
39
14
89
35
15
42
19
24
29


7S
6S
5S
4S
3S
N-1
N-2
N-3
N-4
N-5
.5
.3
.3
.7
.3
.3
.8
.5
.9
.8
.9
1.4
1.2

A'

SO 24-1

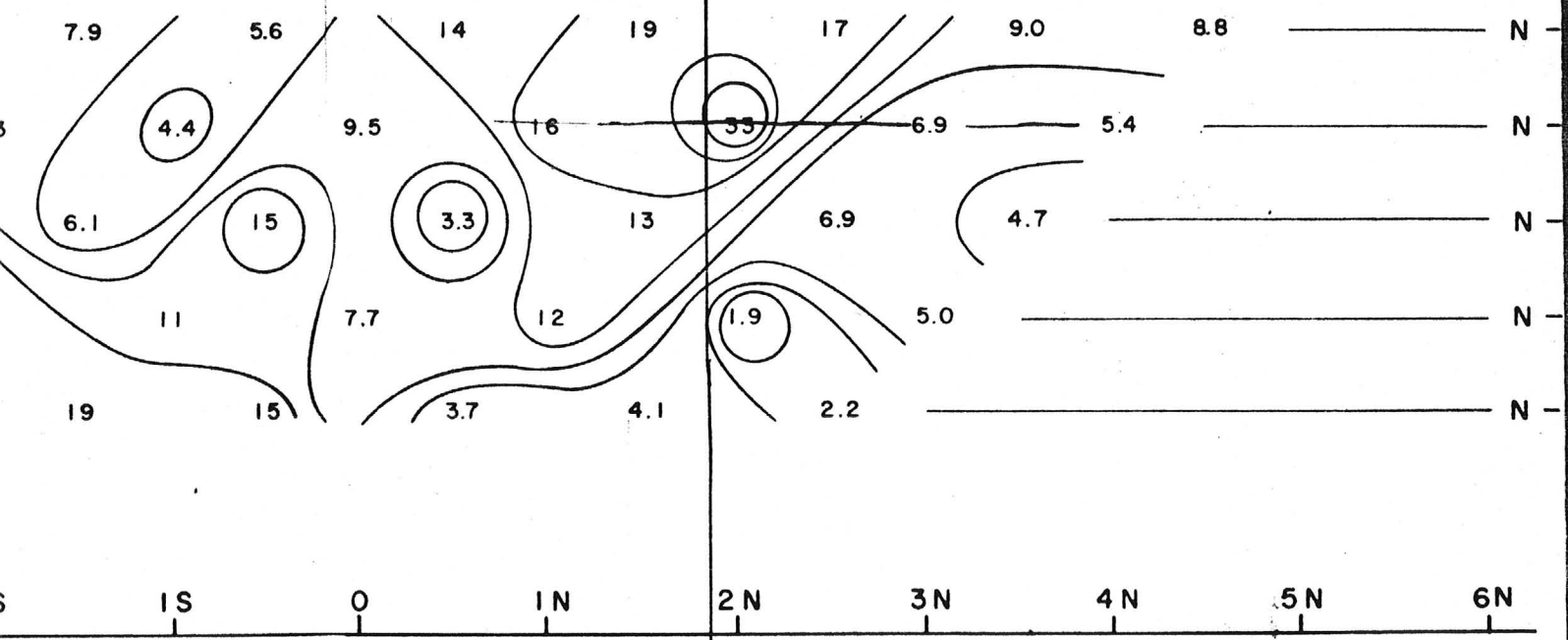


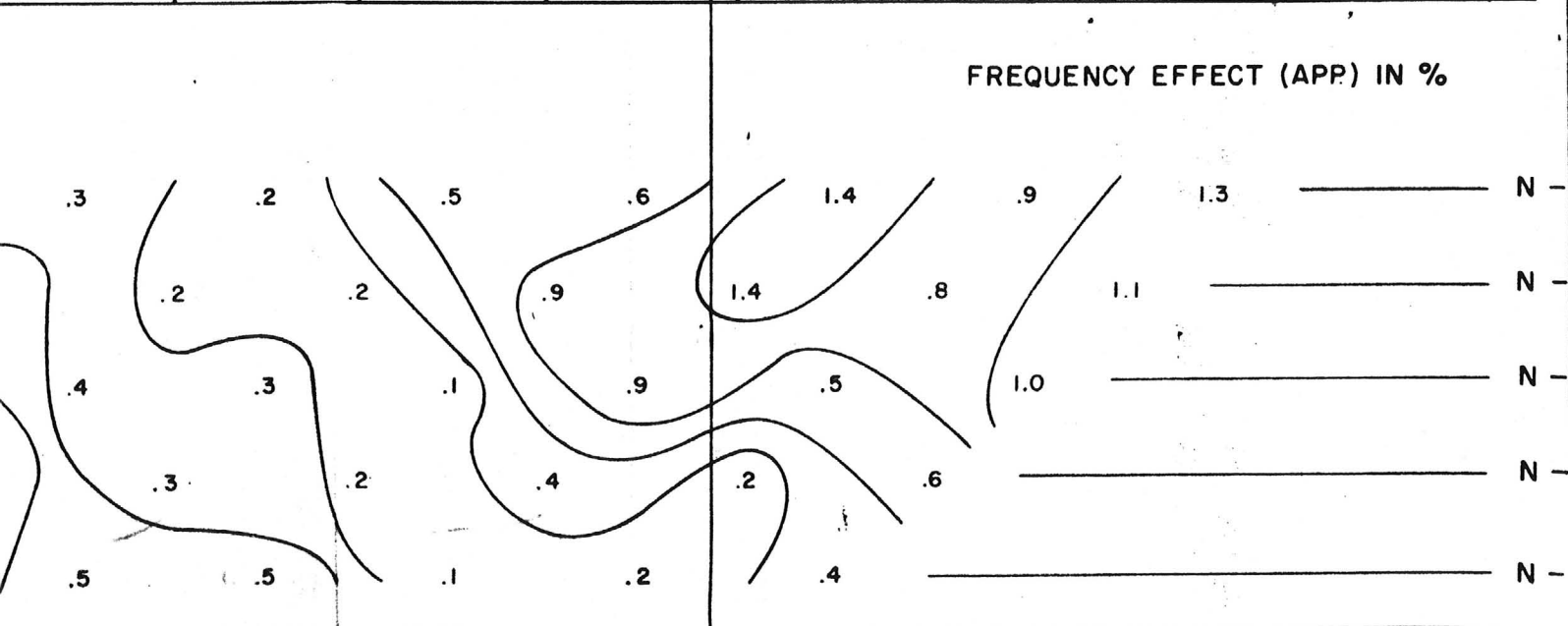
LONGYEAR 9-1-78 TO 9- -78

DRILL SITE

STA 1+95' " METAL FACTOR (APP.)

4 3/4 ID. TO 6'

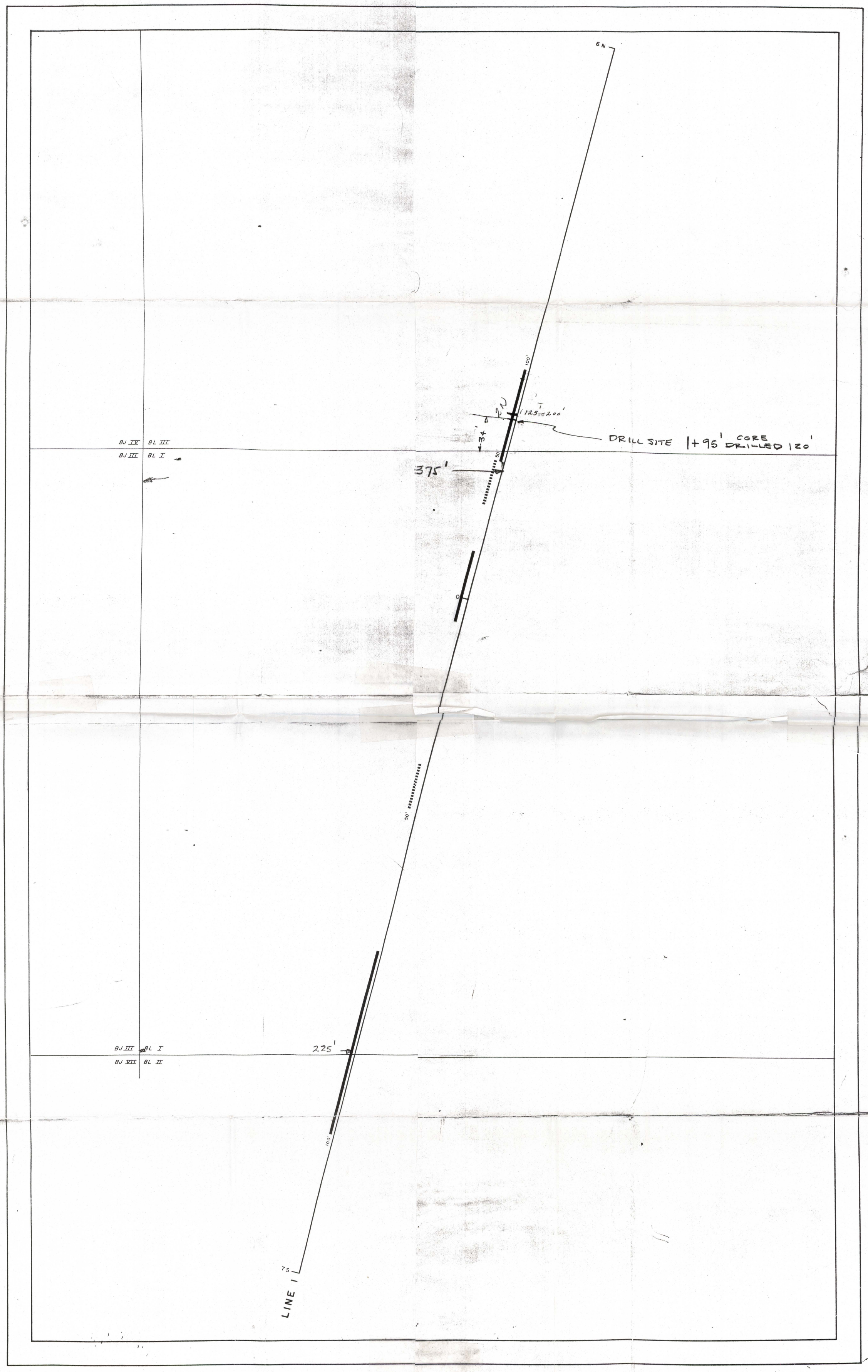




PHOENIX GEOPHYSICS

INDUCED POLARIZATION AND RESISTIVITY SURVEY

PLAN MAP



SURFACE PROJECTION OF ANOMALOUS ZONES

METAL FACTOR	PERCENT FREQUENCY EFFECT
DEFINITE	VERY STRONG
PROBABLE	STRONG
POSSIBLE	MODERATE
	WEAK
	VERY WEAK

APPARENT DEPTH
S = shallow
M = moderate, D = deep
C = contact, F = fault
Number at the end of anomaly indicates spread used.

BRIAN LODE MINING COMPANY

SKUNK CREEK MINING DISTRICT, MARICOPA COUNTY, ARIZONA

SCALE

FEET 50 0 50 100 150 200 250 FEET

1 INCH EQUALS 50 FEET

DRAWN: J.R
DATE: SEPT., 1976
APPROVED: BLB
DATE 10/21/76

DWG. I.P.P. - U - 502