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SAWYER CONSULTANTS INC.

REPORT ON THE
LEACH CLAIMS GOLD PROSPECT
Yavapai County, Arizona

for

ARK ENERGY LTD.

JANUARY 18th, 1980

1-425 HOWE STREET, VANCOUVER, B.C. V6C 2A9 TELEPHONE (604) 684-5433

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INTRODUCTION

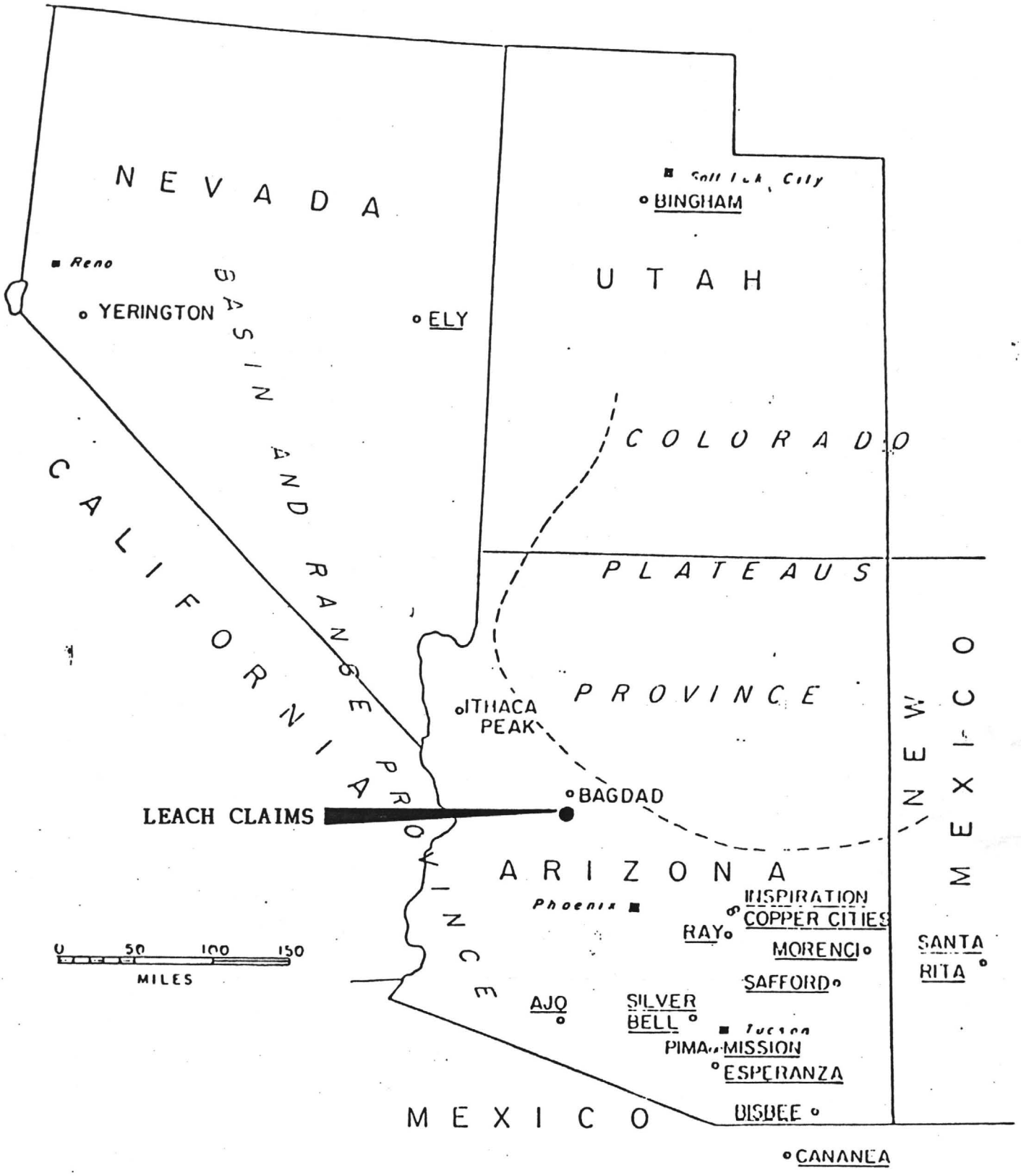
In May 1979 the writer examined several gold prospects in the Bagdad area of Arizona including a property which was at that time staked as the Carl claims on which a number of old surface pits and trenches, and one or two small adits of very limited extent had been excavated by earlier workers. A total of 11 samples, most of them grab samples were taken from these various exposures and were submitted for assay to Arc Laboratories in Phoenix. Almost all of the samples returned significant values in gold and several of them gave surprisingly high gold assays. Since the time of this field examination the area covered by the original Carl claims, which lapsed, has been restaked as the Leach claims and these more recent claims have recently been acquired by Ark Energy Ltd. of Vancouver.

The following report, prepared at the request of Mr. Harry Williams, President of Ark Energy Ltd., is based on the examination made of this property in May 1979.

SUMMARY

The occurrence of gold mineralization, probably related to Laramide orogenic activity, associated with rhyolitic and other acid rocks which have been intruded in the old Precambrian granitic basement in the Bagdad area of Yavapai County, Arizona, is well known and documented. Early in 1979 local prospectors staked a number of claims covering several old pits and trenches in an area immediately south of Crosby Mountain and approximately 7 or 8 air miles southeast of Bagdad. A number of samples collected by the writer in the course of a May 1979 field examination revealed interesting gold values ranging from less than 0.005 oz/ton to a high of 2.55 oz/ton. These values are associated with altered and highly fractured zones in which limonitic and hematitic oxidation are the most obvious features. This association is common in the area.

Subsequent to the time of the field examination the claim owners mined a small amount of this material from surface and built a small heap leaching operation, from which significant recovery of gold is reported. The original 16 claims lapsed and the area of the known mineralization was restaked as a group of 17 claims named the Leach claims. Ark Energy Ltd. of Vancouver has purchased the claims and plan further exploration on them as well as resumption of a leaching operation. The probability of defining additional reserves of similar grade material to that sampled in May 1979, and used for the initial leaching operation, is good. This report recommends a program of geological mapping, and additional staking to be carried out in conjunction with a resumption of the leaching operation on this property. The estimated cost for an initial stage program is $54,750.00.



GENERAL LOCATION SKETCH

ARK ENERGY LTD. – LEACH CLAIMS

Figure 1

PROPERTY AND OWNERSHIP

The property consists of 17 staked claims, called Leach 1-11 inclusive and 14-19 inclusive, staked on BLM land on August 2nd and August 9th, 1979 by Harold E. Best of Apache Junction, Arizona. The claims are standard Federal U.S. claims measuring 600 feet by 1500 feet. They were recorded at the Yavapai County Court House in Prescott on September 4th and 5th, 1979, and the appropriate documents were filed with the Bureau of Land Management Phoenix office, as now required by U.S. Federal Regulations, on October 1st, 1979. The following table summarizes this information.

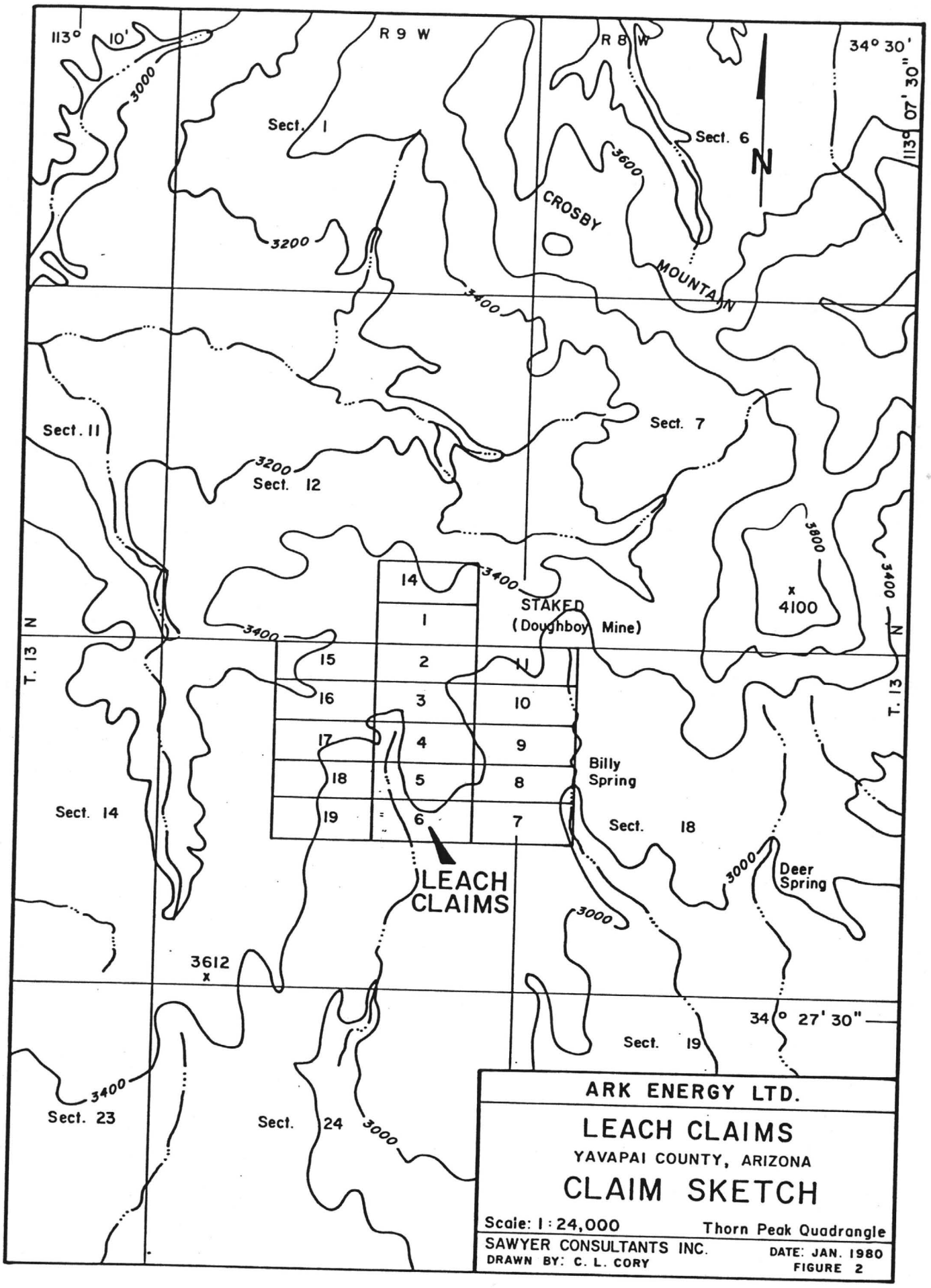
TABLE I

Claim	Staked	Recorded Yavapai County	Application to BLM Made	BLM Record No. Assigned Dec. 3/79	Range	T.13N Section
Leach 1	Aug. 2/79	Sept. 4/79	Oct. 1/79	A MC 68490	9W	12
Leach 2	Aug. 2/79	Sept. 4/79	Oct. 1/79	A MC 68491	9W	13
Leach 3	Aug. 2/79	Sept. 4/79	Oct. 1/79	A MC 68492	9W	13
Leach 4	Aug. 2/79	Sept. 4/79	Oct. 1/79	A MC 68493	9W	13
Leach 5	Aug. 2/79	Sept. 4/79	Oct. 1/79	A MC 68494	9W	13
Leach 6	Aug. 2/79	Sept. 4/79	Oct. 1/79	A MC 68495	9W	13
Leach 7	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68496	8W,9W	13 & 18
Leach 8	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68497	8W,9W	13 & 18
Leach 9	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68498	8W,9W	13 & 18
Leach 10	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68499	8W,9W	13 & 18
Leach 11	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68500	8W,9W	13 & 18
Leach 14	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68503	9W	12
Leach 15	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68504	9W	13
Leach 16	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68505	9W	13
Leach 17	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68506	9W	13
Leach 18	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68507	9W	13
Leach 19	Aug. 9/79	Sept. 5/79	Oct. 1/79	A MC 68508	9W	13

All of the claims are in Township 13N, Ranges 8 and 9 West, Yavapai County, Arizona. The sections in which they lie are indicated in the table above.

The claims have been acquired by Ark Energy Ltd. from the owners for considerations of cash and royalty from production. The details of this agreement are beyond the scope of this report.

Figure 2 of this report is a claim sketch showing the Leach claims in relation to topography and the adjacent Doughboy Mine claims. Other than these (Doughboy) claims, no other claims are located in the immediate area. On the basis of this writer's field examination of May 1979 additional staking to the west of the present Leach claims is desirable and recommended.


113° 10'
R 9 W
R 8 W
34° 30'
113° 07' 30"
Sect. 1
Sect. 6
N
3000
3200
3600
CROSBY
MOUNTAIN
3400
Sect. 11
Sect. 7
3200
Sect. 12
3800
x
4100
3400
STAKED
(Doughboy Mine)
3400
T. 13 N
T. 13 N
14
1
15
2
11
16
3
10
17
4
9
18
5
8
19
6
7
Billy
Spring
Sect. 14
Sect. 18
LEACH
CLAIMS
3000
Deer
Spring
3000
3612
x
34° 27' 30"
Sect. 19
3400
Sect. 23
Sect. 24
3000
ARK ENERGY LTD.
LEACH CLAIMS
YAVAPAI COUNTY, ARIZONA
CLAIM SKETCH
Scale: 1:24,000
Thorn Peak Quadrangle
SAWYER CONSULTANTS INC.
DRAWN BY: C. L. CORY
DATE: JAN. 1980
FIGURE 2

LOCATION AND ACCESS

The property is located approximately seven air miles southeast of Bagdad, Arizona, and approximately 1½ miles southwest of Crosby Mountain within the area of topographic map Thorn Peak in the 7½ minute series. The coordinates of a point approximately at the centre of the property are 113°08'45"W, 34°28'10"N. It is just to the south of paved Highway #96 which links Bagdad with Hillside and Date Creek and between this highway and the main Phoenix to Kingman Highway #93. Access can therefore be had from Bagdad via paved Highway #96, thence southwestwards on Highway #97 which links the Bagdad-Hillside road with the main highway (#93) to Bridal Creek at which point a rough four-wheel drive vehicle road leads into the Crosby Mountain tank area and the Leach claims. The total road distance from Bagdad to the property is approximately 16 miles. Recent reports from Mr. Best indicate that he has upgraded the last few miles of the road to the property as part of work carried out since last summer. The county seat, Prescott, lies about 38 air miles east-northeast of the property.

PHYSIOGRAPHY

This part of western Arizona is characterized by typical semi-arid desert country. Streams are mostly intermittent and growth is restricted to cacti, mesquite, and similar desert shrubs. Elevations in the area range from about 3000 feet to over 3800 feet on Crosby Mountain in the north with the average elevation in the property area being about 3400 feet. Some of the valleys in the area are quite sharply incised locally being eroded into narrow canyons.

GEOLOGY

Regional Geology

Reference to the County geologic map for Yavapai County, published by the Arizona Bureau of Geology and Mineral Technology shows the greater part of the area around Bagdad and in the vicinity of the Leach claims to be underlain by Precambrian granitic rocks and granitic schists and gneisses, and Yavapai schist, with locally, younger centres of Tertiary intrusive and volcanic activity. The major mineralization in the area, including the copper-gold mineralization at the Bagdad Mine are related to these late Cretaceous or early Tertiary intrusive rocks. The gold mineralization occurring on the Leach claims is probably similarly genetically related to Laramide intrusive activity. Unfortunately no detailed geological maps of the area are available or published.

Local Geology

The property has not been mapped and no attempt to map it, other than to record major features was made during the May 1979 field examination. The general country rock in the property area are the old Precambrian granites and granite gneisses which, locally, are intruded by younger acid dykes and related rhyolitic rocks. The mineralization occurs in zones of fracturing and alteration usually locally referred to as veins. However these are probably not veins in the true sense of the word but rather zones of alteration and oxidation having a generally tabular shape and sometimes appearing veinlike in their surface trace. Gold mineralization is associated with zones of limonitic and hematitic alteration within these rhyolitic or late stage acid intrusions. The mineralized zones can be picked out as areas of red and brown stained oxidation products which when examined more closely are frequently found to be oxide boxworks in which the gold has remained as sulphide minerals were leached out. Visible gold is not uncommon in these rocks, several such samples being found by the writer during the May 1979 field examination.

The main part of that examination was confined to a fairly restricted zone which appeared to have a roughly east-west or west-north-westerly strike. A series of nine samples over a distance of some 800-900 feet, all in similar material, were collected by the writer on May 25th, 1979. The following table lists and describes these samples and gives the assays obtained from them. The last two samples listed are from a second zone which lies to the northwest of the main zone sampled and is part of the area which is to be covered by the recommended additional staking. All of the assays were performed by Arc Laboratories of Phoenix, Arizona.

TABLE II

Assay Tag No.	Assay Au oz/ton	Assay Ag oz/ton		Description
17137	0.699	0.16	#1	Grab sample from first location, up hill to east of prospect.
17138	2.55		#2	Grab sample from same vein as #1, but 25 ft. to east.
17139	0.213		#3	Grab, from same vein as #1 but 10 feet east and 5 feet above sample #2.
17140	0.537	0.07	#4	Grab sample from area of 4 or 5 old pits, approx. 300 feet northwest (310°) from samples #1,2,3.
17141	0.201		#5	Special grab sample from large cut, shaft, and drift - 200 feet west of #4 pits area.
17142	0.049		#6	Chip sample across about 8 feet in west wall of pit which includes some hematitic stained material.

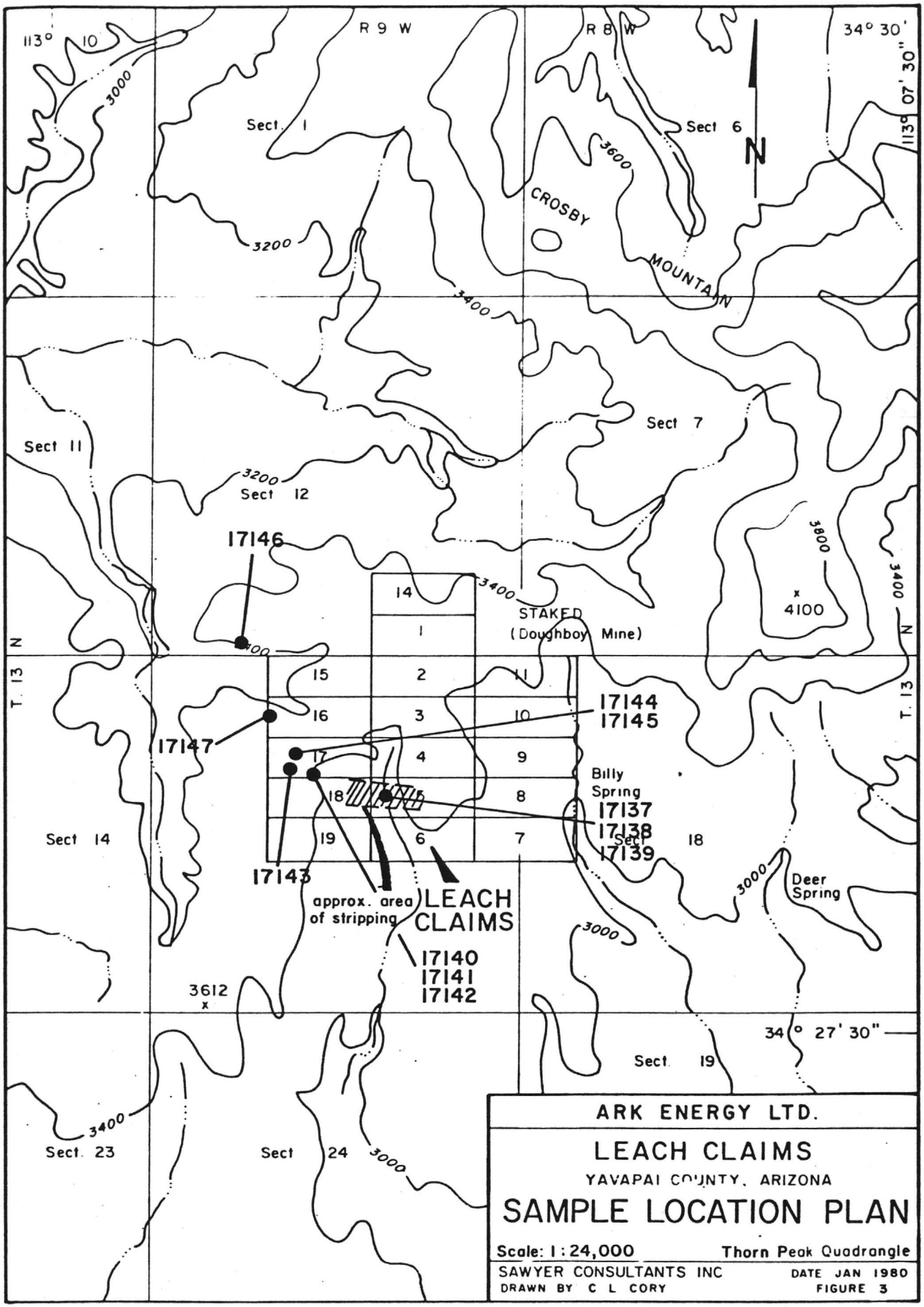

113° 10
R 9 W
R 8 W
34° 30'
113° 07' 30"
N
Sect 1
Sect 6
3000
3200
3400
3600
CROSBY
MOUNTAIN
Sect 7
Sect 11
Sect 12
3800
4100
17146
STAKED
(Doughboy Mine)
14
1
15
2
11
16
3
10
17
4
9
18
5
8
19
6
7
T. 13 N
17144
17145
17147
Billy
Spring
17137
17138
17139
Sect 14
Sect 18
17143
approx. area
of stripping
LEACH
CLAIMS
17140
17141
17142
Deer
Spring
3612
34° 27' 30"
Sect 19
Sect 23
Sect 24
ARK ENERGY LTD.
LEACH CLAIMS
YAVAPAI COUNTY, ARIZONA
SAMPLE LOCATION PLAN
Scale: 1:24,000
Thorn Peak Quadrangle
SAWYER CONSULTANTS INC
DRAWN BY C L CORY
DATE JAN 1980
FIGURE 3

Table II (cont.)

Assay Tag No.	Assay Au oz/ton	Assay Ag oz/ton		Description
17143	0.132		#7	Grab sample from a vein in the pit.
17144	0.361		#8	Grab sample of selected material from a dump from another cut.
17145	0.230		#9	Chip sample across 4½ feet.
17146	0.136		#10	Grab sample of altered hematitic and limonitic material similar to that at the earlier locations.
17147	>0.005		#11	Grab sample from 4'-5' quartz vein between road and wash (southeast of wash) collected by Carl Clay.

Subsequent to the writer's examination the claim owner, H.E. Best, through his own company, Quest Inc., has carried out a limited amount of mining of this material and constructed a small leaching operation. The writer has not seen these latest developments and the following information is based on conversations with Mr. Best and Mr. Williams of Ark Energy Ltd. The mining was done by simple open cut methods using a bulldozer and a pad was constructed upon which a few tons of mineralized material were heaped. The heap was then sprayed with cyanide solution to initiate the leaching and this process was allowed to continue for a few days. Pregnant liquors percolating through the heap were collected and pumped through towers of activated carbon on which the gold cyanide complex is adsorbed. Gold recovery from the activated carbon was carried out by stripping and electrowinning the values from the resultant strip solutions. The writer has no detailed or accurate figures of the grade of material on the heap nor of recoveries but from tentative figures presented all of the initial costs and a reasonable profit appears to have been realized from this initial phase of the operation. It is understood that the material used for the initial leach was essentially the same material sampled by the writer last year. From the examination described it is clear that considerably more rock of similar type, and presumably similarly mineralized, occurs in the area, only a very small part of that seen in 1979 having so far been processed in the initial heap leach. In addition, other areas of similar mineralization, such as that represented by sample #17146 (see Table II above), occur in the general area and no doubt additional reserves of similar material can be defined in these areas by some further mapping and sampling. This being so a fairly small low cost operation such as that initiated by Quest Inc. could be expected to yield a significant cash flow at current precious metal prices.

CONCLUSIONS

From the foregoing descriptions the following conclusions can be drawn concerning the Leach claims gold prospect.

(1) Gold mineralization associated with altered and oxidized acid igneous rocks intruded into old granitic terrain in the Bagdad area occurs on the Leach claims.

(2) Mineralized areas recognized to date include a considerable amount of material of good to high grade, of the order of 0.3 oz/ton gold.

(3) Much, if not all, of this material can be mined by cheap open cast mining methods.

(4) A preliminary leach test conducted by the claim owners has produced satisfactory results demonstrating that this material is amenable to leaching. Recoveries can probably be improved over those obtained in the initial test run with more careful operation and longer leaching time.

(5) On the basis of the earlier results further work to outline additional ore grade material, and to continue and improve the preliminary leaching operation is warranted. A suitable program to continue this work is recommended below.

RECOMMENDATIONS

(1) Additional claims should be staked to cover all presently known mineralized zones in the immediate vicinity of the Leach 1-19 claims. Specifically, at least one additional row of claims should be staked on the western side of the existing Leach claims and contiguous with them.

(2) The material on the leach pad should be augmented with additional ore and the leach operation should be re-started. Studies should be made to determine optimum leaching time and most cost efficient way of recovering the gold from the activated carbon, i.e. by stripping and electro-winning, or simply burning the carbon.

(3) The entire claim area, and adjacent ground should be geologically mapped, and sampled to define additional areas and reserves of ore grade material.

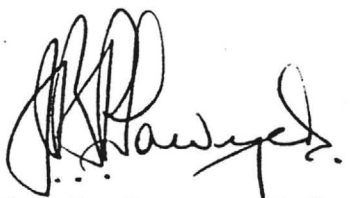
(4) It will be necessary, because of the value of the product, to substitute adequate security procedures at the operation site.

COST ESTIMATES

Additional staking, say 12 claims @ $150.00/claim* (*includes cost of recording, registration with BLM, etc.)	$ 1,800.00
Geological mapping and sampling	5,750.00
Assaying, estimate 100 samples @ $12.00	1,200.00
Capital costs for equipment and supplies re leaching operation	12,000.00
Assay and analytical work re leaching operation	4,000.00
Supplies, accommodation, say average 3 men for 90 days	10,000.00
Travel, vehicle rental, fuel, etc.	5,000.00
Engineering, supervision, reporting, consulting - (geological/mining and chemical re leach operation)	10,000.00
Contingency	5,000.00
	$54,750.00

Respectfully submitted,

SAWYER CONSULTANTS INC.



J.B.P. Sawyer, P.Eng.

CERTIFICATE

I, J.B.P. Sawyer, DO HEREBY CERTIFY:

(1) That I am a consulting geologist with business office at 1 - 425 Howe Street, Vancouver, B.C., V6C 2A9, and President of Sawyer Consultants Inc.

(2) That I am a graduate in geology of Manchester University (B.Sc. - 1953) and of the University of Western Ontario (M.Sc. - 1957).

(3) That I am a Registered Professional Engineer (geological) in the Association of Professional Engineers of the Province of British Columbia, and a Registered Chartered Engineer with the Council of Engineering Professions, London.

(4) That I am a Fellow of the Geological Association of Canada, a Member of the Canadian Institute of Mining and Metallurgy, a Fellow of the Geological Society of London, and Fellow of the Institution of Mining & Metallurgy, London.

(5) That I have practised my profession as a geologist for the past twenty-six years.

(6) That the information, opinions and recommendations in the attached reports are based on a personal field examination of the subject area made in May 1979, on a general knowledge of the geology and style of mineralization in the Bagdad area, and on preliminary review of the initial leaching results obtained by Quest Inc. of Arizona. I have not personally seen the Leach operation set-up which was only initiated after my May 1979 field examination.

(7) That I own no interest in the shares or securities of Ark Energy Ltd. nor do I expect to receive any such interest.

J.B.P. Sawyer, P.Eng.

Dated at Vancouver, British Columbia, this 18th day of January, 1980.

SELECTED REFERENCES

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GEOLOGICAL AND GEOCHEMICAL REPORT

ON THE

GOLDEN ARK PROPERTY,

LEACH CLAIMS,

YAVAPAI COUNTY, ~~NEVADA~~ ARIZONA, U.S.A.

FOR

ARK ENERGY LIMITED

BY

STANLEY B. REAMSBOTTOM PH.D., P. ENG.

KYLE CONSULTANTS LIMITED

APRIL, 1980

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LIST OF FIGURES

SUMMARY:

The Golden Ark property is located near the town of Bagdad, Yavapai County, Arizona, U.S.A.

The property is underlain by two PreCambrian granitic plutons. Significant amounts of gold have been recognized in three, possibly four, separate, but closely related, areas on the property. The gold mineralization is concentrated within areas of alteration and oxidation which straddle the contact zones between "Younger" pegmatitic granites and "older" tan granites. These are characterized by pink feldspars (orthoclase or pink hematite stained potassium feldspar); pyrite cubes pseudomorphed by brown hematite and limonite; abundant oxide coatings on joint and fracture surfaces within the granites; and locally flecks of visible free-gold embedded in oxide pseudomorphs after pyrite.

The average values of 10 samples collected in May 1979 which ranged in value between 0.005 -2.66 ounces of gold per ton, was 0.3 ounces of gold per ton. Thirty-three samples collected by the writer ranged in value between 0.001-0.208 ounces of gold per ton and had an average value of 0.04 ounces of gold per ton. The average value of all samples collected from mineralized areas on the property in 1979 and 1980 is 0.15 ounces of gold per ton.

A reconnaissance geochemical survey of part of the mineral property indicated that the mercury content of soils may prove to be a more reliable indication of gold mineralization than the gold in the soils.

A small-scale leach test conducted in 1979, in which gold was extracted from 500 tons of near-surface material using cyanide solutions and absorbed on activated carbon, was reportedly successful.

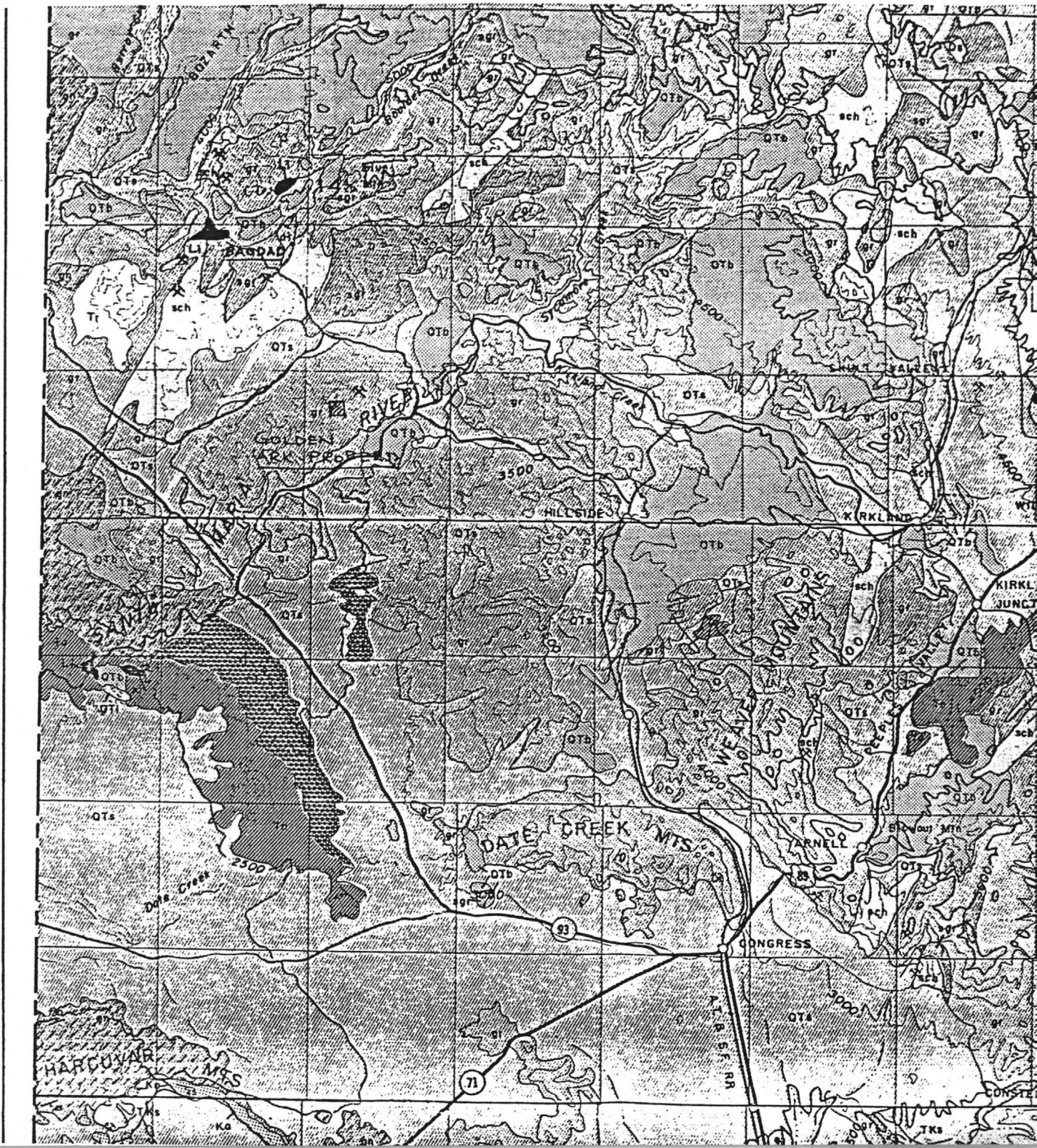
The widespread distribution, grade, and possible leachability of gold mineralization within the Golden Ark property, makes it an attractive target for the development of a large gold deposit which may be mined by open-pit techniques and the gold extracted by a low-capital cost heap-leaching technique.

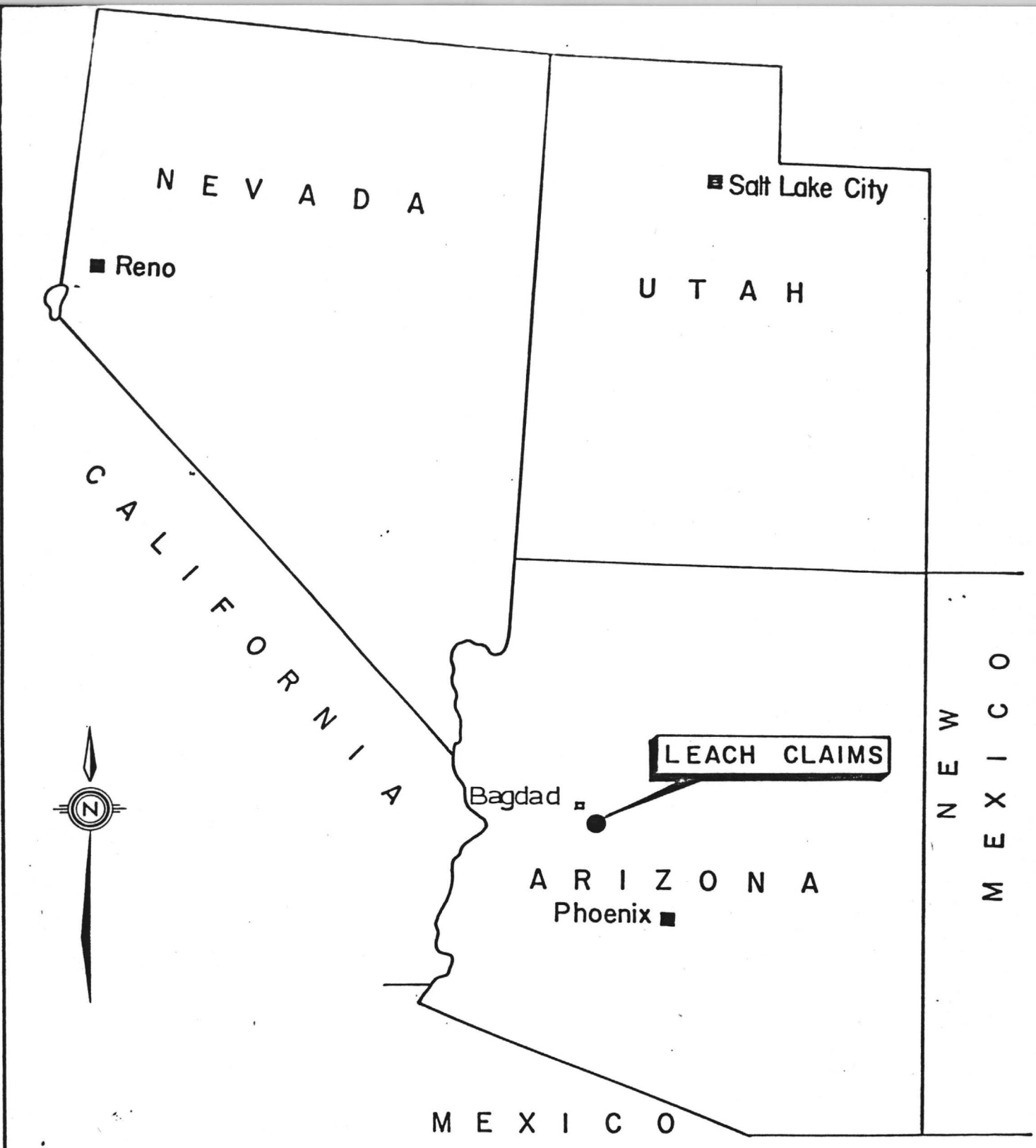
A two-phase programme of surface trenching, percussion drilling and bulk sampling with follow-up, large-scale, heap-leach testing, has been recommended for the economic evaluation and development of the mineral property. Depending on the size of the initial test-leach, the estimated cost of the two-phase programme is $231,000. or $273,100. Gold extracted from the test-heap would more than cover the cost of these evaluation programmes.

Figure 3: Geology Bagdad Area, Yavapai County, Arizona

Legend

Older PreCambrian:	gr	granite
"	sch	Yavapai schist
Laramide (Cret-Tert)	Li	dykes and plugs
Tertiary	Tr	rhyolite
Quaternary/Tertiary	QTb	basalt
Quaternary/Tertiary	QTs	silt, sand, gravel
	⚒	mine





ARK ENERGY LTD.

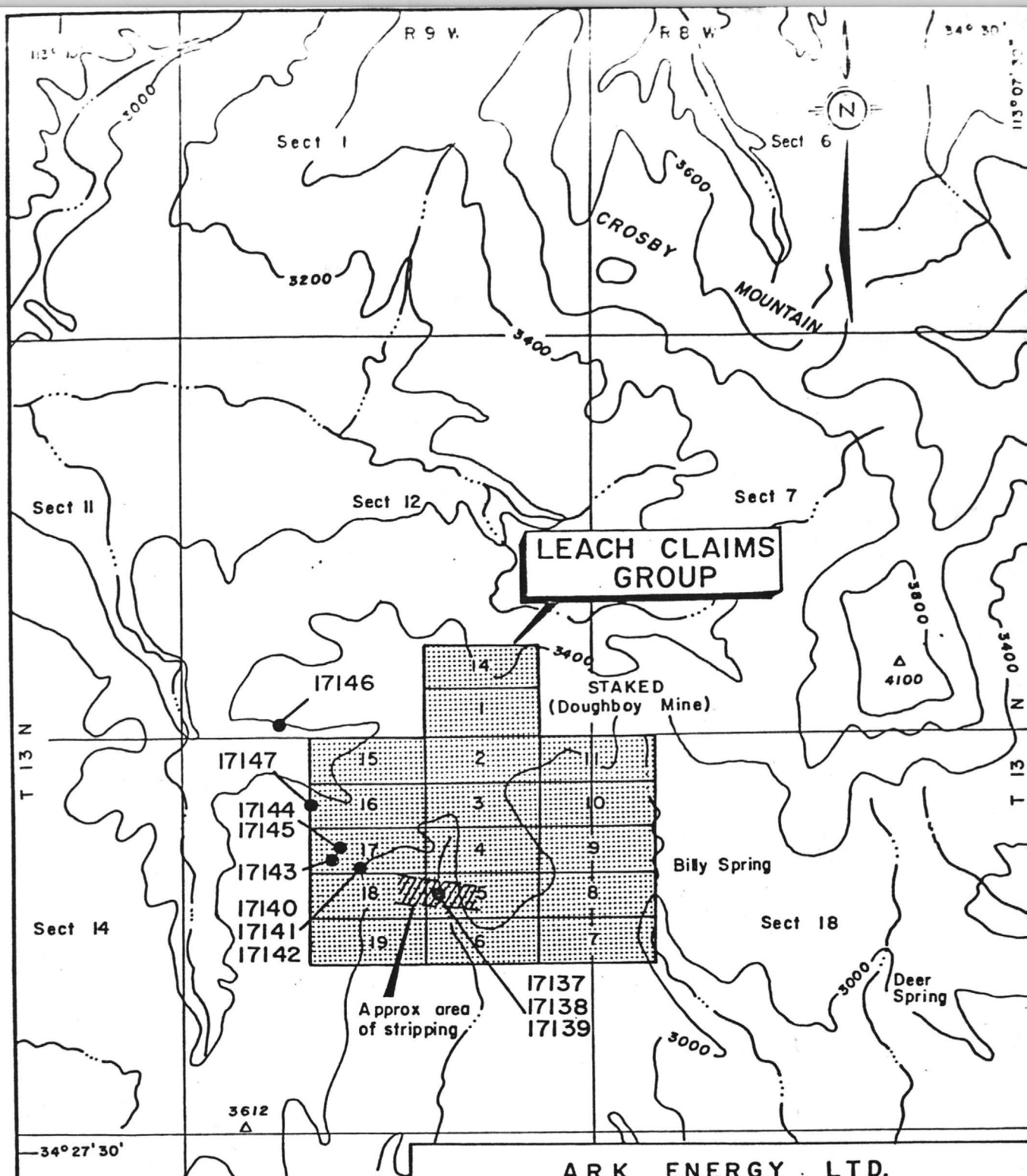
LEACH CLAIMS

YAVAPAI COUNTY, ARIZONA
Thorn Peak Quadrangle

PROPERTY LOCATION MAP

KYLE CONSULTANTS LIMITED.

DRAWN BY : T.K.	CHECKED BY : S.R.	FIGURE No.
0 MILES 50 100	DATE: March 1980	1



ARK ENERGY LTD.

LEACH CLAIMS

YAVAPAI COUNTY, ARIZONA
Thorn Peak Quadrangle

LOCATION MAP

KYLE CONSULTANTS LIMITED

DRAWN BY : T.K.	CHECKED BY : S.R.	FIGURE No
SCALE 1 : 24,000	DATE: March 1980	2

INTRODUCTION

In the period February 2-10, 1980, the writer geologically mapped and geochemically sampled the Golden Ark Property (Leach Claims) in Yavapai County, Arizona, U.S.A.

The following report presents the results of these surveys and outlines a programme for the continued economic evaluation and development of the mineral property.

LOCATION AND ACCESS

The Golden Ark Property is located approximately seven air-miles southeast of Bagdad in Yavapai County Arizona (T13N; R8, 9W; Sections 12,13 and 18). The pertinent map-sheet which covers the property is Thorn Peak (7.5 minute-series). The coordinates of a point at the centre of the property are 113° 08' 45" E; 24° 28' 10" N.

The property is a few miles to the east of Highway 97 which links the Bagdad-Hillside road (Highway 96) with the main Phoenix-Kingman road (Highway 93). A rough four-wheel drive road which leads to the property, leaves Highway 97 at Bridal Creek. Total distance of the property by road from Bagdad is approximately 16 miles. Prescott, the Yavapai County seat, is approximately 38 air miles east-northeast of the property. (Fig 1).

PHYSIOGRAPHY

The property is part of a complex of semi-arid mountain ranges in the Prescott map-sheet which include the Bradshaw Mountains, the Santa Maria Mountains, the Mohon Mountains, the Weaver Mountains, and the Date Creek Mountains.

The ranges in the Bagdad area have no specific name. Elevations in the claim-area range from 2000 to 4344 feet with the average elevation on the property being approximately 3400 feet. This high, rocky-desert country of Arizona is characterized by abundant cacti (saquaro, prickly-pear, yucca) mesquite and other desert shrubs.

As streams run only intermittently, water for camp or mine operation would have to be pumped from wells drilled near the Santa Maria River or Bridle Creek.

PROPERTY

The property consists of seventeen claims staked by location and known as the Leach 1-11 and 14-19 inclusive. (Fig. 2) They were staked on August 2 and 9, 1979 by Harold E. Best of Apache Junction, Arizona.

Claims were recorded at the Yavapai County courthouse in Prescott on September 4 and 5, 1979. The claims were also filed with the Bureau of Land Management in Phoenix on October 1, 1979.

Ark Energy Ltd., of Vancouver, Canada, acquired the claims from Mr. Bests's company, Quest Inc., for considerations of cash and a royalty from production.

Pertinent claim information is tabulated on the page following.

CLAIM	STAKED	RECORDED YAVAPAI COUNTY	APPLICATION TO BLM MADE	BLM RECORD NO. ASSIGNED DEC. 3/79	RANGE	T13N SECTION
Leach 1	Aug 2/79	Sept 4/79	Oct.1/79	A MC 68490	9W	12
Leach 2	"	"	"	A MC 68491	9W	13
Leach 3	"	"	"	A MC 68492	9W	13
Leach 4	"	"	"	A MC 68493	9W	13
Leach 5	"	"	"	A MC 68494	9W	13
Leach 6	"	"	"	A MC 68495	9W	13
Leach 7	Aug 9/79	Sept 5/79	"	A MC 68496	8;9W	13;18
Leach 8	"	"	"	A MC 68497	"	"
Leach 9	"	"	"	A MC 68498	"	"
Leach 10	"	"	"	A MC 68499	"	"
Leach 11	"	"	"	A MC 68500	"	"
Leach 14	"	"	"	A MC 68701	9W	12
Leach 15	"	"	"	A MC 68502	9W	13
Leach 16	"	"	"	A MC 68503	9W	13
Leach 17	"	"	"	A MC 68504	9W	13
Leach 18	"	"	"	A MC 68505	9W	13
Leach 19	"	"	"	A MC 68506	9W	13

HISTORY

The large porphyry copper-gold deposit at Bagdad was first discovered in 1882. The mine became active in the mid-thirties following a long period of dormancy and gradually increased its production from an underground operation utilizing block-caving mining methods (300 t.p.d.) in 1930 through a combination of block-caving and glory-holes (1945) to an open-pit operation in 1950 (4500 t.p.d.). The mine presently processes 40,000 tons of ore per day with a minimum grade of 0.5% copper.

In addition to the Cyprus Mine porphyry deposit at Badgad the area contains the Copper King zinc deposit and several gold-bearing veins, of which the Hillside and Crosby, have been notable producers.

The Hillside Mine, which is located to the north of Bagdad on Boulder Creek, was discovered in 1887 and produced 13,094 tons of ore which yielded 9329 ounces of gold and 219,918 ounces of silver between 1887 and 1949.

The Crosby Mine, which is 3 miles north-east of the Golden Ark property, produced intermittently between 1906 and the 1960's. Production records for the mine are vague and incomplete.

The small adits, shafts and pits on the Leach claims were probably sunk by "old-timers" during the period of initial mineral exploration in the Eurekia district. The claim area had been staked several times prior to Mr. Best's restaking of the property in 1979.

A brief property examination in which several of the mineralized showings were sampled was undertaken in May 1979 (Sawyer, 1980).

Samples collected at this time gave significant values of gold which ranged ~~between~~ from less than 0.005 ounces of gold per ton to 2.55 ounces of gold per ton. The description, assay values and approximate location of these samples is tabulated below and shown in Figure 2.

Assay Tag No.	Au oz/ton	Ag oz/ton	Description
17137	0.699	0.16	# 1 Grab sample from first location, up hill to east of prospect.
17138	2.55		# 2 Grab sample from same vein as # 1, but 25 ft. to east.
17139	0.213		# 3 Grab, from same vein as # 1 but 10 feet east and 5 feet above sample #2.
17140	0.537	0.07	# 4 Grab sample from area of 4 or 5 old pits, approx. 300 feet northwest (310°) from samples #1,2,3.
17141	0.201		# 5 Special grab sample from large cut, shaft, and drift - 200 feet west of # 4 pits area.
17142	0.049		# 6 Chip sample across about 8 feet in west wall of pit which includes some hematitic stained material.
17143	0.132		# 7 Grab sample from a vein in the pit.
17144	0.361		# 8 Grab sample of selected material from a dump from another cut.
17145	0.230		# 9 Chip sample across 4½ feet.
17146	0.136		# 10 Grab sample of altered hematitic and limonitic material similar to that at the earlier locations.
17147	< 0.005		# 11 Grab sample from 4'-5' quartz vein between road and wash (southeast of wash) collected by Carl Clay.

In 1979 the previous property owner, Mr. Best, stripped approximately 500 tons of near-surface mineralized rock and heap-leached it on a small pad. Gold was extracted from the pile using cyanide solutions and adsorbed on activated carbon. According to Mr. Best, a significant amount of gold was recovered from the heap. Detailed metallurgical data on the test-leach are unknown to the writer.

GEOLOGY

General:

The area around the Golden Ark Property is underlain by PreCambrian granitic rocks, granitic schists and greisses, the Yavapai schist and locally, centres of younger volcanic and intrusive rocks. (Fig.3)

The major mineralization of the district, including the copper-gold mineralization at Bagdad, is related to the younger stocks and intrusive rocks which were emplaced during the Laramide orogeny. (Late Cretaceous to early Tertiary time).

Gold mineralization on the Leach claims is probably genetically related to the Laramide orogeny.

Property

A 2500 x 4200 foot grid was established on part of the leach claims and the geology mapped at a scale of 1 inch to 200 feet.

Mapped units are shown in Figures 4 and 5, and a brief description of each is given below.

Schist (s) - Screens and inclusions of quartz, mica schist (Yavapai schist?) are commonly enclosed in the PreCambrian granites.

Tan Granite (TG) - This unit has a characteristic tan colour on weathered surface and crops out as blocky-bluffs with manganese stained joint-surfaces.

It is composed of coarse-grained, porphyritic, tabular crystals of potassium feldspar (1-3 cm) set in a medium-grained matrix of quartz, muscovite and minor biotite. The rock has a distinctly trachytoid texture and may have affinities with the syenites.

Foliate Tan-Granite (TGf) - This unit is similar to the tan granite. It differs in the respect that it has a pronounced foliation. Within the more foliate zones the rock has an "augen-gneissic" texture. "Eyes" of potassium feldspar have been wrapped-around by the micas of ground mass.

Zones of pervasive foliation are extensive within this unit and are not confined to the margins of the intrusive-bodies.

Coarse-Grained Pegmatitic Granite (PG) - The older tan-granites have been intruded by a grey to white coarse-grained granite with a distinctly pegmatitic aspect. Contacts between the granites trend N30E and several dike-like fingers or apophyses from the pegmatitic granite cut the tan-granite in the northwestern part of the mapped area (L25N, Fig. 5).

This unit is composed of coarse-grained (4-5 cm) crystals of potassium-feldspar (orthoclase) quartz, biotite, and large books of muscovite. Locally the rock contains clusters of black prismatic tourmaline crystals, which are indicative of the presence of boron-rich residual fluids during the late stages of the rocks crystallization.

The coarseness of grain and the presence of exotic minerals indicate that this granite crystallized slowly at depth from a water-rich, "sweaty" magma.

Bull-Quartz vein (Qu) - An east-west trending vein of white "bull" quartz cuts the older granites at about 17 +00 N. The vein extends for approximately 2000 feet and varies in thickness from a few feet to 40 feet.

Andesite Dyke (DY) - A thin dyke of tan-coloured andesite cuts the granites between 10 + 00 16+ 00 N. The dyke trends west-northwest across the property and is locally highly jointed and shattered.

MINERALIZATION

Areas of mineralization and alteration are shown as AZ in Figure 5.

Four distinct zones have been recognized, three in the area between 0 + 00 and 12 + 00 N; and 10 + 00 E to 10+ 00 W and one between 0+ 00 N and 8 + 00 S and 16+ 00 E. (Fig. 5).

The mineralized areas appear to be closely related to the contact zones between the pegmatitic and tan granites and are concentrated mainly within altered pegmatitic granites, although the zone at 5+ 00 N; 8 + 00 W is within altered tan granites. It would therefore appear that mineralizing fluids have exploited zones of weakness and fracturing near the granite contacts.

Altered zones are characterized by pink-feldspars (orthoclase or hematite stained potassium feldspar); pyrite cubes, now psuedomorphed by hematite and limonite; red hematite and limonite stained joint and fracture surfaces; and locally, free-gold embedded in the pseudomorphs after pyrite. Surface samples collected from the altered, mineralized zones, when panned, invariably show good colours of fine-grained gold.

A series of 36 samples from dumps, shafts, or adits within the mineralized zones were collected and submitted to Southwestern Assayers and Chemists Inc., Tucson, Arizona for fire-assay.

The sample locations are shown in Figure 5. Their description and gold-silver values are given on the following page.

SAMPLE NO.	DESCRIPTION	Au oz/ton	Ag
Tank Pit Area			
P 1	Grab sample from dump material. Tank pit area	0.008	nil
P 2	8' chip sample around pit face.	0.008	nil
P 3	8' chip from pit. Tank pit area	0.104	nil
P 4	Grab sample from trench in screen of mica schist Tank-pit area	0.003	nil
P 5	12' chip sample in hem.-stained pegmatitic granite	0.032	nil
P 6	Chips within zone of red hem.-stained altered granite with sulphides and obvious free-gold	0.008	nil
Main Pit Area			
P 7	8' chip sample around pit B.L. 6+25N.	<0.001	nil
P 8	Grab sample from dump around water filled shaft	<0.001	nil
P 9	Grab sample from 10' wide trench	0.035	nil
P 10	Grab sample from dump around small pit. Granite siliceous, limonite stained	0.018	nil
P 11	Grab sample from dump around 30' deep shaft	0.028	nil
P 12	Grab sample from dump around small pit	0.095	nil
P 13	Grab sample from dump around small pit	0.040	nil
P 14	Grab sample from dump around small pit	0.003	nil

SAMPLE NO.	DESCRIPTION	Au oz/ton	Ag
P 15	Grab sample from dumps	0.035	nil
P 16	Grab sample from dumps around small pit	0.208	nil
P 17	Grab and chip sample from dumps and small pit	0.020	nil
P 18	Selected sample of red-hematite stained altered pegmatitic granite.	0.140	nil
Western Pit Area			
P 19	Grab sample from dump in front of 30 foot open cut	0.04	nil
P 20	Grab sample from dump around small shaft	0.030	nil
P 21	Chip sample taken over a wide area (150' X 100') in altered tan granite	0.175	nil
Main Pit Area			
P 22	45' channel sample on surface of area which was stripped and moved to leach-pad in 1979	0.007	nil
P 23	25' channel sample on surface of stripped area	0.008	nil
P 24	50' channel sample on surface of stripped area	0.010	nil
P 25	Grab samples from mounds of surface material on stripped zone	0.018	nil
P 26	Grab sample from pit dumps 9+50N; 1+50W	0.015	nil
P 27	Grab sample from dump around shallow shaft 11+40N; 0+40E	0.020	nil
P 28	5+00N; 14+00E: Grab sample fo surface rock chips near contact between peg. and tan granites. Surface soils had panned free gold.	< 0.001	nil

SAMPLE NO.	DESCRIPTION	Au oz/ton	Ag
P 29	5+00N; 20+00E; Grab sample of rusty, limonite stained tan granites. Surface soils had panned free gold.	< 0.001	nil
Eastern Zone			
P 30	Grab sample from pit in red-hematite stained, altered peg. granite	0.035	nil
P 31	Grab sample from dump of small adit	0.045	nil
P 32	Grab sample from dump of adit. Note adit mainly in screen of mica-schist	0.004	nil
P 33	Selected chip sample of red-hematite stained altered peg. granite	0.030	nil
Leach Pad			
LP-1	Surface channel sample across leach pad	0.004	nil
LP-2	"	0.010	nil
LP-3	"	0.002	nil

Average gold-silver values of samples collected from the different areas are as follows:

	Au oz/ton	Ag
West Pit area	0.082	nil
Main Pit area	0.039	nil
Tank Pit area	0.027	nil
Eastern area	0.029	nil

GEOCHEMISTRY

A geochemical soil survey of the prepared grid was completed

to determine whether the mineralized areas had distinct geochemical signatures. The area has an extremely thin (generally less than 6 in.) soil-cover so that, consequently, no mature soil profile has developed. Samples were collected every 100 feet on the E-W lines of the grid, sieved, and placed in Kraft bags. The samples were submitted to Southwestern Assayers and Chemists Inc., Tucson, Arizona for atomic absorption analyses for gold and mercury.

Results are given in the geochemical maps (Figures 6 and 7 in pocket).

Treatment of Data

Statistical treatment of geochemical data can be facilitated by the use of a graphical technique using probability paper (Tennant and White, 1959).

A cumulative frequency curve can be produced by plotting element contents (ppm) against cumulative frequency (%) for the elements studied. The cumulative curves can be used to study the following parameters.

a) the mean (M) and standard deviation (SD). The mean of the logs of the contents is estimated by the value on the cumulative curve which corresponds to the 50th percentile. The standard deviation is estimated by the difference of the values which correspond to the 84th percentile and the mean.

Threshold concentrations for elements where 50 percent or more of the data are above the lower detection limit (mercury) are taken as the mean plus two standard deviations.

Values above this are anomalous. (ie. 2.3% of the population in a log-normal distribution).

For elements where more than 50 percent of the data are below the lower detection limit (gold) the top 2.3 percent of the data are considered anomalous.

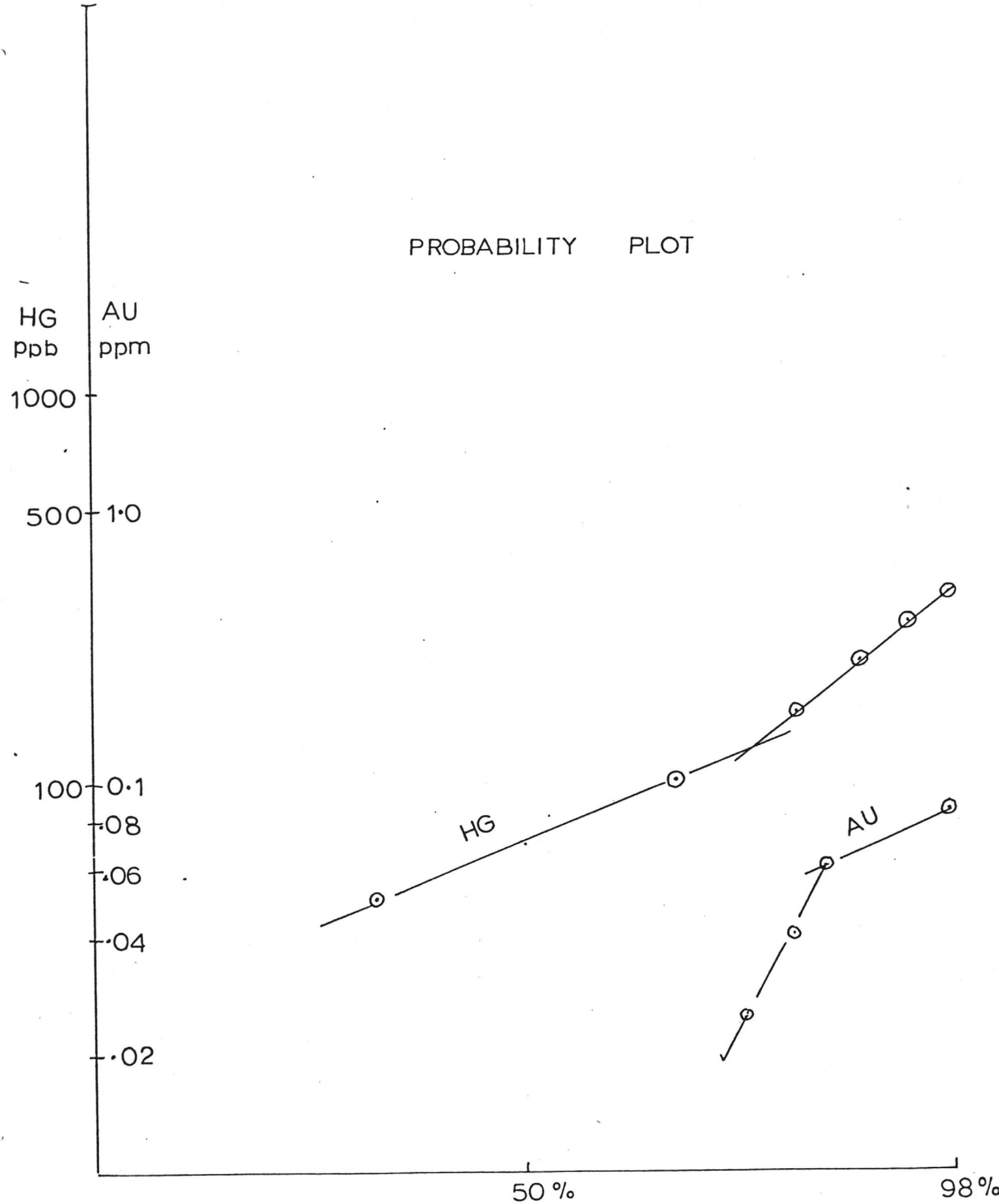

PROBABILITY PLOT
HG
ppb
AU
ppm
1000
500
1·0
100
0·1
·08
·06
·04
·02
HG
AU
50 %
98 %

FIGURE 8

For gold, "high background" values are taken as those between the 84th and 97.7th percentiles.

This designation of threshold and anomalous concentrations for gold and mercury follows that of Ashley and Keith (1976) who studied the geochemistry of gold deposits at Goldfield, Nevada.

Presentation and Discussion of results

The geochemical results have been plotted on probability paper (Fig 8) and are also shown in Figures 6 and 7 in pocket.

The straight-line curves of Fig. 8 show that the geochemical populations are log-normally distributed. The following pertinent data has been interpreted from the graph.

Element	Range	Statistical Data	Threshold Concentration	Range of High Backgrour Concentration
Au	.02-1.22ppm	84 percentile -.025 ppm 97.7 percentile-.08 ppm	.08 ppm	.025-.08 ppm
Hg	10-310 ppb	M - 70 ppb M + SD - 110 ppb M + 2SD - 300 ppb	300 ppb	110 -300 ppb

Gold

Anomalous gold values were noted in the Main Pit area and the eastern zone. Note that samples collected within the mapped mineralized zones did not necessarily return anomalous or high-background gold values. Spot high-background values in gold were noted on lines 15N (4E, 8W); 20N (2E,10E,10W); 25N (4E).

Mercury

Anomalous and high-background values of mercury were recorded within the Main Pit and Tank Pit areas and also down valley from these mineralized zones on LON; 0-6W. Spot high-background values were associated with the Eastern area.

The three samples collected within the Western area showed no anomalous or high-background values in either gold or mercury. In addition spot-high-background values were noted at L10N,14E; L20N, 22E.

The higher mercury values occur within the defined mineralized zones or within or close to the contact zones between the Pegmatitic granites and the tan granites.

Conclusions on Geochem-Survey

Based on the above reconnaissance geochemical survey it would appear that mercury in soils is a good indicator of potential gold mineralization. Gold values in soils return spotty and erratic values within mineralized zones and may therefore not be as reliable indices as mercury.

GENERAL CONCLUSIONS

The Golden Ark property (Leach Claims) is underlain by two PreCambrian granitic plutons. Significant gold mineralization has been recognised and sampled within four, possibly five, separate but closely related areas on the property. Mineralization is confined to zones of alteration close to the contacts between the"younger" pegmatitic granites and "older" tan-granites.

The average values of 10-samples collected by Sawyer (1980) within the mineralized zones was in the order of 0.3 ounces of gold per ton. The average values of 33 samples collected by the writer from the mineralized zones was in the order of 0.04 ounces of gold per ton. The average value of all samples collected from mineralized areas on the property to date is in the order of 0.15 ounces of gold per ton.

The widespread nature of the gold mineralization within these near-surface areas of alteration and oxidation leads one to conclude that the Golden Ark property has excellent potential for the development of a large-tonnage gold deposit (or deposits) which would be amenable to open-pit mining. Gold may be extracted from the ore by a low-capital cost heap-leaching technique.

A small-scale leach-test conducted by the previous owner, Quest Inc., was reportedly successful.

Geochemical surveys on the property demonstrated that mercury in soils may prove to be a useful indicator of gold mineralization.

RECOMMENDATIONS

A two phase programme for the thorough economic evaluation and development of the Golden Ark property is recommended below.

Phase I

1) The zones of mineralization and alteration should be trenched and bulk sampled for gold and silver. In the order of 5000 feet of east-west-trending trenches should be cut and sampled across the main zones of mineralization.
2) In the order of 42 angle, down-hole-hammer percussion drill holes should be drilled across the trend of mineralized zones. Holes should be drilled to 200 feet. This would necessitate about 8500 feet of percussion drilling.
3) During the drill and bulk sampling programme, samples should be submitted for bench-scale metallurgical tests to determine the leachability of the gold-ore.

On completion of this phase of the programme, an estimate of the tonnage and grade of the mineralization can be made and its amenability to heap-leaching by cyanide solutions can be established.

Phase II

The second phase of the programme should involve a large-scale leach-test involving between 20,000 and 40,000 tons of ore.

Gold may be extracted from the ore by spraying sodium cyanide in solution onto the pile. Prior to addition of cyanide the pH of the system should be in the range 10-12. Maintaining the pH at this level helps prevent the

formation of toxic gases (HCN) and markedly improves the efficiency of the leaching process.

The soluble Au-Ag-CN complexes produced by the chemical reactions of the leaching process may be readily taken out of solution by adsorption on activated carbon.

The gold is then stripped from the activated carbon by an electrolytic process. Gold-bearing activated carbon is readily saleable to the Asarco smelter at Helena, Montana. & El Paso & Hayden & others

In the event that early results from the drill programme prove encouraging, start-up of Phase II can be accelerated so that pad preparation, mining and leach tests can be undertaken simultaneously with the drilling and evaluation programme.

ESTIMATED COSTS

Phase I

Percussion drilling: 8500 Feet @ $7.00/foot	$ 59,500.
Cat-work, trenching	3,000.
Assaying: Fire-assay.1100 samples @ $6/sample	6,600.
Labour (4 men/2 months)	12,000.
Metallurgical tests/consulting	5,000.
Supplies, accommodation	10,000.
Travel, vehicle rental	5,000.
Engineering, supervision	5,000.
Contingency	10,000.
	$116,100.

Phase II

(A) 20,000 ton test leach

Plant, equipment, chemicals	$ 30,000.
Mining, pad preparation	50,000.
Assaying	5,000.
Engineering, supervision, consulting -	20,000.
Contingency	10,000.
	$115,000.

(B) 40,000 ton test leach

Plant, equipment, chemicals	$ 30,000.
Mining; pad preparation	90,000.
Assaying	7,000.
Engineering, supervision, consulting	20,000.
Contingency	10,000.
	$157,000.

Total Phase I + Phase II (A)	$231,100.
Total Phase I + Phase II (B)	$273,100.

Note:

20,000 ton pad: assume 0.05 oz/ton Au Average grade;

60% recovery of gold; $500/oz gold.

Metal value recovered

= 20,000 X 0.05 X 0.6 X $500. = $300,000.

40,000 ton pad: assume 0.05 oz/ton Au ore grade

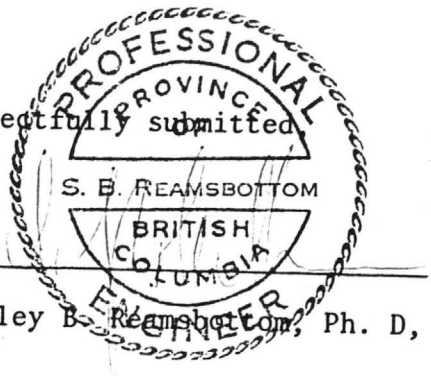
60% recovery of gold; $500/oz gold

Metal Value Recovered

= 40,000 x 0.05 x 0.6 x $500 = $600,000.

Both of the initial test-lifts would probably cover the development costs. The larger lift would obviously be the more profitable.

Respectfully submitted,



Stanley B. Reamsbottom, Ph. D, P. Eng.

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Wilson E.D., Cunningham, J.B., and Butler, G.M., 1967: Arizona lode gold mines and gold mining; Ariz. Bur. Mines Bull. 137, Revised 1967.

CERTIFICATE

I, Stanley B. Reamsbottom, DO HEREBY CERTIFY:

1. THAT I am a consulting geologist with office at # 930 789 West Pender St. Vancouver, B.C. V6C 1J2

2. THAT I am a graduate of the University of Aberdeen, Scotland, 1968 with a B. Sc. Geology (1st Class Honours) degree.

3. THAT I am a graduate of the University of British Columbia, Vancouver, with M. Sc. (Geology (1971) and Ph. D. (Geology) 1974, degrees.

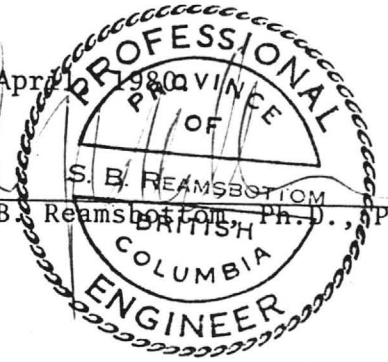
4. THAT I am a registered member of the association of Professional Engineers of British Columbia.

5. THAT I have practised my profession for 10 years.

6. THAT I have no direct, indirect, or contingent interest in the mineral claims held by Ark Energy Limited, nor in the securities of Ark Energy Limited, nor do I intend to receive any such interest.

7. THAT this report dated April, 1980 is based on a personal examination of the Golden Ark property and on government reports on the area.

Dated at Vancouver, B.C. this 22nd day of April, 1980.



Stanley B. Reamsbottom, Ph.D., P.Eng.

A. F. Budge (Mining) Limited
7340 E. Shoeman Lane, Suite 111 "B" (E)
Scottsdale, AZ 85251-3335
(Business Office)
Telephone: (602) 945-4630
Telex: 751739

Don:

Enclosed are:

- copy of P. Hahn's February, 1987 Report on Cimarron
- copy of UVX drilling summary
- copies of UVX assays, holes M-1 thru 809-2 (significant intercepts only)

Carole

A. F. Budge (Mining) Limited
7340 E. Shoeman Lane, Suite 111 "B" (E)
Scottsdale, AZ 85251-3335
(Business Office)
Telephone: (602) 945-4630
Telex: 751739

June 18, 1987

Ernest K. Lehmann
E.K. Lehmann & Associates
1409 Willow Street, Suite 300
Minneapolis, MN 55403

Dear Ernie:

Enclosed is a copy of Pete Hahn's February, 1987 Report on Cimarron, which I promised to send to you a week ago.

The assay results from the 3rd phase drilling program are just getting in now from Skyline. We probably won't have a complete data package assembled until late July.

Also enclosed for your information is the revised set of guidelines for the Ben F. Dickerson Award, along with copies of correspondence with Joe Schlitt concerning this.

Best regards.

Sincerely,

Carole.

Carole A. O'Brien

encls.

A. F. Budge (Mining) Limited
7340 E. Shoeman Lane, Suite 111 "B" (E)
Scottsdale, AZ 85251-3335
(Business Office)
Telephone: (602) 945-4630
Telex: 751739

June 18, 1987

John R. Menke
44 Ogden Road
Scarsdale, NY 10583

Dear John:

Enclosed is the sketch map and drilling summary we discussed on the telephone yesterday.

Please do not hesitate to call if you need any additional information.

Sincerely,

Carole

Carole A. O'Brien

encls.

3903 Rockingham Dr.
Pleasanton, CA 94566

May 25, 1987

Dear Carole,

I was sorry to read about Ben's death. He was an important person in the industry, and we will all miss him. It's sad to lose a person like that.

Are you carrying on the business? I see that you are the Vice President of AIPG, and I'm sure that keeps you busy. Even though I've been in California for a year, my heart is still in Arizona. If it's no added cost or not much trouble, could my name be added to the Arizona Section's mailing list? I like to keep up with what's going on in Arizona. The California Section of AIPG is not as active as Arizona's.

Please use home address →

I've been very busy at ENCON Associates. I've been doing hydrogeologic site characterizations and investigations of ground-water contamination at landfills and industrial facilities. It's interesting and challenging, but not as adventurous as the mining industry. However, the future looks very good; the more investigation we do, the more contamination we find. It's good for JOB security!

Best regards,

Albert Lamarre

A. F. Budge (Mining) Limited
7340 E. Shoeman Lane, Suite 111 "B" (E)
Scottsdale, AZ 85251-3335
(Business Office)
Telephone: (602) 945-4630
Telex: 751739

March 6, 1987

Paul A. Handverger
2160 Old Jerome Highway
Clarkdale, AZ 86324

Dear Paul:

Enclosed for your files are copies of the assay sheets from holes M-1, M-2 and M-3 drilled from the Morgan Drill station on the 950 level.

Also enclosed is Don's schematic on the results of the "drifter" holes, S-1 and S-2, compared to the sampling in the bean hole raise on the 950 level.

Best regards.

Sincerely,

Carole

Carole A. O'Brien

encls.

M.C. LA BARR

6262 N. SWAN RD. — SUITE 132 / TUCSON, ARIZONA 85718 / TELEPHONE (602) 577-2414 / FAX (602) 577-0952 / TELEX 666448

October 26, 1987

Mr. Carol O'Brien, Mining Coordinator
A.F. Budge Mining Limited
7340 E. Shoeman Lane #111B East
Scottsdale, Arizona 85251-3335

Dear Mr. O'Brien:

We enclose a current list of laboratory, pilot and research equipment available from the Anaconda Research Center closing in Tucson.

Since some items are applicable to geological operations, we are including you in our mailing.

We invite your inquiry, suggestion or referral.

Yours very truly,

M.C. LaBarr

MCL/tr
enc: Lab General
(Reverse) Process General

RANDOL

RANDOL GOLD DIRECTORY®
P.O. Box 15632
Lakewood, Colorado 80215

(303) 526-1626
Telex 494-3345

22 OCTOBER 1987

DMEA LTD.
NOV 2 1987
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DMEA LTD.
7340 E. SHOEMAN LANE #111B
SCOTTSDALE, AZ 85251

RE: RANDOL GOLD DIRECTORY 88

GENTLEMEN:

WE WOULD LIKE TO LIST YOUR COMPANY IN THE RANDOL GOLD DIRECTORY.

KINDLY ADVISE WHETHER YOUR EDITH SHAFT MINE IN YAVAPAI COUNTY, AZ IS OPERATING AND PRODUCING GOLD AND/OR SILVER, IS UNDER DEVELOPMENT, AND IS IN EXPLORATION PHASE OR IS INACTIVE.

ALSO, ARE YOU DEVELOPING ANY OTHER PRECIOUS METAL MINES IN NORTH AMERICA?

THANK YOU FOR YOUR TIME AND COOPERATION.

SINCERELY,

Hans

HANS VON MICHAELIS

PS: PLEASE BE ADVISED THAT EACH operating MINE LISTED IN OUR DIRECTORY WILL RECEIVE A FREE DIRECTORY.

DAWSON
METALLURGICAL
LABORATORIES, INC.

P.O. Box 7685
5217 Major Street
Murray, Utah 84107-0685
Phone: 801-262-0922

July 1987

DMEA Ltd.
7340 East Shoeman Lane
Suite 111B East
Scottsdale, Arizona 85251

Attn: Carole A. O'Brien

Dawson Metallurgical Laboratories has been operating ten years and because of our many clients such as you, we have a very busy and interesting operation. With your support we have a very successful operation.

We have had the opportunity to work on a wide variety of projects including gold-silver, base metals, molybdenum, industrial minerals, and tar sand. We have worked on over 1250 projects conducted for many firms large and small, foreign and domestic. Because of economic conditions a majority of our recent investigations have been associated with process development on gold and silver ores. Our projects have varied from a few hours of laboratory time to weeks and even months of effort.

We believe we are fulfilling our goal to provide a service to the industry by offering expertise and laboratory facilities to handle a wide variety of mineral beneficiation problems. Our future depends on our ability to continue to be of service. Our thanks to those who have made our operation a success.

We are looking forward to continued association with our present and past clients as well as new associations. Your inquires are welcome.

Very truly yours,
DAWSON METALLURGICAL LABORATORIES, INC.

Harmel A Dawson
Philip Thorpe
Perry Allen

HAD-dac

In closing, the Vulture Mine is not open to the public and no tours are conducted by the owner or A. F. Budge (Mining) Ltd. Touring or exploring abandoned mines is extremely dangerous and must not be undertaken by the inexperienced.

Thank you for your time.

Sincerly,

A. J. Fernandez
Senior Mining Engineer

GSA Resources, Inc.
P.O. Box 16509
(602) 297-4330
Cortaro, Arizona 85652
Telex 5106001432

September 21, 1987

Carole O'Brien
DMEA, Ltd.
7340 E. Shoeman Lane
Suite 111 "B" (E)
Scottsdale, AZ. 85251

Dear Carole:

I wanted to take a minute to thank you and Joe Fernandez for your help with the Arizona Conference - AIPG joint fieldtrip to Jerome. The people I have talked with who participated were very complimentary of both Don White's and Paul Lindberg's presentations. More impressive are the number of people who did not go who heard favorable comments about the fieldtrip. Once again thanks for your help. I would rate the project a big success.

Very truly yours,

Daniel T. Eyde

DTE/mce

September 15, 1987

Ms. Carole A. O'Brien
Geologist and Mining Coordinator
A. F. Budge (Mining) Limited
7340 E. Shoeman Lane, Suite 111BE
Scottsdale, Arizona 85251-3335

Dear Carole:

Thank you for the material you recently sent, concerning the two properties that you are evaluating. I have not read them in detail, but expect to study them in the next couple of weeks. They are quite old properties and look very interesting both geologically and historically.

I am quite interested in looking over these properties with the possibility of managing their future development and continued production. At the present time I am available to visit in October, and would appreciate a weekend schedule, because of my current obligations.

Thank you for the opportunity to review these reports and the possible future employment with your Company. I will be in touch with you should I have further questions concerning these documents. I am looking forward to meeting you in the near future.

Sincerely,

Robert C. Hedlund

MILLSAPS MINERAL SERVICE, INC.

May 12,1987

Ms. Carole O'Brien, Manager
A.F. Budge Mining Ltd.
Suite 111 B East
7340 Shoeman Lane
Scottsdale, Arizona 85251

Dear Carole:

Here are two resume's for mine engineer. One I think is too high powered for the job and the other is not high powered enough, but I thought that you might appreciate making up your own mind.

I hear by the grapevine that PD is getting into the gold business by buying into a property near Carlin. I wonder if they know enough about running a small operation? Most of the biggies in the copper business havn't been too successful in small operations.

It doesn't look like I will get to Phoenix this month. Sunbeam mining is keeping me on the go. I have a trip to Stanley, Idaho and another one to Vancouver this month, then a trip to Milwaukee the first week in June for them. Unless I can find them a metallurgist before then.

Nothing new to report on the column test as yet. There are some samples in for assay but the column is still running.

I will call as soon as I hear something , until then

As ever,

Frank.

ROOM 202 - 3865 WASATCH BLVD., SLC, UT 84109...(801)277-7130 OFC./277-0750 HOME

BULK MINEABLE PRECIOUS METALS DEPOSITS
OF THE WESTERN UNITED STATES
P.O. BOX 70218
Reno, NV 89570

05/22/87

CAROLE O'BRIEN
7340 E. SHOEMAN LANE (111-B-E)
SCOTTSDALE, AZ 85251

-0-

Dear MS. O'BRIEN,

Thank you for your GSN Symposium publication order. Field Trip Guidebooks are currently being mailed under separate cover. Publication of the Technical Volume is expected during Fall of 1987 and will be mailed at that time.

Sincerely,

Lynne Volpi

Lynne Volpi
Publications Coordinator

Don White
521 East Willis St.
Prescott, AZ 86301
602/778-3140

May 12, 1987

Susan M. McDonald
4278 Canyon Trail #1
Cottonwood, AZ 86326

Dear Ms. McDonald,

Thank you for your resume and inquiry regarding work at the U.V.X. Mine in Jerome.

While the superintendent has hired some miners and mechanics recently, they are the only sorts being sought. They are professional underground miners with many years of experience. We have all our assays run elsewhere and we have no clerical or support positions at this time.

I will duly place your resume in the file of those available but can't offer any encouragement for the foreseeable future.

Regards,

Don White

Don White
Geologist, C.P.G.

DW:sk

bcc. Carole

Yavapai County Board of Supervisors

255 EAST GURLEY
PRESCOTT, ARIZONA 86301
PHONE (602) 445-7450

February 27, 1987

A F Budge Mining, Ltd.
c/o Carol O'Brien DMEA
7340 E. Shoeman Lane, Ste 111 "B"
Scottsdale, AZ 85251

Dear Ms. O'Brien:

We have been notified by the Yavapai County Assessor of a change in valuation on Assessor's parcel number Roll #1380010.

You are listed as the owner of record of this property. We are hereby notifying you that at 10:30 a.m., on Monday, March 23, 1987, the Board of Supervisors will consider making the necessary changes on this parcel, which will result in an increase in taxes as well as an increase in valuation. This may affect any subsequent years' taxes as well.

The reason for this change in valuation is:

Escaped 1986 taxes. Add to the 1986 tax roll.

The valuation and tax changes created by this increase are as follows:

Tax Year: 1986	From	To
Limited Value	- 0 -	$78,150
Full Cash Value	- 0 -	$78,150
Total Taxes	- 0 -	$1,965.39

If you wish to protest this action, you may be present at the hearing which will be held on the above date and time in the County Administration Building, Room 303, located at 255 East Gurley Street, Prescott, Arizona. If you plan to attend, we would appreciate hearing from you by March 16, 1987.

Sincerely yours,

Ann-Lawrie Aisa

Ann-Lawrie Aisa, Clerk

ALA/bjs

SUN VALLEY
Equipment Corp.
Cottonwood, Arizona

DMEA LTD.
JUN 16 1987
RECEIVED

June 15, 1987

A.F. BUDGE MINING, LTD.
7340 E. Shoeman Ln. Ste.111BE
Scottsdale, Az 85251-3335

Dear Customer,

I am pleased to inform you that our credit department has approved your firm and an account has been opened for you. Our terms are net 30 days.

Cottonwood, Arizona is the home of **SUN VALLEY EQUIPMENT.** We are strategically located in the heart of the Verde Valley so that we may better serve our customers. Our goals are to provide the community with quality construction and lawn & garden equipment for both rental and purchase. In addition we have U-Cart Ready Mixed Concrete that is available for purchase in quantities from 1/4 to 1 cubic yard. We view the Verde Valley area as one community and would appreciate your patronage on your existing and future projects valley-wide. For our open account customers, we offer free delivery and pickup service on one (1) day or longer rentals of equipment.

How may we help you? If you have a need for a particular type of equipment or service that we could provide, please let us know. We are here to help you get your projects completed and your success is important to us.

Sincerely Yours,

Bill Hutton
President
SUN VALLEY EQUIPMENT CORP.

681 Justin Dr.
P.O. Box 218
Cottonwood, AZ
86326
(602) 634-9581
Sedona 282-1461

Rental And Sales Of Equipment
For The Contractor And Home Owner

ARIZONA STATE PARKS

SPECIAL EVENT PERMIT

PERMIT GRANTED SUBJECT TO THE FOLLOWING:
(Note: Permit may be cancelled if any of the following are changed without prior approval of the Park Manager.)

1. ISSUED TO: A.F. Budge (Mining) Limited
2. TYPE OF EVENT: Company Picnic
3. DATE(S) OF EVENT: May 16,1987
4. LOCATION: River Day Use Ramada
5. PERSON(S) RESPONSIBLE FOR EVENT: Pete Flores
6. CONCESSION SALES: N/A
7. STIPULATIONS: 1. All vehicles MUST register at the park office.
   2. Fees are $2.00 per car for resident & $3.00 non resident.
   3. Group size cannot exceed more than 60 people.
   4. Group will be responsible for clean up of area.
8. APPROVALS:

Park Manager

Signature Date 4-24-87

Parks State Operations Administrator

Signature Date

Other

Signature Date

(Note: Copies will be returned after all approvals have been made.)

Rev. 7/84 White: Applicant Yellow: Phoenix Office Pink: Park

LITHOLOGICAL, STRUCTURAL, CHEMICAL AND MINERALOGICAL PATTERNS IN A PRECAMBRIAN STRATIFORM GOLD OCCURRENCE YAVAPAI COUNTY, ARIZONA

M. M. Swan
Newmont Exploration Limited
Tucson, Arizona

D. M. Hausen
Newmont Exploration Limited
Danbury, Connecticut

R. A. Newell
Newmont Exploration Limited
Tucson, Arizona

A stratiform gold occurrence of Precambrian age located 20 miles southeast of Prescott, Arizona, within the Agua Fria Mining District, displays chemical, mineralogical, structural and lithological patterns indicative of a distal, exhalative volcanogenic environment. Metavolcanic and metasedimentary rocks of the Proterozoic Yavapai Series (1775-1820 m.y.) host the mineralization and are characterized by greenschist grade metamorphism, steeply-plunging penetrative folds and steeply-dipping schistosity. Mineralization is confined to a 100m thick stratigraphic section that is comprised of a series of thin auriferous massive sulfide beds and intercalated schist containing disseminated sulfides. The mineralization extends more than 4km along strike. Coincident with, and largely confined to the mineralized strata, are anomalous amounts of As, Sb, Cu, Pb, Zn and Ag and associated silicification, sericitization and carbonatization. This exhalative mineralized system is interpreted to have been deposited in a paleotopographic low on the distal flank of a submarine rhyolite dome and to represent the final episode of a Precambrian volcanic cycle.

Introduction

Significant portions of the southwestern United States are underlain by classic Precambrian greenstone belts, but with the possible exception of the Iron King Mine, in the Big Bug Mining District, Yavapai County, Arizona, descriptions of stratiform exhalative gold occurrences are notably absent from the literature (3,4) (Fig. 1). The Iron King is a five-million ton Pb-Zn volcanogenic massive sulfide deposit that averaged 0.123 oz per ton Au (5). The gold prospect that is the subject of this paper is located 5 km southeast of the Iron King deposit in the Agua Fria Mining District. In many respects, this occurrence resembles the Iron King deposit, although it displays the intercalated exhalite character of such deposits as the Thompson-Bousquet gold deposits of northwestern Quebec, Canada (8).

During 1978-1980, an exploration effort by Newmont Exploration Limited and Superior Oil Company examined the gold potential of this exhalative occurrence. The exploration program consisted of reconnaissance geochemical-mineralogical studies, geological mapping, geophysical surveys, detailed stratigraphic geochemistry and diamond drilling.

Regional Geology

The gold mineralization occurs in greenschist-grade generally calc-alkaline metavolcanic and metavolcaniclastic rocks of the Proterozoic Yavapai Series, rocks which are chronologically equivalent to Upper Aphebian rocks of the Canadian Shield (6). The Yavapai Series in the Prescott-Jerome Area comprises a 110 x 140 km greenstone belt that is dominated by stratified volcanic and volcaniclastic rocks that have been deformed and intruded by plutons (Fig. 2). The volcanic to plutonic cycle that produced these rocks started at 1820 ±15 m.y. and ended at about 1720 ±15 m.y. (3). The regional deformation associated with the plutons resulted in variable intensity, isoclinal folding of most stratified rocks about generally steeply-dipping, north-northeasterly-striking axial planes. Fold axes generally plunge 60° to 80° and lie in the plane of foliation. Metamorphic grade is typically lower greenschist rank except where it was locally raised by thermal metamorphism near intrusions.

Mineralization

Host Rocks

Mineralization is characterized by gold-bearing, poly-metallic sulfides that occur as both disseminations and as thin massive beds. Mineralization is stratiform and appears syngenetic with host rock deposition. Exhalite sulfide deposition in contemporary volcanic rocks is well established in the Prescott-Jerome greenstone belt (2,4,5). The mineralized strata dip 55° to the west and become younger to the west (Fig. 3). Host rocks now are largely quartz sericite and quartz chlorite schists that appear to have been deposited as cherty, distal rhyolite tuffs. The mineralized section has a maximum thickness of about 100 m, but it thins to zero to the south. Disseminated sulfides comprise up to about 20% of the rock. Thin massive exhalite sulfide horizons occur throughout the mineralized section. They average 3 cm, but range up to 30 cm in thickness; they are continuous for up to a kilometer along strike. The continuity of the beds and the absence of sedimentary structures suggesting high-energy depositional regimes, are consistent with the distal character of the rocks and their associated mineralization. The sulfides are thoroughly oxidized at the surface and form hematitic gossans in outcrop.

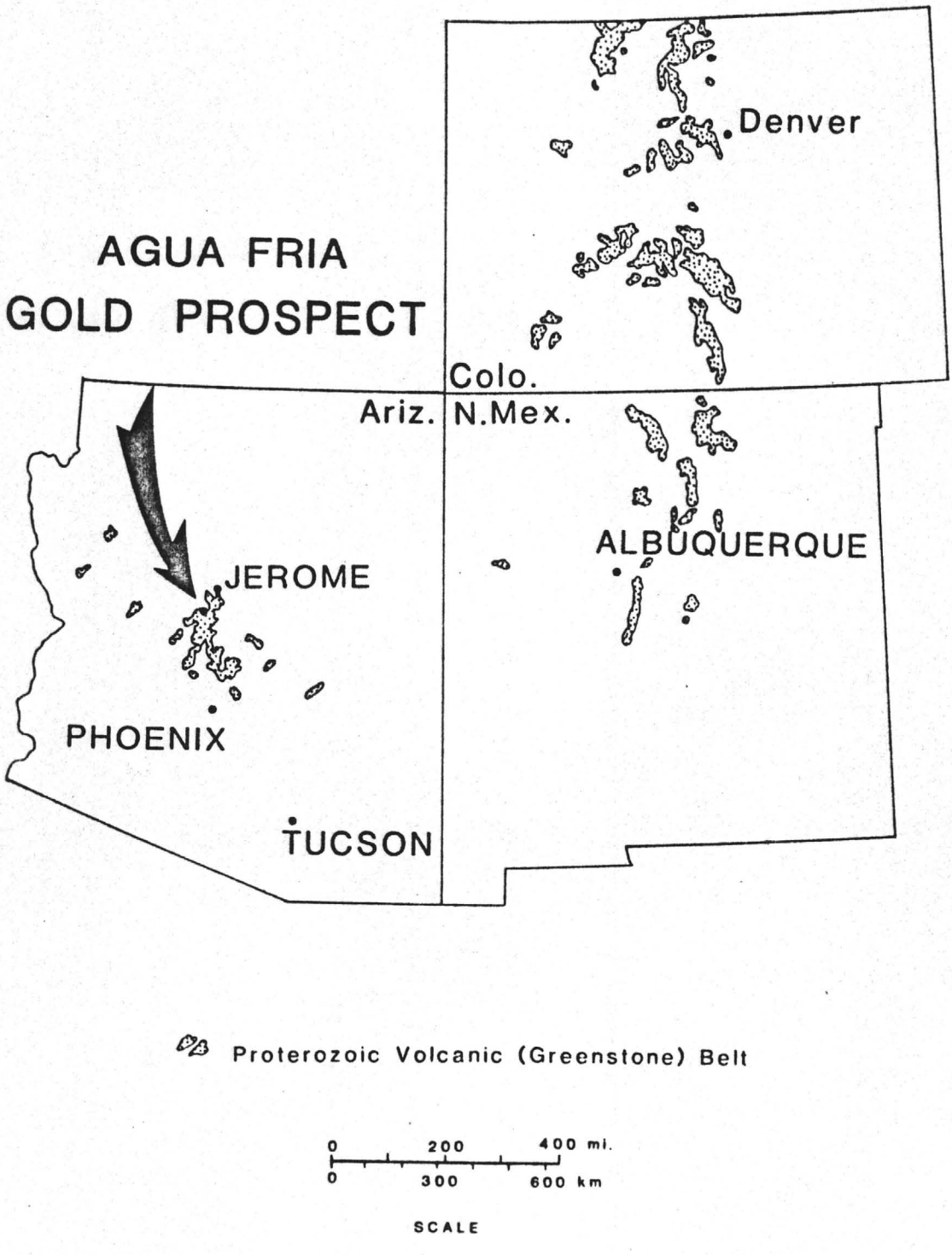
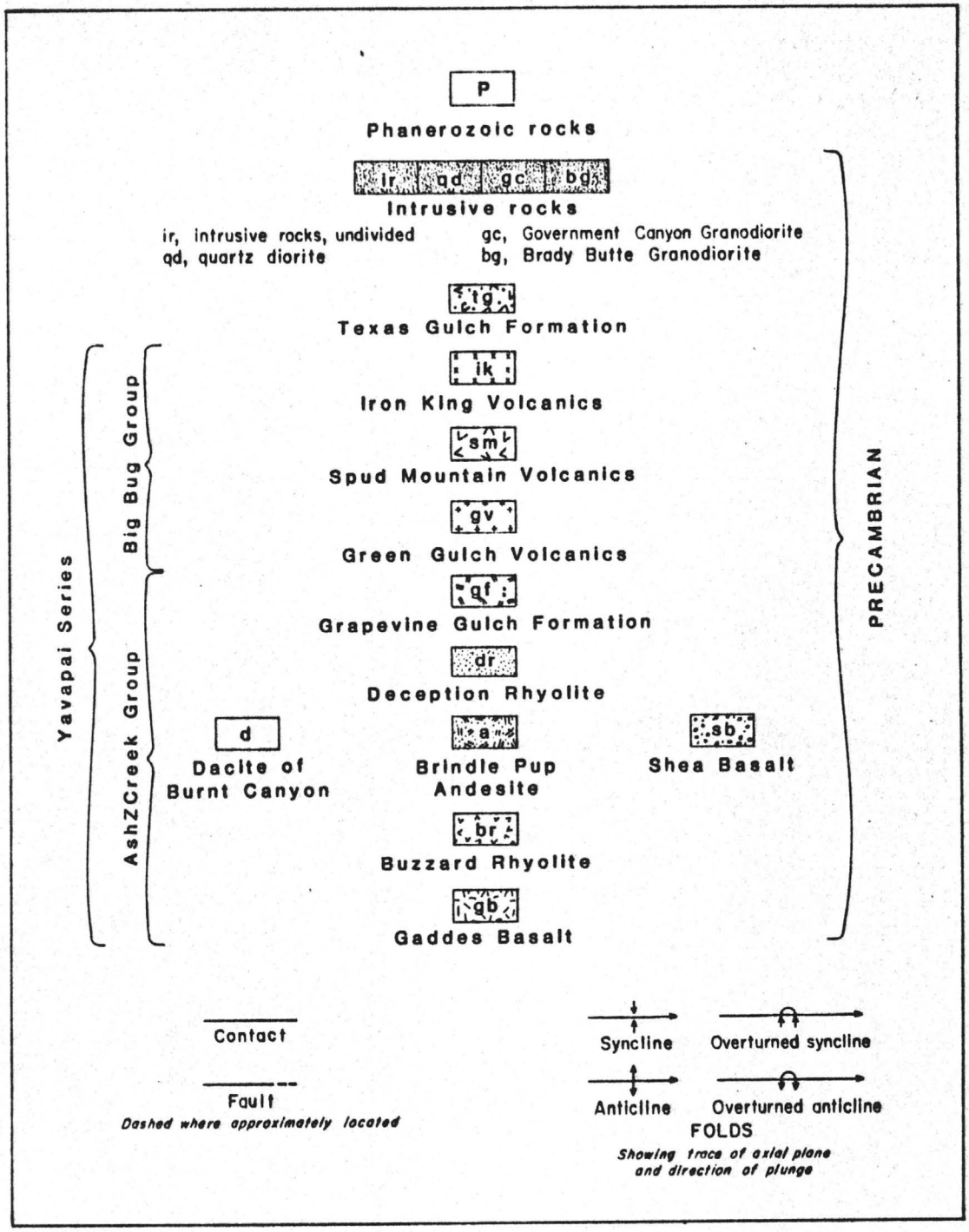


Fig. 1 - Location map showing greenstone belts of the southwestern United States.


P
Phanerozoic rocks
ir
qd
gc
bg
Intrusive rocks
ir, intrusive rocks, undivided
qd, quartz diorite
gc, Government Canyon Granodiorite
bg, Brady Butte Granodiorite
tg
Texas Gulch Formation
ik
Iron King Volcanics
sm
Spud Mountain Volcanics
gv
Green Gulch Volcanics
gf
Grapevine Gulch Formation
dr
Deception Rhyolite
d
Dacite of Burnt Canyon
a
Brindle Pup Andesite
sb
Shea Basalt
br
Buzzard Rhyolite
gb
Gaddes Basalt
Yavapai Series
Big Bug Group
AshZCreek Group
PRECAMBRIAN
Contact
Fault
Dashed where approximately located
Syncline
Overturned syncline
Anticline
Overturned anticline
FOLDS
Showing trace of axial plane and direction of plunge

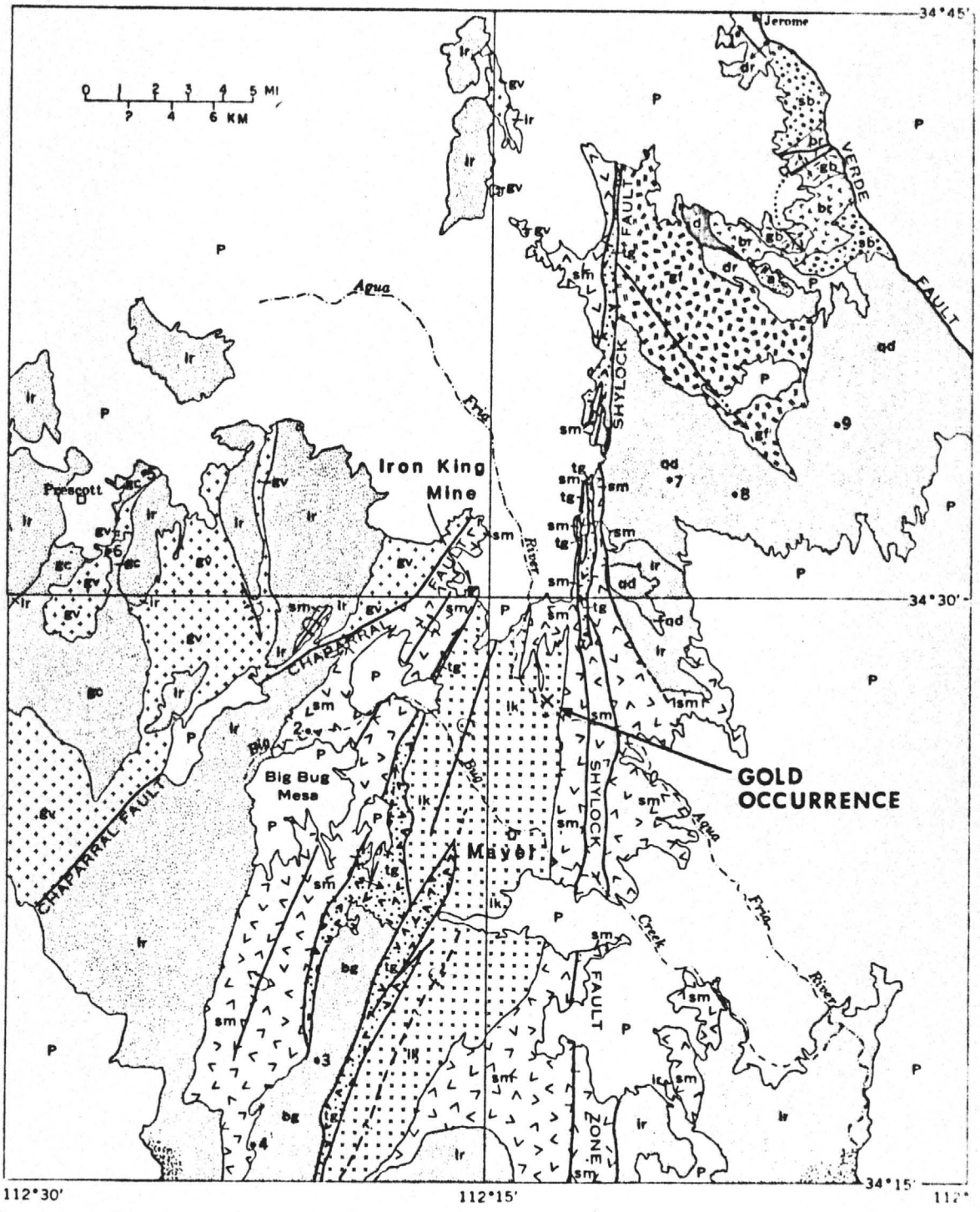


Fig. 2 - Generalized geologic map of the Prescott-Jerome area (after Anderson, et al, 1971).

Ben

The Bell prospect is in the same unit as the Iron King Mine on the other side of the syncline.

Dan

QUATERNARY

A

alluvium

PRECAMBRIAN

B

meta-basalt
meta-gabbro
meta-siltstone

G

meta-gabbro

C

oxide-carbonate facies exhalite

includes:
hematite-magnetite exhalite
carbonate facies exhalite
meta-arkose
meta-chert
meta-siltstone
meta-gabbro

S Cb

quartz - sericite - chlorite schist

carbonate facies
sulfide facies

M Marker unit - chlorite-sericite-quartz schist with calcite "eyes"

includes:
meta-chert
meta-rhyolite tuff
meta-graywacke
disseminated sulfide exhalite
massive sulfide exhalite
disseminated carbonate exhalite
massive carbonate exhalite

Qc

quartz - chlorite schist

includes:
meta-graywacke
meta-andesite tuff
sheared meta-gabbro
carbonate-facies exhalite

C

oxide-carbonate facies exhalite

C

chlorite schist

includes:
metavolcanic rocks
metasedimentary rocks
oxide carbonate facies exhalite
meta-gabbro

21 bedding strike and dip

77 70 foliation strike and dip
lineation trend and plunge

80 fold axis trend and plunge

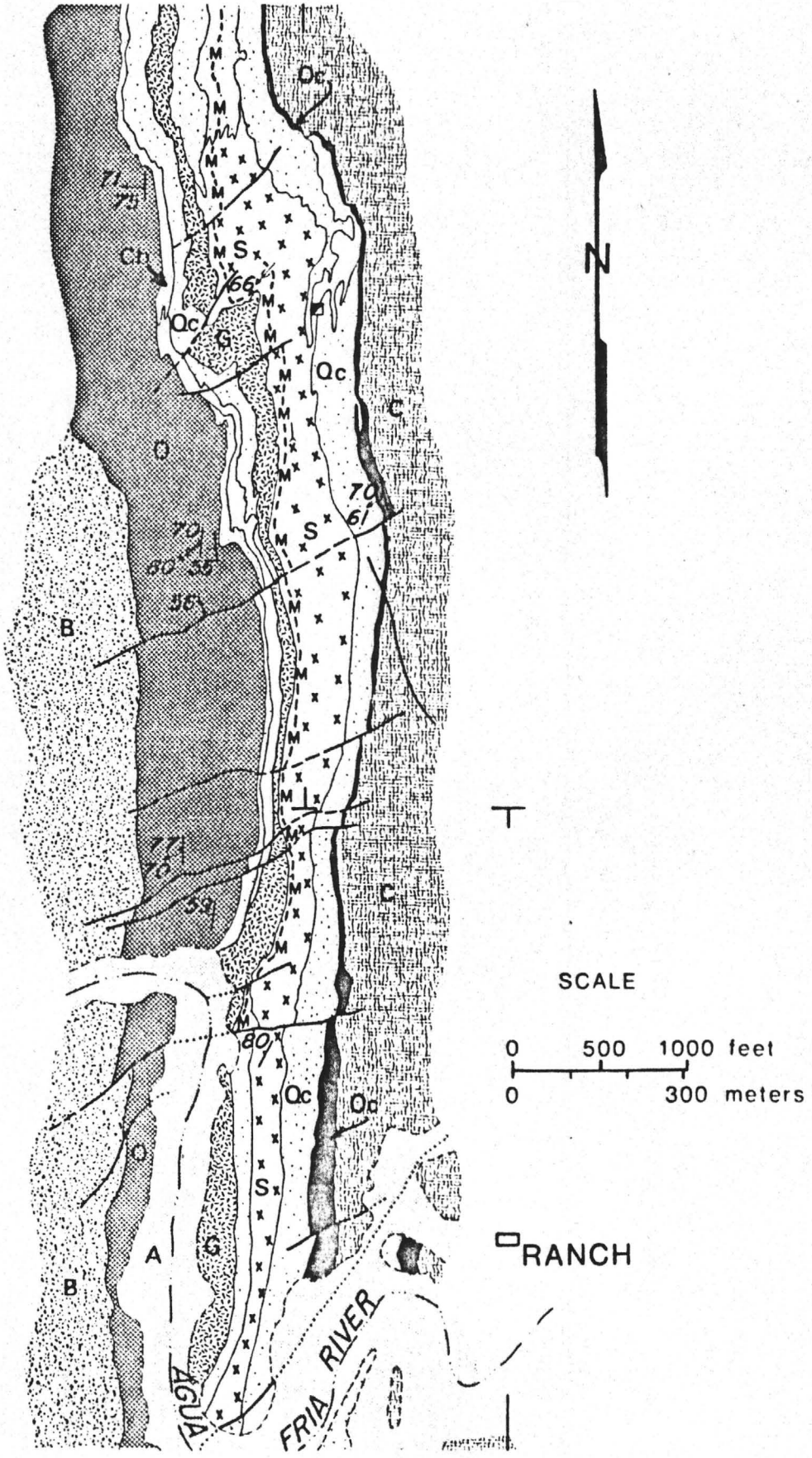


Fig. 3 - Geologic map of the Agua Fria gold occurrence.

The massive sulfide horizons are deformed into en echelon lenses by asymmetric folding. The lenses are thickened near fold closures, thinned in portions of the limbs and elongated parallel to steep, southwest-plunging fold axes. These changes commonly occur at a scale of several meters. A 2 m thick quartz-chlorite schist unit characterized by calcite "eyes" served as a marker unit and helped decipher the structure. Rocks in the stratigraphic hanging wall include a 30-170 m thick, carbonaceous magnetite-pyrrhotite bearing banded iron formation, carbonate exhalite beds, and a sequence of cherty chlorite sericite schists interpreted to be meta-argillites, greywackes, and andesite tuffs. A thick sequence of basalt and meta-argillites lies on top of these rocks. Rocks underlying the mineralized section include chlorite schists interpreted to be andesitic and a banded iron formation. The upper portion of the mineralized sequence is intruded by a Precambrian gabbro sill.

Rocks hosting mineralization are stratigraphically lateral equivalents of a cherty rhyolite dome that lies about 1.5 km north of the occurrence. This dome is stratigraphically asymmetrical, abruptly lensing out to the north. At the present erosion surface it has a maximum stratigraphic thickness of 200 m and a strike length of 500 m.

Chemical Patterns

Coincident with and largely confined to the sulfide-bearing strata are anomalous amounts of Au, As, Sb, Cu, Pb, Zn and Ag with associated silicification, sericitization and carbonatization. Geochemical and alteration changes are complex normal to bedding planes, probably reflecting continual and abrupt changes in exhalite precipitation. In the plane of bedding, they show a more general systematic pattern indicating relatively stable sea floor topography. Facies changes of mineralization observed along strike are believed to reflect varying Eh and pH conditions during exhalite deposition (6,7). A crude generalization of the pattern, starting from the rhyolite dome and proceeding south, can be summarized as:

1. Carbonate facies (strike length = 0.8 km),
2. Sulfide facies and carbonate facies (strike length = 4 km),
3. Carbonate facies (strike length = 1.6 km) (Fig. 4).

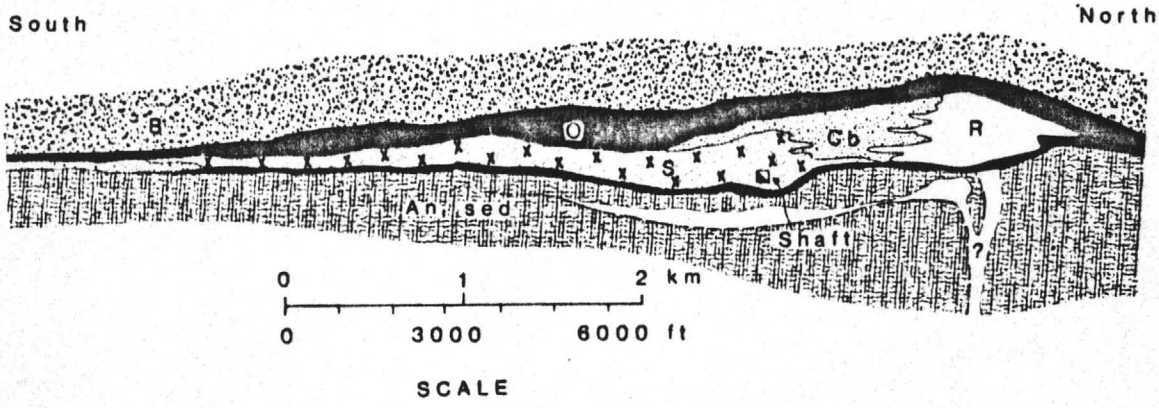


Fig. 4 - Diagramatic section of rhyolite dome and associated exhalites. (See geologic map for explanation.)

Evaluation of reconnaissance rock chip samples by x-ray fluorescence, A.A. and Fire Assay methods indicated that anomalous Au-Ag-Zn-Pb-Cu-As mineralization is confined to the rhyolitic tuff unit. The association of anomalous gold and arsenic in relation to the rhyolitic unit is shown in plan in Figures 5 and 6.

The geochemical patterns in outcrop may or may not reflect primary geochemical patterns of base metals and gold since the surface rocks are so thoroughly oxidized. Oxidation extends 30 to 60 m below the surface. Assays from underground sampling and drilling indicate that surface gold leaching and subsurface enrichment are variable, but locally increase up to ten-fold.

Extensive outcrop channel sampling normal to bedding planes of mineralized strata identified the gold-bearing exhalite horizons (Fig. 7). Sampling along gossan horizons a and b revealed lithogeochemical anomalies that helped define drill targets (Fig. 8). Gold values usually correlate with percent sulfide, especially base metal sulfides such as arsenopyrite and sphalerite. Mineralogical studies showed that gold occurs mostly as fine inclusions (1-10 microns) in pyrite or in iron-oxide pseudomorphs after pyrite.

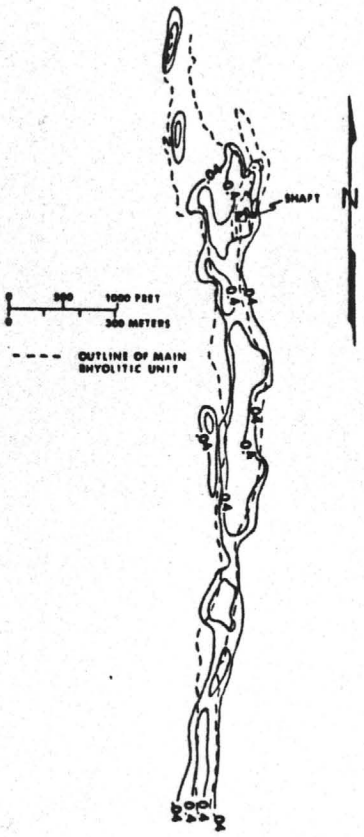


Fig. 5 - Distribution of Gold (ppm) in Relation to Rhyolitic Unit.

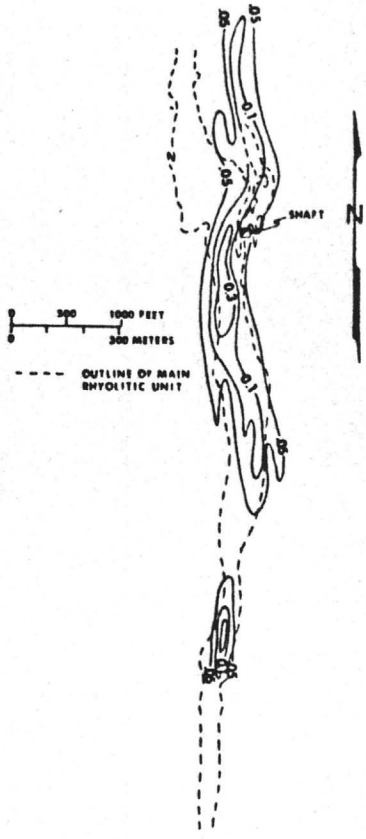


Fig. 6 - Distribution of Arsenic (%) in Relation to Rhyolitic Unit.

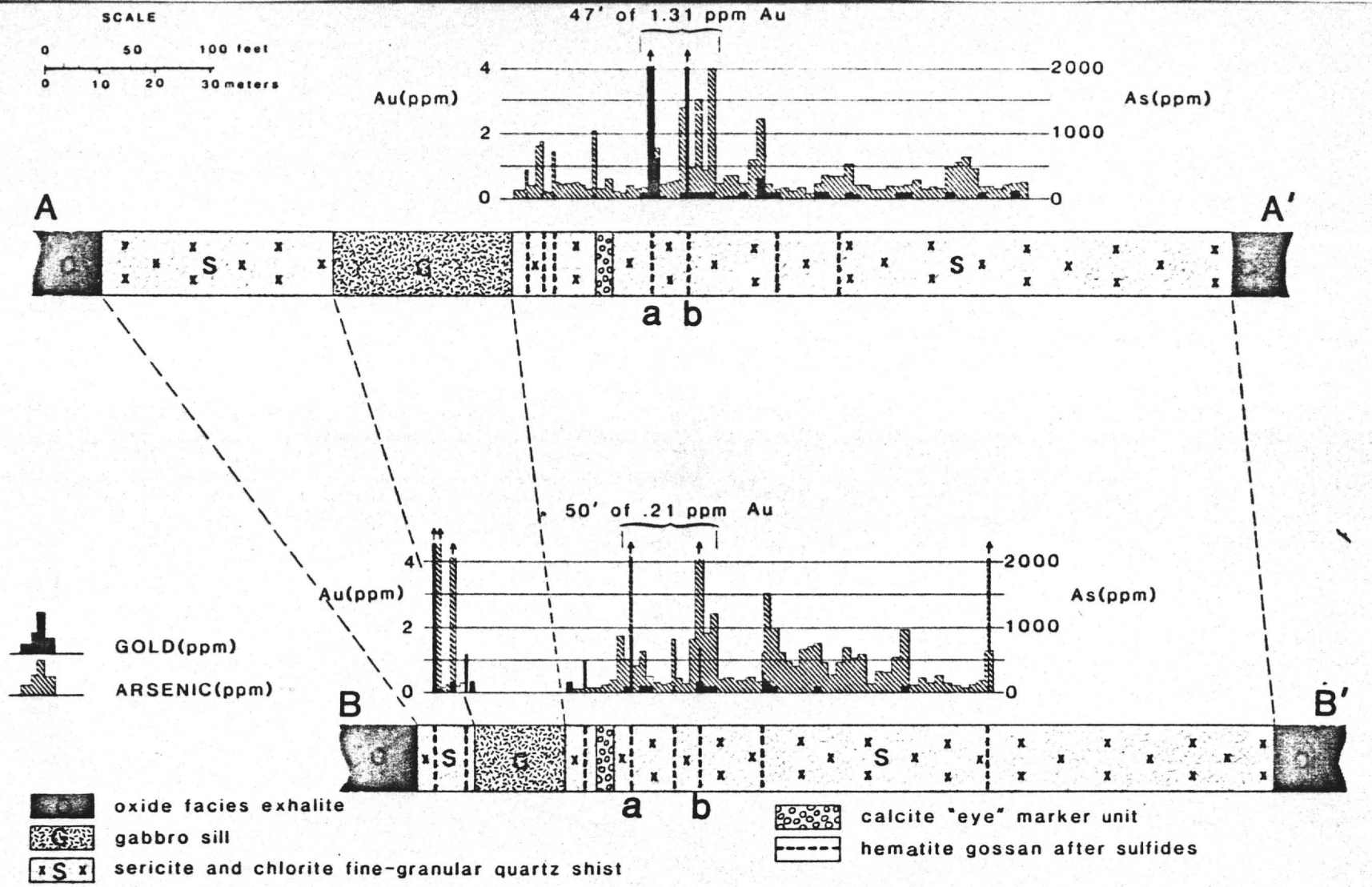


Fig. 7 - Sections of Mineralized strata showing gold-arsenic geochemistry.

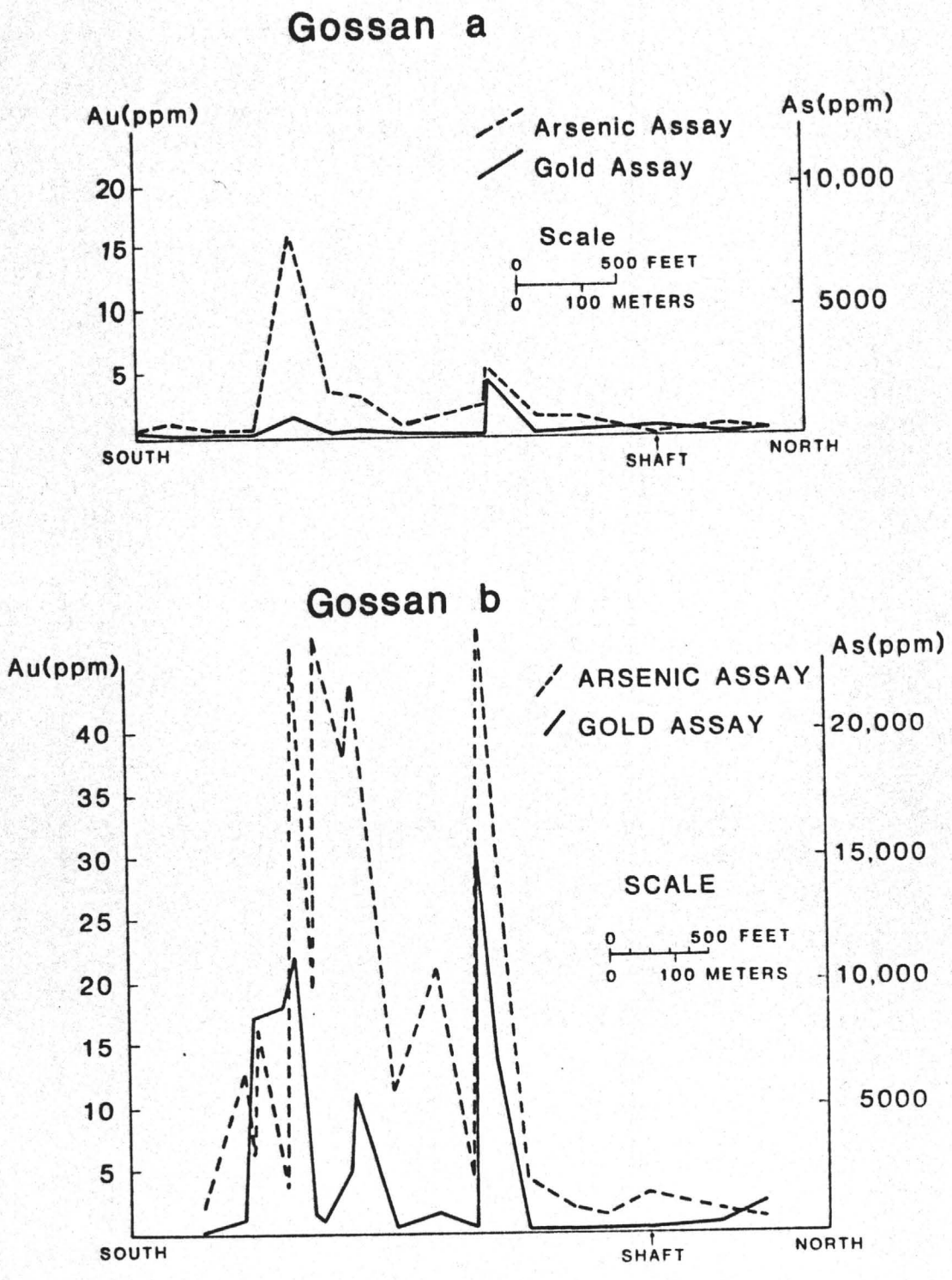


Fig. 8 - Gold-arsenic lithogeochemical profiles.

Mineral Alteration Patterns

The quantitative measurement of alteration is a relatively new concept to economic geologists and is based on the analysis of alteration minerals in representative samples of altered wallrock, and the plotting and contouring of alteration data. Newmont has successfully developed a computer-XRD method for the measurement of alteration intensity (and zoning) by means of x-ray diffraction analysis of alteration minerals (9,10,11). This XRD method is relatively simple in concept, and has been applied in a practical sense to the evaluation of alteration trends in a variety of porphyry, volcanogenic, replacement and disseminated deposits.

Percentages of minerals are calculated from XRD peak intensities, plotted as mineral assays and contoured in plan or cross section. The resulting contours provide a direct measure of alteration intensities, as well as vectorial clues to alteration trends.

Outcrop patterns of sericitization, chloritization, silicification and a strong "feldspar low" in the Precambrian stratiform occurrence are delineated by monomineralic contouring of XRD data from wholerock samples (Figs. 9, 10, 11 and 12). Alteration patterns show a coincident relationship with each other and with gold and arsenic mineralization, paralleling the general strike of the mineralized rhyolitic rock unit.

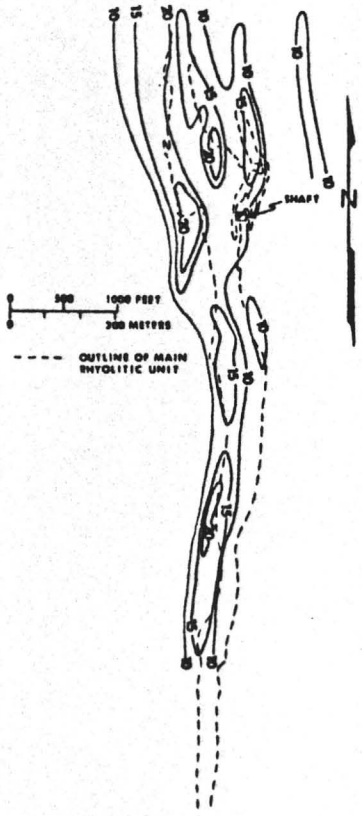


Fig. 9 - Distribution of Sericitization (% Sericite) in Relation to Rhyolitic Unit.

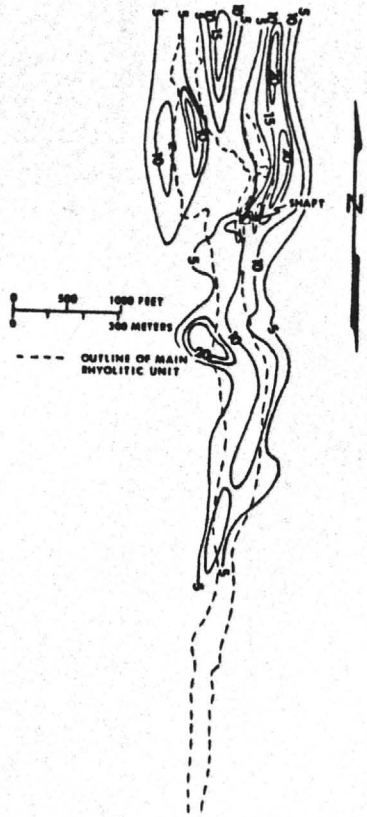


Fig. 10 - Distribution of Chloritization (% Chlorite) in Relation to Rhyolitic Unit.

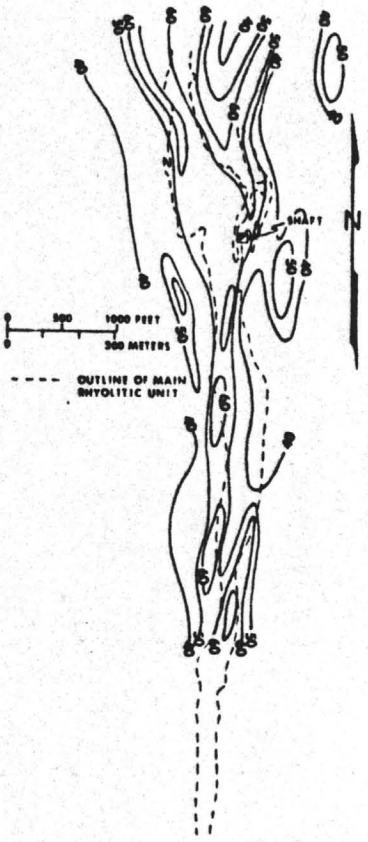


Fig. 11 - Distribution of Silicification (% Quartz) in Relation to Rhyolitic Unit.

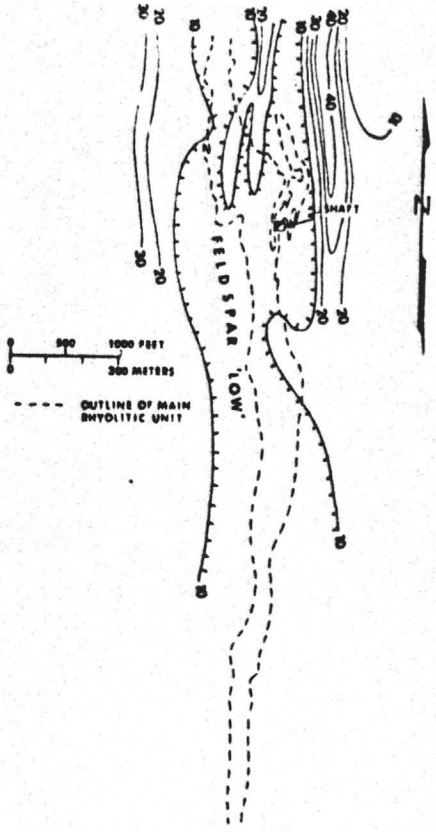


Fig. 12 - Distribution of Feldspar "Lows" (% Total Feldspars) in Relation to Rhyolitic Unit.

A large feldspar "low" is coincident with the unit (Fig. 12). Chlorite occurs mostly along the eastern margin of the unit with carbonate exhalite beds (Fig. 10). Alteration and mineralization increase, as does stratigraphic width, to the north. This geochemical alteration study focused attention on the mineralized stratigraphy and formed the basis for continued detailed study.

Preliminary Metallurgical Considerations

Preliminary methods of gravity concentration using heavy liquids were not successful, resulting in a heavy pyrite-iron oxide concentrate containing 0.94 oz/t gold, but representing only 44 percent recovery of the gold in 20 percent of the sample. However, preliminary cyanide extractions suggest possible gold recoveries near 87 percent. Additional test work on larger samples is required to confirm cyanide amenabilities and possible deleterious effects of cyanide complexing with Cu, Zn and Pb in the ore.

Summary and Conclusions

The gold mineralization is stratabound, exhalative in nature, syngenetic with Proterozoic volcanic host rocks and distal, as indicated both by continuity of thin massive sulfide beds and by the absence of structures suggesting high-energy depositional regimes. The distal nature suggests changes in thicknesses of sulfide beds downdip to be as gradual as they are along strike. The primary distribution of base and precious metals within the mineralized zone is variable and laterally transitional. Secondary gold enrichment to a ten-fold increase is present but highly variable. Gold values generally increase with increasing base metal values. Gold especially follows arsenopyrite and sphalerite. Asymmetric folding has thickened the massive sulfide horizons near fold closures, thinned the horizons along fold limbs and elongated them parallel to fold axes. These changes commonly occur at a scale of several meters. The exhalative system is interpreted to have deposited chemical sediments in a paleotopographic low off the flank of a submarine rhyolite dome.

Acknowledgments

We are indebted to Roly Ridler for his invaluable contribution and help in identifying and interpreting the volcanogenic features of this exhalite gold occurrence, and to Phil Anderson for his contribution concerning its regional setting. The manuscript was reviewed by John M. Guilbert and Donald F. Hammer. We gratefully acknowledge the permission granted by Newmont Exploration Limited and the Superior Oil Company to publish the contained information.

References

1. C. A. Anderson, and P. M. Blacet, "Geologic Map of the Mount Union Quadrangle, Yavapai County, Arizona," U.S. Geol. Survey Map GQ 997, 1972a.

   -----"Geologic Map of the Mayer Quadrangle, Yavapai County, Arizona," U.S. Geol. Survey Map GZ 996, 1972b.

   -----"Precambrian Geology of the Northern Bradshaw Mountains, Yavapai County, Arizona," U.S. Geol. Survey Bull. 1336, 1972c, p. 82.

2. C. A. Anderson, and J. T. Nash, "Geology of the Massive Sulfide Deposits of Jerome, Arizona - a Reinterpretation," Econ. Geol., v. 67, (1972) pp. 845-863.

3. C. A. Anderson, and L. T. Silver, "Yavapai Series - a Greenstone Belt," Geol. Soc. Arizona Digest, v. 10, (1976) pp. 13-26.

4. P. Anderson, and J. M. Guilbert, "The Precambrian Massive Sulfide Deposits of Arizona - a Distinct Metallogenic Epoch and Province," paper presented at 5th Annual Symposium, AIME-IAGOD, Snowbird, Utah, 1978.

5. P. Gilmour, and A. R. Still, "The Geology of the Iron King Mine," pp. 1238-1257 in Ore Deposits of the United States, 1933-1965, Graton-Sales, Vol. 2, AIME, New York, 1968.

6. Private communication, R. H. Ridler, Newmont Exploration of Canada Limited, Jan., 1979.

7. R. H. Ridler, "Stratigraphic Keys to the Gold Metallogeny of the Abitibi Belt," Canadian Mining Journal, vol. 97, No. 6 (1976) pp. 81-89.

8. D. Sheehan, "Long Lac's Gold Exploration Programme in Northwestern Quebec," paper presented at 81st Annual Convention of the Canadian Institute of Mining & Metallurgy, Montreal, Quebec, Canada, 1979.

9. D. M. Hausen, "X-Ray Diffraction Methods of Evaluating Potassium Silicate Alteration in Porphyry Mineralization," Geochemical Exploration, CIM Special Vol. 11 (1971) pp. 1-7.

10. D. M. Hausen, "Application of Quantitative Mineralogy by X-Ray Diffraction to Problems in Mineral Exploration," Quarterly of the Colorado School of Mines, Chapter in Quantitative Mineral Exploration, Vol. 68, No. 1, Jan. 1973.

11. D. M. Hausen, "Quantitative Measurement of Wallrock Alteration in the Exploration of Buried Mineral Deposits," Society of Mining Engineers Trans., Vol. 266, 1979, pp. 1853-1959.

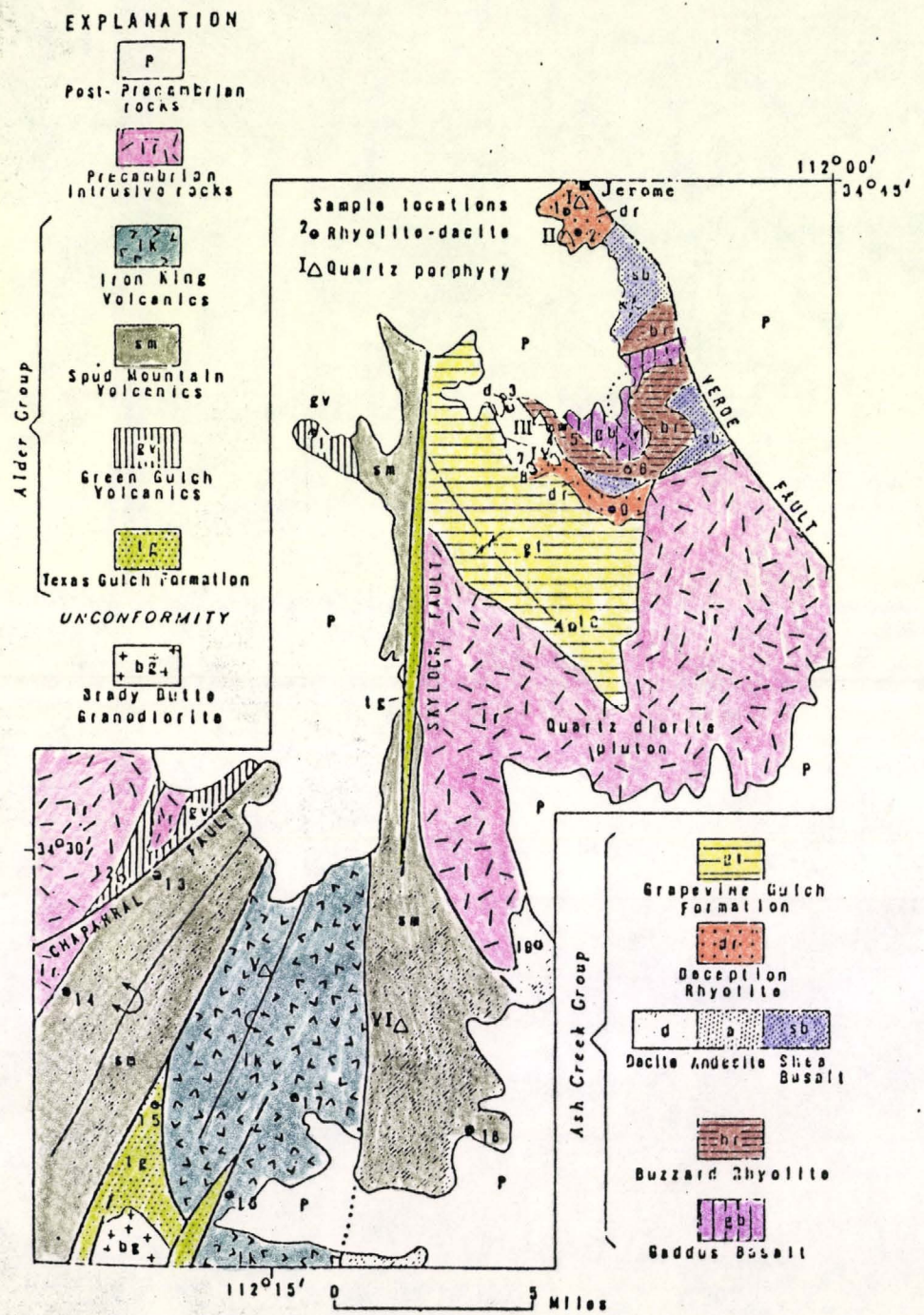


Figure 1. Generalized geologic map of area south of Jerome, Ariz.

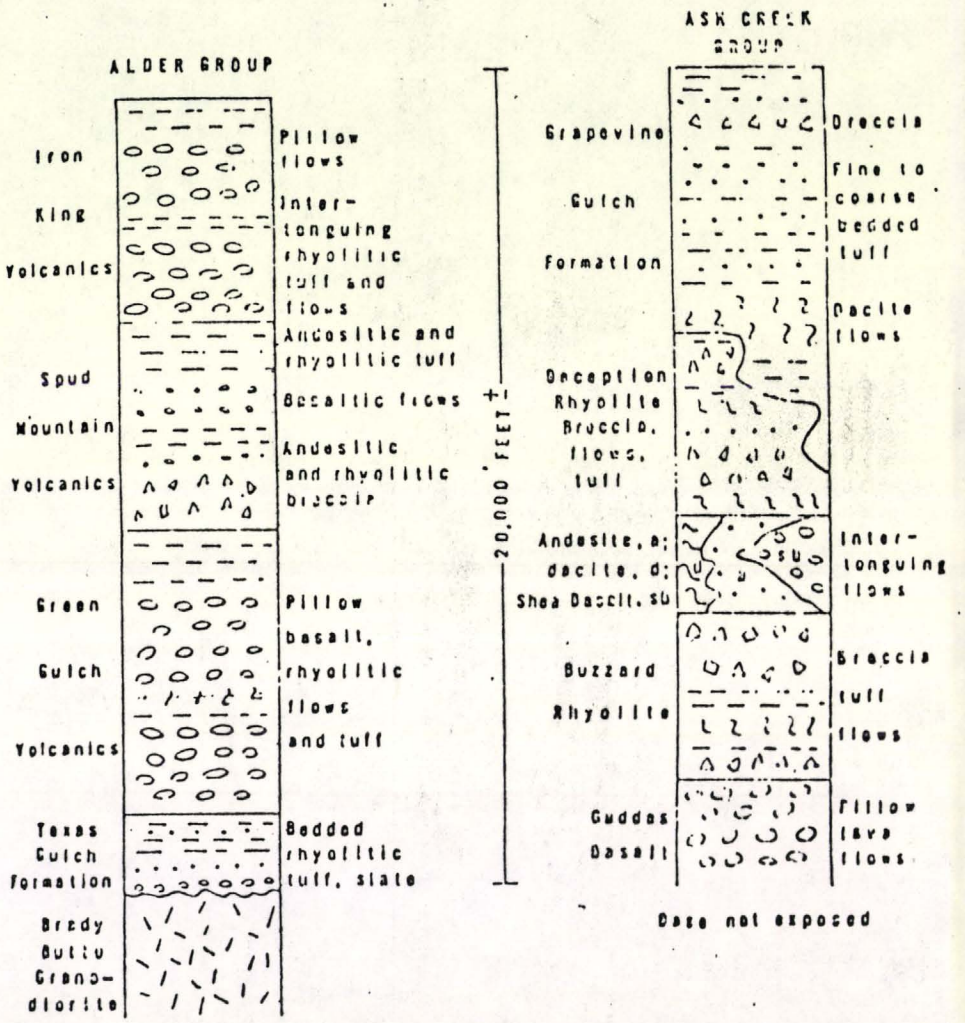


Figure 2 Generalized columnar sections of the Alder and Ash Creek Groups.

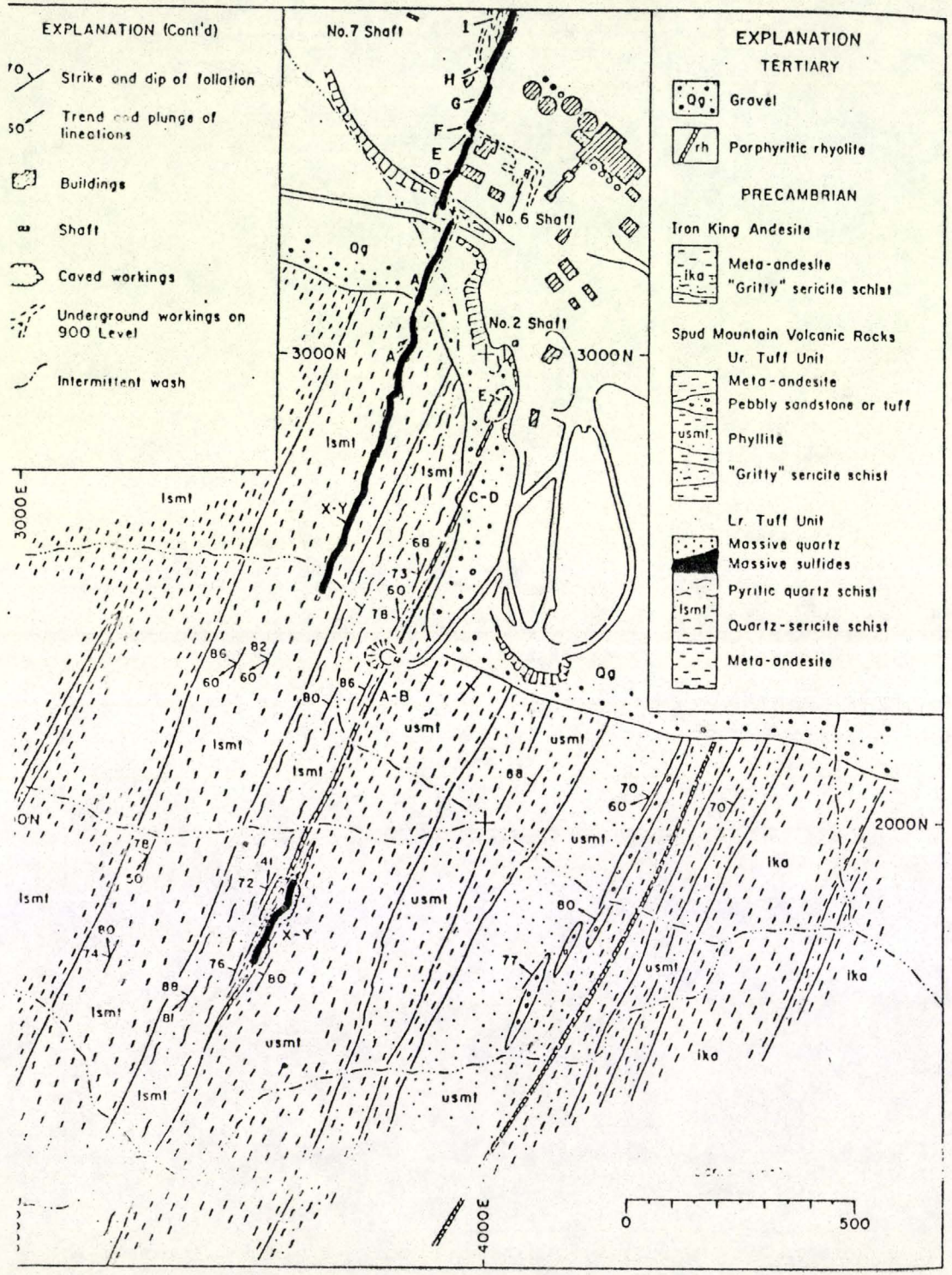


Figure 8

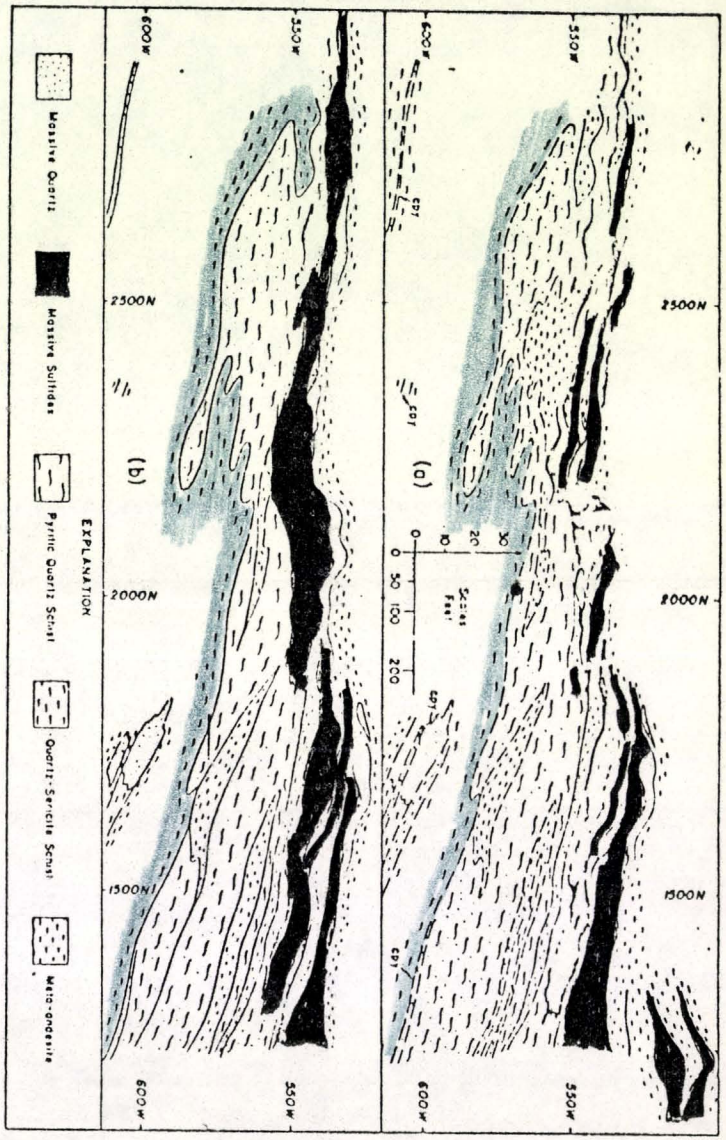
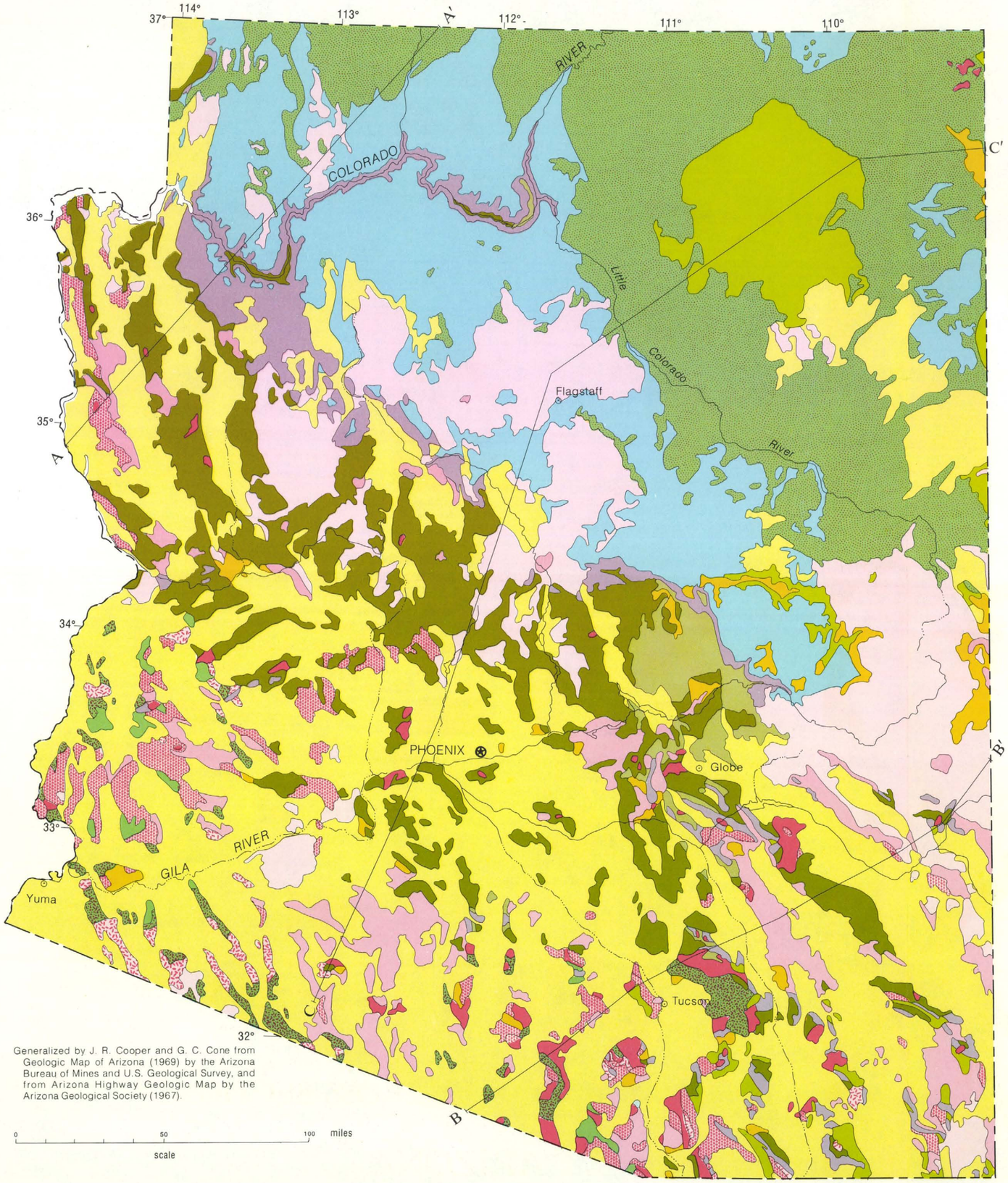


FIG. 9 *Plan of the 2200 Level Foreshortened along Strike by a Factor of Five.*
FIG. 5b. *Simplified and Idealized Version of (a).*



Generalized by J. R. Cooper and G. C. Cone from Geologic Map of Arizona (1969) by the Arizona Bureau of Mines and U.S. Geological Survey, and from Arizona Highway Geologic Map by the Arizona Geological Society (1967).

0 50 100 miles
scale

EXPLANATION

SEDIMENTARY AND VOLCANIC ROCKS

CENOZOIC

QTs — Quaternary and upper Tertiary (Pliocene) sedimentary rocks, mostly unconsolidated; includes scarce lava and silicic tuff

QTv — Quaternary and upper Tertiary volcanic rocks, mostly basaltic in composition

Ts — Middle Tertiary (Miocene and Oligocene) sedimentary rocks; locally include lava and tuff

Tv — Middle Tertiary volcanic rocks of silicic to basaltic composition; includes related intrusive rocks

MESOZOIC

Ks — Cretaceous sedimentary rocks

TMzv — Lower Tertiary to Triassic volcanic rocks; includes some sedimentary rocks

JRs — Jurassic and Triassic sedimentary rocks

Mesozoic sedimentary rocks

PALEOZOIC

PPs — Permian and Pennsylvanian sedimentary rocks; shown only on Colorado Plateau

M€ / Pz — Mississippian through Cambrian sedimentary rocks on Colorado Plateau; all Paleozoic sedimentary rocks in Basin and Range province

PRECAMBRIAN

Yp€ — Younger Precambrian sedimentary rocks and intrusive diabase

Op€ — Older Precambrian rocks of all types, including schist, gneiss, and fine- to coarse-grained igneous intrusive rocks

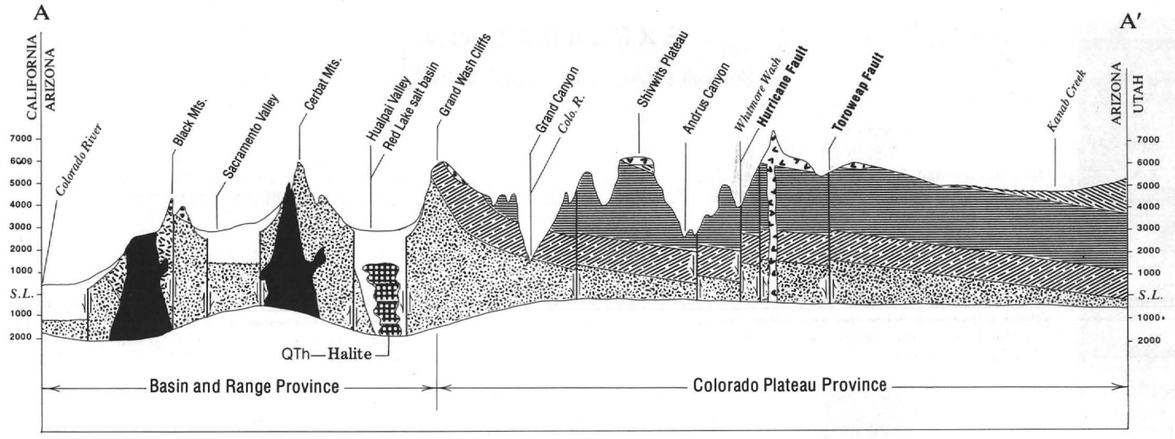
OTHER METAMORPHIC AND INTRUSIVE IGNEOUS ROCKS

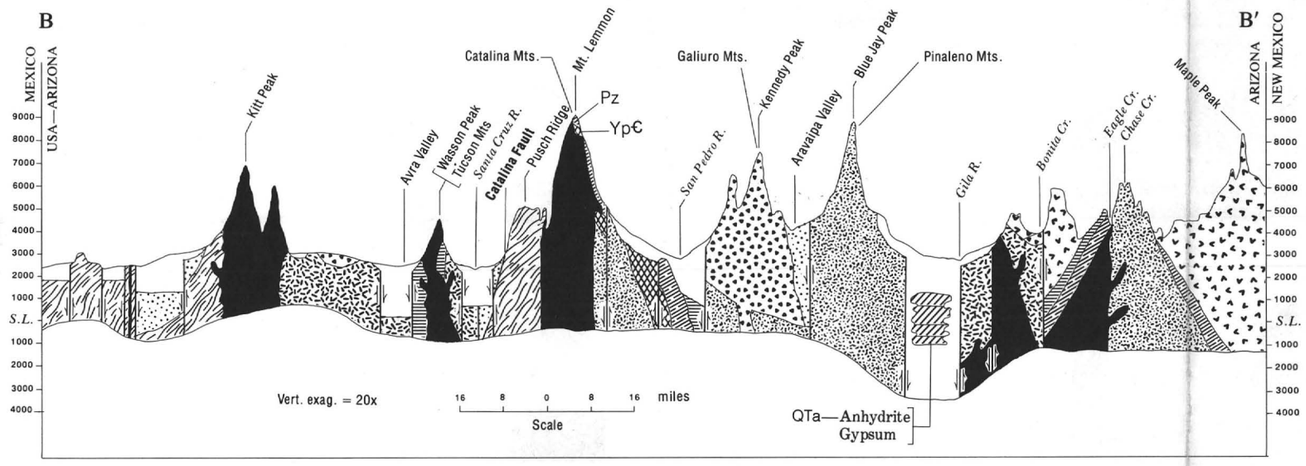
Tku — Tertiary and Upper Cretaceous intrusive igneous rocks

TMz — Post-Paleozoic gneiss and schist

KTr — Mid-Cretaceous to Triassic intrusive igneous rocks

GEOLOGIC MAP and CROSS-SECTIONS of ARIZONA





EXPLANATION

SEDIMENTARY AND VOLCANIC ROCKS

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Ts — Middle Tertiary (Miocene and Oligocene) sedimentary rocks; locally include lava and tuff

Ks — Cretaceous sedimentary rocks

JRs — Jurassic and Triassic sedimentary rocks

QTh—QTa — *Evaporites*
QTh—Halite
QTa—Anhydrite
Gypsum

QTv — Quaternary and upper Tertiary volcanic rocks, mostly basaltic in composition

Tv — Middle Tertiary volcanic rocks of silicic to basaltic composition; includes related intrusive rocks

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CENOZOIC
MESOZOIC
PALEOZOIC
PRECAMBRIAN

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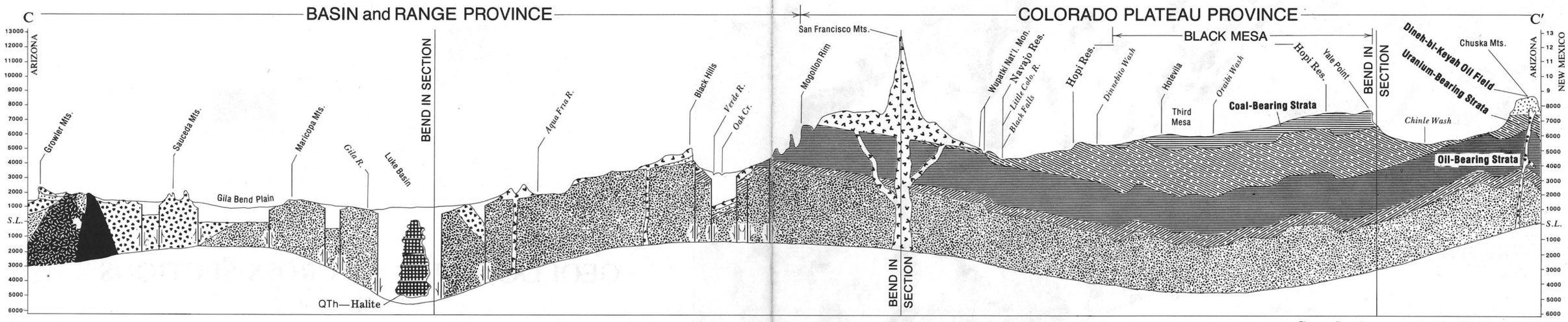

Cross-Sections compiled by H. W. Peirce

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1 4 EXHALITES
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974511 80-17734

Lithochemistry applied to the study of Precambrian exhalites, with comments on the problem of predicting blind orebodies
Mossman, D. J.; Koo, J.
Univ. Saskatchewan, Dep. Geol., Saskatoon, Saskatchewan, CAN; Western Mines, CAN
Fourth Annual meeting of the Geological Association of Canada, Mineralogical Association of Canada, Sainte-Foy, Quebec, Canada, May 23-25, 1979
Geol. Assoc. Can.-Mineral. Assoc. Can., Jt. Annu. Meet., Program Abstr. 4, 68p., 1979
CODEN: PAACD6
Subfile: B
Country of Publ.: Canada
Doc Type: SERIAL; CONFERENCE PUBLICATION Bibliographic Level: ANALYTIC
Languages: English
Descriptors: *mineral deposits; *genesis; *Japan ; processes; economic geology ; exhalative processes; base metals; Precambrian; lithology; mineral deposits, genesis; Asia; kuroko-type; deposition; sedimentary rocks; igneous rocks; Mattabi; Flin Flon; volcanism
Section Headings: 27 .(ECONOMIC GEOLOGY, METALS)

1/5/2
936484 79-20354
Copper-zinc zonation in tuffaceous exhalites, Millenbach Mine, Noranda, Quebec
Comba, C. D. A.
Queen's Univ., Kingston, Ont., CAN
unknownp., 1975
Subfile: B
Degree Level: Master's
Country of Publ.: Canada
Doc Type: THESIS Bibliographic Level: MONOGRAPHIC
Languages: English
Latitude: N473000; N483000 Longitude: W0780000; W0790000
Descriptors: *Quebec; *Canadian Shield; *mineral deposits; *genesis ; economic geology; processes ; zinc; copper; exhalative processes; Canada; Noranda; Millenbach Mine; stratabound deposits; volcanic rocks; ore deposits; volcanism; mineral deposits, genesis; base metals; zoning; sulfides; massive deposits; North America
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1/5/3
859225 77-36907

Depositional environment of Archean exhalites, Kirkland Lake-Larder Lake area, Ontario
Hyde, R. S.
The Geological Society of America, North-central Section, 9th annual meeting, Waterloo, Ont., Canada, May 5-17, 1975
Geol. Soc. Am., Abstr. Programs 7: 6, 789p., 1975
CODEN: GAAPBC
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Country of Publ.: United States

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Descriptors: *Ontario; *sedimentary rocks; *sedimentation; *Precambrian ; sedimentary petrology; chemically precipitated rocks; environment; Canada ; iron-rich rocks; east; Kirkland Lake; Larder Lake; iron formations; environmental analysis; Timiskaming Group; marine environment; fans; deposition; Archean
Section Headings: 06 .(PETROLOGY, SEDIMENTARY)

1/5/4
756438 75-22209

The gold metallogeny of Archean exhalites .abstr..
Ridler, R. H.
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Econ. Geol. Vol. 70, No. 1, p. 250, 1975
CODEN: ECGLAL
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Section Headings: 27 .(ECONOMIC GEOLOGY, METALS)

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2 2422 ARCHEAN
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3 2765 MICHIGAN
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991251 80-28117

Geological evolution of the Ishpeming greenstone belt, Michigan, U.S.A.
Morgan, P. J.; DeCristoforo, D. T.
Chevron Resour. Co., San Francisco, Calif., USA; Amoco Prod. Co., USA
Archean geochemistry of North America
Barker, F.(EDITOR); Goodwin, A. M.(EDITOR)
Precambrian Res. 11: 1, 23-41p., 1980
CODEN: PCBRBY ISSN: 0301-9268 30 REFS.
Subfile: B
Country of Publ.: International
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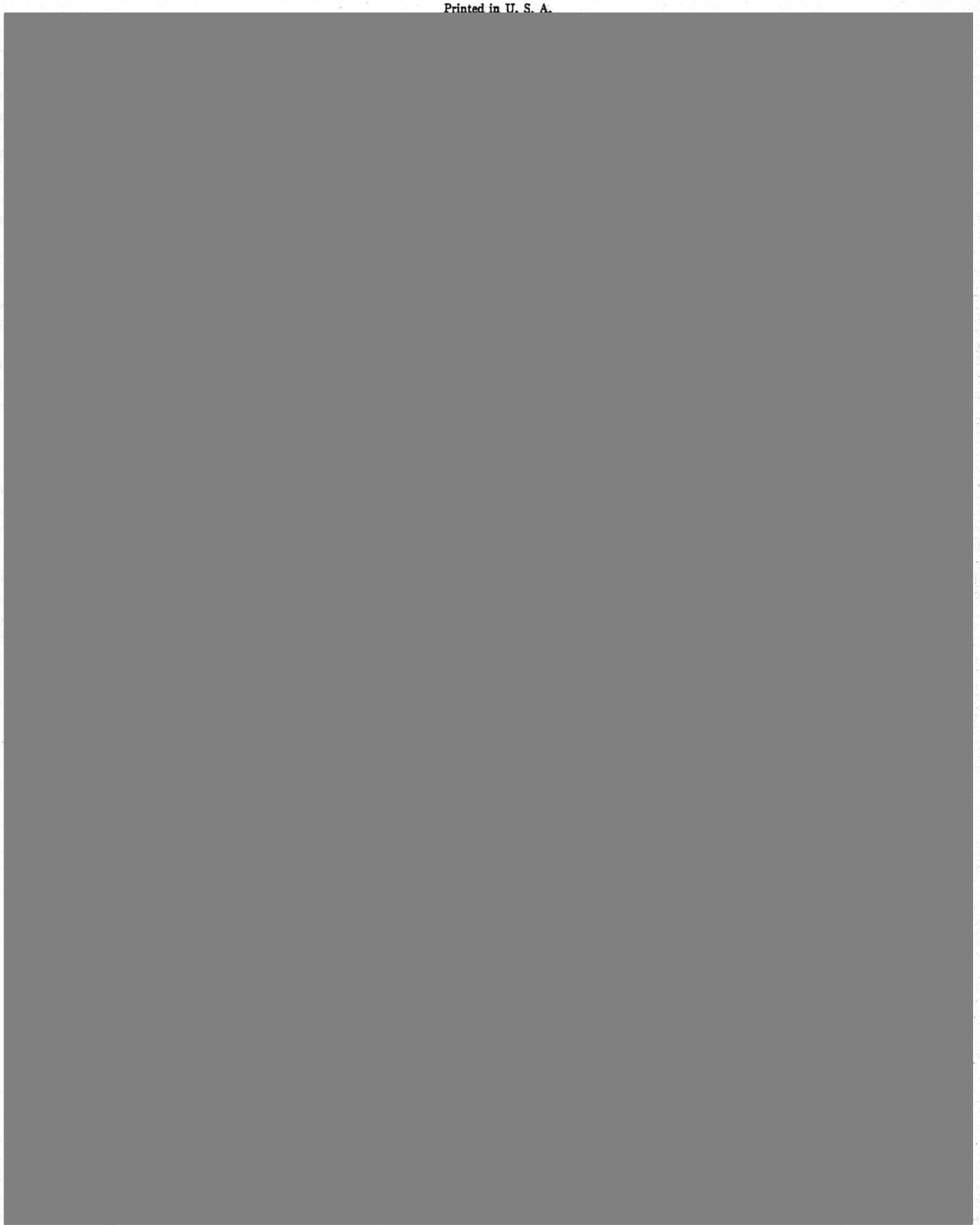
Reprinted from Economic Geology, Vol. 71, No. 4 June-July, 1976
Printed in U. S. A.



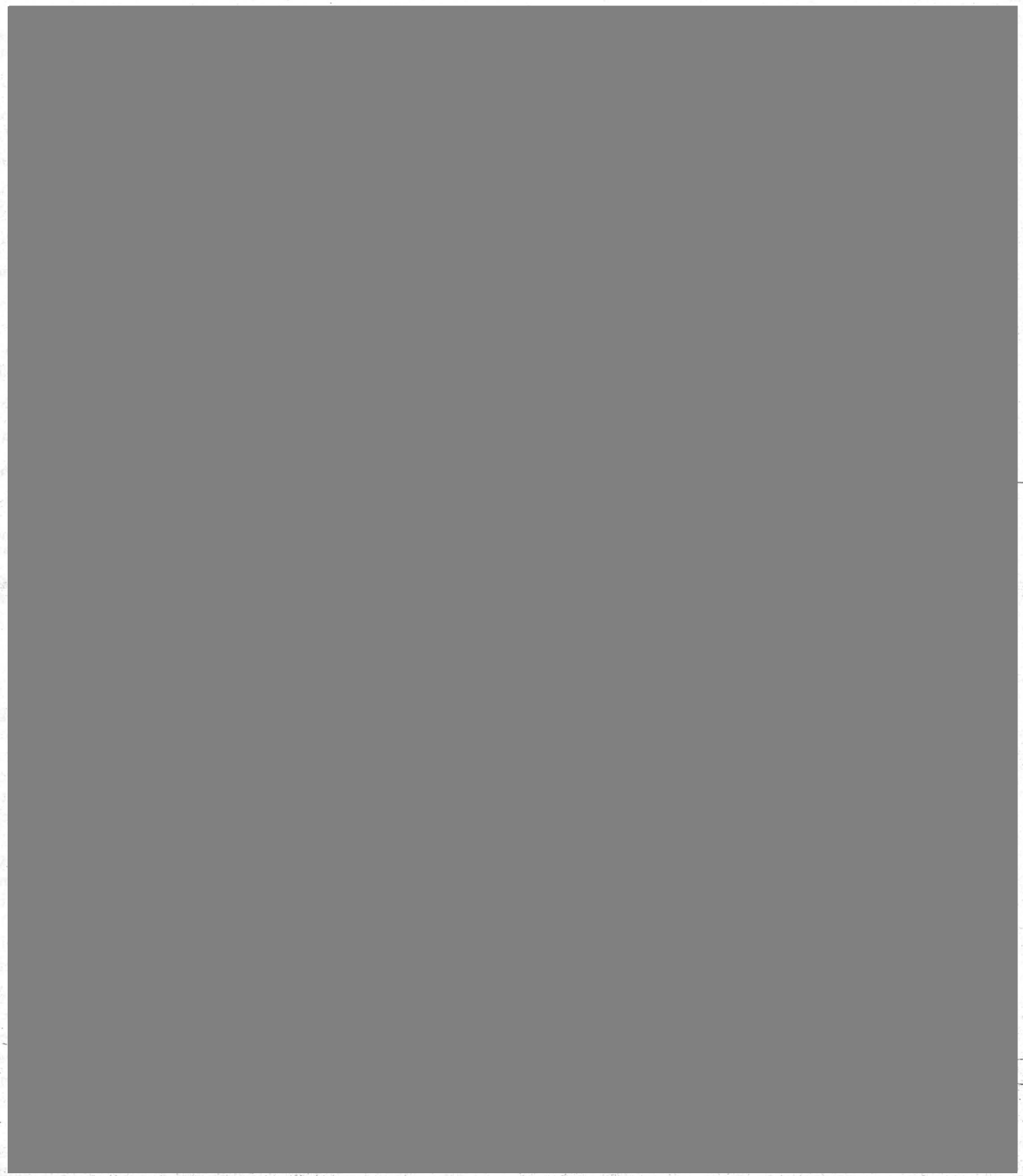


FIG. 2. Generalized sections of the Ash Creek and Big Bug groups. (After Anderson, 1968)

12. S. S. Adams, H. S. Curtis, and P. L. Hafen, "Alteration of Detrital Magnetite-Ilmenite in Continental Sandstones of the Morrison Formation, New Mexico," IAEA-SM-183/36.

13. F. Dimanche and P. Bartholome, "The Alteration of Ilmenite in Sediments," Mineral Science Engineering, V. 8, No. 3, July, 1976.

14. J. D. Wells, and T. E. Mullens, "Gold-Bearing Arsenian Pyrite Determined by Microprobe Analysis, Cortez and Carlin Gold Mines, Nevada," Econ. Geol., V. 68 (1973) pp. 187-201.

15. P. Joralemon, "The Occurrence of Gold at the Getchell Mine, Nevada," Econ. Geol., V. 46, No. 3 (1951) pp. 267-309.

Ben,
This paper was written in part by Monte Swan the geologist responsible for the mapping at the Bell Gold Prospect. It provides a good overview of the property.
Dan

LITHOLOGICAL, STRUCTURAL, CHEMICAL AND MINERALOGICAL PATTERNS IN A PRECAMBRIAN STRATIFORM GOLD OCCURRENCE YAVAPAI COUNTY, ARIZONA

M. M. Swan
Newmont Exploration Limited
Tucson, Arizona

D. M. Hausen
Newmont Exploration Limited
Danbury, Connecticut

R. A. Newell
Newmont Exploration Limited
Tucson, Arizona

A stratiform gold occurrence of Precambrian age located 20 miles southeast of Prescott, Arizona, within the Agua Fria Mining District, displays chemical, mineralogical, structural and lithological patterns indicative of a distal, exhalative volcanogenic environment. Metavolcanic and metasedimentary rocks of the Proterozoic Yavapai Series (1775-1820 m.y.) host the mineralization and are characterized by greenschist grade metamorphism, steeply-plunging penetrative folds and steeply-dipping schistosity. Mineralization is confined to a 100m thick stratigraphic section that is comprised of a series of thin auriferous massive sulfide beds and intercalated schist containing disseminated sulfides. The mineralization extends more than 4km along strike. Coincident with, and largely confined to the mineralized strata, are anomalous amounts of As, Sb, Cu, Pb, Zn and Ag and associated silicification, sericitization and carbonatization. This exhalative mineralized system is interpreted to have been deposited in a paleotopographic low on the distal flank of a submarine rhyolite dome and to represent the final episode of a Precambrian volcanic cycle.

Introduction

Significant portions of the southwestern United States are underlain by classic Precambrian greenstone belts, but with the possible exception of the Iron King Mine, in the Big Bug Mining District, Yavapai County, Arizona, descriptions of stratiform exhalative gold occurrences are notably absent from the literature (3,4) (Fig. 1). The Iron King is a five-million ton Pb-Zn volcanogenic massive sulfide deposit that averaged 0.123 oz per ton Au (5). The gold prospect that is the subject of this paper is located 5 km southeast of the Iron King deposit in the Agua Fria Mining District. In many respects, this occurrence resembles the Iron King deposit, although it displays the intercalated exhalite character of such deposits as the Thompson-Bousquet gold deposits of northwestern Quebec, Canada (8).

During 1978-1980, an exploration effort by Newmont Exploration Limited and Superior Oil Company examined the gold potential of this exhalative occurrence. The exploration program consisted of reconnaissance geochemical-mineralogical studies, geological mapping, geophysical surveys, detailed stratigraphic geochemistry and diamond drilling.

Regional Geology

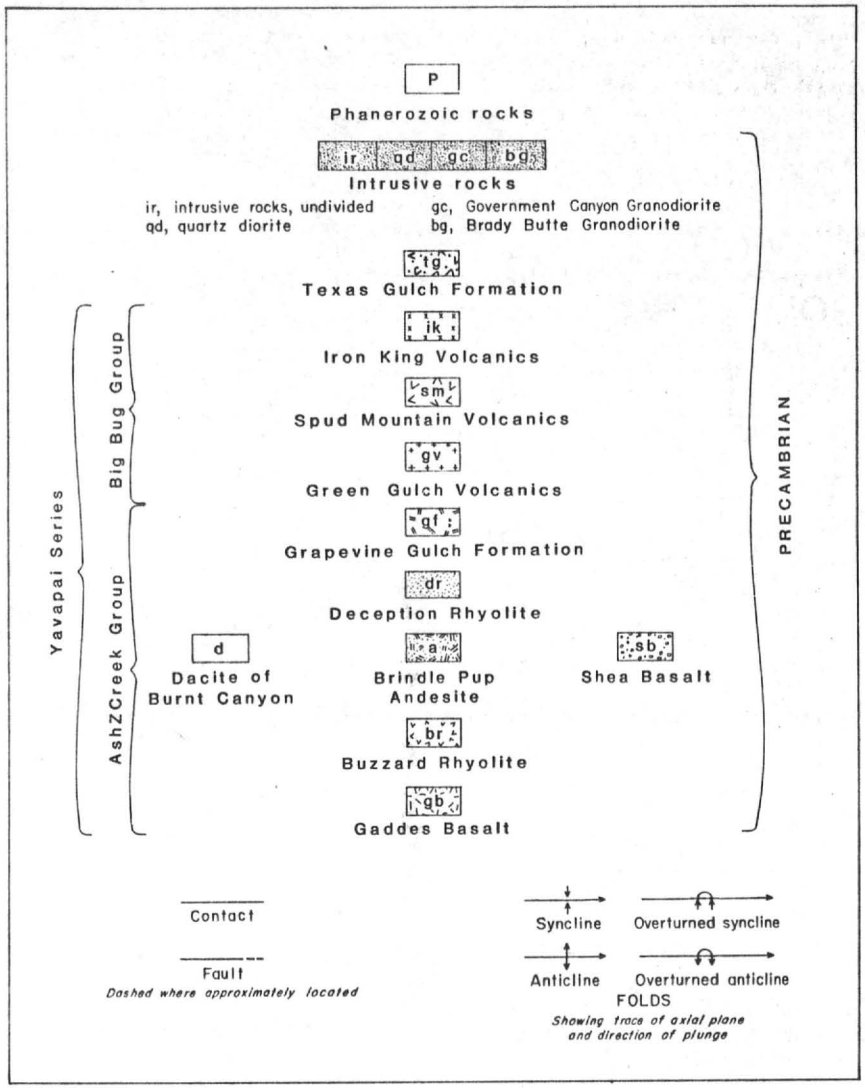
The gold mineralization occurs in greenschist-grade generally calc-alkaline metavolcanic and metavolcaniclastic rocks of the Proterozoic Yavapai Series, rocks which are chronologically equivalent to Upper Aphebian rocks of the Canadian Shield (6). The Yavapai Series in the Prescott-Jerome Area comprises a 110 x 140 km greenstone belt that is dominated by stratified volcanic and volcaniclastic rocks that have been deformed and intruded by plutons (Fig. 2). The volcanic to plutonic cycle that produced these rocks started at 1820 ±15 m.y. and ended at about 1720 ±15 m.y. (3). The regional deformation associated with the plutons resulted in variable intensity, isoclinal folding of most stratified rocks about generally steeply-dipping, north-northeasterly-striking axial planes. Fold axes generally plunge 60° to 80° and lie in the plane of foliation. Metamorphic grade is typically lower greenschist rank except where it was locally raised by thermal metamorphism near intrusions.

Mineralization

Host Rocks

Mineralization is characterized by gold-bearing, poly-metallic sulfides that occur as both disseminations and as thin massive beds. Mineralization is stratiform and appears syngenetic with host rock deposition. Exhalite sulfide deposition in contemporary volcanic rocks is well established in the Prescott-Jerome greenstone belt (2,4,5). The mineralized strata dip 55° to the west and become younger to the west (Fig. 3). Host rocks now are largely quartz sericite and quartz chlorite schists that appear to have been deposited as cherty, distal rhyolite tuffs. The mineralized section has a maximum thickness of about 100 m, but it thins to zero to the south. Disseminated sulfides comprise up to about 20% of the rock. Thin massive exhalite sulfide horizons occur throughout the mineralized section. They average 3 cm, but range up to 30 cm in thickness; they are continuous for up to a kilometer along strike. The continuity of the beds and the absence of sedimentary structures suggesting high-energy depositional regimes, are consistent with the distal character of the rocks and their associated mineralization. The sulfides are thoroughly oxidized at the surface and form hematitic gossans in outcrop.

Fig. 1 - Location map showing greenstone belts of the southwestern United States.



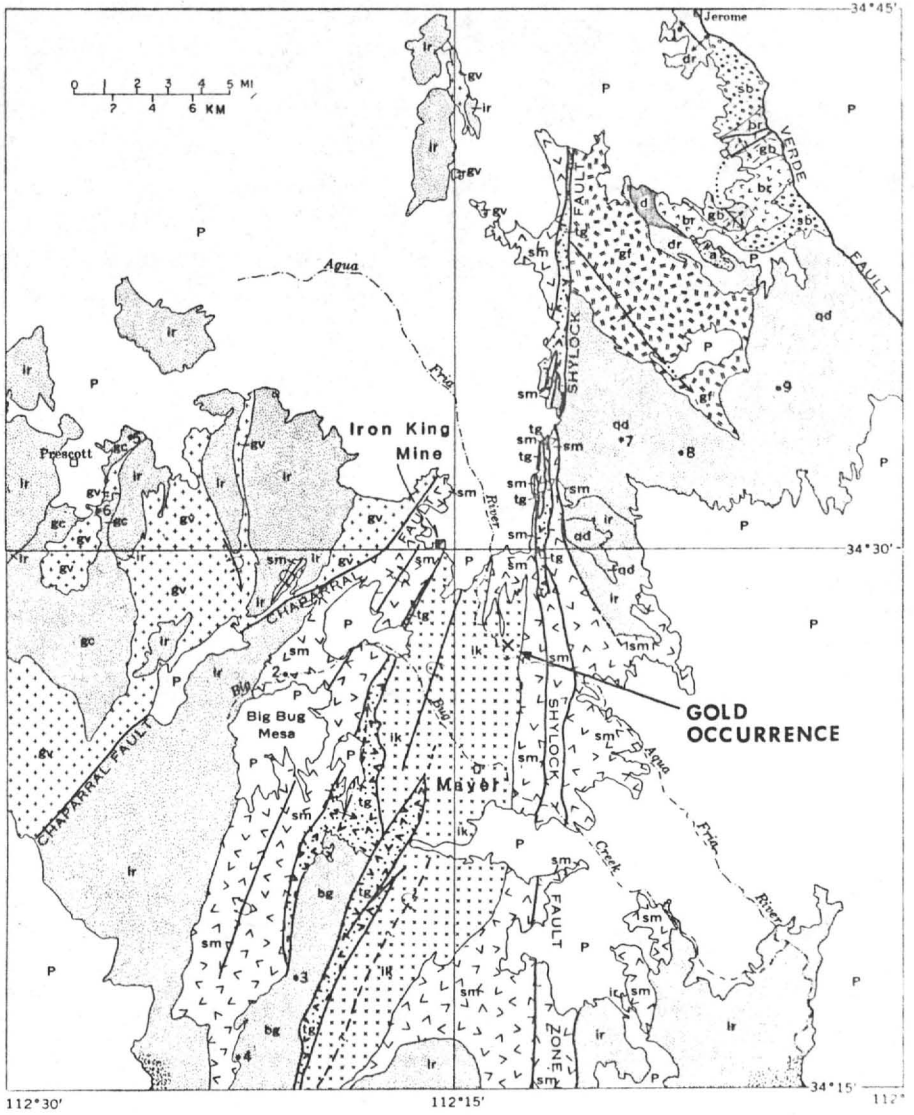


Fig. 2 - Generalized geologic map of the Prescott-Jerome area (after Anderson, et al, 1971).

Ben

The Bell prospect is in the same unit as the Iron King Mine on the other side of the syncline.

Don

QUATERNARY

PRECAMBRIAN

A
alluvium

B
meta-basalt
meta-gabbro
meta-siltstone

G
meta-gabbro

C
oxide-carbonate facies exhalite
includes:
hematite-magnetite exhalite
carbonate facies exhalite
meta-arkose
meta-chert
meta-siltstone
meta-gabbro

S Cb
quartz - sericite - chlorite schist
carbonate facies
sulfide facies
M Marker unit - chlorite-sericite-quartz schist with calcite "eyes"
includes:
meta-chert
meta-rhyolite tuff
meta-graywacke
disseminated sulfide exhalite
massive sulfide exhalite
disseminated carbonate exhalite
massive carbonate exhalite

Qc
quartz - chlorite schist
includes:
meta-graywacke
meta-andesite tuff
sheared meta-gabbro
carbonate-facies exhalite

oxide-carbonate facies exhalite

C
chlorite schist
includes:
metavolcanic rocks
metasedimentary rocks
oxide carbonate facies exhalite
meta-gabbro

21 bedding strike and dip

77/70 foliation strike and dip
lineation trend and plunge

80 fold axis trend and plunge

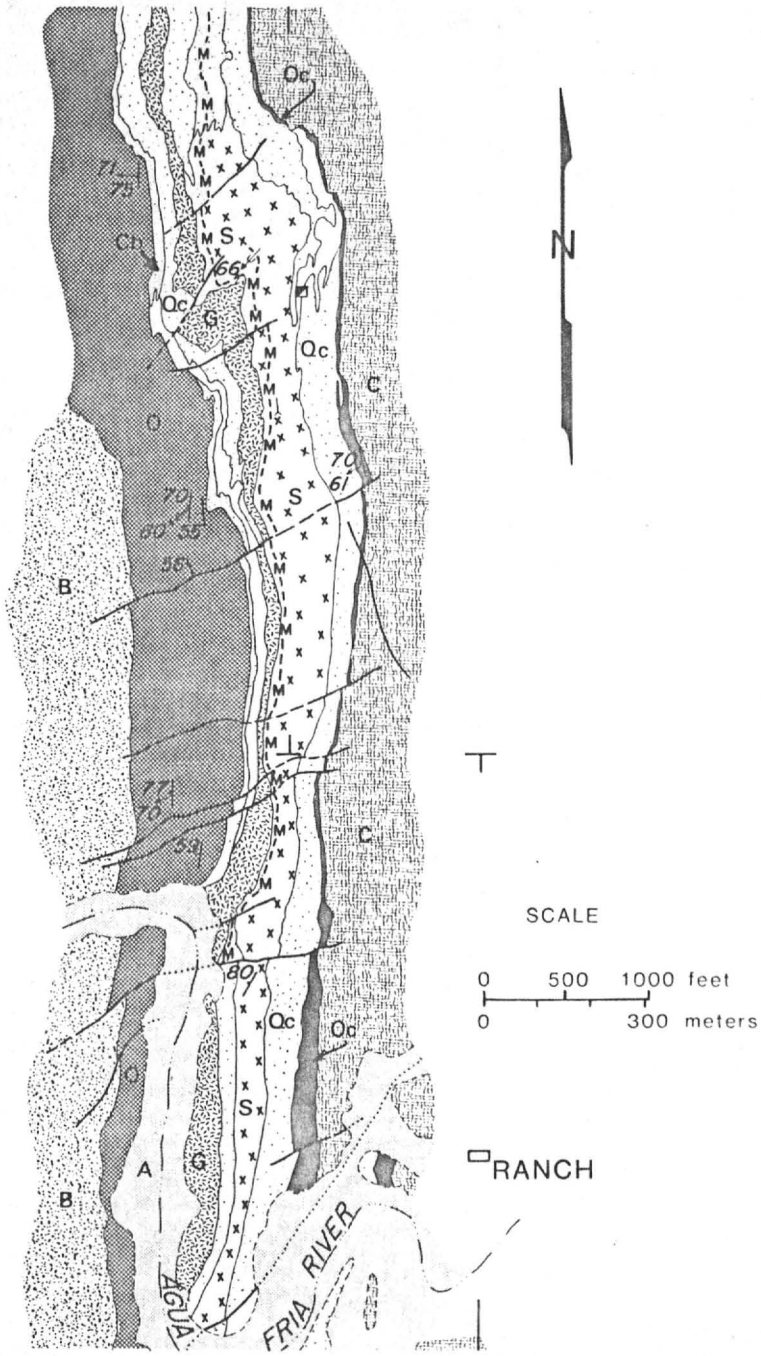


Fig. 3 - Geologic map of the Agua Fria gold occurrence.

The massive sulfide horizons are deformed into en echelon lenses by asymmetric folding. The lenses are thickened near fold closures, thinned in portions of the limbs and elongated parallel to steep, southwest-plunging fold axes. These changes commonly occur at a scale of several meters. A 2 m thick quartz-chlorite schist unit characterized by calcite "eyes" served as a marker unit and helped decipher the structure. Rocks in the stratigraphic hanging wall include a 30-170 m thick, carbonaceous magnetite-pyrrhotite bearing banded iron formation, carbonate exhalite beds, and a sequence of cherty chlorite sericite schists interpreted to be meta-argillites, greywackes, and andesite tuffs. A thick sequence of basalt and meta-argillites lies on top of these rocks. Rocks underlying the mineralized section include chlorite schists interpreted to be andesitic and a banded iron formation. The upper portion of the mineralized sequence is intruded by a Precambrian gabbro sill.

Rocks hosting mineralization are stratigraphically lateral equivalents of a cherty rhyolite dome that lies about 1.5 km north of the occurrence. This dome is stratigraphically asymmetrical, abruptly lensing out to the north. At the present erosion surface it has a maximum stratigraphic thickness of 200 m and a strike length of 500 m.

Chemical Patterns

Coincident with and largely confined to the sulfide-bearing strata are anomalous amounts of Au, As, Sb, Cu, Pb, Zn and Ag with associated silicification, sericitization and carbonatization. Geochemical and alteration changes are complex normal to bedding planes, probably reflecting continual and abrupt changes in exhalite precipitation. In the plane of bedding, they show a more general systematic pattern indicating relatively stable sea floor topography. Facies changes of mineralization observed along strike are believed to reflect varying Eh and pH conditions during exhalite deposition (6,7). A crude generalization of the pattern, starting from the rhyolite dome and proceeding south, can be summarized as:

1. Carbonate facies (strike length = 0.8 km),
2. Sulfide facies and carbonate facies (strike length = 4 km),
3. Carbonate facies (strike length = 1.6 km) (Fig. 4).

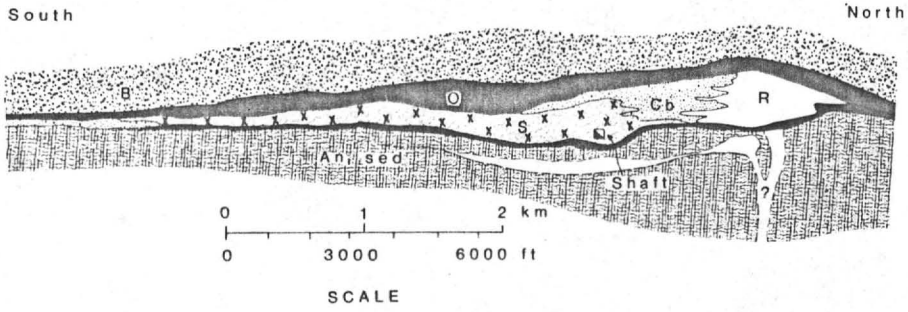


Fig. 4 - Diagramatic section of rhyolite dome and associated exhalites. (See geologic map for explanation.)

Evaluation of reconnaissance rock chip samples by x-ray fluorescence, A.A. and Fire Assay methods indicated that anomalous Au-Ag-Zn-Pb-Cu-As mineralization is confined to the rhyolitic tuff unit. The association of anomalous gold and arsenic in relation to the rhyolitic unit is shown in plan in Figures 5 and 6.

The geochemical patterns in outcrop may or may not reflect primary geochemical patterns of base metals and gold since the surface rocks are so thoroughly oxidized. Oxidation extends 30 to 60 m below the surface. Assays from underground sampling and drilling indicate that surface gold leaching and subsurface enrichment are variable, but locally increase up to ten-fold.

Extensive outcrop channel sampling normal to bedding planes of mineralized strata identified the gold-bearing exhalite horizons (Fig. 7). Sampling along gossan horizons a and b revealed lithogeochemical anomalies that helped define drill targets (Fig. 8). Gold values usually correlate with percent sulfide, especially base metal sulfides such as arsenopyrite and sphalerite. Mineralogical studies showed that gold occurs mostly as fine inclusions (1-10 microns) in pyrite or in iron-oxide pseudomorphs after pyrite.

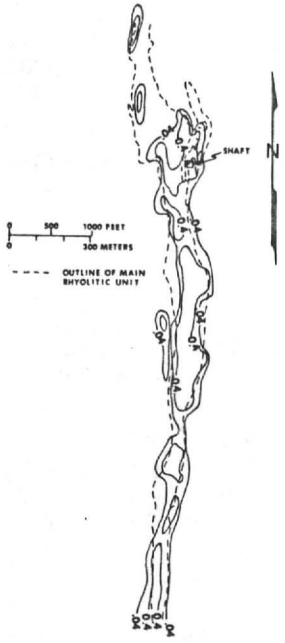


Fig. 5 - Distribution of Gold (ppm) in Relation to Rhyolitic Unit.

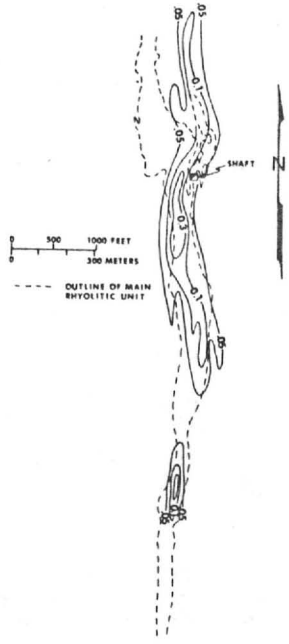


Fig. 6 - Distribution of Arsenic (%) in Relation to Rhyolitic Unit.

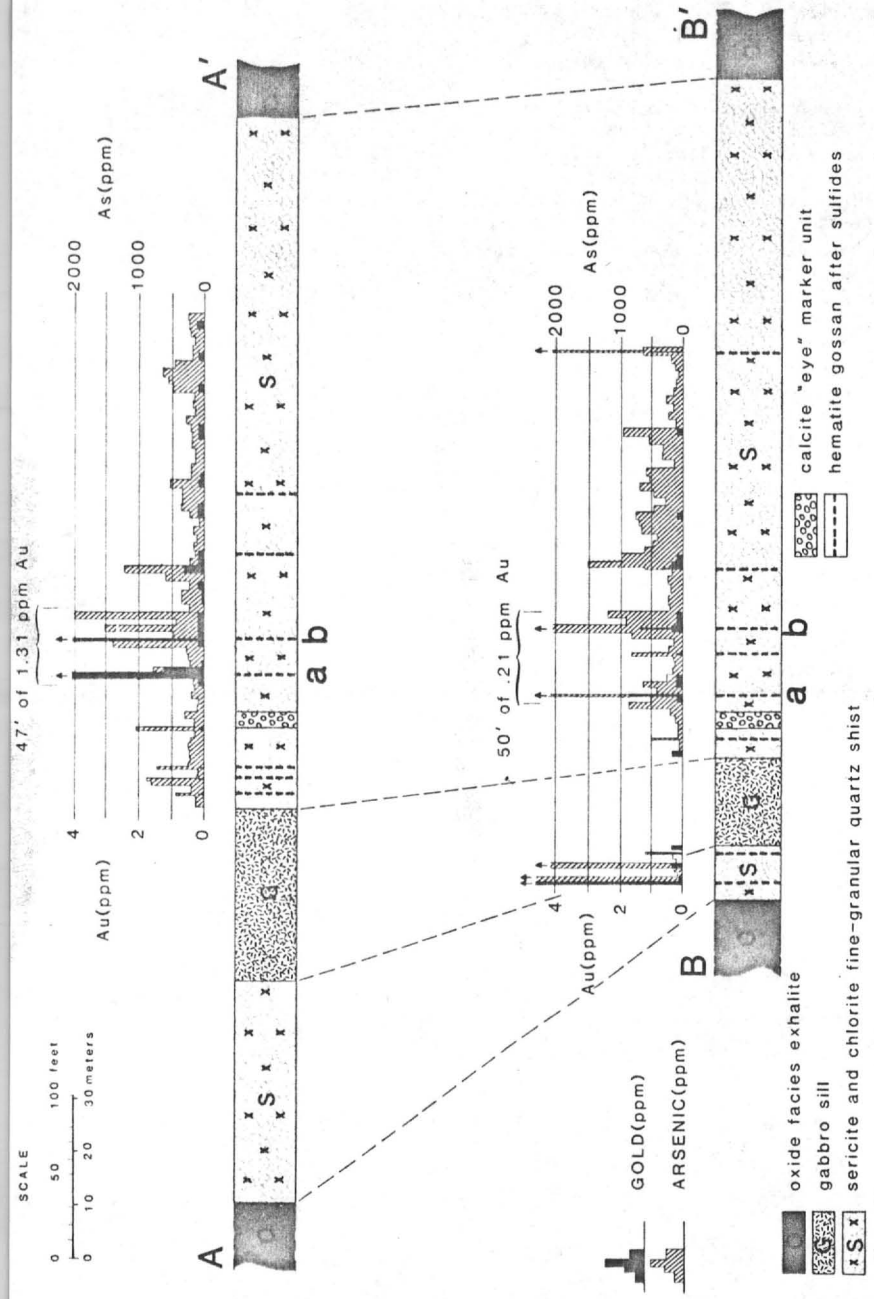
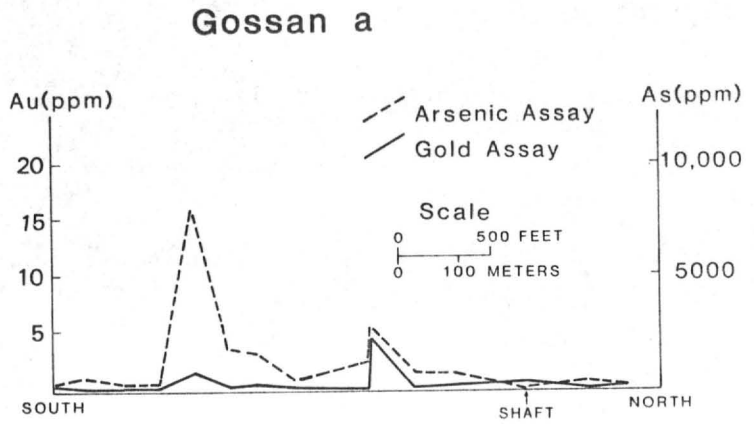


Fig. 7 - Sections of Mineralized strata showing gold-arsenic geochemistry.



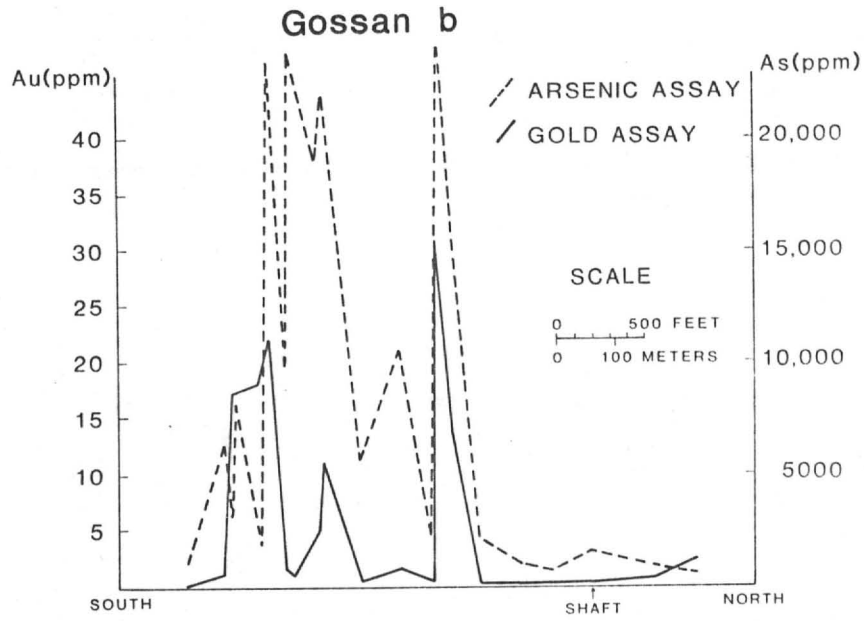


Fig. 8 - Gold-arsenic lithogeochemical profiles.

Mineral Alteration Patterns

The quantitative measurement of alteration is a relatively new concept to economic geologists and is based on the analysis of alteration minerals in representative samples of altered wallrock, and the plotting and contouring of alteration data. Newmont has successfully developed a computer-XRD method for the measurement of alteration intensity (and zoning) by means of x-ray diffraction analysis of alteration minerals (9,10,11). This XRD method is relatively simple in concept, and has been applied in a practical sense to the evaluation of alteration trends in a variety of porphyry, volcanogenic, replacement and disseminated deposits.

Percentages of minerals are calculated from XRD peak intensities, plotted as mineral assays and contoured in plan or cross section. The resulting contours provide a direct measure of alteration intensities, as well as vectorial clues to alteration trends.

Outcrop patterns of sericitization, chloritization, silicification and a strong "feldspar low" in the Precambrian stratiform occurrence are delineated by monomineralic contouring of XRD data from wholerock samples (Figs. 9, 10, 11 and 12). Alteration patterns show a coincident relationship with each other and with gold and arsenic mineralization, paralleling the general strike of the mineralized rhyolitic rock unit.

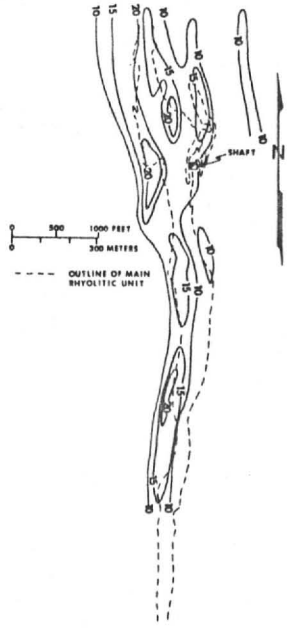


Fig. 9 - Distribution of Sericitization (% Sericite) in Relation to Rhyolitic Unit.

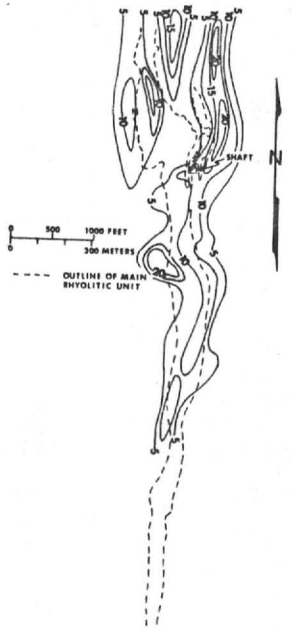


Fig. 10 - Distribution of Chloritization (% Chlorite) in Relation to Rhyolitic Unit.

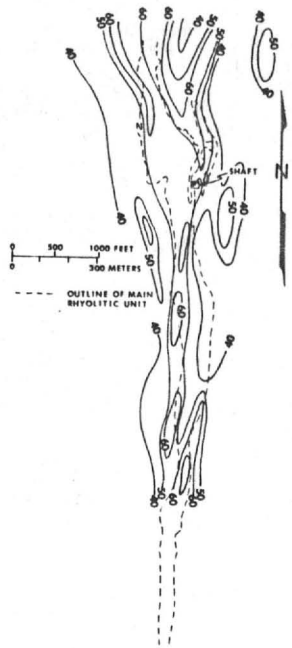


Fig. 11 - Distribution of Silicification (% Quartz) in Relation to Rhyolitic Unit.

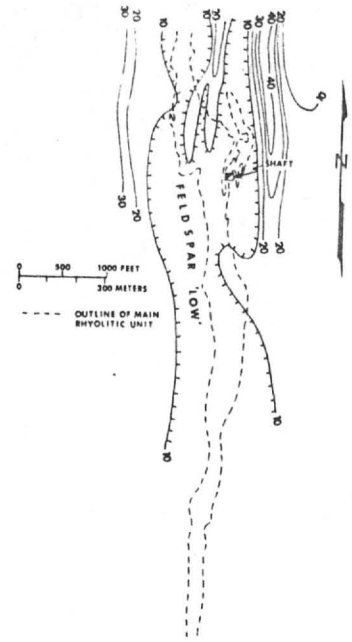


Fig. 12 - Distribution of Feldspar "Lows" (% Total Feldspars) in Relation to Rhyolitic Unit.

A large feldspar "low" is coincident with the unit (Fig. 12). Chlorite occurs mostly along the eastern margin of the unit with carbonate exhalite beds (Fig. 10). Alteration and mineralization increase, as does stratigraphic width, to the north. This geochemical alteration study focused attention on the mineralized stratigraphy and formed the basis for continued detailed study.

Preliminary Metallurgical Considerations

Preliminary methods of gravity concentration using heavy liquids were not successful, resulting in a heavy pyrite-iron oxide concentrate containing 0.94 oz/t gold, but representing only 44 percent recovery of the gold in 20 percent of the sample. However, preliminary cyanide extractions suggest possible gold recoveries near 87 percent. Additional test work on larger samples is required to confirm cyanide amenabilities and possible deleterious effects of cyanide complexing with Cu, Zn and Pb in the ore.

Summary and Conclusions

The gold mineralization is stratabound, exhalative in nature, syngenetic with Proterozoic volcanic host rocks and distal, as indicated both by continuity of thin massive sulfide beds and by the absence of structures suggesting high-energy depositional regimes. The distal nature suggests changes in thicknesses of sulfide beds downdip to be as gradual as they are along strike. The primary distribution of base and precious metals within the mineralized zone is variable and laterally transitional. Secondary gold enrichment to a ten-fold increase is present but highly variable. Gold values generally increase with increasing base metal values. Gold especially follows arsenopyrite and sphalerite. Asymmetric folding has thickened the massive sulfide horizons near fold closures, thinned the horizons along fold limbs and elongated them parallel to fold axes. These changes commonly occur at a scale of several meters. The exhalative system is interpreted to have deposited chemical sediments in a paleotopographic low off the flank of a submarine rhyolite dome.

Acknowledgments

We are indebted to Roly Ridler for his invaluable contribution and help in identifying and interpreting the volcanogenic features of this exhalite gold occurrence, and to Phil Anderson for his contribution concerning its regional setting. The manuscript was reviewed by John M. Guilbert and Donald F. Hammer. We gratefully acknowledge the permission granted by Newmont Exploration Limited and the Superior Oil Company to publish the contained information.

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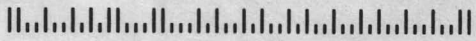

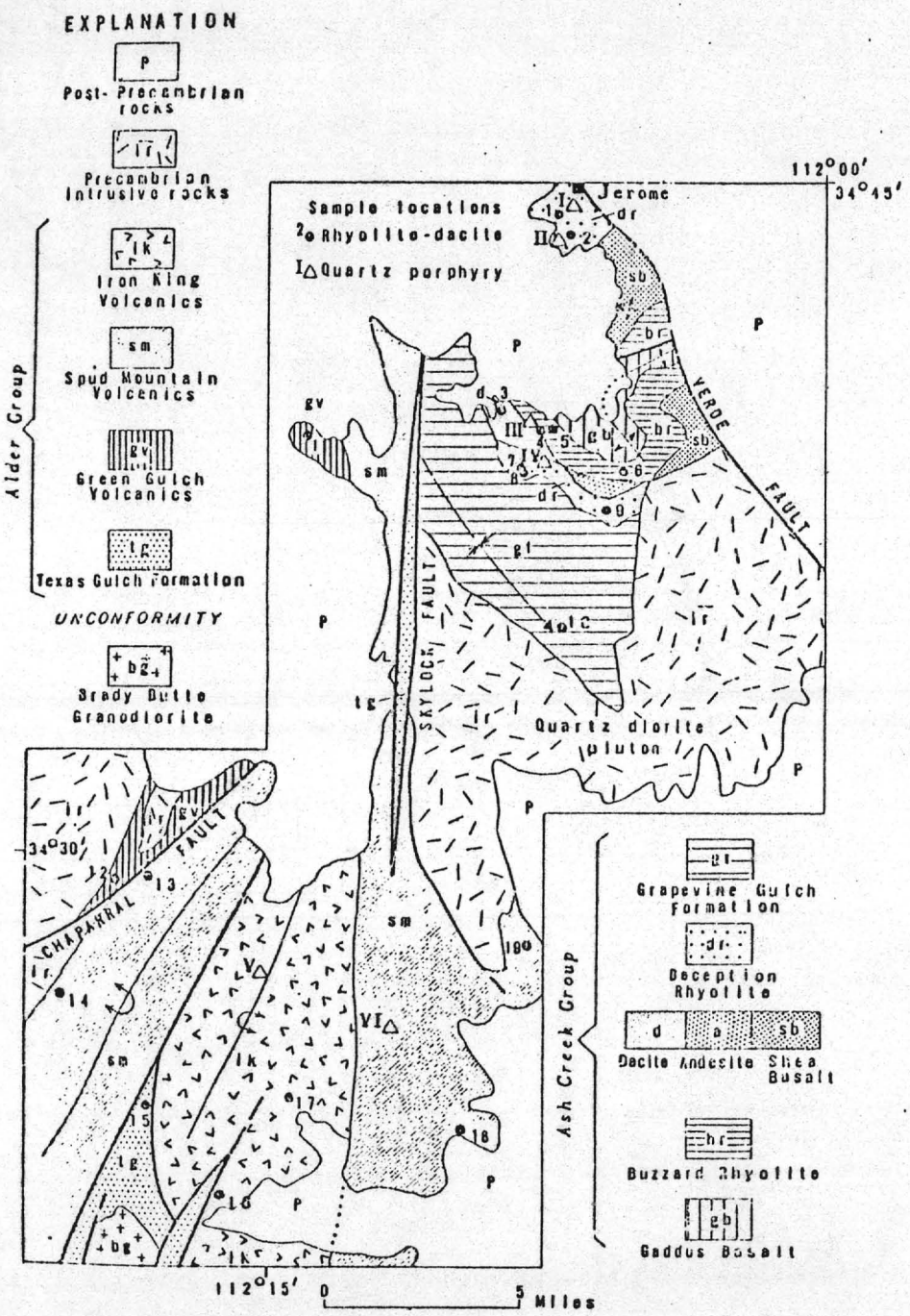

Figure 1. Generalized geologic map of area south of Jerome, Ariz.

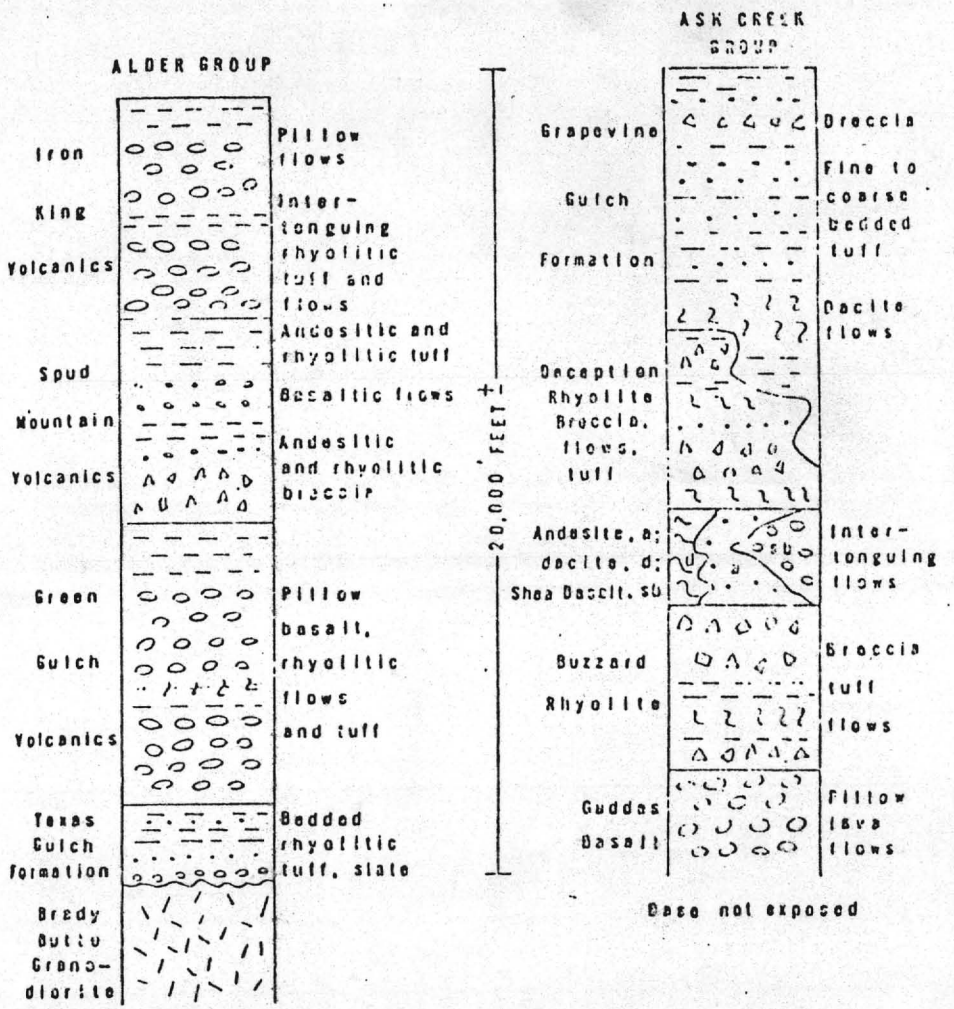

Figure 2 Generalized columnar sections of the Alder and Ash Creek Groups.

SKYLINE LABS, INC.
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Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UQX 013
June 5, 1984
113301 TO 114000

A.F. BUDGE (MINING) LIMITED
Attn: Mr. Ben Dickerson III
DMEA Ltd.
4203 North Brown Avenue, Suite F
Scottsdale, Arizona 85251

RECEIVED JUN 7 1984

Analysis of 62 Rock Samples

ITEM	SAMPLE NO.	FIRE ASSAY Au* (oz/t)	Ag* (oz/t)
1	113301	<.005	<.01
2	113302	<.005	<.01
3	113303	<.005	<.01
4	113304	<.005	<.01
5	113305	<.005	<.01
6	113306	<.005	<.01
7	113307	<.005	<.01
8	113308	<.005	<.01
9	113309	<.005	<.01
10	113310	<.005	<.01
11	113311	.035	<.01
12	113312	<.005	<.01
13	113313	<.005	<.01
14	113314	<.005	<.01
15	113315	<.005	<.01
16	113316	.010	<.01
17	113317	<.005	<.01
18	113956	<.005	<.01
19	113957	<.005	<.01
20	113958	<.005	<.01
21	113959	<.005	<.01
22	113960	<.005	<.01
23	113961	<.005	<.01
24	113962	.085	.05
25	113963	.055	<.01

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

JOB NO. UQX 013
June 5, 1984

ITEM	SAMPLE NO.	FIRE ASSAY Au* (oz/t)	Ag* (oz/t)
26	113964	.015	<.01
27	113965	.030	<.01
28	113966	<.005	<.01
29	113967	<.005	<.01
30	113968	<.005	<.01
31	113969	<.005	<.01
32	113970	.030	<.01
33	113971	<.005	<.01
34	113972	<.005	<.01
35	113973	.010	<.01
36	113974	<.005	<.01
37	113975	.005	<.01
38	113976	<.005	<.01
39	113977	<.005	<.01
40	113978	<.005	<.01
41	113979	<.005	<.01
42	113980	<.005	<.01
43	113981	<.005	<.01
44	113982	<.005	<.01
45	113983	<.005	<.01
46	113984	.050	<.01
47	113985	<.005	<.01
48	113986	<.005	<.01
49	113987	.005	<.01
50	113988	<.005	<.01

Charles E. Thompson
Arizona Registered Assayer No. 9427

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1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

ITEM	SAMPLE NO.	FIRE ASSAY Au* (oz/t)	Ag* (oz/t)
51	113989	<.005	<.01
52	113990	<.005	<.01
53	113991	<.005	<.01
54	113992	<.005	<.01
55	113993	<.005	<.01
56	113994	<.005	<.01
57	113995	<.005	<.01
58	113996	.020	<.01
59	113997	<.005	<.01
60	113998	.060	<.01
61	113999	.015	<.01
62	114000	<.005	<.01

*NOTE: Analysis based on one assay-ton sample.

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

INVOICE
NET 30 DAYS

JOB NO.UQX 013
June 5, 1984
113301 TO 114000

A.F. BUDGE (MINING) LIMITED
Attn: Mr. Ben Dickerson III
DMEA Ltd.
4203 North Brown Avenue, Suite F
Scottsdale, Arizona 85251

Analysis of 62 Rock Samples

*62 Au&Ag (oz/t)	@ $ 8.90	$ 551.80
62 Samples crushed, split and pulverized	@ $ 3.90	$ 241.80
	TOTAL	$ 793.60

*NOTE: Cost per sample based on one assay-ton sample.

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

Milton W. Hood
P. O. Box 20865
Wickenburg, AZ 85358

May 22, 1984

Mr. Ben Dickerson III
DMEA Ltd.
4203 N. Brown Ave, Suite F
Scottsdale, AZ 85251

Dear Ben:

In accordance with your instructions, I have sampled the Ark Energy Property located in Sec 13, T13N; R9W SRB&M in Yavapai County, AZ.

The sampling procedure included taking grab samples from old dumps and stockpiles along with both grab and chip samples from pit faces and dozer trenches. Orange flagging ribbon with the sample number marked thereon were placed at the approximate center of the area represented by the sample. These markers were nailed to the rock and should be secure for a considerable period of time.

The following is a summary of samples taken from the various zones.

Zone	Sample No	Tag No
West	W-1-W-15	113956-113970
East	E-1-E-5	113971-113975
Tank	T-1-T-15	113976-113990
Main	M-1-M-10	113991-114000
Main	M-11-M-25	113301-113315
Leach Dump	LD-1- LD-2	113316-113317

Billing for services and supplies are summerized as follows:

M. W. Hood		
Fees @ $275.00/day x 3.25 days		$893.75
Mileage @ $0.205 x240 miles		49.20
Film 1-roll		3.80
Film, developing		2.69
Nails		0.81
Marker, Fine tip felt		0.72
	Total	$950.97
Jim Hood		
Labor@ $8.00/hr x 23.0		184.00
Mileage for sample delivery @ $0.205 x185		37.93
	Total	$221.93
	Project Total	$1192.90

Sincerely,

M. W. Hood

Milton W. Hood

ARK ENERGY PROJECT

Received from M. W. Hood

Labor @ $8.00/hr

5/20/84 11-hrs x $8.00 = $88.00

5/21/84 12-hrs x $8.00 = 96.00

$184.00

Mileage for sample Delivery. To Skyline Labs IN Tucson, AZ. Wickenburg to Tucson 185 Mi @ $0.205 $37.93

Total $221.93

Jim Hood

5/22/84

DMEA Ltd.
Mineral Exploration Advice

Ben F. Dickerson III
Registered & Certified Geologist
Carole A. O'Brien
Geologist & Associate

4203 N. Brown Avenue, Suite F
Scottsdale, AZ 85251
(602) 945-4630

July 18, 1984

Harry L. Williams
President
Ark Energy Limited
Suite 810, 675 W. Hastings
Vancouver, B.C. V6B 1N2

Re: Leach Claims, Yavapai Co.,AZ.

Dear Mr. Williams:

Thank you for allowing us the opportunity to examine the referenced property on behalf of our client. Based on the results of our sampling, and due to prior commitments on other projects, we cannot express any further interest in the Leach Claim property at this time.

Enclosed is your geological map which you lent us plus a copy of the assays and a brief description of the sample locations by M.W. Hood. Mr. Hood sampled the property on May 20 and 21, and at that time did not notice any recent dozer work, such as you mentioned. It might have been done subsequent to his visit. But nothing had certainly been done this season.

Also enclosed are a couple of photographs of the property which you might wish to add to your data base on the area.

Thank you again, and please keep us in mind should you come across any other prospect which you feel might be of interest.

Sincerely,

Carole A. O'Brien
Geologist

encls.

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UQX 013
June 5, 1984
113301 TO 114000

A.F. BUDGE (MINING) LIMITED
Attn: Mr. Ben Dickerson III
DMEA Ltd.
4203 North Brown Avenue, Suite F
Scottsdale, Arizona 85251

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3	113303	<.005	<.01
4	113304	<.005	<.01
5	113305	<.005	<.01
6	113306	<.005	<.01
7	113307	<.005	<.01
8	113308	<.005	<.01
9	113309	<.005	<.01
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37	113975	.005	<.01
38	113976	<.005	<.01
39	113977	<.005	<.01
40	113978	<.005	<.01
41	113979	<.005	<.01
42	113980	<.005	<.01
43	113981	<.005	<.01
44	113982	<.005	<.01
45	113983	<.005	<.01
46	113984	.050	<.01
47	113985	<.005	<.01
48	113986	<.005	<.01
49	113987	.005	<.01
50	113988	<.005	<.01

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

JOB NO. UQX 013
June 5, 1984

ITEM	SAMPLE NO.	FIRE ASSAY Au* (oz/t)	Ag* (oz/t)
51	113989	<.005	<.01
52	113990	<.005	<.01
53	113991	<.005	<.01
54	113992	<.005	<.01
55	113993	<.005	<.01
56	113994	<.005	<.01
57	113995	<.005	<.01
58	113996	.020	<.01
59	113997	<.005	<.01
60	113998	.060	<.01
61	113999	.015	<.01
62	114000	<.005	<.01

*NOTE: Analysis based on one assay-ton sample.

REGISTERED ASSAYER CERTIFICATE NO. 9425 WILLIAM L. LEHMBECK DATE SIGNED Arizona U.S.A.

William Lehmbeck
Manager

Ark Energy Ltd.

Ste. 810 - 675 West Hastings Street
Vancouver, B.C. V6B 1N2
Telephone (604) 687-3388

April. 5/84

RECEIVED APR 13 1984

Dear Mr. Dickerson;

I am enclosing some information on the Leach claims (35 claims) as well as a map showing where the dirt road leads off of the Bagdad road. It is only about 200 yds past the road to Gibsons ranch yard, he has a large trailer that you can see from the road.

The trenching should be nice and fresh when you get there so have fun.

Best Regards.

L. L. Williams

P.S. Please let me have your comments.

Ark Energy Ltd.

Ste. 810 - 675 West Hastings Street
Vancouver, B.C. V6B 1N2
Telephone (604) 687-3388

May 9/84

D. M. E. A. Ltd.
#203 North Brown Ave.
St. F. Scottsdale Arizona
85251

RECEIVED MAY 16 1984

Mr. Ben F Dickerson and associates;

Dear Sir;

Thank you for the phone call re the Leach claims, Im glad you was able to take a look at the property.

I was unable to get a color copy of the Geo. Map. so I am enclosing the original. Please return it to me.

Kindest Regards.

D. Killam

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UQX 010
May 11, 1984
113951 THRU 113955
PAGE 1 OF 1

A.F. BUDGE (MINING) LIMITED
Attn: Mr. Ben F. Dickerson III
DMEA Ltd.
4203 North Brown Avenue, Suite F
Scottsdale, Arizona 85251

Analysis of 5 Rock Chip Samples

ITEM	SAMPLE NO.	FIRE ASSAY Au* (oz/t)	Ag* (oz/t)
1	113951	<.005	<.01
2	113952	<.005	<.01
3	113953	<.005	<.01
4	113954	<.005	<.01
5	113955	<.005	<.01

*NOTE: Analysis based on one assay-ton sample.

REGISTERED ASSAYER CERTIFICATE NO. 9425 WILLIAM L. LEHMBECK STATE SIGNED Arizona U.S.A.

William L. Lehmbeck
Manager

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

REPORT OF ANALYSIS

JOB NO. UQX 010
May 11, 1984
113951 THRU 113955

A.F. BUDGE (MINING) LIMITED
Attn: Mr. Ben F. Dickerson III
DMEA Ltd.
4203 North Brown Avenue, Suite F
Scottsdale, Arizona 85251

Analysis of 5 Rock Chip Samples

ITEM	SAMPLE NO.	FIRE ASSAY Au* (oz/t)	Ag* (oz/t)
1	113951	<.005	<.01
2	113952	<.005	<.01
3	113953	<.005	<.01
4	113954	<.005	<.01
5	113955	<.005	<.01

*NOTE: Analysis based on one assay-ton sample.

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

SKYLINE LABS, INC.
1775 W. Sahuaro Dr. • P.O. Box 50106
Tucson, Arizona 85703
(602) 622-4836

INVOICE
NET 30 DAYS

JOB NO.UQX 010
May 11, 1984
113951 THRU 113955

A.F. BUDGE (MINING) LIMITED
Attn: Mr. Ben F. Dickerson III
DMEA Ltd.
4203 North Brown Avenue, Suite F
Scottsdale, Arizona 85251

Analysis of 5 Rock Chip Samples

* 5 Au&Ag (oz/t)	@ $ 8.90	$ 44.50
5 Samples crushed, split and pulverized	@ $ 2.40	$ 12.00
	TOTAL $	56.50

*NOTE: Cost per sample based on one assay-ton sample.

DUPLICATE INVOICE

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

UQX 014 (T., June 5th) : Devault placer

113351
52
53
54
55
56
113357

Total: 7 samples

UQX 013 (W., June 6th) : Ark Energy - Leach claims

113956	< .005	
57	< .005	
58	< .005	
59	< .005	
60	< .005	
61	< .005	
62	.085	Grab E of p.t rd w/7 wood stake
63	.055	Grab E of pit adit dump vn. Motorcycle
64	.015	adit dump, E of pit W-9
65	.030	grab, 2nd adit dump
66	< .005	
67	< .005	
68	< .005	
69	< .005	
70	.030	Main: Road, E of p.t
113971	< .005	
72	< .005	
73	.010	
74	< .005	
75	.005	East zone top p.t
113976	< .005	
77	< .005	
78	< .005	
79	< .005	
113980	< .005	
81	< .005	
82	< .005	
83	< .005	
84	.050	Tank zo. 2N
85	< .005	
86	< .005	
87	.005	Tank zo 3-N
88	< .005	
89	< .005	
90	< .005	
113991	< .005	
92	< .005	
93	< .005	
94	< .005	
95	< .005	
96	.020	Main zo. 3N
97	< .005	
98	.060	Main zo Dump 3-N
99	.015	Main zo. p.t area
114000	< .005	

— cont'd -

113301

2

3

4

5

6

7

8

9

10 <

11 .035 Main to 6.N

12 <

13

14

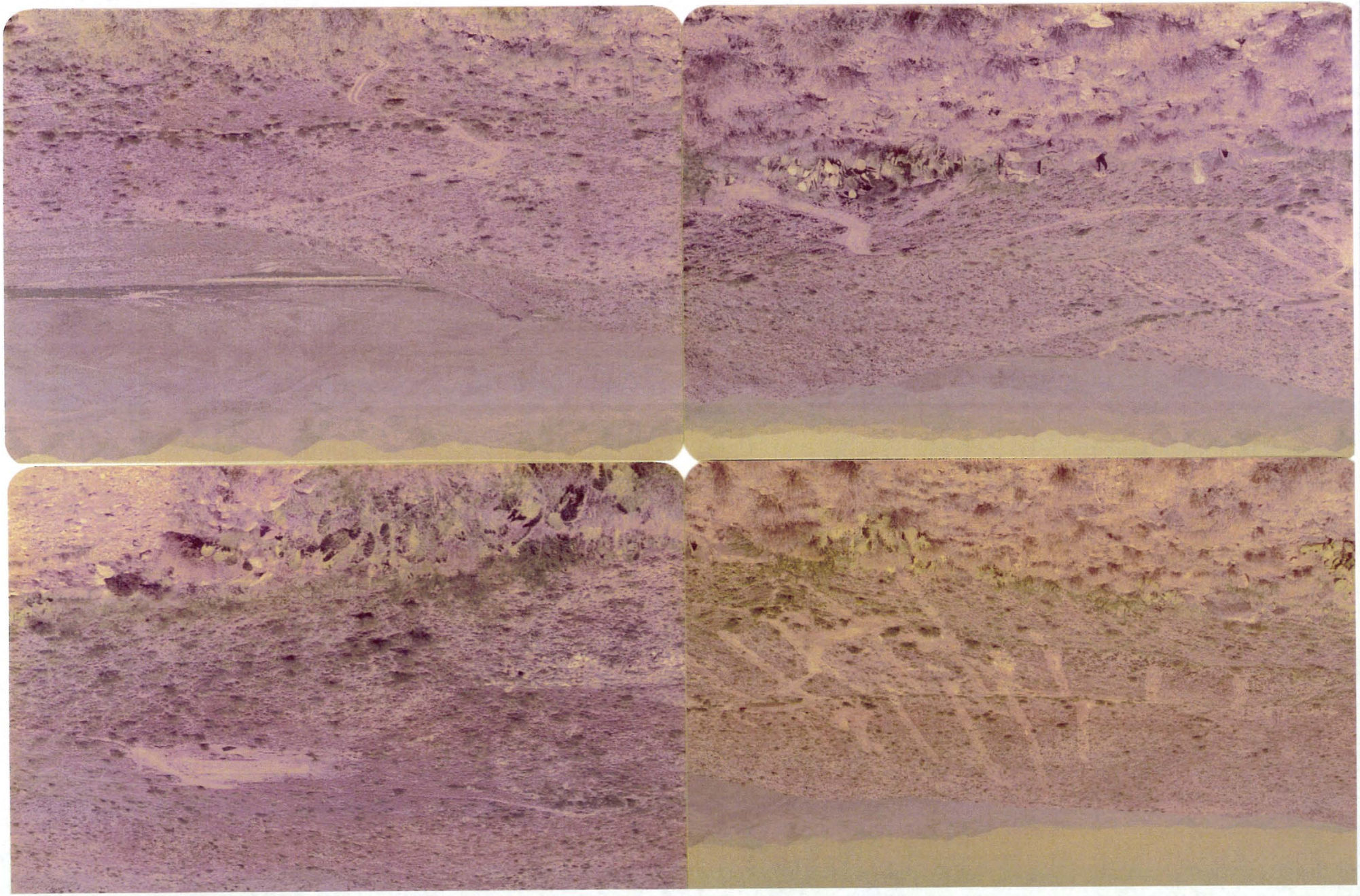
15

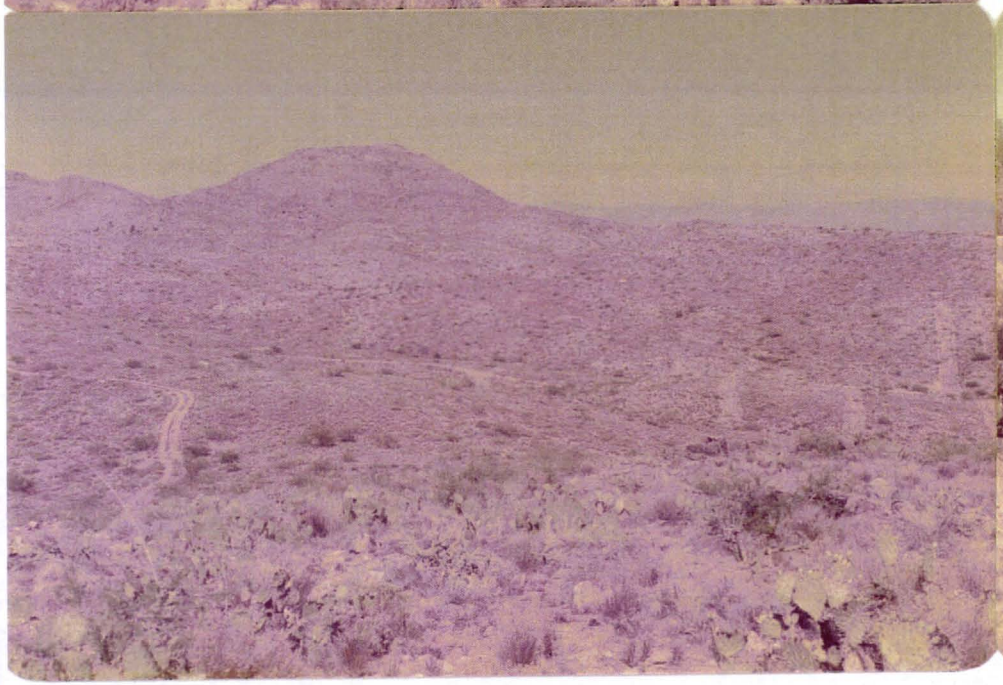
16 .010 Leach dump. 3E Toe

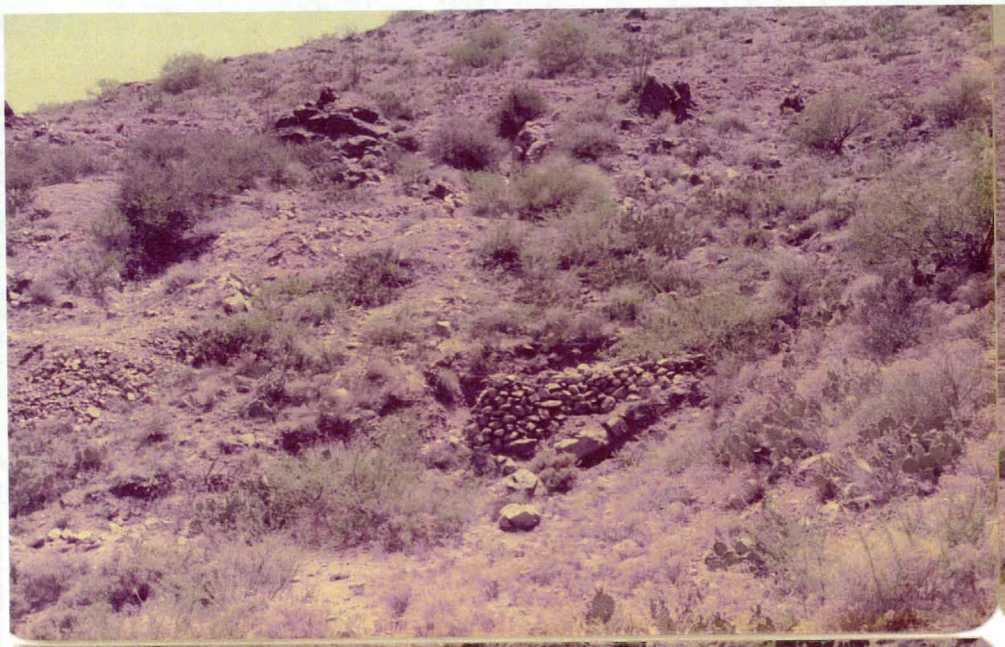
113317 <

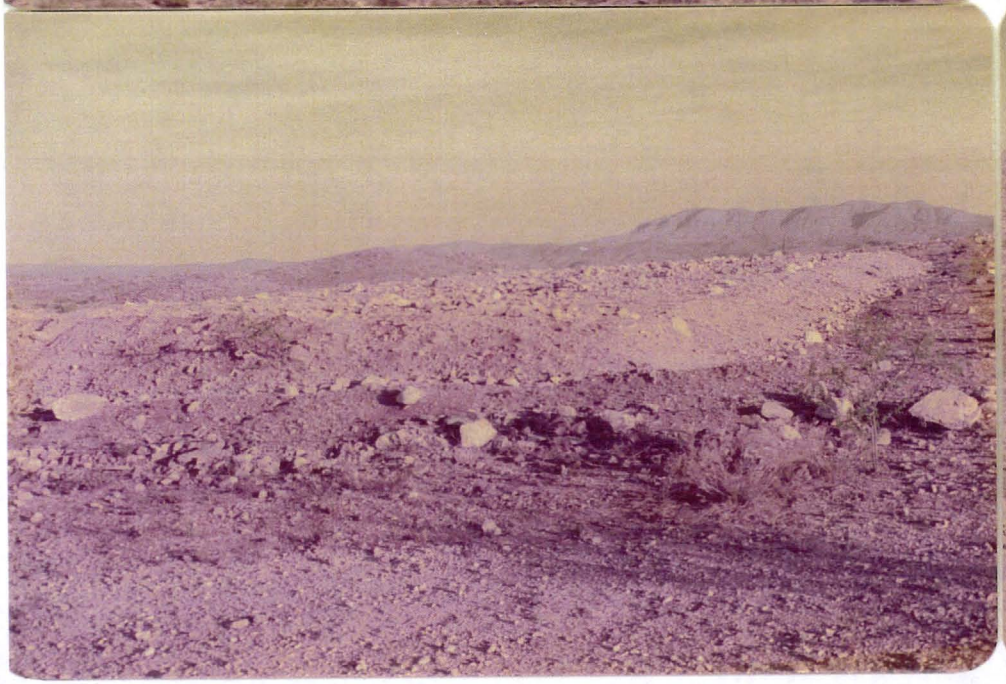
Total: 62 samples

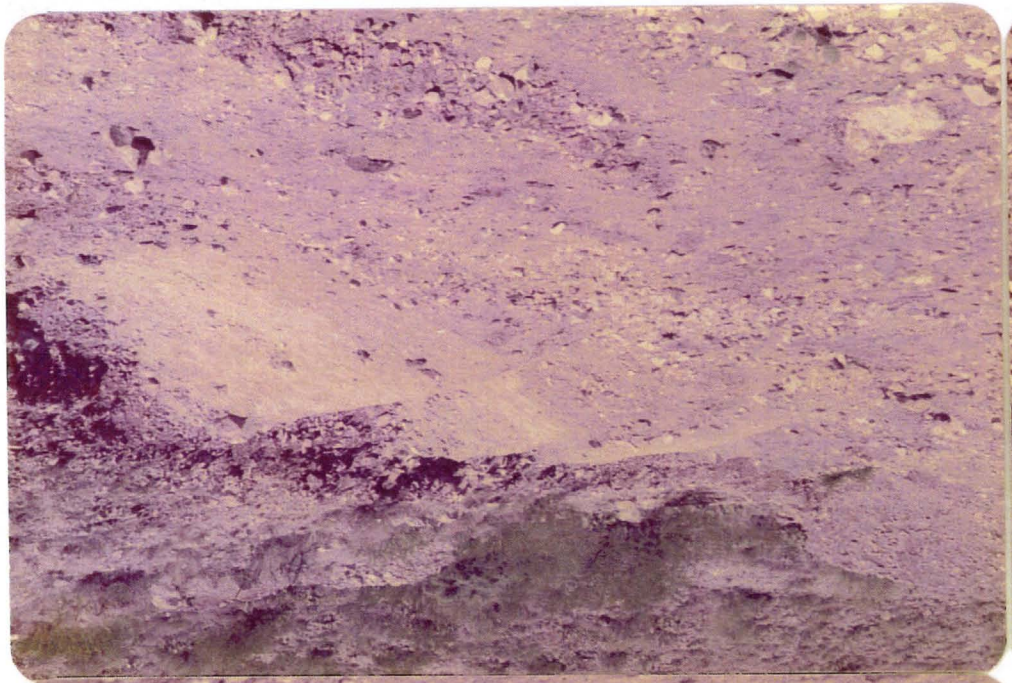
14 w/ gold

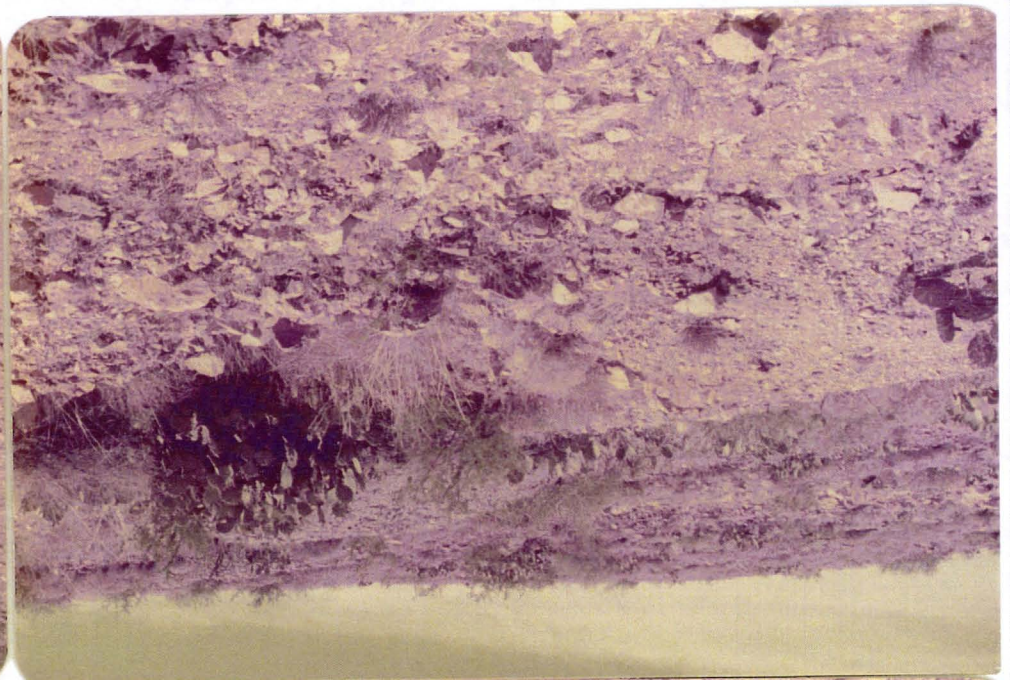


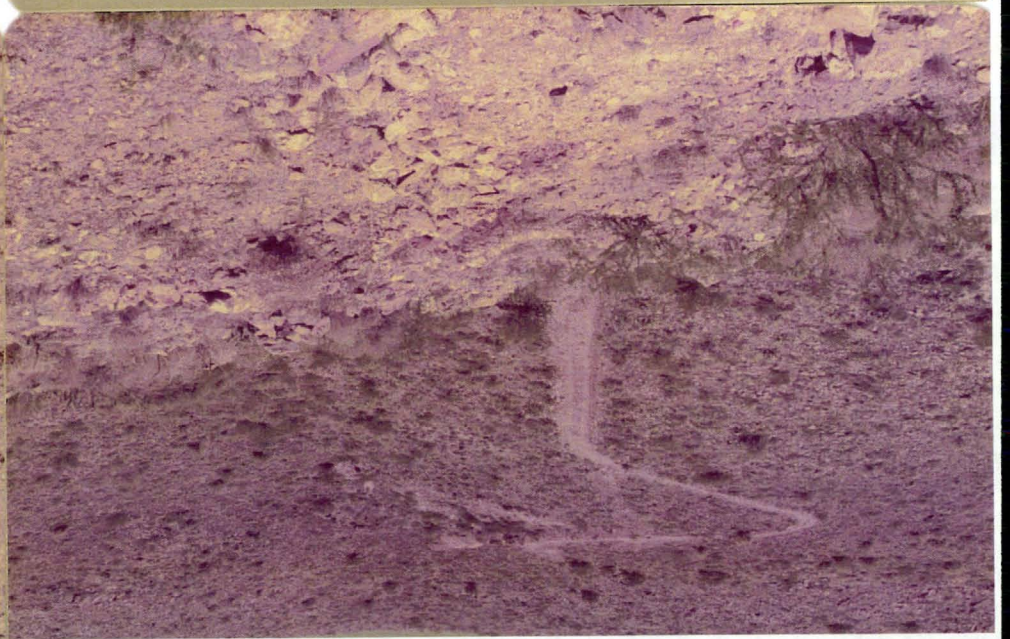












III - DESCRIPTION OF SILVER SUMMIT PROPERTY HIGHLIGHTS

Summit Silver (formerly known as the Swastika Group of claims) is located three (3) miles north of Crown King, Arizona, and about forty-five (45) miles north of Phoenix, Arizona.

Past History -- The property produced three million (3,000,000) ounces of silver from high grade ore in veins along a north by 25 degrees east trending structure.

Considering that only higher grade ores that could withstand the off-site costs of transportation and smelting resulted in sellable product and revenue for the operation, a large amount (120,000 tons) of 14 ounce ore remains on the dumps and in the old stopes. According to the old maps and reports, limited amounts of high grade is still in place in numerous locations, as well as the potential for considerable tonnages of mill grade ore in and around the proximity of the old stopes and workings.

Also, the production of the mine took place before the advent of modern exploration techniques and the total potential of the ore bearing structures on the property have only been explored and/or developed to possibly ten percent (10%) of their total potential.

Thus, in addition to the excellent mill grade and high grade ores available in and around the old workings, an ore potential in excess of ninety percent (90%) still remains for future development and exploitation using modern exploration and development techniques.

Don Williams
916-273-7463
Dave Harriston
916-272-5572

Yavapai County

GEOLOGICAL EVALUATION
of the
SUMMIT SILVER PROPERTY

Peck Mining District
Yavapai County, Arizona

Prepared for: RAINEX INDUSTRIES, LTD.
837 Derwent Way
New Westminister, B.C. V3M 5R4

Prepared by: Dr. Robert A. Jones
R. A. JONES & ASSOCIATES, INC.
Post Office Box 5958
Reno, Nevada 89513
(702) 825-1932

FEBRUARY 1986

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LIST OF FIGURES

1. INTRODUCTION

1.1 General Statement

This report has been prepared on behalf of Rainex Industries, Ltd. at the request of Mr. George Pithers, President. It is based primarily upon an office review of data obtained by the principals from previous operators and exploration groups. Additional sources of information include available state and federal survey reports. The writer field inspected the Summit Silver property and the Peck Mining District on February 22 and 23, 1986.

This property is a past producer of rich silver mineralization with credits in gold from the Swastika Mine. The base metals copper, lead, and zinc occur with the precious metal mineralization in a volcanogenic setting and could be important credits in any mining venture. The property has been dormant for many years. This report is oriented towards a basic description of the Swastika Mine and the claim group. Further exploration and development is warranted and recommendations are made herein to initiate an aggressive exploration and development program. An estimate of the costs for a two phase exploration program are included.

1.2 Property and Ownership

The Summit Silver property consists of 4 patented claims

which comprise the Swastika Mine and 25 unpatented lode claims of which 16 are full sized claims and the remaining 9 are fractions. The claims are contiguous and cover an area of approximately one half square miles on Forest Service land within the Prescott National Forest (Figures 1 and 2).

The claim group is held by one owner and is optioned to Rainex Industries, Ltd. under the following terms:

1. Monthly payments towards a buyout of $500,000.00 to be exercised at any time.
2. No royalties attached.
3. Property reverts to the owner if the operator decides against proceeding with development and production.

The claims are all duly recorded at the Yavapai County Courthouse in Prescott, Arizona; taxes are paid to date on the four patented claims and the annual assessment requirements are up to date and on file at both the County Recorder in Prescott and the Bureau of Land Management in Phoenix. To the best of the writers knowledge the claims are unencumbered and are in good standing.

1.3 Location and Access

The Summit Silver property is located in Sections 30 and 31, Township 11 North, Range 1 East, and Sections 25 and 26, Township 11 North, Range 1 West; Gila and Salt River Meridian, Yavapai County,

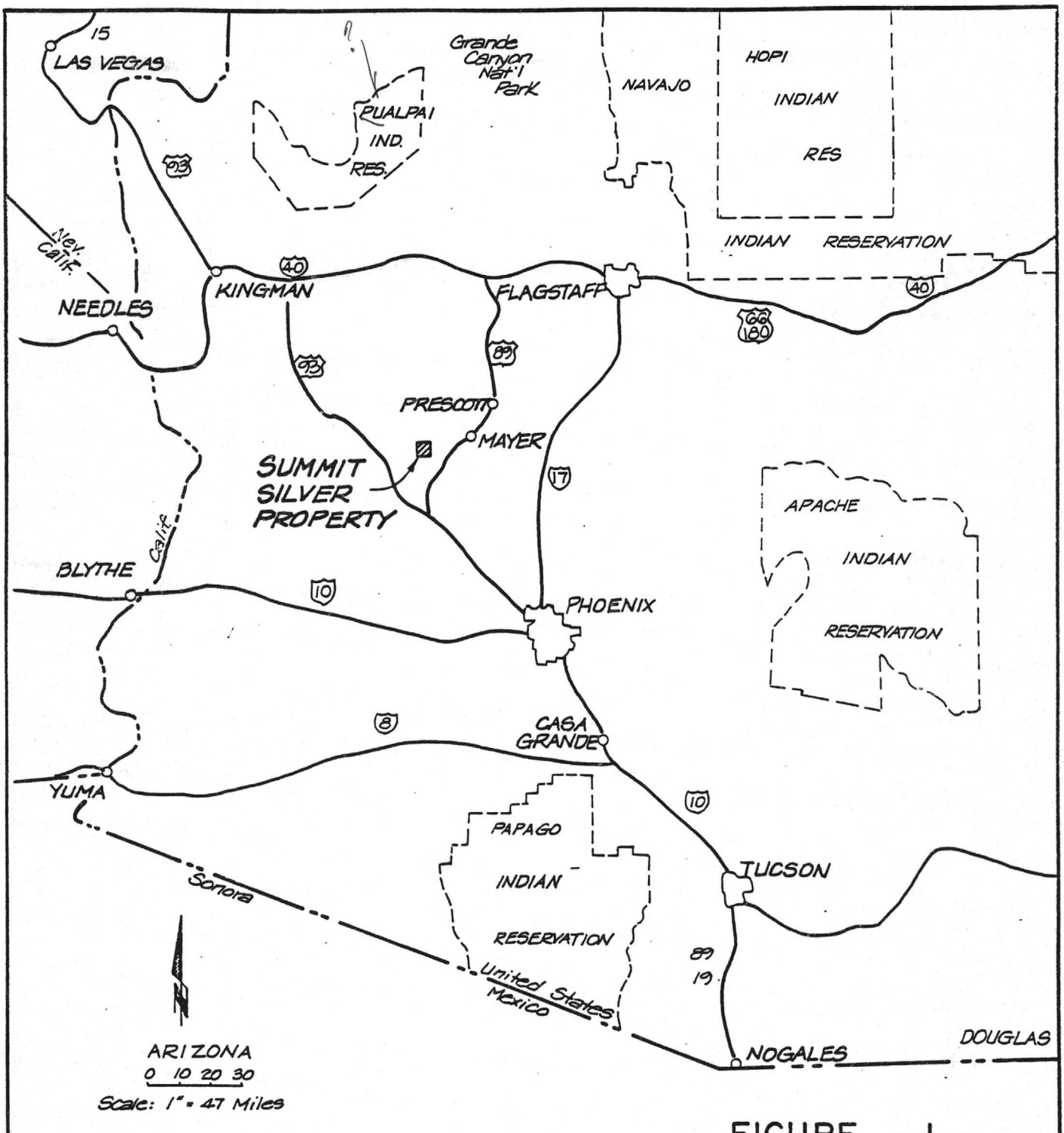


FIGURE 1

RAINEX INDUSTRIES, LTD.

LOCATION MAP

SUMMIT SILVER PROPERTY

PECK MINING DISTRICT
Yavapai County, Arizona
FEBRUARY 1986

DRAFTING BY: P. M. Elliott

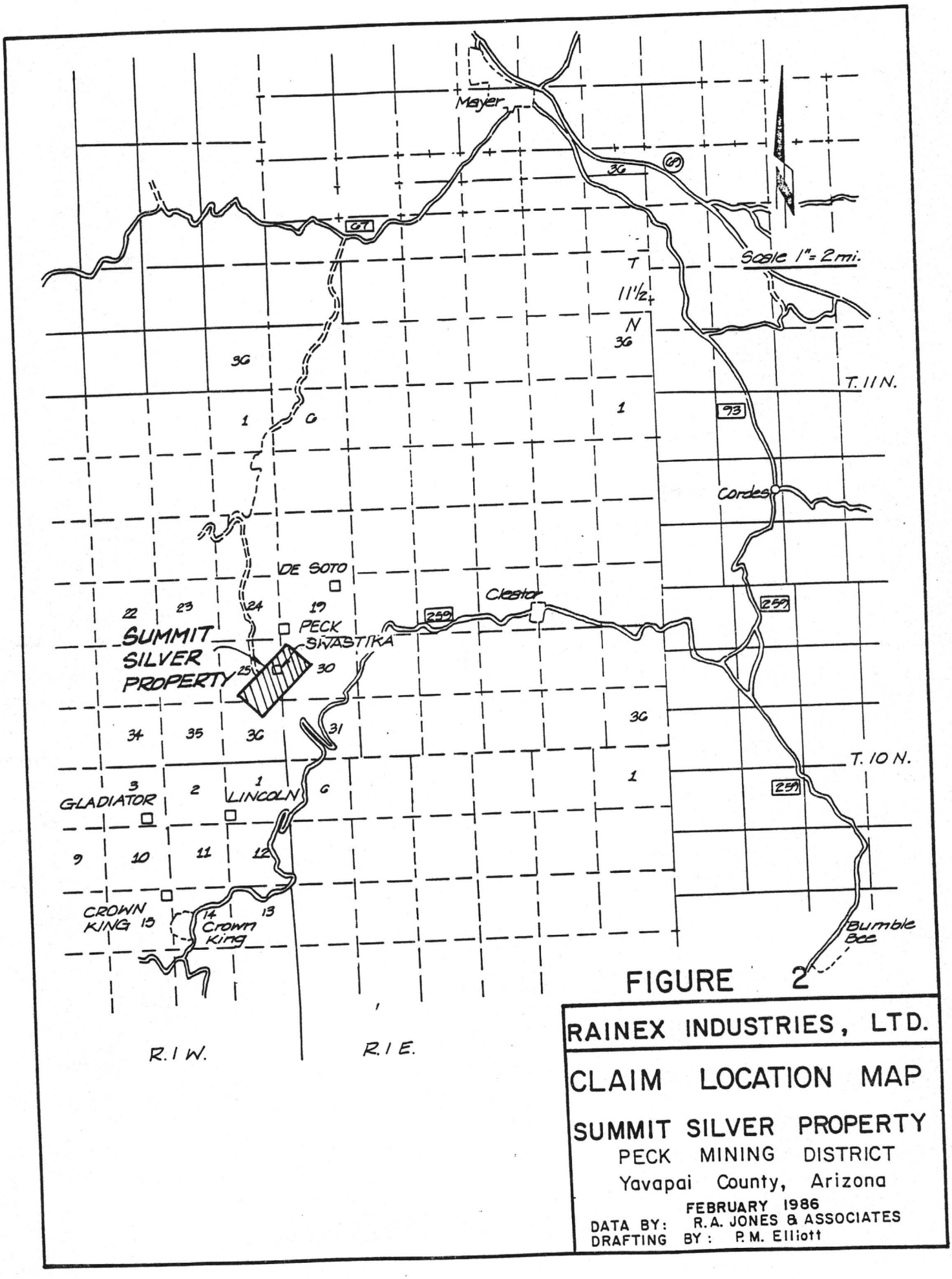


FIGURE 2

RAINEX INDUSTRIES, LTD.

CLAIM LOCATION MAP

SUMMIT SILVER PROPERTY

PECK MINING DISTRICT

Yavapai County, Arizona

FEBRUARY 1986

DATA BY: R.A. JONES & ASSOCIATES

DRAFTING BY: P.M. Elliott

Arizona (Figures 1 and 2).

Access is from Prescott, the County seat for Yavapai County, east and south on State Highway #69, a distance of 25 miles to the small town of Mayer. One mile southeast of Mayer, on State Highway #69, a gravel road turns south towards the hamlet of Cleator, a distance of 12 miles. A gravel road continues west and southwest another 8 miles to the Swastika turnoff (Figure 2).

Access within the property is good. Several old exploration roads and ore haulage roads traverse the hillsides and are readily accessible to 4x4 vehicles. Dense undergrowth will inhibit cross country traversing.

1.4 Physiography and Vegetation

The Peck Mining District is situated regionally in the Mountain Region of the Basin and Range Province. This area is characterized by irregular mountain masses of which the Bradshaw Mountains are a prominent example. The Bradshaws are a series of broad ridges trending north or north-northwest and dissected by a vast number of valleys and gulches that generally drain southward.

In the vicinity of the Peck Mining District altitudes range from 4,000 to 5,500 feet. It is an area of high, rugged ridges, well wooded in the higher parts, with sharply incised canyons. The country slopes off to the east to an area of lesser topographic relief in the deep depression of Crazy Basin (Figure 2).

The vegetation in the area is characteristic of the Mountain

Region of the Basin and Range Province. Scrub oak, chaparral, and manzanita predominate with common desert grasses and a variety of cactii. Cottonwoods and aspen flourish in the water courses and areas of springs and seepages. Larger conifers are common in the higher altitudes.

The climate in this region is quite moderate in spite of the high altitude. The mean average temperature is slightly below 60 degrees Fahrenheit and the average annual precipitation averages approximately 15 inches. Snow will fall in the winter time but rarely accumulates for any period of time and will not affect a year round mining operation.

Although the area is subjected to intermittent periods of rain and snowfall, water should be plentiful enough to sustain a major mining operation. According to Giroux (undated report), abundant water was encountered during the sinking of the main Swastika shaft and at a depth of 400 feet a flow of 10,000 to 20,000 gallons per 24 hours was encountered. Adequate water will be generated by the mine workings to operate a large mill.

No known endangered species of flora or fauna occur in this area.

1.5 History of the Peck Mining District

The mining district was probably discovered in 1874 and in 1875 the Swastika Mine was located and production was initiated from two vein systems, Silver Prince and Black Warrior. According to Dodd

(1947) mining continued on the two veins until 1885 and was then inactive until 1910. Production to this point totalled $865,000. In the period 1910 to 1915 production increased to 3,000,000 ounces of silver from high grade vein deposits (Dodd, 1947). Lindgren (1926) states that in the period 1910 to 1915 the Swastika Mine produced 600,000 ounces of silver and that the total production to report time was about 1,000,000 ounces. Even though there is a conflict in the figures stated by the two writers, the Swastika was a major producer.

The ore mined during the early periods of the Swastika was high grade silver with lesser credits in gold. Grades to 113 ounces per ton silver were reported in the ore prior to 1885 (Lindgren, 1926). After 1915, production from the Swastika Mine was intermittent and no figures are available for production. Dumps and tailings were reworked to recover silver values from low grade ore left behind in the early days of mining.

During the period of production at the Swastika Mine a considerable amount of development work was carried out. A total of 923 feet in shafts, 1,500 feet in raises, and 9,000 feet in drifts and cross-cuts were utilized in the mining.

Other notable producing mines in the Peck District included the Peck and DeSoto Mines. Lindgren (1926) states that:

> "In the Mint report of 1883 the mine (Peck) is mentioned as highly productive. At that time the levels aggregated 1,400 feet in length, and a shaft of 400 feet deep was sunk. There was a 10-stamp mill on the property. About $1,000,000 to $1,500,000 in silver is the reported production between 1875 and 1885".

Lindgren (1926) points out that the ore bodies at the DeSoto Mine were of a pyrite-chalcopyrite type and up to the time of his report had produced a total of 180,000 tons averaging about 3.75 per cent of copper and one ounce of silver and 0.02 ounce of gold per ton.

In the period from 1915 to the present only intermittent mining activity was apparent. Decline in the availability of rich oxide silver ores, two wars, and the general rising labor and other mining costs tended to keep the industry in a depressed state.

During the past several years interest has been revived in the Peck District with the increase in precious metal prices and the realization that gold is an important constituent in some of the ores being pursued, particularly in the sulphide ores. For example, the Gladiator Mine in the Pine Grove District is considered to be located on a southerly extension of the Gold King vein system from the Peck District. At the present time Nor-Quest Resources Ltd. is operating the Gladiator Mine and reports (personal communication) that the grades in the sulphide ore are averaging above 0.30 oz/ton gold and over 3 ounces per ton silver. Similarly, old reports on the Lincoln Mine in the Pine Grove District indicate the sulphide ore runs as high as 4 oz/ton gold. Geologists at the Gladiator property feel that the Lincoln and Swastika Mines are on the same structure.

2. GEOLOGICAL OBSERVATIONS

2.1 Regional Geological Setting of the Peck Mining District

Rocks of Precambrian age dominate the geology of this part of Arizona. Figure 3, is adapted from Lindgren (1926) and shows the regional relationship of the Summit Silver property (Swastika Mine) to rock types and to other significant producing mines in the general vicinity.

A band of Yavapai schist strikes northeast-southwest across the area of interest. This series of metasedimentary and metavolcanic rocks represents the oldest in the district and possibly Arizona. The schists are highly compressed and have been intruded by the younger granites and related intrusives. Near the intrusive bodies the schists are highly metamorphosed and exhibit high temperature minerals such as andalusite, sillimanite, and staurolite. The Yavapai formation is, for the most part, a monotonous group of chloritic mica schists of sedimentary origin, with lesser limestones, quartzites, and iron formation. Allied metavolcanic units include amphibolites and greenstones of basic composition. More prominent, however, are schistose and brecciated rhyolites or rhyolite porphyries.

Lindgren (1926) states:

> "..... it is believed, that the Yavapai schist comprises a series of sedimentary beds with a large amount of interbedded, supracrustal, igneous rocks and tuffs. To what extent the series contains intrusive rocks is difficult to say .....".

The ore deposits of the Peck and Pine Grove Districts are confined to the Yavapai schist units and are everywhere parallel to

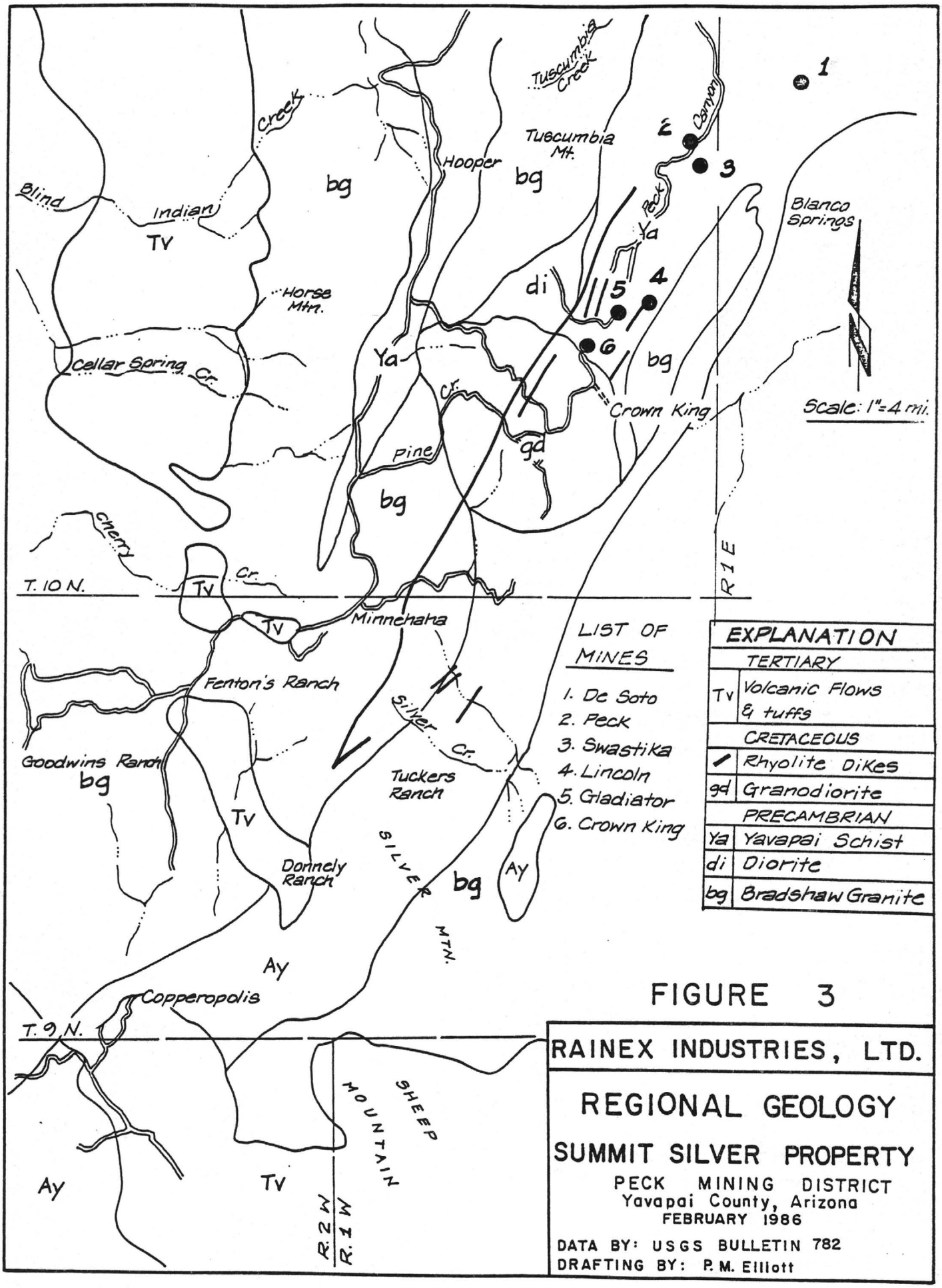


FIGURE 3

RAINEX INDUSTRIES, LTD.

REGIONAL GEOLOGY

SUMMIT SILVER PROPERTY

PECK MINING DISTRICT
Yavapai County, Arizona
FEBRUARY 1986

DATA BY: USGS BULLETIN 782
DRAFTING BY: P. M. Elliott

the bedding or schistosity in the host rocks. Local folding and faulting has affected the ore bearing horizon.

The Yavapai metamorphic sequence is tilted on edge and squeezed between two masses of Bradshaw granite of younger Precambrian age (Figure 3). The granite bodies are typically white, medium to coarse grained, and very massive. The relationship of the ore deposits in the Yavapai schists to the massive granites is not established, but off shoots of the granite masses certainly have cross-cut the vein systems and have been injected parallel to the schistosity planes.

Diorite and granodiorite bodies occur scattered throughout the Bradshaw Mountains. One such rounded granodiorite mass is located immediately south of the Crown King area (Figure 3) and cross-cuts both the Bradshaw granite and the Yavapai formation. Lindgren concludes that the granodiorites could be Cretaceous in age.

The youngest intrusive rocks in the district are rhyolite and related dike rocks, which cut all of the above rock types and which are remarkable for their continuity along the schistosity planes of the Yavapai schists. Lindgren (1926) concluded that the acidic dike rocks were intimately connected with the later mineralization in the Bradshaw Mountains, and assigned them to the Cretaceous or Tertiary period.

Lindgren (1926) divided the metallic ore deposits of the Bradshaw Mountains as follows:

Precambrian

a. Pyritic copper deposits in schist

b. Magnetite deposits

c. Contact-metamorphic deposits

d. Gold-quartz veins

e. Gold-quartz tourmaline replacement deposits

f. Quartz veins carrying silver, copper, and lead

Mesozoic or Tertiary

a. Quartz veins carrying gold and silver

b. Silver veins:

Veins with barite gangue

Veins with quartz gangue

It is not the intention of the writer to go into descriptions and examples of each ore type. However, it should be pointed out that the geologists of Lindgrens era were all hydrothermalists and attributed all base and precious metal ore deposits to intrusives and related actions. The writer is of the opinion that all of the mineralization observed at the Peck and Pine Grove Districts reflect Precambrian stratabound, volcanogenic type, massive sulphides that were deposited as part of the sedimentary-volcanic sequence. Subsequent regional metamorphism together with intrusion of later granitic bodies and dikes has remobilized the sulphide mineralization into pods and lenses that replace favorable rock units or fill voids and crevices in brecciated quartz and rhyolite masses. Later erosion of the sulphide deposits has caused enrichment in the near surface

ores.

2.2 Geology and Mineralization of the Summit Silver Property

All rock formations, large intrusive masses, dikes and sills recognized and mapped on the Summit Silver property are considered, for the most part, to be Precambrian in age. Figure 3 represents a generalization of the geology from Lindgren (1926).

In the Summit Silver area rocks of the Yavapai schist make up the prominent rock formations. The Yavapai is represented everywhere by siliceous schists cut by numerous dikes of rhyolite together with dikes of granite and quartz porphyry which are probably off shoots from major, and younger, granite masses on both sides (Figure 3). The strike of the volcanic and sedimentary units is north-northeast and the dikes trend in a general northerly direction. Not enough detailed geology has been accomplished to understand the relationship between the various dike rocks, the schists, and the ore occurrences. Geological mapping will form a major part of the exploration program proposed herein.

The most recent summary of the mine geology is presented by Dodd (1947). To paraphrase:

> "The mine workings are wholly in the Pre-Cambrian Yavapai Schists. This formation consists of typical chloritic fissile to dense schists, with some sericite, with numerous large Quartzite lenses ..... (Description of dikes) ..... while these dykes have some genetic connection with the mineralization, the ore does not develop on the contacts to the same extent that it does in vein fissures in the Quartzite but near the dykes".

Recent development and detailed mapping of the ore zones at

the Gladiator Mine indicates that there is a direct relationship between sulphide mineralization and brecciation of rhyolitic dike material. It is anticipated that similar relationships will be discovered on the Summit Silver property when the geology is mapped in detail. The fact that Dodd (1947) states his Quartzite could be a highly silicified porphyry reinforces the writers contention that the geology at Summit Silver will parallel that at the Gladiator.

There are two main recognized vein systems at the Swastika Mine: (1) the Prince, and (2) the Little Prince. These vein systems are about 250 feet apart, are confined generally to the schistosity of the host Yavapai formation rocks, and exhibit both parallel and transverse branch fissures.

Dodd (1947) further states:

> "There are a number of faults, of which none are of very great displacement, and appear to be pre-mineral, with a general strike of North 70 degrees West. These faults appear to have considerable bearing on the deposit.
>
> The veins have an average strike of North 25 degrees East, and dip about 70 degrees West. The vein matter ranges from a clean Quartzite to Siderite with dolomite and various manganese materials".

Giroux (undated) recognizes five well defined vein systems on the property and states that the outcropping area of these systems:

> "..... giving 3,000 feet of prospecting area along the strike of the veins, with 1,500 feet in cross section".

Further, Giroux (undated) describes the vein systems at the Swastika Mine as follows:

> "The main, or big Prince vein on which are the principal workings of the Swastika, appears ..... as a big jaspery quartzite ledge with high reef outcrops for many feet in places ....., but remaining where exposed a true course of conformity with the schistosity. It varies from ten to fifty feet wide along its

> strike and shows much oxidation; it lies on the foot wall side of the rhyolite dyke. Assays taken from the outcrop of this vein run from 4 to 150 ounces of silver per ton. The Little Prince vein, ..., is not as bold or pronounced in its outcrop; it lies above the rhyolite dyke, making the dyke its foot wall and a band of schist for its hanging wall ..... The copper condition (vein system) is about 200 feet west of the Little Prince vein. ..... Copper occurs in this condition as lenticular replacements in the schist; samples taken have given from 1% to 30% copper, 2 to 20 ounces silver, and $2 to $14.00 gold per ton (1918 prices). ..... It is upon its continuation to the north that the large workings of the DeSoto Mine have been conducted and it promises great possibilities at depth in the Swastika ground. ....."

Giroux (undated) mentions the occurrence of two more vein systems but these are unrecognized for the purpose of this report and will be mapped and detailed during an ensuing exploration program.

At the time of the writers field inspection of the property it was not possible to gain access to the underground workings. However, the Gladiator Mine, a few thousand feet to the south, offered an excellent opportunity to study the ore occurrence, and there is every reason to believe from surface outcroppings that parallels can be drawn between this mine and the mineralized occurrences on the Summit Silver property. At the Gladiator, massive sulphide volcanogenic type ore occurs associated with brecciated rhyolite along structures developed parallel to the schistosity in the host Precambrian schists. Discrete masses of chalcopyrite and galena occur with quartz and carbonate gangue minerals. Two narrow veins are recognized: (1) a hanging wall vein, and (2) a foot wall vein. These veins vary in thickness and separation but rarely exceed five feet in the latter. Both pinch and swell and where conditions of swelling occur they make rich ore pockets. A brecciated rhyolite occurs with areas of rich ore. Gold is the main ore mineral at the Gladiator and

averages over 0.3 oz/ton in the development ore and could average over 0.5 oz/ton in the ore once development work is completed. Silver values range over 3 oz/ton. Prior mining activities appear to have been confined largely to the hanging wall vein and the footwall vein may have been unrecognized thereby causing the operators to miss rich ore zones.

The ores mined from the Summit Silver property (Swastika Mine) were deeply oxidized. Lindgren (1926) describes the ore thusly:

> "The vein ..... carries dark-brown limonitic ore. There is little quartz, but the principal gangue mineral is a siderite carbonate, with native silver, chloride, and some sulphides. The sulphides consist of a partly decomposed tetrahedrite rich in silver and a little chalcopyrite."

Dodd (1947) discussing the ore describes it:

> "The only important material is silver and it appears as a chloride, bromide, native and tetrahedrite. Some chalcopyrite was noted and high silver galena is not uncommon".

Oxidation at the Gladiator Mine extends downward for over 200 feet vertically and it is presumed the same situation exists on the Summit Silver property. Ores now mined at the Gladiator are sulphides. We anticipate that the ores in the old Swastika Mine will also be largely sulphide at the level of the bottom workings, or at the least will be a combination of sulphides and oxides.

2.3 Development at the Swastika Mine

The Swastika Mine was developed on two claims, the Silver Prince and the Curtin. Figure 4 represents a cross section of the workings on the Silver Prince vein on these two claims. In addition

to this development some 900 feet of drifting was completed on the Nora B claim to the southwest of the Silver Prince and Dodd (1947) states that a considerable amount of "pay ore" was extracted and sent to the smelter. Vein systems also exist on the Hardscrable and Isis claims but these have not been explored to any extent to date.

The Silver Prince was explored to a depth of 400 feet by the Swastika shaft (Figure 4). Four levels were developed, each 800 feet in length. Rich silver ore was mined from ore shoots on the four levels.

The workings on the Silver Prince claim were confined largely to the main Prince vein. However, the Little Prince vein to the northwest of the main structure was developed by a tunnel and a 135 foot shaft and was drifted on from the Prince 100 foot level (Figure 4). Dodd (1947) reports that considerable production came from this development.

The workings on the Silver Prince claim connect with those on the Curtin claim with a somewhat difference in terminology based on the surface elevations of respective claims. The Curtin claim was also developed to the 400 foot level by a series of tunnels, internal shafts, drifts, stopes, raises, and winzes (Figure 4). A main haulage tunnel was driven on the 300 foot level and connected the workings to the milling facilities. Another access tunnel was also driven on the 200 foot level into the workings. Ore from both claims was probably transported by means of these two haulage ways. Several massive, rich, shoots of silver ore were encountered and mined. Whereas there was stoping on the 400 foot level of the Silver Prince, there was no

development on this level on the Curtin. The operators of the mine had made plans to develop a 500 foot level prior to closure of the operation.

Dodd (1947) reports that the total development at the Swastika Mine was 11,423 feet, composed of 923 feet of shafts, 1,500 feet of raises, and 9,000 feet of drifts and cross cuts.

The condition of the mine workings is unknown to the writer. It is reported that the workings are flooded below the 300 foot level as there is no drainage access. Rehabilitation will be a main consideration in any program of evaluation.

2.4 Swastika Mine - Ore Reserves

Giroux (1918-20) reports that there is 120,000 tons of 14 oz/ton silver ore on the old dumps and as backfill in the old stopes from cobbing and hand sorting operations during mining of high grade ore. A cross section of the workings (Figure 4) shows these ore shoots extending to the proposed 500 feet level. Ore was mined to the 400 foot level on the Silver Prince claim but only to the 335 foot level on the Curtin claim. Assay information is scarce and where presented on Figure 4 is given in dollars and cents, presumably at seventy cents per ounce silver at the time of operation. Dodd (1947) does report that a four foot sample on the north face of a stope on the 365 foot level of the Curtin assayed 43.4 ounces per ton silver, and that a grab sample from a stope 35 feet below the above sample assayed 25.6 ounces per ton silver.

The early mining history was essentially a high grade

operation and the miners only removed profitable ore from the mine. As a result low grade ore was used as fill in the stopes. Giroux (undated) reports that 125,000 tons of ore averaging 14 ounces silver per ton remains on the dumps and as fill in the old stopes. A sample of tails taken by the writer from the old millsite assayed 10.2 ounces per ton of silver and a trace of gold. He also reports that the bottom of the 400 foot level on the Silver Prince claim has exposed three short shoots of high grade ore and that a raise close to the north end line of the Silver Prince (400 foot level) is in high grade ore, running 100 to 123 ounces of silver per ton.

No assays are given for gold and no descriptions are given for the ore. However, from the high grade silver values it would appear that the mineralization is oxide and secondary in nature. By analogy with the newly re-activated Gladiator Mine to the south it can be assumed that gold values could be prominent in the sulphide ore below the present workings.

Other vein systems are present on the property. The most noted is the "copper vein" which outcrops 250 feet northwest of the main, Silver Prince vein and which is correlated with the DeSoto vein system further north. This system has not been developed and essentially is untested. Plans during operation of the Swastika Mine called for an exploration drift from the 100 foot level of the Curtin to the copper vein system. The gold bearing ore at the Gladiator Mine is copper rich, and again by analogy, may have a bearing on gold values expected from the "copper vein" on the Summit Silver property. As noted earlier, Giroux (undated) states that the Copper Vein (DeSoto

type) assays 1% to 30% copper, 2 to 20 oz/ton of silver, and $30 to $245.00 oz/ton of gold (at $300 per ounce gold).

3. SUMMARY

3.1 Conclusions

The following conclusions were reached by the writer subsequent to a field inspection of the Summit Silver property, the Peck and Pine Grove Mining Districts and a review of the available geological data:

A. According to Giroux (1918-20), the Summit Silver property contains proven ore reserves of 125,000 tons of 14 oz/ton silver ore as fill in the stopes and dump at the Swastika Mine. Mr. Giroux was a reputable geologist and was the mine manager at the time when this ore was backfilled into the stopes.

B. In addition to the ore in A, above, re-evaluation of the existing workings at the Swastika Mine could develop additional ore in the old stopes that was not economical during the mining era, but which could be viable, utilizing todays standards of technology.

C. Additional tonnages of high grade silver ore could exist below the 400 foot level of the Silver Prince claim and the 300 foot level of the Curtin claims in the Swastika Mine.

D. Additional tonnages of high grade silver ore could be developed along strike extensions of the Swastika Mine vein system to the north and south. Development of the down dip and horizontal

extension of the vein systems in the Swastika Mine could develop in excess of one million tons of viable precious metal ore.

E. Several other vein systems are known to exist at the Swastika Mine to the west of the old workings. Random sampling at the surface and shallow underground workings proves the existence of high grade silver values in the veins. High gold values are indicated from the surface of the Copper Vein (DeSoto). They are essentially unexplored. It is reasonable to conclude that further significant tonnages of precious metal mineralization will be discovered and developed by further exploration. A figure in excess of a million tons of high grade silver and/or gold ore is not unreasonable to expect.

G. This is a large block of ground that, except for the Swastika Mine proper, has been essentially unexplored by modern techniques. It is logical to conclude that an ongoing reconnaissance program over the claims and surrounding area will locate more mineralized vein systems.

H. This part of Arizona is experiencing a renewed interest in the mining industry. The initiation of a 150 ton per day operation at the Gladiator Mine and the exploration of several other past producers are indicators of the viability the the district.

I. The terms under which Rainex Industries, Ltd. have obtained the Summit Silver property are very favorable to the company. No royalties apply and a buyout of one half million dollars is a positive factor.

3.2 Recommendations

On the basis of the foregoing conclusions, it is strongly recommended hat the Summit Silver property be further explored and developed by a Phase I exploration and Phase II development program. The program would involve re-evaluation and development at the Swastika Mine together with the exploration and development of other known vein systems. A regional reconnaissance exploration program over the whole property and outlying areas would be carried out simultaneously with the above recommended programs.

Phase I

A. Restore access to the underground workings of the Swastika Mine and pump water from the workings below the 300 foot level.

B. Survey the workings of the Swastika Mine and map the underground geology.

C. Systematically sample the vein systems exposed in the Swastika workings to establish grade and to establish ore reserves remaining in place between the levels. Sample muck left as fill in the stopes to verify the existence of broken ore reported by earlier writers.

D. Drill several "long holes" horizontally from the Swastika workings to establish the existence of other parallel vein systems and to test their grade. The "Copper Vein" is

the primary target.

E. Drill several "long" holes along strike and down dip from the Swastika workings to test for horizontal and down dip extensions of the vein system.

F. Conduct metallurgical tests on bulk samples from the fill and dumps to determine the most efficient means of extracting the precious metal values.

G. In conjunction with the underground exploration and evaluation of the Swastika workings a program of surface exploration will be conducted. Selected parts of the claim group will be gridded on a 400 foot basis and the grid will be tied to the underground workings at the Swastika Mine for reference and future mine development.

H. Complete a program of detailed geological mapping and rock geochemistry over the gridded areas to trace vein exposures, determine the surface grades, and to develop targets for drill testing.

I. Carry out a program of detailed geophysics over the grid area to trace mineralized veins and geological structures under soil and debris cover. The nature of known vein structures and the occurrence of magnetite bearing rocks lends the property amenable to VLF and ground magnetometer surveys.

J. Re-open other short adits and shafts that exist on other vein systems outside the Swastika Mine proper. Geologically map and sample the exposed structures.

K. Consider several short reverse circulation holes from the surface

to explore targets developed by the above geology, geochemical, and geophysical programs (H and I) and to test horizontal extensions of the Swastika system.

L. Carry out a program of regional geological mapping and prospecting with the goal of developing future exploration targets and ore reserves.

M. Conduct a land title search and stake additional claims on open ground in conjunction with L, above.

N. Finally, compilation of the above data towards a feasibility study. Conduct a feasibility study to determine the rate and method of mining best suited to assure maximum return on the companys investment.

Phase II

Contingent upon favorable results from Phase I, as outlined above, and in anticipation of same, it is recommended that the property be further evaluated by a program consisting of the following steps:

A. Develop the existing haulage way on the 300 foot level of the Swastika Mine and develop the underground workings to accommodate modern mining equipment.

B. Erect a mill and other ancillary requirements to treat the broken and mined ore from the Swastika Mine and existing dumps. At the present time it is not possible to determine the feasible size of

the mining operation but a 150 ton per day operation seems reasonable in light of other activity in the region.

C. Place the mine and mill into operation.

D. During production of the developed and broken ore we will continue programs of further development utilizing revenue generated from the initial mining operation. These include:

   a. Cross cut from the 400 foot level of the Swastika Mine to intersect the Copper Vein and other projected parallel vein structures. Explore and develop ore by drifting and/or long hole drilling.

   b. Drift north and south on the Swastika vein system to develop ore in new areas above the 400 foot level.

   c. Deep diamond drilling from the surface to intersect and test the numerous vein structures at depth and to develop drill indicated ore reserves.

   d. Plan and initiate an additional haulage decline to intersect and develop the Swastika workings at a level several hundred feet below the present bottom level (400 foot).

   e. Plan for the development of ore zones from the other vein systems both utilizing the Swastika workings and considering the possibility of shallow open pit methods.

3.3 Estimated Exploration and Development Costs

The following represents the writers best effort to cost

estimate the recommended program to evaluate and explore the Summit Silver property and to place it into production.

Phase I

A.	Personnel:	
	1. Manager - 2 months at $8,000.00	$ 16,000.00
	2. Senior Geologist - 3 months at $6,000.00	$ 18,000.00
	3. Two Assistants - 2 months at $3,000.00	$ 12,000.00
	4. Labor (estimated) 3,000 manhours at $8.00	$ 24,000.00
B.	Surveying and establishing surface grid	$ 5,000.00
C.	Drilling:	
	1. Underground: 1,000 foot long hole at $20.00	$ 20,000.00
	2. Surface: 1,000 foot reverse circulation at $10.00	$ 10,000.00
D.	Pumping lower levels of Swastika Mine - equipment, etc.	$ 8,000.00
E.	Construct living quarters, sample preparation building, storage shed, purchase sample preparation equipment	$ 10,000.00
F.	Assays: 1,000 at $10.00	$ 10,000.00
G.	Metallurgical Tests	$ 5,000.00
H.	Timber and Mine Supplies	$ 20,000.00
I.	Rental or purchase of mining equipment to re-establish access to workings	$ 20,000.00
J.	Fuel, miscellaneous supplies, freight and haulage	$ 12,000.00
K.	Drill access on surface - D-9: 50 hours at $100.00	$ 5,000.00
L.	Rental of geophysical equipment	$ 3,000.00
M.	Meals and Accommodations for professional staff on site	$ 5,000.00

N.	Vehicles: 2 x 5,000 miles each at $.40	$ 4,000.00
O.	Travel - Management	$ 3,000.00
P.	Reports, typing, drafting, telephone, related office expenses	$ 5,000.00
	Sub Total:	$ 215,000.00
	Contingency 15%:	$ 32,250.00
	TOTAL - PHASE I (US):	$ 247,250.00

Phase II

The cost estimate for this phase depends on the results of Phase I and the decision to go to production at the rate of 150 tons per day from the broken and developed ore in the Swastika Mine. This phase would be complete to a return on investment. How long, you idiot!

A.	150 tons per day flotation/cyanide mill B.S.!	$ 500,000.00
B.	Mining equipment and supplies, including rail, timbers, muckers, cars, hoists, all ancillary equipment, etc.	$ 350,000.00
C.	Office building, assay building, and supplies; shop, dry, all equipment and tools, etc.	$ 120,000.00
D.	On site living quarters, supplies, etc.	$ 50,000.00
E.	Surface Equipment:	
	1. Dump truck	$ 20,000.00
	2. 2 x personnel carriers (used)	$ 10,000.00
	3. Backhoe, front end loader (used)	$ 10,000.00
	4. D-6 tractor (used)	$ 20,000.00
F.	Labor - on/off site costs	$ 500,000.00
G.	Professional staff management wages	$ 80,000.00

H.	Mine office and general office equipment	$ 8,000.00
I.	General office supplies - off site	$ 8,000.00
J.	General office staff wages	$ 40,000.00
	Sub Total:	$1,716,000.00
	Overhead Contingency 10%:	$ 171,600.00
	TOTAL - PHASE II (US):	$1,887,600.00
	TOTAL PHASE I and PHASE II (US):	$2,134,850.00

At the end of Phase II, the mine would be ready for production and return on investment. Cash flow from this mining operation on the broken and developed ore in the Swastika Mine could be used for further mine development of new ore on the Swastika and related vein systems. Additional capital costs would be required for this operation.

pay B. at $1.50/oz net
will require ±650,000 oz

4. BIBLIOGRAPHY

1. Anderson, C. A. and Blacet, P. M. (1972): Precambrian Geology of the Northern Bradshaw Mountains, Yavapai County, Arizona; U.S.G.S. Bulletin 1336

2. Dodd, H. E. (1947): Report on the Swastika Mine located in the Peck Mining District, Yavapai County, Arizona (unpublished)

3. Giroux, F. W. (Undated-probably 1918-20): Report on the Swastika Silver and Copper Property, Pecks Siding, Yavapai County, Arizona (unpublished)

4. Tenney, J. P. and Stone, C. (1980): Studies in Western Arizona; Arizona Geological Society Digest, Volume XII

5. Lindgren, W. (1926): Ore Deposits of the Jerome and Bradshaw Mountains Quadrangles, Arizona; U.S.G.S. Bulletin 782

5. CERTIFICATE OF QUALIFICATION

I, Robert A. Jones, hereby certify that:

1. I am an independent consulting geologist and the President of the firms of Jones Geological Consultants, Ltd., and R. A. Jones and Associates, Inc., with residential and business addresses in Vancouver and Mississauga, Canada, and Reno, Nevada, U.S.A.

2. I am a graduate of the University of New Brunswick (B.Sc., 1957; M.Sc., 1960) and the University of Cincinnati (Ph.D., 1964).

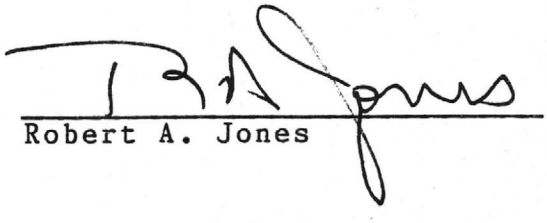
3. I am a Fellow of the Geological Association of Canada; a member of the Canadian Institute of Mining and Metallurgy; the Society of Economic Geologists; and the Society of Mining Engineers of the AIME.

4. I have practiced my profession since 1964 in the Southwestern United States; the South Pacific; Canada; Central America and South America.

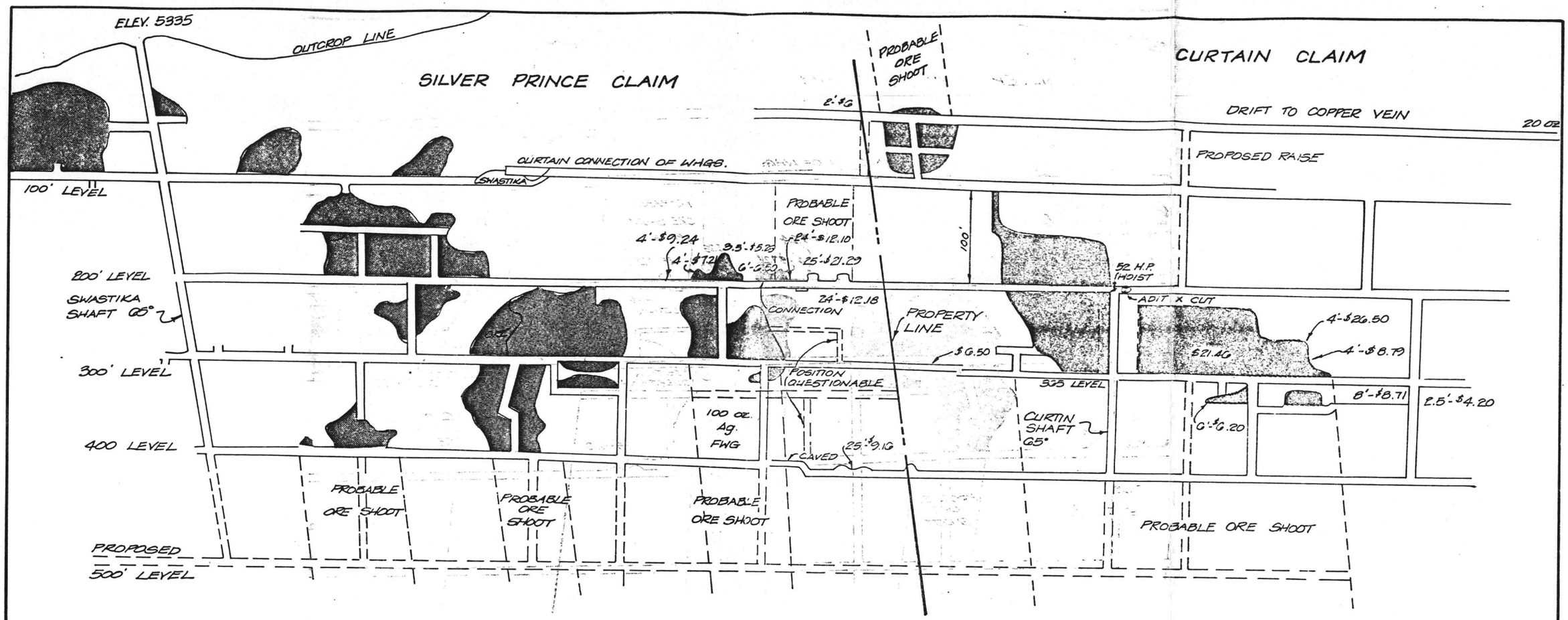
5. I personally examined the Summit Silver Property described in this report.

6. I hold no interest, direct or indirect, in the property described herein nor in the securities of Rainex Industries, Ltd, nor do I expect to receive such interest.

I hereby consent to the use of this report in a Prospectus or Statement of Material Facts or other such filings as may be required by the Office of the British Columbia Superintendent of Brokers; the Vancouver Stock Exchange, or other regulatory agencies.



Robert A. Jones



SCALE : 1" = 100'

NOTE : SHADED AREAS ARE STOPED

FIGURE 4

RAINEX INDUSTRIES, LTD.

CROSS-SECTION PRINCE VEIN

SUMMIT SILVER PROPERTY

PECK MINING DISTRICT
Yavapai County, Arizona
FEBRUARY 1986

DATA BY : SWASTIKA SILVER & COPPER COMPANY

DRAFTING BY : P. M. Elliott

STATE OF ARIZONA, County of _____ } ss.

I hereby certify that the within instrument was filed and recorded _____, 19____, at _____ M.

In Docket No. _____, Page _____

When recorded mail to: J. TAVORMINA [redacted]
426 S. ROBSON
MESA AZ 85202 RUSH

Fee No.:

INDEXED

MICROFILMED

RECORDER YAVAPAI COUNTY ARIZONA

Instrument # 34465
Recorded Official Records
of Yavapai County, Arizona
OCT 12 83 12 50 PM

at the request of John Tavormina
PATSY C. JENNEY, County Recorder
Deputy Andrea M Weeks

Fee: $ 5/P cw
1-2

NOTICE OF MINING CLAIM LOCATION

MC 207659

1. ☐ Location ☐ Amendment ☐ Relocation
2. ☒ Placer ☐ Lode ☐ Millsite ☐ Tunnelsite
3. The name and address of the Locator is

ANTHONY FAZZINI, JOHN TAVORMINA, CONRAD CLARK, PETER BELLONE
Name

426 S. ROBSON
Address

MESA AZ 85202
City State Zip

4. The name of the claim is METAL RECOVERY #1
5. The date of the location is 10-5-83
6. The claim is 2640 feet long and 1320 feet wide. The distance from the Location monument to each end of the claim is 1320 feet in a EAST direction and 2640 feet in a SOUTH direction.
7. The general course of the claim is from the NORTH to the SOUTH.
8. The location of the claim is in Section 7, Township 8 N, Range 4 W G&SRB&M, WEAVER Mining District, YAVAPAI County, Arizona.
9. If amending or relocating, the previous claim name was _____ recorded in Docket ___, Book ___, ___ Mining District, _____ County, Arizona.
10. The location of the claim with reference to a natural object or permanent monument is THIS CLAIM IS IN THE SOUTHWEST QUARTER OF SECTION 7 AND MEASURES 1320 FEET EAST OF THE SECTION LINE BETWEEN SECTION 12 AND SECTION 7 AND IS 2640 FEET LONG IN A SOUTHERLY DIRECTION FROM THE NORTHWEST CORNER OF THE SOUTHWEST QUARTER OF SECTION 7

BOOK 1576 PAGE 479

RECEIVED
AZ STATE OFFICE
PHOENIX, ARIZONA
OCT 19 10 29 AM '83

Date 10-12-83

John Tavormina
Signature

MAP OF MINING CLAIM LOCATION

1. The name of the claim is METAL RECOVERY #1

2. The NORTH EAST corner of the claim is 0 feet in a 0 direction to a survey monument or permanent natural object described as SURVEY PLUG MARKING LOT #1/4 SECTION 12/7

3. The type of location monument is _____

   The type of corner and end monuments are 2x4 WOOD POSTS

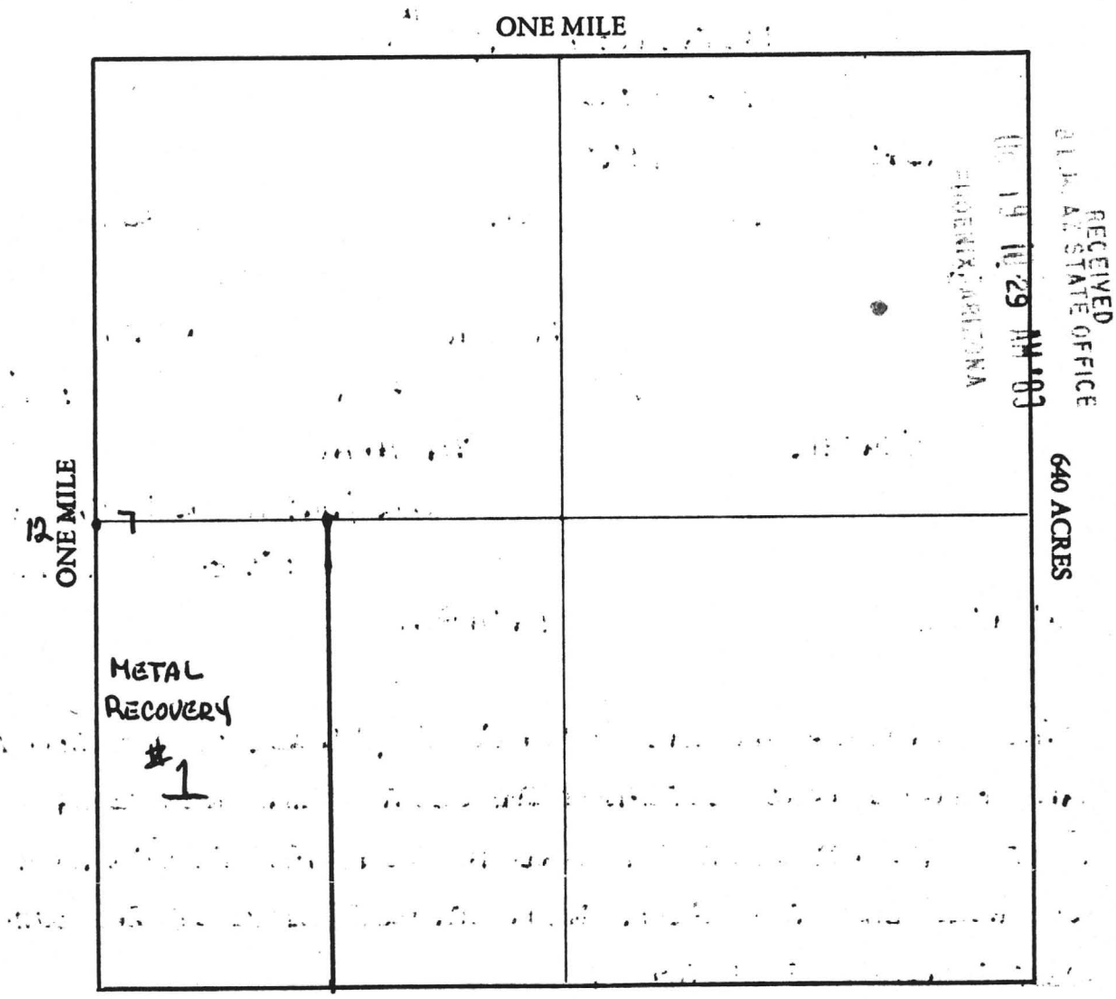
4. The bearing and distance between the corners of the claim are beginning at the NORTH EAST corner of the claim, 2640 feet in a SOUTH direction to the SOUTHEAST corner, then 1320 feet in a WEST direction to the SOUTHWEST corner, then 2640 feet in a NORTH direction to the NORTHWEST corner, then 1320 feet in a EAST direction to the point of beginning.

A MC 207659

MAP

One inch = One thousand feet

North Arrow



Section 7 Range 4 W Township 8 N, G&SRB&M

Date 10-12-83

BOOK 1576 PAGE 480

John Lawrence
Signature

3-19-85

RECEIVED MAR 2 1 1985

Dear Carole,

I am enclosing information I have obtained on the property held by Metal Recovery Mining association. The property is in T8N R4W sec. 7. They also hold property in T8N R4W sec. 6 and T9N R4W sec. 31.

No geologic work, either mapping or sampling on a large scale, or drilling has been done. They have been running material from one area and the size of the material is very fine to very coarse. Nice nuggets are found in each run.

Assay reports range from $.50 to $34.00 a yard. Some test I ran

myself and recovery from their work would lead me to believe with conventional placer machinery $2.00 to $6.00 a yard would be expected. Under conditions where the fine gold would be collected a much higher recovery would be seen.

I know I am sending you very little information but they fail to release assay results taken by others would be inappropriate. I do feel that this is some of the better placer I have seen on the Hassayampa River and if you have a geologist in the area he or she might take a look at it.

Hope to get by to meet you someday.

Sincerely,

Jon B. Lamb
P.O. Box 20411
Wickenburg Az 85358
Ans. service. 684-5468

The property is held by
Tony Fazzini
602-684-5350
Wickenburg

Gibson & Greenbee property assays by. Miller Esp Smelter Mill.

		Cu %	Silver oz/Ton	Gold oz/Ton
Gibson	G.B. #2 (sludge)	44.64	4.08	.880
Gibson	GB #3	18.92	.65	.625
N-Franks prop	BFW #1	15.00	2.20	.416
Greenbee pr	GR #1	27.08	4.40	.257
Greenbee	GR #4	.70	43.51	3.686
Gibson	GIB #1 (sulfide)	42.39	3.59	.286

Left out Greenbee 2 & 3 samples

IP & RESISTIVITY SURVEY
LYDIA PROSPECT
GILA COUNTY, ARIZONA

FOR

G. WEATHERS ON BEHALF OF N. GREENLEE

INTRODUCTION:

During the period of August 1 through 3, 1972 an induced polarization and resistivity survey was performed on the titled property. The field survey was under the direction of Michael G. Sayovitz, Engineer for Mining Geophysical Surveys.

Three profiles at intervals of about 1000' cross an area that contains numerous narrow vein-like sulfide deposits. The purpose of this survey was to ascertain the existance of a substantially larger sulfide occurrence that may represent the immediate source of the small vein-like deposits. The electrode array and spacings used give effective penetration to about 1000' in depth.

A moderate increase in response at a depth of 700 - 800' on line 2 may represent the upper fringe of a large response zone. Further studies would be required to determine the extent of this moderate response. Elsewhere in the area surveyed no anomalous IP response is indicated that would suggest the occurrence of a substantially large sulfide deposit.

mining

low resistivity dike is a near-surface feature and likely can be identified by surface geology.

SUMMARY:

A broad zone of high background response of 15 ms strikes NE-SW parallel to the schistosity through the area of study. The zone is narrower and near-surface to the northeast and appears to plunge to depth towards the southwest. At a depth of 700 - 800' on Line 2 the IP response increases to 25 ms and could represent 1% by volume disseminated sulfide mineralization. This area should be considered for further study.

A relatively narrow dike-like low resistivity feature occurs on all three lines, but because of apparent offset is not considered one continuous zone. The low resistivity material occurs near-surface and likely can be identified by surface geologic mapping. One suspects a fracture zone or local alteration of the schist to be the cause. There is no evidence that sulfide mineralization is associated with the low resistivity feature.

In reviewing the geophysical results one should keep in mind some qualifying thoughts (see also Application of Induced Polarization Method--Page 2): The induced polarization technique is a volume measuring method and therefore for a given electrode spacing will only detect those bodies whose volume distribution is compatable with that electrode spacing used.

This characteristic is very much in evidence on the Lydia prospect where high-grade sulfide mineralization occurs in fractures or faults as narrow vein-like deposits. These mineralized veins were not detected by the survey because they are extremely small in volume with respect to the electrode spacing used. The survey was of course designed to detect the occurrence of larger sulfide bodies that might prove economical and to that end the moderate response on Line 2 at the SW corner of the property could represent the beginning of a potentially large IP anomally. The occurrence or lack of IP response should be considered by a geologist in an evaluation of the property.

Respectfully submitted,

Michael G. Sayovitz
Engineer

W. Gordon Wieduwilt
Geophysicist

August 15, 1972
Tucson, Arizona

REPORT OF INVESTIGATION

ON

GREENLEE PROPERTY

GILA COUNTY, ARIZONA

for

TIFFANY OIL & GAS CORP.
800 - 509 Richards Street
Vancouver, B.C.
V6B 2Z6

E.D. CRUZ, P.Eng.
Consulting Geological Engineer

March 25, 1983

TABLE OF CONTENTS

ILLUSTRATIONS

SUMMARY

This report covers the geological work performed by the writer on the portion of Lydia claims, generally termed "Greenlee Property", several miles south of Miami or Globe in Southern Arizona. Included is a brief description and analysis of previous work data on the property available to the writer.

The significant gold-silver values were obtained from the preliminary check samples under the current investigaton:

Gold	0.5 - 2.2 ounces per ton
Silver	12.92 - 25.58 ounces per ton

The channel sample ranged 1-2' in true width.

The above sample results together with the extensive manganiferous and hemato-limonitic oxides along the sheared and the silicified zones in the pre-Cambrian metamorphics warrant additional exploration to detail and amplify the known extent of mineralization. The program will also be targetted to disclose the hidden vein systems, specifically the 1972 IP anomaly on Lydia No. 3 and No. 4 claims.

A progressive three stage exploration program is recommended. The second and the final stage program should only be initiated upon the favourable results of the first one.

Stage 1	US$	18,000
Stage 2	US$	48,000
Stage 3	US$	66,000
Total	US$	132,000

INTRODUCTION

At the request of Tiffany Oil & Gas Corp., the writer examined the Greenlee property. A total of 9 channel samples were obtained for the preparation of this report within the context of preliminary property evaluation. The period of February 21-22, 1983 was spent on the property.

The data presented in this report is based on the writer's actual field work in addition to published U.S.G.S. data and private reports listed in the Appendix. Any legal aspects of the property are beyond the scope of this report.

OBSERVATIONS AND CONCLUSIONS

1. The Greenlee property near Globe, Arizona, presents the mineralized vein structures with sporadic quartz veining along the sheared and silicified zones, hosted by the pre-Cambrian rocks. The oxidized zones in the surface are fairly extensive at several locations. These zones are visibly composed of limonite, hematite and manganiferous oxides. Malachite, azurite, chryscolla and abundant pyrite are also noted in the dumps and underground workings.

2. Gold and silver bearing minerals occur significantly in the veins at or near the surface on the Lydia No. 10 and No. 13 claims, as evidenced by two samples from the current investigation; 0.52-2.2 ounces/ton in gold and 12.92-25.58 ounces/ton in silver over 1'-2' in cut width.

3. A 1972 IP and resistivity survey by Mining Geophysical Survey, Tucson, Arizona, shows a significant anomaly at a depth of 700-800' on Line 2, which encompasses Lydia No. 3 and No. 4 claims. W. Gordon Wieduwilt, geophysicist on the project, notes that the anomaly on Line 2 "could present 1% by volume disseminated sulphide mineralization".

   In contrast to the negligible IP response on Line 2 in the Lydia No. 13, from which the significant samples up to 2.2 ounces/ton in gold were obtained as described earlier, the moderate IP response on the claims in question may indicate the occurrence of the unknown larger sulphide bodies.

4. A 1970 geochemical survey by G. Weathers, Consulting Geologist, Phoenix, Arizona, resulted in several copper anomalies, which would be in general coincident with the exposed manganiferous and limono-hematitic oxide zones described above.

5. Two short diamond drill holes were put down in the vicinity of Prospector's Cabin on Lydia No. 10 claim by Weymark Engineering Ltd., Vancouver, B.C., in 1968. The assay results from this work were not satisfactory; trace - 0.005 ounces/ton in gold, 0.1-0.6 ounces/ton in silver and negligible percentage value in copper.

6. Past development has been confined to several prospect pits, short adits and shallow shafts, which were concentrated on the northwestern corner of the Greenlee property. Small size dumps on the Lydia No. 13 and No. 10 claims attest the limited past production from the underground mines. The current samples of significant gold-silver value are available at the surface or at the roof of short adit, about 50; in length on the Lydia No. 13 claim.

7. To the writer's knowledge, about 70% of the property area has never been systematically soil sampled, geophysically surveyed and geologized.

8. In view of the foregoing findings, the property offers an exploration potential. the program should be targetted to:

   a) amplify the extent of the known sulphide zones with 0.5-2.2 ounces/ton gold and 12.92-25.58 ounces/ton silver on the Lydia No. 13 claim,

   b) detail the 1972 IP anomaly on Line 2 encompassing the Lydia No. 3 and No. 4 claims, followed by trenching to reveal the conductors for economic viability, and

   c) geologize and survey geophysically and geochemically the entire claim area, to seek hidden vein systems.

PROPERTY

The property consists of 16 contiguous unpatented lode mining claims, Lydia 1 through 15 and Jessica 10. Ekach claim covers an area of 600' x 1,500'. The property is reportedly held by Mrs. Natasha Greenlee, 4148 North 33rd Street, Phoenix, Arizona. Presently, Lester Cox of Miami, Arizona, has a lease, with option to buy the property.

The mineral claims are located in Sections 4, 3, 34 and 35, Townships 1 and 2S, Range 14E, Pinal Mountain Mining District, Gila County, Arizona.

At the current investigation, discovery posts for Jessica No. 1, Lydia No. 10 and No. 13 were verified.

LOCATION AND ACCESSIBILITY

The Greenlee prospect lies approximately 80 road miles east of Phoenix, Arizona. The property is reached by travelling west of Miami or Globe, Arizona, on U.S. Highway 60-70 for approximately four miles to a crossroads immediately opposite the well marked road sign, "Castle Dome". Turn south onto the Gibson mine road and proceed for 2.5 miles, thence left on the Lyon-Bear fork road for 1.3 miles, thence right on the Lyon fork road for 1.9 miles, thence left on the Lydia mine road for 3 miles to the east end of the property, exhibited by a discovery post for Jessica No. 10 claim on the dirt road. A four wheel drive vehicle is recommended for this travel.

PHYSIOGRAPHY

The property is situated on the southwest slope of the Pinal Mountains. Topographic feature is moderately gentle over the claim area. Relief on the property ranges from 4,000' to 4,500'. Bedrock exposures are generally poor. The greater part of the south of the property is principally covered by grasses and mescal without natural rock exposures, whereas the northern part is characterized by scrub oak brush, cacti, cat claw and thickets of mountain laurel with sparse natural rock outcrops. A low flowing creek traverses the Lydia No. 10 and 13 claims and can be conveniently used for diamond drilling and other mine development purposes.

GEOLOGY AND MINERALIZATION

The property is embraced in the large body of the pre-Cambrian rocks that predominate the regional surface geology in the area surrounding Superior, Miami and Globe, Arizona. The pre-Cambrian rocks in the property have been grouped into three mappable units by the previous workers; Pinal schist, Madera diorite and a biotite granite. A lenticular dyke of diabasic rock occurs reportedly in the diorite along a vein structure on the Lydia No. 11 claim.

The Pinal schist occupies the bulk of the property area on the south, in which the majority of the known mineralization occurs in the sheared or faulted structures, paralleling in general to the strike and dip of the schistosity. The prevailing strike of its schistosity is N30-60E and dips 58o-90o to NW. A moderate chloritization in the granitic rock was noted.

The oxidized zone occurs predominantly in the Pinal schist and is composed of limonite, hemotite, imanganiferous oxides and sparsely stained malachite and azurite coatings. Pyrite, chalcopyrite, galena, sphalerite, bornite and chryscolla in limited amount are noted in the mine dumps and the underground workings. Silver and gold occur in the mineralized structures, as evidenced by the assays of the current and the previous sampling results.

RECOMMENDATION

A three-stage program is recommended.

Stage 1

1-1 Exploration on the Lydia No. 13 and 10 claims.

The known mineralization of significant gold-silver value in the adit and the road cut should be stripped further along the strike to the northeast and southwest, and then systematically sampled.

1-2 Detailing the 1972 IP anomaly on Line 2 resulted by Mining Geophysical Survey on the Lydia No. 3 and No. 4 claims.

The zone of increasing IP response should be carefully examined, stripped and then sampled if possible.

1-3 Geologic mapping of the entire claim map area.

All the known showings, physical works, claim posts and geologic exposures should be mapped, plotted in surveys and presented in topographic plan map with reasonable contour intervals.

Stage 2

Diamond drilling of the mineral occurrence on the Lydia No. 13, succeeded by the stage 1-1 work as noted above. Approximately 1,000' of drilling may be necessary.

Stage 3

Subject to the encouraging results from the stage 1-2 on Lydia No. 3 and No. 4 claims, drilling should be implemented to determine the economic viability for further development.

ESTIMATED COSTS

Stage 1

Trenching bulldozer - 50 working hours @ $100/hour		US$ 5,000
Assays - 100 samples @ $20/sample		2,000
Geological mapping and supervision including documentation - 15 days @ $300/day		4,500
Transportation rental plus gasoline - 20 days @ $50/day		1,000
Travel and Accommodation including air fare (Engineer)		2,000
Supplies		500
Contingencies @ 20%		3,000
	Sub-total	US$18,000

Stage 2

Diamond drilling on Lydia No. 13 claim, B.Q. core 1,000' @ $30/ft. including accommodation		US$30,000
Core logging, supervision including documentation		5,000
	Total	US$132,000

APPENDIX I

CERTIFICATE

I, Ernesto D. Cruz, DO HEREBY CERTIFY AS FOLLOWS:

1. That I am a consulting mining engineer-geologist and reside at 7734 Garrett Drive, Delta, B.C.

2. That I am a graduate mining engineer of Mapua Institute of Technology, Philippines (BSEM), Missouri School of Mines and University of Washington (MSEM).

3. That I have been engaged in mineral exploration for the past twenty-two years (6 years in the Philippines, 16 years in North America).

4. That I am registered with the Association of Professional Engineers of British Columbia.

5. That I have no interest directly or indirectly in the "GREENLEE" Mineral Property or the securities of Tiffany Oil & Gas Corp.

E.D. CRUZ, P.Eng.

APPENDIX II

REFERENCES

W. Gordon Wilduwilt (1972), Tucson, Arizona - IP & Resistivity Survey Lydia Prospect, Gila County, Arizona - private report.

G.W. Weathers (1970), Phoenix, Arizona - Results of a Geochemical Survey over a portion of the Lydia Copper property.

Weymark Engineering Ltd. (1968), Vancouver, B.C. - Greenly Mining Property Diamond Drilling.

U.S.G.S. Map (1970) - Pinal Mountains.

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

SAM POWELL PEAK QUADRANGLE
ARIZONA—YAVAPAI CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

3452 III NE (CONGRESS)

3452 II NW (YARNELL)

3452 II NE (WAGONER)

3451 III SE (FLORES)

3452 II SE (MORGAN BUTTE)

3451 IV (VULTURE MTS.)

3451 I NE (RED PICACHO)

3451 I NW (WICKENBURG)

112°45′ 34°07′30″ 112°37′30″ 34°00′

339 000m.E. 340 341 342 343 344 345 346 347 348 349 000m.E.

42′30″ 40′ 280 000 FEET

3777 000m.N. 3776 3775 3774 3773 3772 3771 3770 3769 3768 3767 3766 3765 3764 000m.N.

5′ 2′30″

1 130 000 FEET

1 100 000 FEET

250 000 FEET

T. 9 N.
T. 8 N.

R. 5 W. R. 4 W.

YARNELL 9 MI.

WICKENBURG 2.5 MI.

WICKENBURG 4 MI.

4 MI. TO U.S. 93

Antelope Creek
Weaver Creek
Hassayampa River
Blue Wash
Box Canyon
Fools Canyon
King Solomon Gulch
Sand Hills
Black Hills
Mistake Box Canyon
Hassayampa River
Blue Wash
Calamity Wash
Tank Wash
Sam Powell Peak
The Needle
Wickenburg Mts
Constellation Road
Rincon Road
Sayer Spring 1 Mi.

Mines
Mistake Mine
Gaging Station
Oro Grande Mine
Gravel Pit
Prospect
Tailings
Well
USMM 1886

JEEP TRAIL
PACK TRAIL

Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1968. Field checked 1969

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Fine red dashed lines indicate selected fence lines

GN MN
0°57′ 17 MILS
14½° 258 MILS
UTM GRID AND 1969 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000
1 0 1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
DOTTED LINES REPRESENT 20-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ROAD CLASSIFICATION
Light-duty road, all weather, improved surface
Unimproved road, fair or dry weather

ARIZONA
QUADRANGLE LOCATION

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1979

SAM POWELL PEAK, ARIZ.
N3400—W11237.5/7.5

1969

AMS 3452 II SW—SERIES V898