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

The following file is part of the

Arizona Department of Mines and Mineral Resources Mining Collection

ACCESS STATEMENT

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

CONSTRAINTS STATEMENT

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

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

QUALITY STATEMENT

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

LEAD-SILVER DEPOSITS ON THE ELLSWORTH PROPERTY

ASH SPRING DISTRICT, COCHISE COUNTY, ARIZONA

A Preliminary Report

by

John N. Faick, Ph.D.
Registered Geologist

2238 East Grant Road
Tucson, Arizona 85719

November 5, 1968

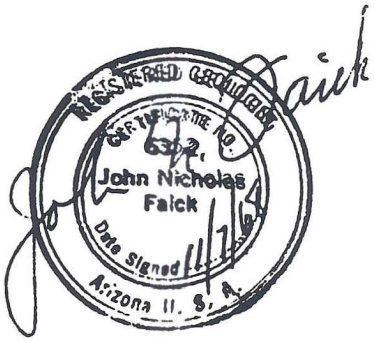


TABLE OF CONTENTS

TABLES

ILLUSTRATIONS

LEAD-SILVER DEPOSITS ON THE ELLSWORTH PROPERTY ASH SPRING DISTRICT, COCHISE COUNTY, ARIZONA

A Preliminary Report
by
John N. Faick, Ph.D.
Registered Geologist

INTRODUCTION

Located a few miles east of Douglas, Cochise County, Arizona, is a three-square-mile area in which small, sporadic, rich, lead-silver deposits have been prospected from time to time during the last 12 or 15 years by Earle and Leona Ellsworth of Douglas, Arizona. I visited this area October 10, and again on October 25, 26 and 27, 1968. As a result of these visits to the area I am convinced that the lead and silver deposits are sufficiently abundant to present an attractive exploration target for companies interested in possible future production of lead and silver ore. Many of the small deposits are closely spaced and the intervening zones seem to be sufficiently well mineralized so that some parts of the area should be considered as large, low-grade, disseminated lead deposits. In two or three places these lead-rich zones may be suitable for open pit mining on a moderate scale. The deposits should be explored and evaluated to determine whether mining of the deposits is economically feasible.

LOCATION, ACCESSIBILITY, TOPOGRAPHY, POWER AND WATER

The area where the lead-silver deposits have been found lies in sections 15, 16, and 17 in T. 24 S., R. 29 E., from about seven to ten miles east of Douglas, Arizona. The south side of these three sections adjoins the Mexican border and a Cochise County road passes approximately along the north side of the mineralized area. This road, which is an extension of East 15th Street in Douglas, provides easy access to the property.

The area in which the deposits are found is generally referred to as the Ash Spring district but is sometimes referred to as the Douglas district. As shown on figure 1 it is an area of low mountains with moderate topography; having a maximum difference of elevation of about 750 feet. Most of the property is readily accessible over several jeep trails.

Douglas, with a population of about 12,000, is the site of a Phelps-Dodge smelter which treats the copper ores from the Bisbee Mines. It is also an important railroad shipping point and the heart of a thriving farming and ranching area. It would be the principal source of labor and supplies for any work done in the Ash Spring district.

The nearest source of power is at Douglas. A small dependable supply of water is said to be available in a mine shaft on section 15 but large supplies probably would have to be obtained from the San Bernardino Valley toward the east or the Douglas area west of the lead-silver deposits.

OWNERSHIP OF THE PROPERTY

The lead-silver deposits occur on both Federal and State land and the mineral rights are controlled by Earle and Leona Ellsworth who at one time operated a cattle ranch in the area and who have prospected it for several years. The Ellsworths have unpatented lode claims on the Public Domain and mineral leases on claims on the Arizona State land. Some of the Ellsworth claims are shown on figure 2; others have not been mapped. Ellsworth's title to the land and the mineral resources seems to be in good shape; however, it is still under investigation.

HISTORY

A brief history of early exploration in the Ash Spring district is recorded by the Copper Handbook for the years 1909, 1910-1911, and 1918. It was reported that extensive lands were being explored for copper in 1907, and in 1908 the Grand Arizona Copper Company was incorporated to develop the land. At that time the company reportedly had 36 unpatented claims covering an area of about 700 acres near the foot of Nigger Head Butte. The property was developed by about 1000 feet of workings which included three shafts respectively 40, 70 and 325 feet deep; and a 42-foot and 65-foot crosscut tunnel and a 115-foot drift tunnel. Apparently these workings are on section 15, where a General Land Office survey plat (dated 1914) shows a mine shaft designated as Arizona Copper Company. In 1908 the property was fully equipped with a 72-HP steam power plant, hoists, machinery and seven buildings but the entire property was sold for debt in 1912.

By 1908 the mine had explored a contact deposit (Copper Handbook, Vol. X, p. 878) averaging about eight feet wide between limestone and porphory. This was a sulfide ore deposit containing a small percentage of copper and zinc and up to 46 percent lead and 28 ounces of silver per ton with small values in gold. The ore is said to have contained some chalcopyrite and bornite. Some pyrite was found on the waste dump in October 1968.

It is rumored locally that the mine had produced about $75,000 worth of silver just before operation ceased and that the reason for closing the mine was that an excessive flow of water was encountered by the workings. The shaft was used as a source of water for Ellsworth's cattle for several years.

There are several other shafts and prospect pits on the property but the history of them is unknown. Some of them, including the old underground workings of the Grand Arizona Copper Company, are situated near the eastern margin and possibly outside of the lead-bearing zone which I think has the best possibility of becoming productive.

In 1957 the Mineral Reserve Co., reported to be a Nevada Corporation, became interested in the property and made an intensive investigation of it. Apparently this company sampled the lead deposit extensively and made a mill test on about 10 tons of ore taken from

seven deposits on three or four different claims. Most of the records of this investigation have been lost. The Mineral Reserve Company is reported to have discontinued its work on the Ellsworth property in order to concentrate all of its efforts on a gold mine in Mexico.

PRODUCTION

It is rumored that the Grand Arizona Copper Company produced silver ore worth about $75,000 in the early 1900's. In June 1957 the Minerals Reserve Company produced about 10 tons of lead ore for a mill test in Douglas but the records are incomplete. Shipments of ore for the mill test are shown below.

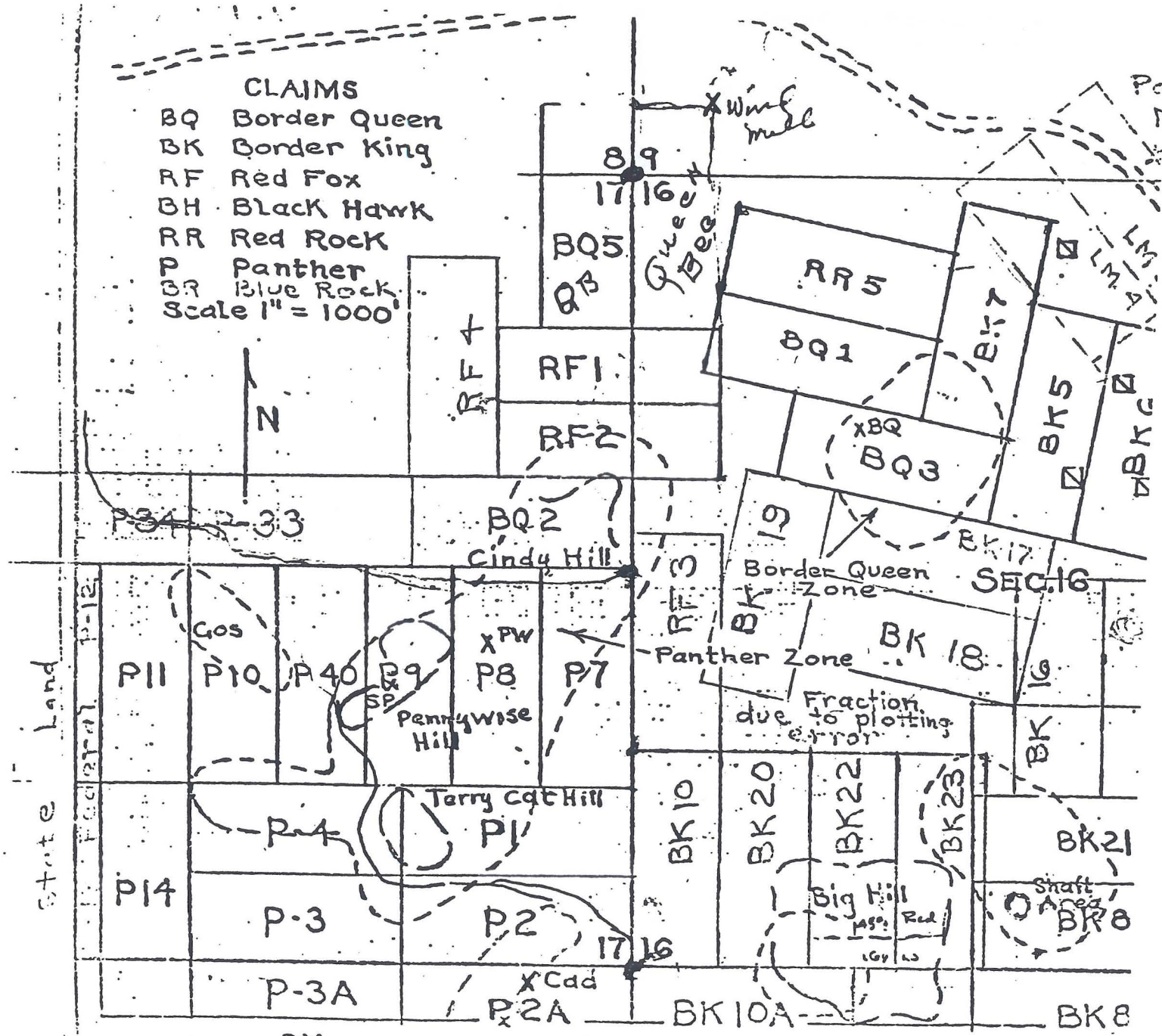
Source by claims	Date of shipment	Weight in pounds
Panther 3	6-14-57	3,065
Unidentified	6-19-57	3,500
Unidentified	6-19-57	3,250
Border King 8	6-20-57	2,890
Border King 8	6-20-57	2,775
Border King 8	6-20-57	2,950
Border King 8	6-25-57	2,145
	Total	20,575

Ore from the unidentified sources was obtained from the Penny 8(?), Penny 9(?), or Border King 8 claims but the exact source is no longer known. All of this ore was mixed, sampled and assayed but the assay record is not available. The ore was valued at $110 per ton and was paid for at this rate by Winter and Wolf of New York.

GENERAL GEOLOGY

The Ash Spring district, as shown by a reconnaissance geological map by Cooper (1960), is underlain by stratified rocks of the Bisbee group of Cretaceous age and by intrusive igneous rocks which may be as young as Tertiary. The stratified rocks in the area are dominantly thin-bedded limestone with which are associated some shale and relatively thin discontinuous beds of quartzite. The thickness of these strata in the Ash Spring district is not known but elsewhere in southeastern Arizona the formation attains a thickness of at least 4000 feet. These strata, on the Ellsworth property, generally have a north-northwesterly strike and a southwesterly dip but locally they are considerably deformed by faults and folds.

The igneous intrusive rocks are relatively fine-grained porphyritic sills, dikes and small stock-like masses of andesite and monzonite. These formed irregular masses that intruded into the Bisbee formation with sharp contacts but with little or no alteration along the contacts. Small bodies of these intrusives are widely scattered throughout the area but the principal bodies were shown in the reconnaissance map of Cooper, from which the attached geologic map, figure 3, was compiled.



BY
JOHN N. FAICK, Ph.D
MINING GEOLOGIST
NOV. 5, 1968

FIG. 2

CLAIM MAP OF SOME OF ELLSWORTH (
Subject to revision

ALTERATION AND MINERALIZATION

Alteration of both the igneous and sedimentary rock was relatively mild. Some of the igneous rocks are essentially unaltered but some zones show the effects of alteration to clay and locally to sericite. The weathered outcrops are brownish or reddish, thus suggesting the presence of iron pyrite in the intrusive masses.

Locally the limestones have been slightly bleached and recrystallized but for the most part they seem to be unaltered. Most of the fine-grained clastic beds or shales have been indurated to form a flint-like mass or "hornstone" which was probably metamorphosed by heat from the igneous intrusions rather than by the process of mineralization.

The ore minerals seem to be confined entirely to the limestone strata although the distribution is not well known. Most of the ore seems to occur in widely scattered elongate lenses and pods that occur in faulted and folded limestone strata. Some of the deposits are vein-like and appear to be concentrated along minor fractures and faults, other deposits are localized on bedding planes in the limestone strata. Some deposits are in the limestone near the igneous intrusions but no lead ore has been found in the intrusive bodies. Some nuggets of galena (lead sulfide) have been found in a couple of shallow gulches where galena concentrated after weathering of the outcrops.

In a two-page private report, prepared July 28, 1960 by Dr. Spencer R. Titley, Professor of Geology, University of Arizona, he reported the wide-spread distribution of the lead on the Ellsworth property and noted that it seemed to be most abundant in close proximity to the igneous intrusions. Mr. Ellsworth advised me that Dr. Titley examined the SW$\frac{1}{4}$ of section 15 and the S$\frac{1}{2}$ of section 16, but he apparently did not see the numerous exposures of lead ore in the north central part of section 16 where lead seems to be most abundant. A copy of Dr. Titley's report is attached herewith as Appendix "A".

An important reason why we know so little about the distribution and relative abundance of the lead-silver ore is because the weathered outcrops of the ore look very similar to the weathered limestone host rock and it is difficult to recognize the ore. The best method to detect it is by a simple geochemical test.

The ore minerals are galena (lead sulfide) and cerusite (lead carbonate). Here and there are small spectacular occurrences of copper sulfides and carbonates but copper seems to be so scarce that it probably would not have any commercial value. The only metals sufficiently abundant to be valuable are lead and silver which are always in close association as shown by assays of the ore. It is reported that one large nugget of native silver was found on the property in recent years. The ore contains only traces of gold and less than one percent zinc.

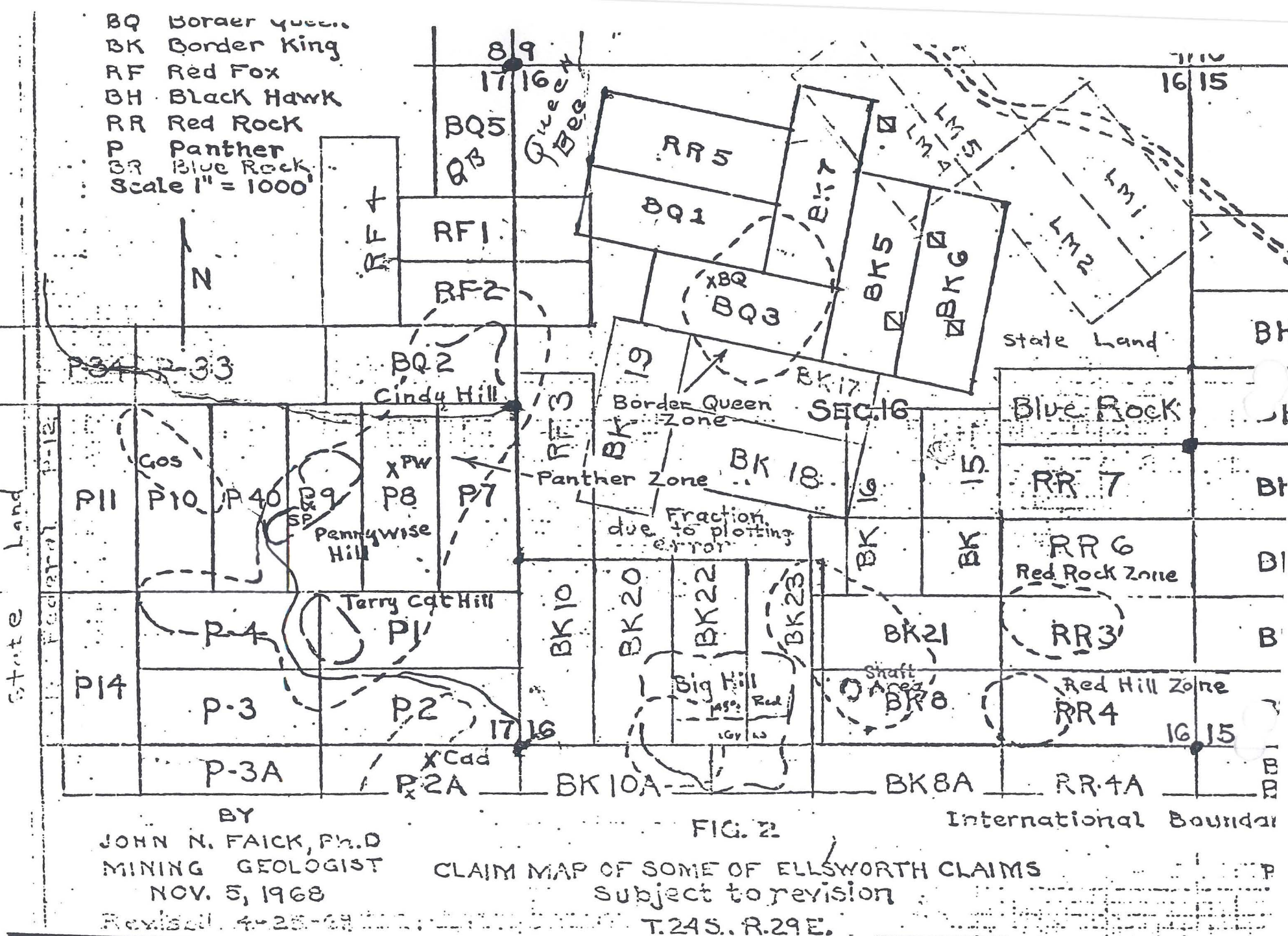


FIG. 2

CLAIM MAP OF SOME OF ELLSWORTH CLAIMS
Subject to revision
T. 24 S., R. 29 E.

BY
JOHN N. FAICK, Ph.D
MINING GEOLOGIST
NOV. 5, 1968
Revised 4-25-69

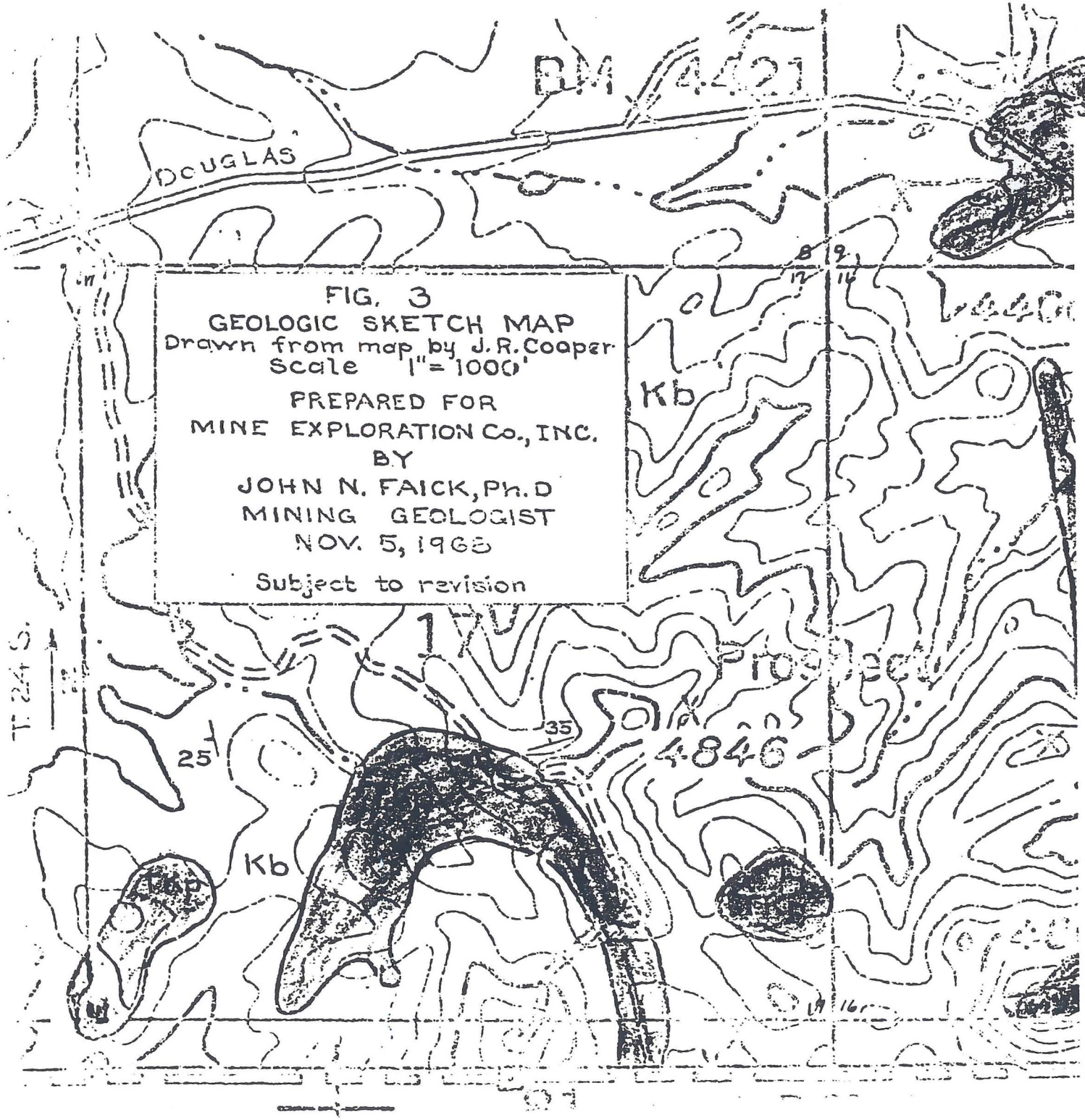


FIG. 3
GEOLOGIC SKETCH MAP
Drawn from map by J. R. Cooper
Scale 1" = 1000'

PREPARED FOR
MINE EXPLORATION Co., INC.
BY
JOHN N. FAICK, Ph. D
MINING GEOLOGIST
NOV. 5, 1968

Subject to revision

The ore minerals are associated with relatively abundant barite, quartz and minor amounts of calcite. Limonite associated with some of the ore suggests the former presence of siderite, an iron carbonate. There is a slight possibility that barite might be sufficiently abundant in this deposit to be recovered as a by-product from the production of lead.

SAMPLES AND GRADE OF ORE

Many assays of samples of the ore from the Ellsworth property have been made but assays of only 47 samples are available. Table I gives a list of the available assays with the sample locality given by claim: they cannot be located precisely without an accurate survey. Obviously the samples represent choice, select ore material found during prospecting activities and do not represent the grade of ore that might be mined from the deposit.

The arithmetic average of the 42 silver assays and 38 lead assays shown on Table I is 5.30 ounces of silver per ton of ore and 15.0 percent lead. The indicated average metal ratio is one ounce of silver for each 2.83 percent of lead but the range is from 1.8 to 9.0 percent lead for each ounce of silver. An interesting variation of the metal ratio is indicated by comparison of average assays of samples from different localities as shown by Table II.

Table II Average grade of samples and metal ratios showing percent lead for each ounce of silver.

Locality by claim	No. of assays averaged	Oz. Silver per ton	Percent Lead	Ratio Oz.Ag/T : Percent lead
Panther 7	3	4.62	8.1	1 : 1.8
Panther 8	4	15.55	32.8	1 : 2.1
Border Queen 3	2	3.80	8.0	1 : 2.1
Red Rock 4A	1	0.60	1.5	1 : 2.5
Border Queen 1	3	7.02	20.2	1 : 2.9
Panther 9	3	8.37	27.3	1 : 3.3
Border Queen 2	3	4.84	16.7	1 : 3.5
Border King 21	3	3.03	11.9	1 : 3.9
Panther 1	2	3.20	18.5	1 : 5.8
Border King 5	4	2.43	25.3	1 : 6.2
Border King 6	1	0.80	5.6	1 : 7.0
Panther 4	2	1.20	10.8	1 : 9.0

The above metal ratios suggest a zonal relationship of lead and silver with a central zone having a relatively high proportion of silver which is surrounded by a zone having a relatively high proportion of lead.

TABLE I - Assays of Samples from Ellsworth Property, Ash Spring District, Arizona

Assay date	Assay Office	Collected by	Silver Oz./T	Copper Percent	Lead Percent	Description and Location
8/24/55	Phelps-Dodge	Collett	0.10			Hand Sample, Red Rock 3.
12/30/55	Hawley	Ellsworth	0.30	2.07		Near monument, on Saddle, Panther 8
11/ 2/56	Hawley	"	9.40	0.44	26.3	Panther 9; near Jeep park.
"	Hawley	"	2.50	0.26	9.7	Border King 5; on hill above prospect.
"	"	"		3.4		Border King 6; near old silver mine.
1/17/57	"	"	6.70		23.9	Panther 9.
2/15/57	"	"	Tr.		0.4	Unidentified.
3/21/57	"		9.10			Border Queen 2; in arroyo.
6/24/57	"	"	1.50		20.9	Border King 5.
6/26/57	"	"	1.40		9.4	Panther 4.
6/26/57	"	Minerals Reserve	3.70		10.7	Panther 1.
"	"	" "	0.90	0.28	7.3	Panther 7.
7/ 3/57	"	" "	3.20		10.9	Panther 7. Float sample collected over large area by McFaren.
9/20/57	Nevada Mineral Lab.	Ellsworth	1.00		12.3	Panther 4.
10/10/57	Hawley	"	4.60		21.1	Border Queen 1.
11/ 5/57	"	"	1.60		7.0	Border King 5.
11/15/57	"	"	11.00		39.9	Border Queen 2.
1/10/58	"	"	4.90		27.3	Panther 8.
3/ 5/58	"	"	9.00		31.9	Panther 9.
3/24/58	"	"	5.50		29.8	Panther 8. Small old prospect below big cut. In "blue vein."
8/19/58	"	"	2.70		26.3	Panther 1. In barite. E. side Terri Kat hill, halfway down slope.
11/26/58	"	"	39.60		55.6	Panther 8. On NW side of hill.
11/12/59	"	"	31.80 Silver			Panther 8.

Assay date	Assay Office	Collected by	Silver Oz./T	Copper Percent	Lead Percent	Description and Location
1/ 5/61	Hawley	Ellsworth	6.16		12.5	Border Queen 1. Out of arroyo.
7/ 4/61	Rochin	Ellsworth	8.40		17.5	Border King 1-3. On saddle.
8/19/61	"	"	10.30		26.9	Border Queen 1.
8/ 3/62	"	"	2.90			Panther 1.
6/11/64	"	"	0.60		1.5	Red Rock 4A.
6/11/64	"	"	3.00		3.8	Border Queen 2.
"	"	"	3.20		7.6	Red Rock 5.
"	"	"	12.80		3.0	Panther 31.
"	"	"	2.20		12.3	Border King 21.
"	"	"	5.30		5.6	Border King 23.
"	"	"	4.00		6.9	Border Queen 3.
"	"	"	12.20		18.6	Panther 8.
"	"	"	0.40		3.0	Border Queen 5.
"	"	"	1.00		6.3	Panther 40.
2/ 9/65	"	"	0.80	0.08	5.6	Border King 6.
"	"	"	9.80	0.71	7.5	Red Fox 1.
7/28/65	"	"	1.60		17.7	Border King 21.
5/17/65	"	"	3.60		9.1	Border Queen 3.
8/12/66	"	"	1.04			Border Queen 3.
"	"	"	4.12		23.5	Border King 5.
"	"	"	0.52		6.3	Border Queen 2.
9/26/63	"	"	9.76		6.2	Panther 7.

Average of 42 assays 5.30 oz.Ag.

Average of 38 assays 15.0% Pb.

This apparent zoning, as shown on figure 4, may have considerable economic significance in the future but at present it is of uncertain validity because it is based on insufficient data.

POSSIBLE METHODS OF TREATING ORE

Mineralogy of the ore is very simple and it seems probable that the metals could be recovered from the ore by simple methods. Probably a heavy media process could be used for preliminary treatment to recover a concentrate to be up-graded by flotation to yield a high-grade lead-silver concentrate for direct shipment to the El Paso smelter. This would be a relatively low-cost method of treatment because most of the waste rock would be eliminated by heavy media and only a relatively small volume of material would be subjected to higher-cost processes of fine grinding and flotation.

ORE RESERVES AND FUTURE DISCOVERIES

The mineralized zone on the Ellsworth property is relatively large and the small bodies of lead-silver ore with minor amounts of copper are widely distributed over section 16, the east one-half of section 17 and the west one-half of section 15 in T. 24 S., R. 29 E. At least three of these small bodies may contain enough lead and silver to be minable during periods of high metal prices. However, the greatest future for the property lies in the possibility of finding relatively large zones that are sufficiently well mineralized to be mined by medium size open-pit mining operations. There appears to be three zones that are especially favorable and warrant further investigation to determine if they are sufficiently well mineralized to form large, low-grade, disseminated-type ore bodies. These zones are on or near the Border King 5, Panther 1 and 4, and Panther 8 and 9 claims shown on figure 2.

SUGGESTED EXPLORATION

The Ellsworth property has been extensively prospected by shallow pits and cuts which proved the area to be extensively mineralized; however, little of the work was systematically done and the property was never drilled. It now remains for carefully engineered, intensive exploration methods to prove if any of the mineralized zones are large enough and rich enough in lead and silver to make a commercial mine.

Exploration work that should be done in the near future consists of the following:

(1) Verification and/or validation of all property rights in the area of interest and possible acquisition of adjoining property.

(2) Geological mapping to determine the distribution of the stratified rocks and the intrusive igneous rocks, and the faults and folds that may have been important factors in localizing the lead-silver ore.

THE BORDER SILVER PROPERTY

Cochise County, Arizona

A SUMMARY REPORT ON THE GEOLOGY AND SILVER POTENTIAL

Frank J. Frankovich
Consulting Geologist
President of Border Silver Mining

August, 1983

Spokane, Washington

BORDER SILVER PROPERTY, COCHISE COUNTY, ARIZONA
REPORT ON GEOLOGICAL EXAMINATION

Joel R. Mangham
Consulting Geologist
March 1983

TABLE OF CONTENTS

TABLE OF CONTENTS

BORDER SILVER PROPERTY, COCHISE COUNTY, ARIZONA

REPORT ON GEOLOGICAL EXAMINATION

Joel R. Mangham
Consulting Geologist
March 1983

This report summarizes my work and observations during fourteen days (2/21/83 - 3/6/83) on the Border Silver Property controlled by Mr. Frank Frankovich.

SUMMARY AND CONCLUSIONS

The Border Silver property is located on Cretaceous limestone and sandstone intruded by Laramide stocks. Mineralization may be Laramide in age, however, the possibility of Cretaceous syngenetic mineralization also exists.

The Border Silver property appears to contain substantial, untested silver-lead ore potential. In the writer's opinion, ore grade will almost certainly be found on the property, however, it is not possible on the basis of only surface geological data, to estimate the continuity and tonnage. Exposed on the surface are ample thicknesses (up to 10 feet plus) of gossan, indicating that high-grade mineralization may occur at depth. Potential strike length and extent down-dip can only be determined with trenching and drilling.

The property contains several attractive drill targets related to planar-shaped mineralization which is exposed on the surface as thick, high-sulfide gossan. The oxidized gossan probably had a pre-oxidation sulfide content ranging from 5% to nearly 100%.

Locally, the gossans contain occurrences of visible argentiferous galena indicating that the gossans may be leached remnants of

silver-lead mineralization. Assays of galena show a high percentage of silver; the number of ounces of silver assayed is approximately equal to the percent of lead in the sample. Assays of completely weathered goassan show little lead or silver (or other metals); it is quite possible that below the zone of oxidation, sulfide content may be up to 100% with a lead content of 10 - 20% and a silver content of 10 - 20 oz./ton or possibly higher. The zone of oxidation and leaching probably extends down to the water table, where there is a possibility of finding high-grade, enriched ore.

RECOMMENDATIONS

The property, by usual exploration standards, has had little useful exploration work done on it. The most important feature of the property, that is, the gossans, were not noted by previous investigators and consequently have not been systematically drilled nor explored. Similarly, the other silver-lead occurrences have also not been explored in a meaningful and systematic way. The property warrants comprehensive exploration, including a diamond drilling program to explore each of its several targets. This exploration program should proceed in several phases, as follows:

1. A refined geological map should be made with more detail than the existing map. (I suggest using a scale of 1" = 200'.) At the same time geochemical grid surveys should be made over a number of favorable areas (ncluding all of the Kbla).
2. All of the target areas should be drilled first with shallow holes to establish lateral continuity of the mineralized horizons and to test geochemical anomalies.
3. Deep holes should be drilled to follow mineralization down-dip to determine the metal content below the zone of oxidation, to explore for possible supergene enrichment, and to examine the effects of possible deep listric faults. Favorable results in the above program would indicate that commercial ore may be present and justify:

4. Further geophysical and geochemical work;
5. More intensive deep drilling on favorable targets from the above program to start delineating ore reserves;
6. Delineation of new targets based on favorable geological, geochemical, and geophysical criteria;
7. Drilling these new targets to look for potential ore bodies not presently evident.

INTRODUCTION

I spent two weeks examining the Border Silver Property in southern Cochise County, Arizona. My work consisted mostly of geologic mapping, at scales of 1" = 500' (revising, finishing, and extending an earlier geologic map), and 1" = 50' and 1" = 100' on specific, mineralized target areas. In addition to refining drill targets, my commission was to present my ideas and conclusions concerning the genesis of the mineralization. This report summarizes the above work. Previous workers on the property apparently examined it for its porphyry copper potential. It should be noted that none of the previous workers made any note of the several gossans, nor did they assay for silver.

GEOLOGY

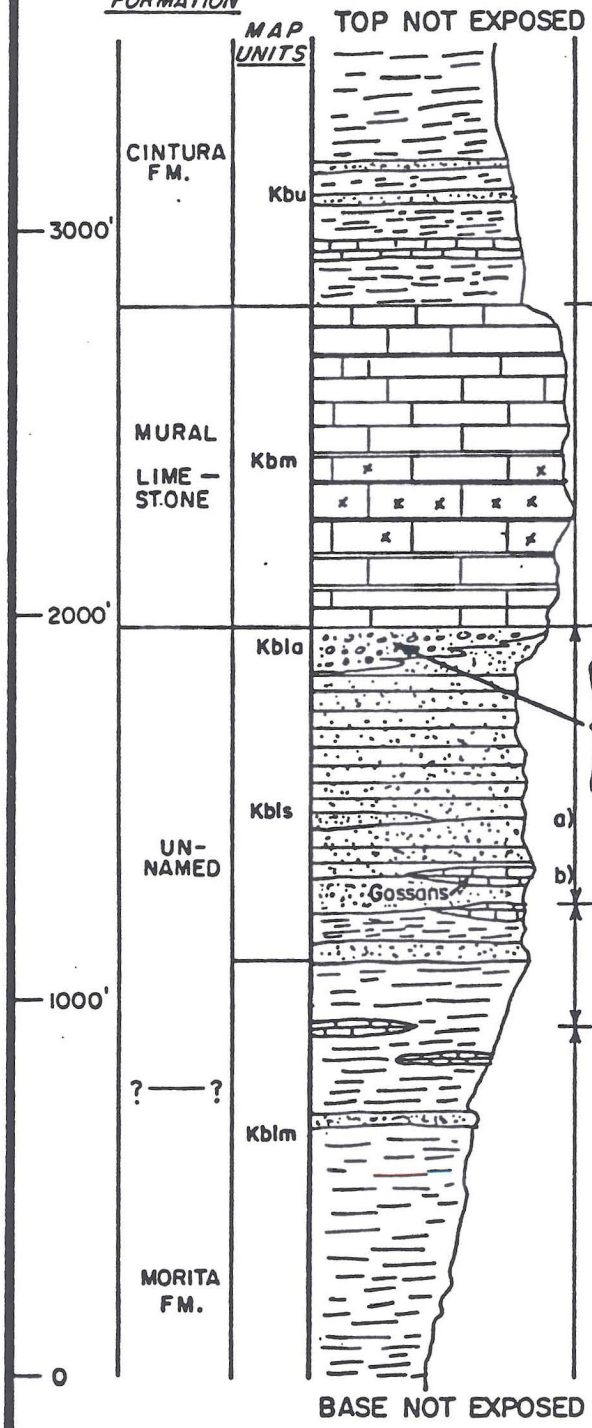
Method of Study

Of the 14 days of field work, approximately five days were spent examining the general geology of the property, chiefly by revising, finishing, and extending an earlier 1" = 500' map. A revised map was prepared together with a stratigraphic column and cross-sections. My observations follow:

General

The Border Silver Property contains Cretaceous Bisbee Group limestone, sandstone, and shale which has been gently folded,

STRATIGRAPHIC COLUMN FOR THE BISBEE GROUP AT THE ELLSWORTH PROPERTY OF BORDER SILVER MINING CO. COCHISE COUNTY, ARIZONA



LOCAL LITHOLOGY

SHALE
Tan, siliceous, with minor sandstones. Gray limestone bed near base.

LIMESTONE – Gray, medium to thin-bedded With shale interbedded, and minor black chert. Zones of MINERALIZATION, (××××) gossans, bedded and in fissures. Argentiferous galena in blebs along bedding, dissem. and in fissures. Barite.

SANDSTONE – "Debris flow", chocolate brown, poorly bedded. 95% quartz dolomite + calcite. Sand grains cemented with calcite. This supports 5% – 1-30mm clasts of mud and chert. Outcrop in west area of property.

SANDSTONE – Clean quartz grains, some subarkosic sandstone and shale near base.
a) Resistant quartzite marker bed in west.
b) Mineralized limestone in east (gossans)

LIMESTONE and cherty, silicified (?) limestone. Interbedded fine grained sandstone, shale.

SHALE – Green, some maroon, thin bedded. Some darker green beds may have epiclastic volcanic component. Minor sandstone and limestone near top.

Paleogeography (Hayes 1970)

SUBAERIAL PROGRADING DELTA

SHALLOW WATER REEF-BUILDING

INTERBEDDED MARINE & NON-MARINE-BRACKISH, DELTAIC PLAIN, GRADING UPWARD TO SUBAERIAL DELTA.

COASTAL PLAIN

PREPARED by JOEL MANGHAM, CONSULTING GEOLOGIST, for FRANK J. FRANKOVICH 2/26/83.

faulted, and intruded by Laramide stocks. The age of mineralization is somewhat problematical. Some may have been deposited synchronously with the sediments, and thus was subjected to all of the later structures and intrusions. It is possible that some of the mineralization may be "hydrothermal"--related solely to mineralizing solutions emanating from igneous intrusions. It is also very likely that a hybrid type may exist--mineralization which originally was syngenetic, and has been remobilized by the hydrothermal cells surrounding the Laramide stocks.

Stratigraphy

Sedimentary rocks of the Bisbee Group are the oldest rocks exposed at the Border Silver Property. Details of the stratigraphy are presented in the stratigraphic column. In general, the oldest unit exposed is a 1000' sequence of maroon and green sandstone (quartzite to subarkose) interbedded with thin limestone layers near the base. At the top of this unit is the "Chocolate Arkose" (Kbla), a lensoid unit which actually contains quartz sandstone with dolomite cement, as well as local mudflows with clasts of mud and chert. This unit was not studied in detail by the writer, but it is known to contain a gossanous zone near the west side of the property (see section on Kbla below).

Overlying the sandstone is an 800'-thick section of limestone called the Mural Limestone. At the central part of the Border Silver Porperty this unit is the host for most of the mineralization. Overlying the Mural Limestone is a sequence of tan shale with minor limestone and sandstone present at the western end of the property.

The overall sequence in the Bisbee Group is indicative of coastal plain sedimentation followed by marine and non-marine deltaic plain and shallow limestone reef building; all indicative of a transgressive area. This is followed by a regressive sequence of deltaic sand and minor limestone.

Structure

After the deposition of the sedimentary sequences at the Border Silver Property, the entire area underwent east-west oriented compression producing gently north-plunging open folds. Resultant dips on sedimentary rocks range up to 70° with dips of 30° - 50° being common.

Low angle faults cut the earlier-formed folds. The first extends from the Border King area northward and separates shale of the Kbu formation with limestones of the Kbm. Instead of a thrust (as previously mapped) I believe that this is a moderate-angle normal (listric) fault. Siliceous breccia along the fault is mineralized, suggesting that this is a pre-mineral fault.

Another major low-angle fault exists between the Kbm unit and the Kbla surrounding the major anticline in Section 17. Field mapping has turned up examples of places where steeply dipping limestone (Kbm) directly overlies nearly flat-lying sandstone (Kbla). The outcrop pattern on the southeastern side of the anticline suggests a nearly flat-lying contact. The lack of intense folding in the hanging wall plate, plus the relationship of younger-over-older suggests to me that this is a very low angle or normal fault. Such faults, described in Nevada and Arizona, are termed "listric" faults. More and more of these are being found throughout the desert Southwest, suggesting that these are a fairly common feature in the Basin and Range.

Other puzzling rock relationships exist on the map, but were not examined by the author. One is the contact between Kbm and Kbu on the extreme west end of the map. It appears that irregular strikes and dips, and northwestward-thinning Kbla, Kbm and Kbu units indicate that a northwestward trending high-angle fault exists along the contact. Another puzzle is the Kbu unit at the north end of Section 17. Its contacts do not fit with the structures as mapped. I would suspect that faults are again involved.

Intrusions

Numerous plugs, dikes, and sills intrude the sedimentary rocks in the property. I did not examine all of the mapped intrusions, but I did see enough to make some generalizations. Most of the intrusions are latite porphyry with plagioclase feldspar phenocrysts. Locally, altered hornblende phenocrysts, and muscovite phenocrysts are found. At one locality 2000 feet west of the Great Arizona mine, the intrusion is fine-grained, equigranular granodiorite or quartz monzonite. This heterogeneity suggests, but does not prove, more than one intrusive pulse. However, I did not see the multi-phase intrusions that one would expect to find at a porphyry copper or porphyry molybdenum prospect. The preponderance of porphyry textures and gross map-scale relationships suggest that the intrusions are hypabyssal and intruded along bedding, forming igneous masses which are, on a large scale, sill-like.

Alteration

Moderate volumes of alteration exist on the property. The intrusions show the strongest alteration with white clay and quartz-sericite products. I believe that it would be impossible to determine what zoning may exist between these two types without extensive thin-section or x-ray work. The most intense alteration is in the center of the property, in the Border Queen - Border King area.

The sedimentary rocks show less alteration than the intrusions. The limestone has the most, with silicification and skarn formation in places. The strongest skarn formation is at the Great Arizona Company mine. Shale of the Kbu unit is silicified and brecciated immediately east and northeast of the Border King area. Elsewhere it is unaltered.

Mineralization

Mineralizaton is represented at the surface by porous, oxidized gossan. Pre-oxidation sulfide content was between 5% and 100%.

Gossan with a low sulfide cast content is represented by hematitic subarkosic sandstone of the Kbla unit on the west side of the property. Here, sulfide casts are disseminated and locally are in layers in the sandstone (see discussion below). Original sulfide content was low, possibly 5 - 15%.

Gossans with a high sulfide cast content are predominantly located within the Kblu unit or in limestone below this unit. The gossan bodies with a very high sulfide cast content are layered; possibly due to collapse perpendicular to the plane of the gossan, and to transported limonite which has redeposited in layers. Some of the contacts of these massive gossans are sheared, giving the impression that these gossans formed along fault zones. Other exposures are inadequate to tell whether the gossan is shear-bound or strata-bound. Gangue minerals in the gossan vary from almost non-existent, to silica, to skarn minerals (in the Great Arizona Company area, especially). Barite is associated with the gossan at the Border Queen area.

The gossans almost certainly contained pyrite prior to oxidation and leaching, as evidenced by casts and abundant limonite; and galena, as evidenced by remnants of the fresh sulfide. Assays of galena show a high percentage of silver; the number of ounces of silver assayed is approximately equal to the percent of lead in the sample. Assays of completely weathered gossan show little lead or silver (or other metals). It is probable that this is simply an indication of near-total leaching of the gossan. It is quite possible that below the zone of oxidation, sulfide content may be up to 100% with a lead content of 10 - 20% and a silver content of 10 - 20 oz/ton or possibly higher.

Thus, the gossans are a very favorable feature at the Border Silver Property; they are a definite indicator of sulfide, probably high in silver and lead, and if they have substantial lateral and/or vertical dimensions, there would be a very good chance of finding ore on the property.

Genesis of Mineralization

The tonnage question is directly related to the genesis of the deposits. The association of altered, and locally mineralized intrusions with mineralized limestone suggests skarn, and indeed skarn mineralization showing garnet+diopside+epidote+sulfide zones cross cutting bedding is present. One mineralized area (Great Arizona Company, see below) is definitely a skarn-mineralization system.

The genesis of mineralization at other areas is more ambiguous. Gossan exposed at Border Queen appears to cross cut bedding, and is associated with weak silicification. These are indications of an epigenetic, hydrothermal source, however, it is entirely possible that these are sulfides emplaced during diagenesis with sulfide being deposited along early "growth" faults as well as bedding. Laramide hydrothermal activity may have obscured these earlier relationships. Regional relationships show that a basin was developing toward the southeast (in present Mexico) during limestone deposition. This would be a permissible setting for sedimentary exhalative mineralization at the Border Silver Property.

LOCAL GEOLOGY

Three areas were examined in detail during my work at Border Silver. Geologic maps were prepared using a base map surveyed with Topofil and Brunton and fill-in pacing. Topofil survey points are marked on the ground with wooden stakes. Errors in surveying are estimated at 1% of the traverse length.

Great Arizona Company

Mineralization at the Great Arizona Company is confined to a 100 foot aggregate thickness of limestone interbedded in siltstone and sandstone. Mineral-gangue relationships along 800 feet of strike length show sulfide casts associated with silification or garnet+diopside+epidote±chlorite skarn. The bedding dips westerly at approximately 40°.

Fifteen hundred feet west of the limestone are outcrops of fine-grained equigranular quartz monzonite. The limestone-intrusive setting is similar to Ward Mountain, Nevada, or Pinos Altos, New Mexico where poly-metallic skarn has formed during late hydrous skarn formation and deposited nearly massive sulfide undip from the causative intrusion along the reactive limestone beds.

This prospect is well worth drilling and can be tested by placing holes down-dip from the Great Arizona shaft and projecting to intersect the limestone horizon. A geologist experienced with skarns will be able to tell if the mineralization is distal or proximal to the source of mineralization and can further guide the exploration effort.

Border Queen

The Border Queen area is underlain by homoclinally dipping limestone of the Kbm unit with apophyses (sills?) of latite porphyry. The porphyry is altered with very fine-grained clay+sericite(?) but with little mineralization. The mineralization occurs along a roughly east-west zone and dips across bedding (at least on surface exposures) towards the north. It consists of highly porous masses of goethitic/jarositic gossan with silica and barite. The gossan is locally very thick (10 feet-plus with bottom covered) with a very high sulfide content. Locally there

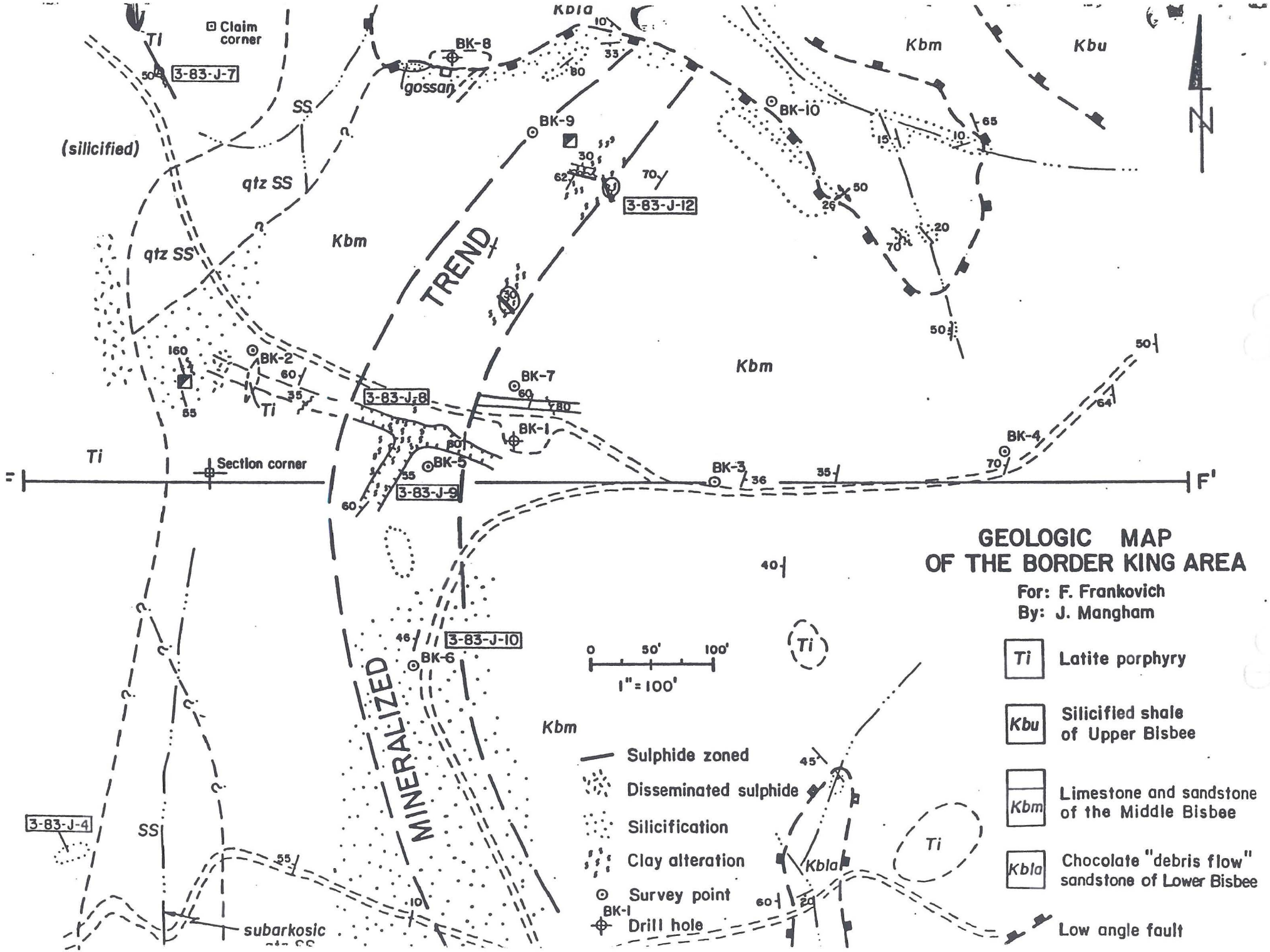
is slight skarn formation, however, the preponderance of alteration is silicification. The genesis of the mineralization is problematical. There definitely has been some later epigenetic mineralization, however, this could be superimposed on an earlier, strata-controlled mineralization.

A drill program that can test this mineralization should drill on both sides of the gossan: (1) down the dip of the gossan, to test for its continuation, and (2) also down the dip of the bedding to see if the plumbing connects up with the bedding. An examination of drill core will indicate whether the fresh sulfides are skarn-related or are related to early diagenetic or syngenetic mineralization.

Border King Area

The Border King area is underlain by a shaly portion of the Kbm unit. This area is structurally complex; the eastern edge is bounded by an east-dipping low-angle listric fault with Kbu shales over KBM limestone and shale. The west is bordered by a latite porphyry intrusion, and the area may be underlain by a near-flat listric fault with brown carbonate+arkose sandstone of the Kbla unit. This reduces the volume available for mineralization within the Kbm unit except for two things: (1) the mineralization appears to be fault-controlled and is parallel to the low-angle listric faulting and (2) the mineralization is associated with widespread argillic alteration and silicification and is clearly hydrothermal, therefore it should continue along the shear-induced plumbing, and may not be affected by change in rock type.

This mineralization is clearly related to an east dipping shear zone. High silver values in brown chalcedony veins in this zone warrant following up with drilling on the down-dip projection of this mineralization.


Claim corner
Ti
3-83-J-7
SS
(silicified)
qtz SS
qtz SS
Kbm
TREND
BK-8
gossan
Kbla
BK-9
3-83-J-12
BK-10
Kbm
Kbu
N
BK-2
BK-7
3-83-J-8
BK-1
BK-5
3-83-J-9
BK-3
BK-4
Section corner
F'
Kbm
3-83-J-10
BK-6
MINERALIZED
Kbm
3-83-J-4
SS
subarkosic
0 50' 100'
1"=100'
Sulphide zoned
Disseminated sulphide
Silicification
Clay alteration
Survey point
BK-1 Drill hole
GEOLOGIC MAP
OF THE BORDER KING AREA
For: F. Frankovich
By: J. Mangham
Ti Latite porphyry
Kbu Silicified shale of Upper Bisbee
Kbm Limestone and sandstone of the Middle Bisbee
Kbla Chocolate "debris flow" sandstone of Lower Bisbee
Low angle fault

Border Ace (Gossanous Arkose)

An area of mineralization termed gossanous arkose exists near the western border of the property. I did not map the target, but I did visit and offer the following observations:

1. The "arkose" is actually part of the Kbla unit containing feldspathic (< 25% feldspar) quartz sandstone with some carbonate grains and carbonate cement.
2. The sandstone at the target area is strongly hematite stained, and contains abundant sulfide casts, some of which are strata bound.
3. I am not certain what sulfide formed the casts; it is, or course, possible that they were base metal sulfides.
4. This area should be mapped and sampled at 1" = 100'.
5. Even at this stage I can see that this target may warrant drill holes to intercept unoxidized mineralization below the water table.

CONCLUSIONS

1. The Border Silver Property is a quality silver-lead prospect.
2. Numerous drill targets exist on the property, some of which are clearly stratiform.
3. Hydrothermal mineralization certainly exists on the property, however, it is possible that older, syngenetic mineralization may also occur.
4. Most of the targets are related to surface exposures of gossan. Some of the gossan is quite thick and clearly contains silver-lead mineralization.
5. If drilling can establish continuity to these mineralized zones, I believe that this property has a good chance of containing ore.

ADDENDUM TO JOEL R. MANGHAM RESUME
By Frank J. Frankovich
August 1983

Joel Mangham left the Border Silver Project earlier than was originally planned to work as a consultant for Chevron Oil Company on the Getchell gold property, Nevada. After that he worked for Union Oil Company on mineral property evaluation in Sonoma County, California, and then for Conoco on the Peck Mountain massive sulphide prospect in Adams County, Idaho. He is now employed by Coeur d'Alene Mines Corporation on its Thunder Mountain gold project in Idaho.

JOEL R. MANGHAM

Route 1, Box 342
Chattaroy, Washington 99003
(509) 276-6900

EDUCATIONAL QUALIFICATIONS

9/75-6/76 University of Washington: classwork in Pacific Northwest geology and economic geology. Completed one year of PhD in structural geology, but dropped it in favor of a career in economic geology, GPA overall 4.0.

9/73-8/75 University of Wisconsin: M.S. geology, GPA overall 3.7, GPA geology 3.7, thesis subject: Structure and Petrology of the Mellen Gabbro Complex in Northern Wisconsin.

9/69-6/73 University of Washington: B.S. geology, GPA overall 3.3, GPA geology 3.8.

Scholastic Honors: Certificate of High Scholarship 1971-72 and 1972-73.
Traineeship 1973-74-75.
Teaching assistantship 1975-76.

EXPERIENCE

11/80 - 1/83 Project Geologist, Getchell Project, Conoco Inc.
Supervised and directed a group of professionals and semiprofessionals in a detailed gold mine evaluation. Interfaced and coordinated with mine engineers, metallurgists, economists, lawyers, safety coordinators, computer programmers, and other outside professional groups. Assembled data from three miles of underground workings and 100,000 feet of drilling on six coordinate systems into a coherent package. Directed the generation of computer plotted maps and cross-sections, and proven ore reserves. Repeatedly and successfully presented factual and conceptual data to mid and upper management.

11/79-11/81 Geologist, Conoco Inc., Reno, Nevada
Conceptualized and implemented volcanogenic massive sulfide grass roots exploration in Oregon, Idaho and Washington. Mapped and drilled a volcanogenic massive sulfide prospect and reconstructed the paleoenvironment during sea-floor mineralization. This resulted in a discovery of a large, as yet subeconomic, massive sulfide deposit.

4/78-11/79

Geologist, Earth Resources Co., Golden, Colorado
Ran several drill projects in a small, aggressive, disseminated gold program. One of my projects resulted in the discovery of a 1-2 MT protore deposit. Participated in a grass roots gold exploration program which netted the company a 900% R.O.I. after one year.

11/77-4/78

Temporary Geologist, Conoco Inc., Spokane, Washington
Evaluation of "hard rock" uranium prospects in Washington and Montana.

6/77-10/77

Temporary Geologist, Conoco Inc., Reno, Nevada
Mapped and unraveled the complex stratigraphic, structural, and mineralizing history of a porphyry copper skarn district near Luning, Nevada. My efforts resulted in a new interpretation of the stratigraphy of the Luning Formation as well as an understanding of the regional distribution of mineralizing intrusions.

6/73-6/77

Spent summers during my school years doing thesis work as well as the following employment:

a) mapped an obducted terrane for my professor in Washington
b) assisted in the discovery drill program for Noranda at the Green's Creek massive sulfide prospect in Alaska
c) conceptualized and taught an introductory geology class as well as a geology of the Pacific Northwest class.

PUBLICATIONS

Mangham, Joel R., 1983, The Geology of the Peck Mountain Massive Sulfide Prospect, Adams County, Idaho (abs.): Geological Society of America Abstracts with Programs (in preparation).

Tabet, David E., and Joel R. Mangham, 1978, The Geology of the Eastern Mellen Intrusive Complex, Wisconsin: Geoscience Wisconsin, V.3, pp 1-19.

Mangham, Joel R., 1975, Structure and Petrology of the Mellen Intrusive Complex, Wisconsin (abs.): Institute of Lake Superior Studies.

Not included are numerous unpublished company reports.

MISCELLANEOUS

My interests include travel, photography, woodworking, scuba diving, skiing, hiking, climbing.

PRELIMINARY REPORT

RESULTS OF AN EXPLORATION DRILLING PROGRAM

ELLSWORTH PROPERTY
COCHISE COUNTY, ARIZONA

December 1, 1978

UNDERLINING in this copy is not by Schryver. An unmarked original is not available.

By

ROBERT F. SCHRYVER

Robert Schryver and Associates
2005 North Central Avenue
Phoenix, Arizona
85004

I. INTRODUCTION

This report will summarize the results of an exploration drilling program conducted on the Ellsworth Property located in the Ash Springs Mining District, Cochise County, Arizona. The drilling program was implemented in December, 1977 and completed in January, 1978 under the technical management of Robert F. Schryver for Ten Corporation of Newport Beach, California.

In August, 1977, a report was prepared by Robert F. Schryver at the request of Mr. Everett Gust, President of Ten Corporation, which outlined a drilling program to explore the Ellsworth Property. This property, which was leased by Ten Corporation several years ago, is located adjacent to the international boundary between the Republic of Mexico and the United States, approximately eight miles east of Douglas, Arizona. The property consists of unpatented mining claims that are located on federal and state lands and contains a total of approximately 1350 acres.

Within the property area, there are sporadic occurrences of silver, lead, zinc, and copper minerals in sedimentary rocks that have been correlated to the Bisbee formation of Cretaceous age and in intrusive rocks that are believed to be of late Cretaceous or early Tertiary age. The mineralization apparently occurs primarily within limestone beds of the Bisbee formation or along the contacts between the limestone and the intrusive rocks. Most of the past prospecting and development efforts have been concentrated along faults, shear zones and contact zones that exhibit discontinuous gossan features at the surface.

The prospecting and development activities consist mostly of shallow pits and a limited amount of trenching and open cut mining. In addition there are some underground development on the property. Most of these workings are presently inaccessable. However, old reports have stated that one prior operation located in Section 15, T.24S. R.29E. contained workings ranging in depth from 40 to 320 which developed a contact deposit between limestone and intrusive rocks that produced silver, lead, and copper. This mine ceased production in 1912.

During 1969 McPhar Geophysics conducted induced polarization and resistivity surveys on the property. The results of these surveys indicated several weak anomalous zones but no further work was done. In 1973 Cominco apparently had a lease on the Ellsworth Property and drilled three holes that ranged in depth from 100 to 300 feet. The exact locations of these drill holes are not known. In 1976 Rosario Mining Company completed a geologic investigation of the property that included a geochemical grid survey. The results of this survey indicated two broad anomalies of lead and zinc values located on the property.

The objective of the drilling program conducted by Ten Corporation was to explore for possible silver, lead, and zinc

deposits on the property that would contain sufficient grade and tonnage for a viable mining venture that could produce 500 to 1000 tons per day by shallow underground or surface mining methods.

II. SUMMARY

Preliminary studies of the Ellsworth Property indicated that there were two broad drilling target areas. The selection of these broad target areas were based upon the results of the geophysical surveys conducted by McPhar in 1969, the results of the geochemical survey by Rosario in 1976, and the results of numerous samples reported in 1968 and 1971 by Dr. John Fiack, a consultant to the owners of the property. The two major target areas were outlined by the coincidence of the areas of the strongest geochemical anomalies, the strongest geophysical anomalies and the strongest surface mineralization.

The location of specific drill sites were selected on the assumption that the mineralization must be sufficiently disseminated in occurrence to create a deposit that could be extracted profitably within the objectives of Ten Corporation. The geologic areas within the property that indicated the highest potential for fullfilling the requirements included the following:

1. mineralized contact zones between the limestone and rhyolitic to andesitic porphyry intrusive bodies.
2. mineralized fractured and brecciated zones within the limestone beds.
3. mineralized zones occurring as irregular replacement bodies along the bedding in the limestone sequences.

Approximately 3070 feet of rotary drilling was completed during the program in ten vertical holes. The locations of the drill holes are shown in Figure one. The lithlogic and assay logs are included in the appendix.

The assay results of the drilling clearly indicates that the holes did not encounter ore grade mineralization. Apparently the mineralized zones that were prospected by the drilling do not contain sufficient grade for a viable mining venture that will accomplish the objectives of Ten Corporation. Further drilling for possible disseminated silver-lead-zinc deposits at shallow depths in the specific areas explored during this drilling program is not recommended at this time.

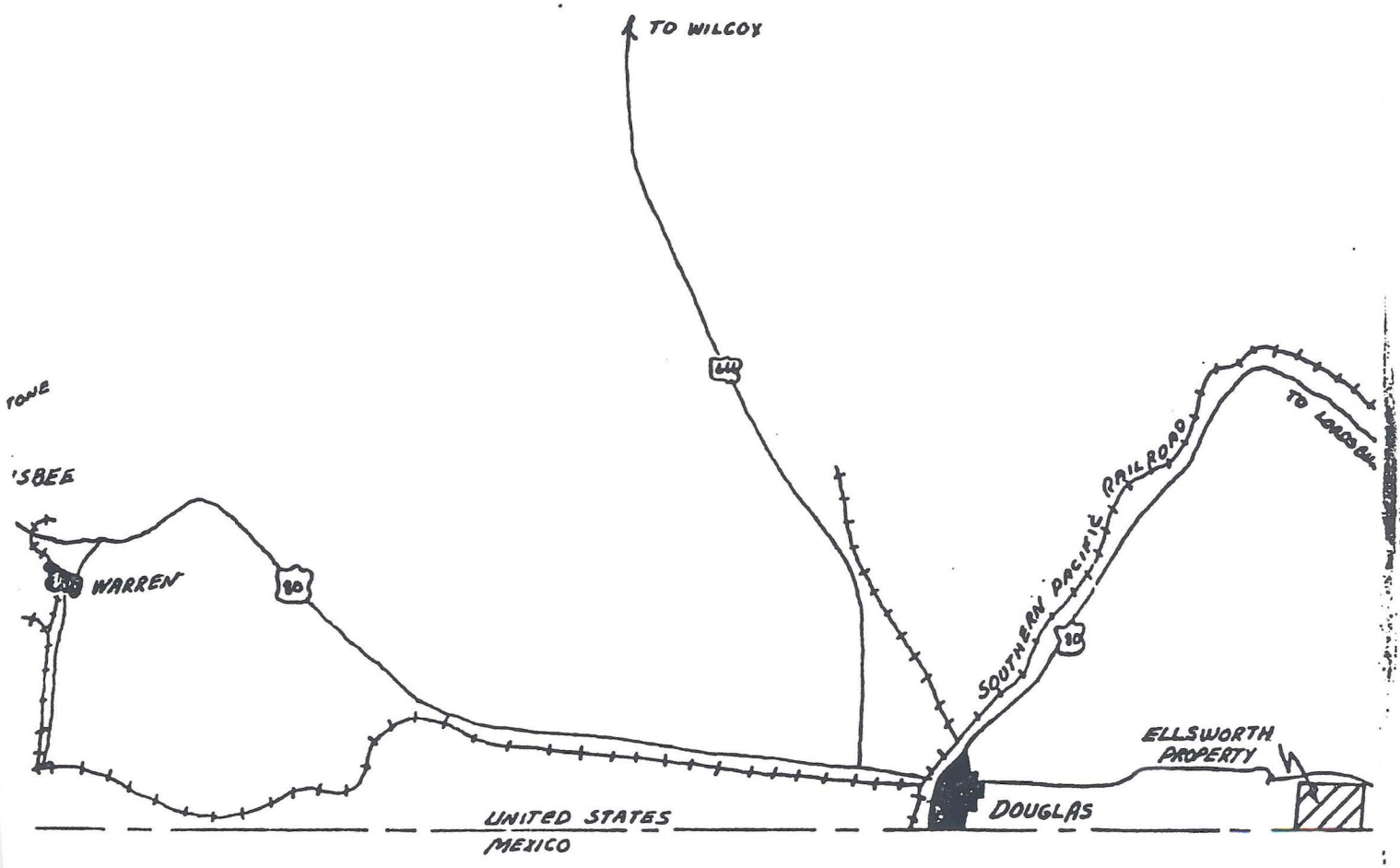
However, the Ellsworth Property does contain the potential for other types of deposits. The exposed mineralization indicates t the potential for relatively small deposits that may exist along narrow veins and perhaps in limited replacement type of ore bodies within the limestone. This potential would need to be explored by rather extensive diamond drilling program.

The other potential types of deposits that may be encountered within the Ellsworth Property are limestone replacement deposits that are massive breccia replacement deposits at a much greater depth than that reached during this drilling program. The possibility of these deposits are indicated by the following:

1. The drilling has indicated that minor amounts of lead and zinc mineralization are present in all of the holes throughout the entire length of nearly every hole. This pervasive lead and zinc mineralization may represent a geochemical halo from a massive deposit at a much greater depth. NC

2. The drilling has indicated that at shallow depths (to 500 feet) the relationship of the intrusive igneous body to the sedimentary rocks of the Bisbee formation is primarily as dikes and sills. This indicates that the main mass of the intrusive has not been penetrated and large thicknesses of potential sedimentary host rock have not yet been tested for massive ore deposits.

3. The drilling has indicated that most of the rocks encountered are moderately to strongly altered and contain much disseminated pyrite which may indicate stronger mineralizing solutions at depth. No



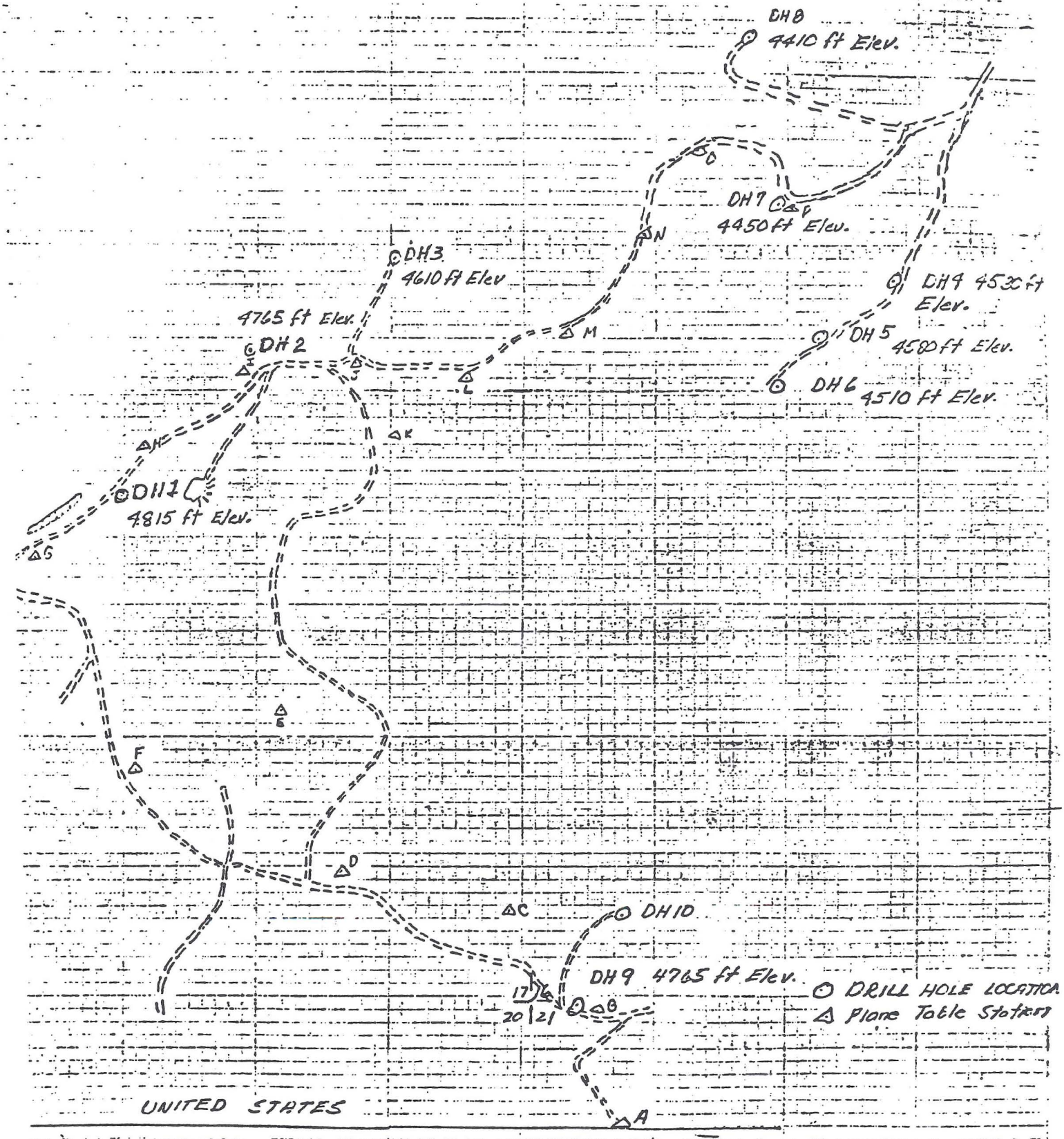
LOCATION MAP
ELLSWORTH PROPERTY
COCHISE COUNTY, ARIZONA

SCALE one inch= four miles

FIGURE 1

BY ..... DATE ..... SUBJECT ..... SHEET NO. ..... OF .....

CHKD. BY ..... DATE ..... JOB NO. .....



DRILL HOLE LOCATION MAP

ELLSWORTH PROPERTY

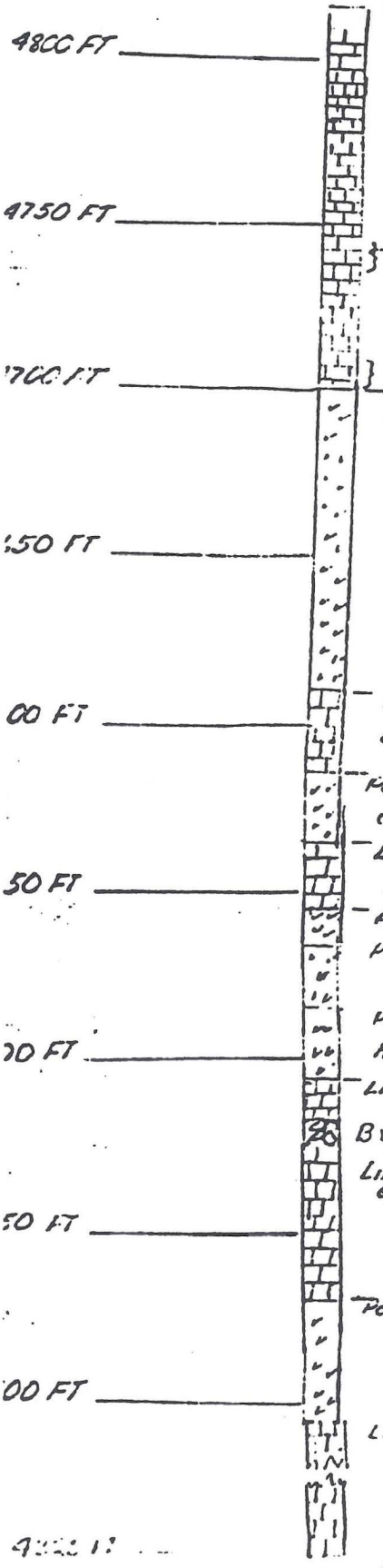
COCHISE COUNTY, ARIZONA

SCALE 1" = 500'

JOB NO.

LITHOLOGIC
Scale 1"=50 feet

ELEVATION OF COLLAR 1815 FT ±



	ASSAY			
	oz Ag	oz Au	% Pb	% Zn
0-10	Tr	Tr	0.003	0.052
10-20	Tr	Tr	0.005	0.008
20-30	Tr	Tr	0.006	0.021
30-40	Tr	Tr	0.024	0.030
40-50	Tr	Tr	0.014	0.019
50-60	Tr	Tr	0.025	0.048
60-75	Tr	Tr	0.027	0.058
75-80	Tr	Tr	0.014	0.016
80-95	Tr	Tr	0.026	0.028
95-110	Tr	0.02	0.009	0.009
110-115	Tr	0.02	0.010	0.004
115-120	Tr	Tr	0.008	0.008
120-190	Not Sampled			
190-195	Tr	Tr	0.008	0.009
195-200	Tr	0.04	0.008	0.009
200-205	Not sampled			
205-210	Tr	Tr	0.009	0.011
210-215	Tr	Tr	0.014	0.010
215-225	Tr	Tr	0.007	0.010
225-235	Tr	0.02	0.007	0.003
235-250	Not Sampled			
250-255	Tr	0.06	0.008	0.007
255-265	Tr	Tr	0.008	0.010
265-275	Tr	0.02	0.007	0.007
275-280	Tr	0.02	0.009	0.013
280-290	Tr	Tr	0.008	0.008
290-300	Tr	0.02	0.009	0.011
300-310	Tr	0.02	0.007	0.015
320-325	Tr	Tr	0.008	0.009
325-330	Tr	0.02	0.009	0.018
330-340	Tr	Tr	0.006	0.011
350-355	Tr	Tr	0.005	0.010
355-360	Tr	Tr	0.008	0.017
360-365	Tr	Tr	0.020	0.036
365-370	Tr	0.02	0.019	0.035
370-375	Tr	Tr	0.008	0.019
375-380	Tr	Tr	0.006	0.007
380-385	Tr	Tr	0.008	0.010
385-390	Tr	Tr	0.008	0.009

(see next page)

LITHOLOGIC AND ASSAY LOG
DRILL HOLE NO 1
ELLSWORTH PROPERTY
COCHISE COUNTY, ARIZONA

DATE

SUBJECT

SHEET NO. ..... OF .....

JOB NO. .....

ASSAY

	oz Au	oz Ag	% Pb	% Zn
390-400	Tr	Tr	0.010	0.012
400-410	Tr	Tr	0.005	0.008
410-420	Tr	Tr	0.005	0.007
420-430	Tr	Tr	0.007	0.011
430-435	Tr	Tr	0.010	0.013
435-440	Tr	Tr	0.007	0.011
440-445	Tr	Tr	0.005	0.009
445-450	Tr	Tr	0.005	0.014
450-455	Tr	Tr	0.007	0.009
455-460	Tr	Tr	0.006	0.006
460-465	Tr	Tr	0.007	0.008
465-470	Tr	Tr	0.007	0.006
470-480	Tr	Tr	0.006	0.008
480-490	Tr	Tr	0.007	0.007

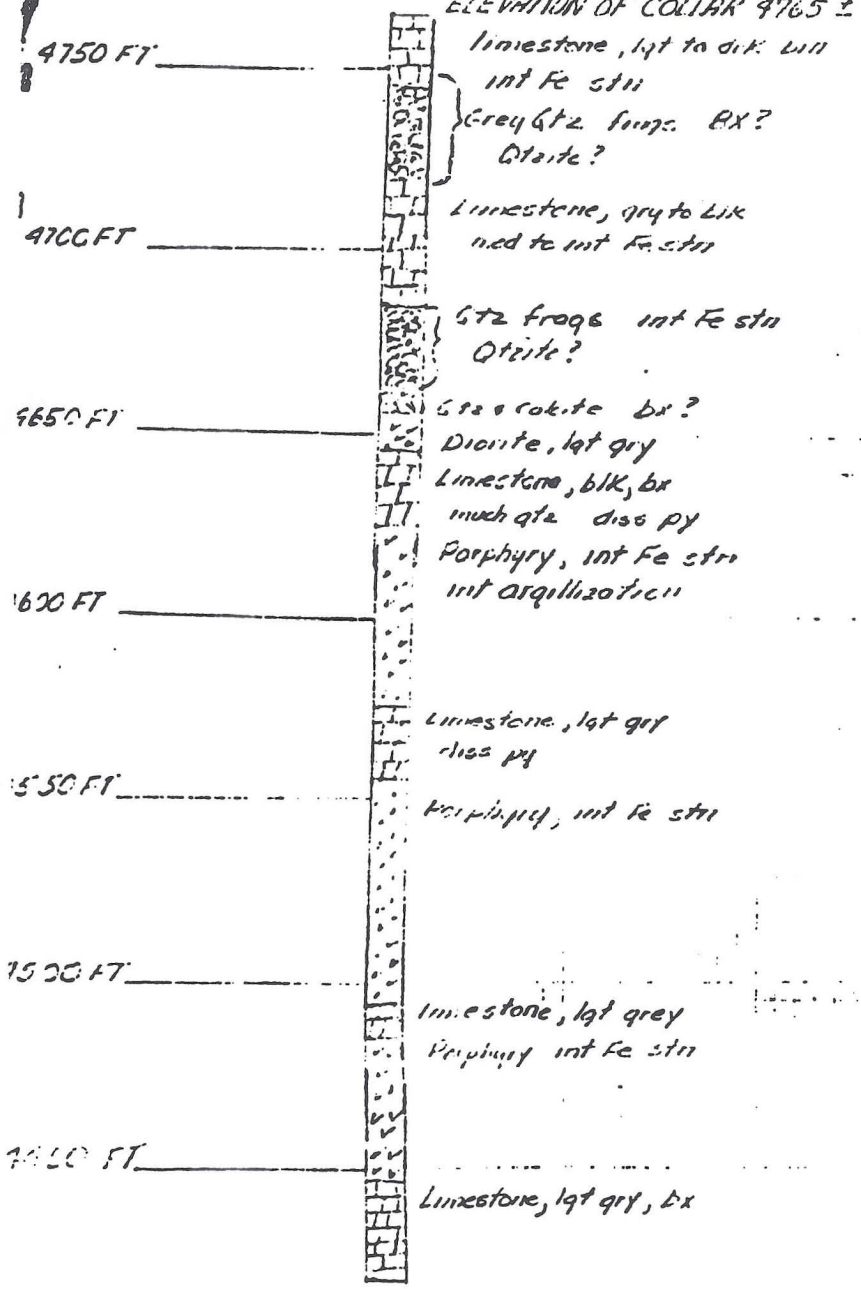
ASSAY LOG CONTINUED
DRILL HOLE NO 1

ELLSWORTH PROPERTY
COCHISE COUNTY, ARIZONA

DATE SU CT SHEET NO. ..... OF .....

BY DATE JOB NO. .....

LITHOLOGIC
Scale 1" = 50 feet



ASSAY

	oz Au	oz Ag	% Pb	% Zn
0 - 5	Tr	0.02	0.027	0.039
5 - 10	Tr	0.02	0.020	0.034
10 - 15	Tr	0.02	0.003	0.018
15 - 20	Tr	Tr	0.007	0.014
20 - 25	Tr	0.02	0.008	0.018
25 - 30	Tr	0.02	0.016	0.026
30 - 35	Tr	Tr	0.010	0.027
35 - 40	Tr	Tr	0.021	0.027
40 - 45	Tr	Tr	0.014	0.040
45 - 50	Tr	0.06	0.011	0.032
50 - 55	Tr	0.06	0.008	0.015
55 - 60	Tr	Tr	0.007	0.014
60 - 65	Tr	Tr	0.012	0.026
65 - 70	Tr	Tr	0.009	0.024
70 - 75	Tr	Tr	0.008	0.027
75 - 80	Tr	Tr	0.009	0.027
80 - 85	Tr	Tr	0.007	0.030
85 - 90	Tr	Tr	0.015	0.011
90 - 95	Tr	Tr	0.006	0.016
95 - 100	Tr	Tr	0.006	0.056
100 - 110	Tr	Tr	0.029	0.174
110 - 120	Tr	Tr	0.011	0.040
120 - 130	Tr	Tr	0.006	0.013
130 - 135	Tr	Tr	0.006	0.008
135 - 140	Tr	Tr	0.007	0.009
140 - 145	Tr	0.02	0.006	0.008
145 - 150	Tr	Tr	0.005	0.010
150 - 160	Tr	Tr	0.006	0.010
160 - 170	Tr	Tr	0.005	0.007
170 - 180	Tr	Tr	0.006	0.010
180 - 190	Tr	0.02	0.006	0.008
190 - 200	Tr	Tr	0.005	0.005
200 - 210	Tr	0.08	0.004	0.007
210 - 220	Tr	0.04	0.004	0.009
230 - 240	Tr	Tr	0.008	0.012
240 - 290	No Sample			
290 - 300	Tr	0.04	0.005	0.015
300 - 310	Tr	Tr	0.005	0.010
310 - 320	Tr	0.01	0.004	0.010
320 - 330	Tr	Tr	0.006	0.013
330 - 340	Tr	0.01	0.006	0.013

LITHOLOGIC AND ASSAY LOG
DRILL HOLE NO 2

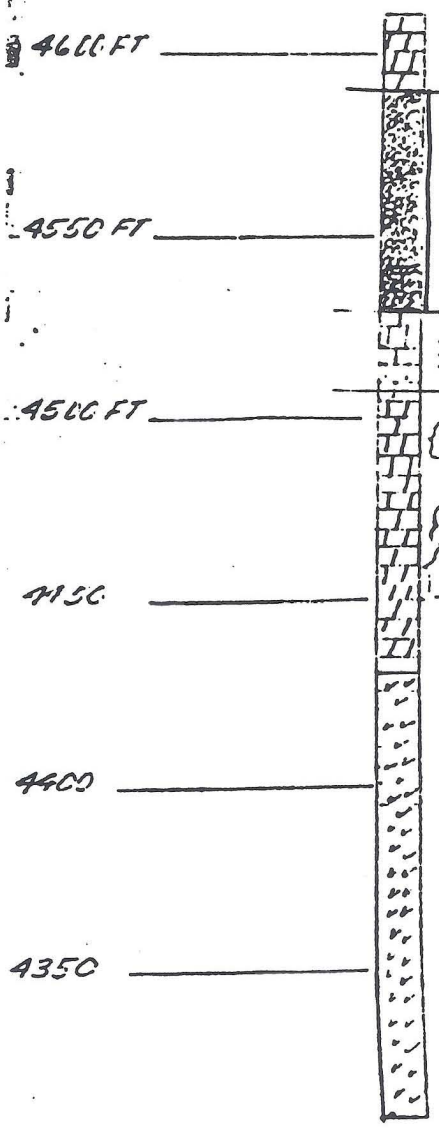
ELLSWORTH PROPERTY
COCHISE COUNTY, ARIZONA

DATE SUBJECT SHEET NO. ..... OF .....

BY DATE JOB NO. .....

LITHOLOGIC LOG

Scale 1" = 50 feet



ASSAY LOG

	Au	Hg	Pb	Zn
	oz/T	oz/T	%	%
0-5	Tr	002	0.006	0.006
5-10	Tr	0.02	0.013	0.014
10-15	Tr	0.10	0.036	0.032
15-20	Tr	0.12	0.272	0.157
20-25	Tr	0.12	0.307	0.203
25-30	Tr	Tr	0.113	0.160
30-35	Tr	Tr	0.031	0.053
35-40	Tr	Tr	0.020	0.047
40-45	Tr	Tr	0.137	0.083
45-50	Tr	Tr	0.173	0.102
50-55	Tr	Tr	0.127	0.128
55-60	Tr	Tr	0.030	0.069
60-65	Tr	Tr	0.026	0.068
65-70	Tr	Tr	0.048	0.061
70-75	Tr	Tr	0.017	0.025
75-80	Tr	Tr	0.015	0.022
80-85	Tr	Tr	0.015	0.031
85-90	Tr	Tr	0.009	0.015
90-95	Tr	0.06	0.025	0.040
95-100	Tr	Tr	0.210	0.138
100-110	Tr	0.02	0.017	0.061
110-120	Tr	0.10	0.112	0.101
120-130	Tr	Tr	0.015	0.083
130-140	Tr	Tr	0.013	0.043
140-150	Tr	Tr	0.037	0.070
150-160	Tr	Tr	0.011	0.053
160-170	Tr	Tr	0.010	0.061
170-180	Tr	Tr	0.008	0.045
180-190	Tr	Tr	0.007	0.039
190-200	Tr	Tr	0.009	0.019
200-210	Not Sampled			

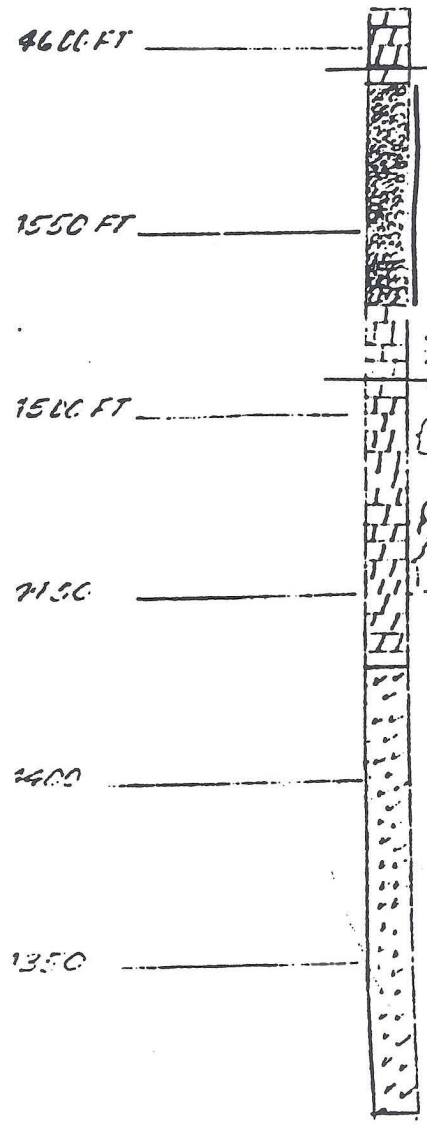
LITHOLOGIC AND ASSAY LOG
DRILL HOLE NO 3
ELLSWORTH PROPERTY
COCHISE COUNTY, ARIZONA

DATE SUBJE SHEET NO. OF

BY DATE B NO.

LITHOLOGIC LOG

Scale 1" = 50 feet



ASSAY LOG

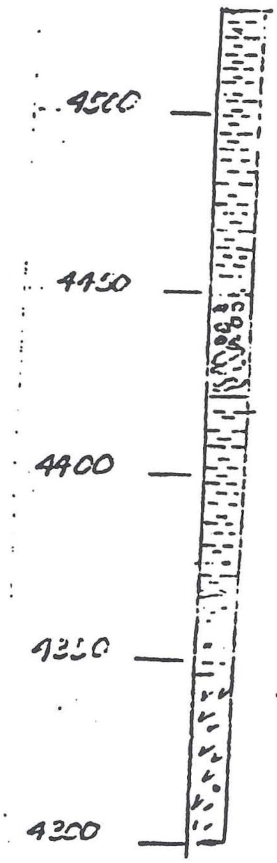
	oz Au	oz Ag	% Pb	% Zn
0-5	Tr	002	0.004	0.006
5-10	Tr	0.002	0.002	0.014
10-15	Tr	0.10	0.026	0.032
15-20	Tr	0.12	0.272	0.159
20-25	Tr	0.12	0.307	0.203
25-30	Tr	Tr	0.113	0.160
30-35	Tr	Tr	0.031	0.053
35-40	Tr	Tr	0.020	0.017
40-45	Tr	Tr	0.137	0.083
45-50	Tr	Tr	0.173	0.102
50-55	Tr	Tr	0.122	0.126
55-60	Tr	Tr	0.030	0.069
60-65	Tr	Tr	0.026	0.068
65-70	Tr	Tr	0.048	0.061
70-75	Tr	Tr	0.017	0.025
75-80	Tr	Tr	0.015	0.022
80-85	Tr	Tr	0.015	0.031
85-90	Tr	Tr	0.009	0.015
90-95	Tr	0.06	0.025	0.040
95-100	Tr	Tr	0.210	0.138
100-110	Tr	0.92	0.017	0.061
110-120	Tr	0.10	0.112	0.101
120-130	Tr	Tr	0.015	0.083
130-140	Tr	Tr	0.013	0.042
140-150	Tr	Tr	0.037	0.070
150-160	Tr	Tr	0.011	0.053
160-170	Tr	Tr	0.010	0.061
170-180	Tr	Tr	0.008	0.045
180-190	Tr	Tr	0.007	0.039
190-200	Tr	Tr	0.009	0.019
200-300	Not Sampled			

LITHOLOGIC AND ASSAY LOG
DRILL HOLE NO 3
ELLSWORTH PROPERTY
COCHISE COUNTY, ARIZONA

BY .... DATE .... JOB NO. ....

LITHOLOGIC
Scale 1" = 50'

ELEVATION OF COLLAR 4530' ±



limestone, lgt grn to gry
[illegible]

[illegible], qtz, [illegible] frags
lgt to med fe stn

Limestone, lgt gry, silcified

Porphyry, lgt gry

Total Depth 120'

ASSAY

	oz Au	oz Ag	% Pb	% Zn
1-5	Tr	0.02	0.10	Tr
5-10	Tr	0.06	0.02	Tr
10-15	Tr	0.02	0.10	Tr
15-20	Tr	Tr	0.04	Tr
20-25	Tr	Tr	0.03	Tr
25-30	Tr	Tr	0.03	Tr
30-35	Tr	Tr	0.04	Tr
35-40	Tr	Tr	0.04	Tr
40-45	Tr	0.06	0.05	Tr
45-50	Tr	0.04	0.10	Tr
50-55	Tr	Tr	0.01	Tr
55-60	Tr	0.02	0.01	Tr
60-65	Tr	Tr	0.02	Tr
65-70	Tr	Tr	0.01	Tr
70-75	Tr	0.04	0.01	Tr
75-80	Tr	Tr	0.01	Tr
80-85	Tr	Tr	0.01	Tr
85-90	Tr	Tr	0.01	Tr
90-95	Tr	Tr	0.03	Tr
95-100	Tr	Tr	0.03	Tr
100-105	Tr	Tr	0.03	Tr
105-110	Tr	Tr	0.03	Tr
110-115	Tr	Tr	0.03	Tr
115-120	Tr	Tr	0.03	Tr

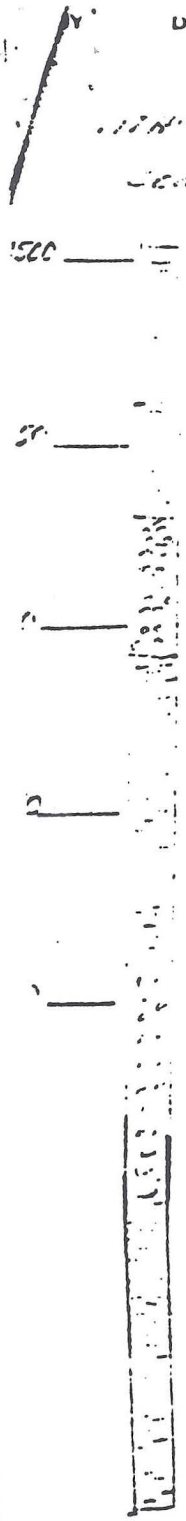
LITHOLOGIC AND ASSAY LOG
DRILL HOLE NO 4

ELLSWORTH PROPERTY
COCHISE COUNTY, ARIZONA

DATE

SHEET NO. OF

B NO.



	Cu ppm	Co ppm	Zn ppm	Pb ppm
1-5	Tr	Tr	0.02	Tr
5-10	Tr	Tr	0.04	0.02
10-15	Tr	Tr	0.04	0.01
15-20	Tr	Tr	0.04	Tr
20-25	Tr	Tr	0.02	Tr
25-30	Tr	Tr	0.03	Tr
30-35	Tr	Tr	0.03	0.04
35-40	Tr	Tr	0.03	0.01
40-45	Tr	Tr	0.03	0.01
45-50	Tr	Tr	0.02	Tr
50-55	Tr	Tr	Tr	Tr
55-60	Tr	0.02	Tr	0.02
60-65	Tr	Tr	Tr	0.01
65-70	Tr	Tr	0.03	Tr
70-75	Tr	Tr	0.02	Tr
75-80	Tr	Tr	0.02	Tr
80-85	Tr	0.02	0.012	0.046
85-90	Tr	0.06	0.04	0.02
90-95	Tr	0.04	0.04	Tr
95-100	Tr	Tr	0.03	Tr
100-105	Tr	Tr	0.03	Tr
105-110	Tr	Tr	0.03	0.01
110-115	Tr	Tr	0.02	0.02
115-120	Tr	Tr	0.03	0.01
120-125	Tr	0.04	0.04	002
125-130	Tr	Tr	0.04	0.02
130-135	Tr	Tr	0.03	Tr
135-140	Tr	0.04	0.04	0.02
140-145	Tr	Tr	0.01	Tr
145-150	Tr	Tr	0.02	Tr
150-155	Tr	Tr	0.03	0.01
155-160	Tr	0.02	0.03	0.02
160-165	Tr	Tr	0.04	002
165-170	Tr	Tr	0.03	0.01
170-175	Tr	Tr	0.02	Tr
175-180	Tr	Tr	0.03	002
180-185	Tr	Tr	0.04	0.02
185-190	Tr	Tr	0.03	Tr

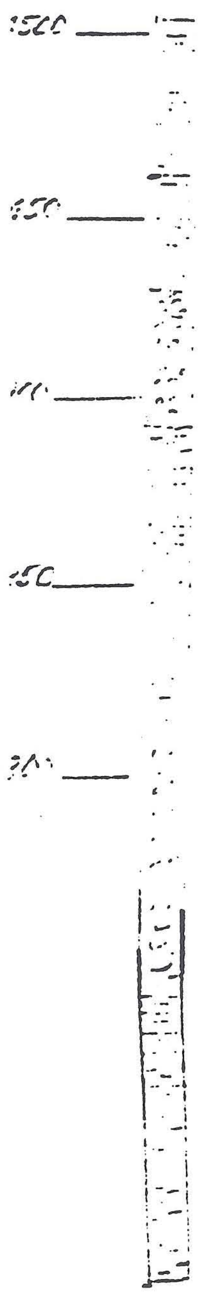
LITHOLOGIC AND ASSAY LOG
DRILL HOLE AC 6

ELECTRUM EXPLORATORY

BY DATE JOB NO.

LITHOLOGIC

Scale 1" = [illegible]



Elevation of collar 4510 ft

Limestone, lt gry [illegible], med to crs

Limestone, [illegible] [illegible]

[illegible] qtz [illegible]

Limestone, lt to med gry [illegible]

[illegible]

Limestone, dk gry to blk [illegible]

TOTAL DEPTH [illegible]40 ft

ASSAY

	oz Au	oz Ag	% Pb	% Zn
1-5	Tr	Tr	0.05	Tr
5-10	Tr	Tr	0.04	0.02
10-15	Tr	Tr	0.04	0.02
15-20	Tr	Tr	0.04	Tr
20-25	Tr	Tr	0.03	Tr
25-30	Tr	Tr	0.03	Tr
30-35	Tr	Tr	0.03	0.04
35-40	Tr	Tr	0.03	0.01
40-45	Tr	Tr	0.03	0.01
45-50	Tr	Tr	0.02	Tr
50-55	Tr	Tr	Tr	Tr
55-60	Tr	0.02	Tr	0.02
60-65	Tr	Tr	Tr	0.01
65-70	Tr	Tr	0.03	Tr
70-75	Tr	Tr	0.02	Tr
75-80	Tr	Tr	0.02	Tr
80-85	Tr	0.02	0.012	0.046
85-90	Tr	0.06	0.04	0.02
90-95	Tr	0.04	0.04	Tr
95-100	Tr	Tr	0.03	Tr
100-105	Tr	Tr	0.03	Tr
105-110	Tr	Tr	0.03	0.01
110-115	Tr	Tr	0.02	0.02
115-120	Tr	Tr	0.03	0.01
120-125	Tr	0.04	0.04	0.02
125-130	Tr	Tr	0.04	0.02
130-135	Tr	Tr	0.03	Tr
135-140	Tr	0.04	0.03	0.02
140-145	Tr	Tr	0.01	Tr
145-150	Tr	Tr	0.02	Tr
150-155	Tr	Tr	0.03	0.01
155-160	Tr	0.02	0.03	0.02
160-165	Tr	Tr	0.04	0.02
165-170	Tr	Tr	0.03	0.01
170-175	Tr	Tr	0.02	Tr
175-180	Tr	Tr	0.03	0.02
180-185	Tr	Tr	0.04	0.02
185-190	Tr	Tr	0.03	Tr

LITHOLOGIC AND ASSAY LOGS
DRILL HOLE NO 6

[illegible] PROPERTY
[illegible] COUNTY, ARIZONA

FF notes 2/1/2

Summary Report
Ellsworth Property
Cochise County, Arizona

July 2, 1973

D. K. Brook

The Ellsworth Group of approximately 67 unpatented claims is situated 15 miles east of Douglas, Arizona and is presently held by Cominco American under a lease-option agreement. The agreement calls for a monthly payment of $300.00 per month from May 1 until October 31, $600.00 per month from November 1, 1973 until April 30, 1975, and $1,000 per month from May 1, 1975 until October 31, 1976. The end purchase price is $500,000.00, payable $100,000.00 at exercise of option and then an annual payment of $100,000.00.

Since optioning the claims Cominco American has carried out a moderate exploration program utilizing geologic mapping, geophysics, geochemical surveys and diamond drilling. These methods have outlined a zone of porphyry type alteration and mineralization. A brief summary of the data is below.

No Fact 500'

Geology:

Geologic mapping was done on a scale of 1" to 500' on a topographic base. The map shows a large, structuraly complex area consisting of altered monzonitic intrusive and sediments. Abundant lead showings were noted and mapped in the limestones along with scattered copper oxide occurrances in the sediments and intrusive. The intrusive shows definite porphyry type alteration zones varying from propylitic on the margins to intense phyllic in the center. Surface outcrops are stained from the oxidized pyrite and abundant sulfide casts are visible and occasional silicified zones preserve sulfides at the surface. The intense phyllic, quartz-sericite-pyrite, alteration area is roughly correspondent to the area of higher copper geochem values. In DDH #2 the porphyry is completely altered to quartz-sericite-pyrite, the pyrite making up about 20% of the rock. The pyrite occurs as disseminated grains and fracture coatings. Feldspar phenocrysts are visible but completely altered to sericite. The groundmass is a very fine grained quartz sericite mixture. There are also abundant quartz veinlets which carry sulfides. This type of alteration is identical to Guilbert's Phyllic Alteration Zone and Outer Pyrite Halo Zone as per his Kalamazoo Paper. The altered porphyry outcrops are limited to the central portion of the property as none were found to the west and north. Porphyry does outcrop to the east but it is generally unmineralized. The porphyry occurs as dikes.

Diamond Drilling:

Three core holes were drilled with a combined footage of 500 feet. Hole #1 was on Cindy Hill and tested the abundant Pb veins exposed at the surface. No veins as such were encountered in the 100' of brecciated, somewhat silicified, dark gray limestone but one 20' interval assayed 0.15% Pb and 0.15% Zn. SILVER NOT ASSAYED

Hole #2 was drilled into the large red hill next to the border in section 16 to test an extremely brecciated, altered and mineralized area. The surface outcrop was the source of the highest copper geochem values and was initially thought to be a breccia pipe or some such similar structure. This zone is now thought to be an intrusion breccia associated with the sill intersected by the hole. The hole collared in oxidized, fractured, silicified, iron stained limestones and quartzites. Oxidation continued past the sediment-porphyry contact at 95' and into the highly pyritic porphyry to 133.5. The altered porphyry continued until 219.5 where sediments were again encountered. A section of coarse arkose was oxidized but the underlying (possibly overturned) limestones were silicified and contained abundant disseminated sulfides as well as sulfide fracture coatings. The 214' of porphyry showed intense phyllic alteration and up to 20% sulfides.

Hole #3 was drilled on the east side of Terri Cat hill to test the abundant Pb ceins exposed on the hillside. The 100' of dark gray, brecciated, silicified limestone had abundant sulfides below the oxidation zone which was at 80'.

Additional work:

The wide spread occurrance of altered intrusive and mineralized sediment indicate a large area which has the characteristics and the potential for a porphyry copper deposit. The zonal alteration and abundance of sulfides are certainly indicative of a porphyry environment. The work completed to date serves to confirm this idea and has served to guide future work toward more favorable areas. The western area of the property should be the next area of drilling. It has a good IP response as well as good geochemical values and favorable geology. Outcrops suggest phyllic alteration which, if is the case, would tend to close the alteration zone around the central portion of the property and make it the most favorable site for deeper drilling. A short hole 200 to 400' is recommended for the western area to test the IP response and alteration theory. Results from this hole would be utilized in placing deeper, 500 - 1,000' holes in the central part of the property. The implementation

TABLE OF CONTENTS

MAPS AND CROSS SECTIONS

Geologic Map Border Silver area, 5"=500'

Geophysical and Geochemical Surveys - overlay for geological map, 1"=500'

Geologic Cross Section A-A' Through Great Arizona Prospect Area, 1"=100'

Geologic Cross Section A-A' Through Border Queen Prospect Area, 1"=100'

Border Ace Prospect Area, Geologic Cross Section A-A', Showing Proposed Diamond Drill Holes, 1"=100'

APPENDICES

A. "Border Silver Property, Cochise County, Arizona - Report on Geological Examination", Joel R. Mangham, Geologist, March 1983.

B. "Preliminary Report - Results of An Exploration Drilling Program, Ellsworth Property, Cochise County, Arizona", a private report for the Ten Corporation by Robert F. Schryver, December 1978.

C. "Summary Report, Ellsworth Property, Cochise County, Arizona", D. K. Brook, geologist for Cominco American, copy of a report provided for property owners, July 1973.

D. "Lead-Silver Deposits on the Ellsworth Property, Ash Springs District, Cochise County, Arizona - A Preliminary Report", by Dr. John N. Faick, geologist, November 1968.

F. "Ellsworth Mining Property", a private report by Dr. Spencer R. Titley, Professor of Geology, University of Arizona, Tucson, July 1960.

THE BORDER SILVER PROPERTY, COCHISE COUNTY, ARIZONA

A SUMMARY REPORT ON THE GEOLOGY AND SILVER POTENTIAL

Frank J. Frankovich
Consulting Geologist
August, 1983

SUMMARY

An exceptional amount of silver-lead sulphide and gossan mineralization is found in many areas on the surface of this property. These features are convincing evidence of a large silver-lead ore potential at depth. Strangely, this property has had little more than minimal prospecting work done on it because southern Arizona is "copper country" and very little copper staining is evident. Lead prospects have been of no interest in the area, and the fact that excellent silver values are always associated with the lead was for the most part missed entirely, or ignored because of its low value in the past. Silver is now, by far, the most important metal value in the property. The very important gossans (indicative of a large ore potential) were not noted previously in any geologic report nor literature that I could find, and for that reason the property was seriously under-valued by previous investigators.

CONCLUSIONS

The widespread silver-lead mineralization, the substantial gossans, and the property's favorable geologic environment, all indicate a high probability that several commercial ore bodies can be found providing that the correct theory of mineral origin is used to guide exploration.

The "hydrothermal theory" of ore occurrence was used as a guide in the past, leading to the incorrect conclusion that the silver-lead mineralization was unimportant -- that it was only an indicator of the possible existence of a porphyry copper deposit in the property. If the "syngenetic theory" is used, however, to guide exploration, it is probable that several high grade silver-lead ore bodies will be found that will support a long-lived underground mine and a milling operation. The principal value of such an operation would be in silver, and the lead and zinc values would pay for most of the production costs.

INTRODUCTION

Cochise County is very large, very sparsely settled and occupies the entire southeast corner of Arizona. It contains two exceptional mining districts -- Tombstone, the rich old silver producer, and Bisbee, the enormously profitable copper district. There are hundreds of prospects in the county, but no other substantial producers.

I have been examining silver prospects in Cochise County since 1958 when I first acquired mining claims and other interests in the Tombstone mining district. In 1960, in association with some Nebraska investors, I exercised an option to buy almost all of Tombstone's mining properties from Newmount Mining Company. That investment has paid handsomely in real estate values and advance royalties continuing today. After the Tombstone acquisition, I began searching throughout all the vast Cochise County for another good silver property. My intermittent search during the years revealed several promising properties, but none really exceptional until November, 1982 when I obtained a copy of the Robert Schryver report (1978) on the Ellsworth property. That report was very negative and described that no ore was found in drilling 3,070 feet in ten drill holes, and it recommended no more drilling. In reviewing that report, I noticed an indication in one drill log that the hole might have gone through a gossan, although it was not described as such. The situation appeared

good enough to justify a field trip from Spokane in November, 1982.

The field examination revealed that the hole of interest went through gossanous limestone, but not through a real gossan. In examining the vicinity, however, I was amazed to discover the remarkable outcrop of the Border Queen gossan. it was about 300 feet away and out of sight from the drill site in a thicket of mesquite and cacti. (See cross-section A-A' through the Border Queen.) There are partially caved old workings in it that were probably made prior to 1900. The gossan was obviously bedded, more than ten feet thick (the top and bottom are covered) and it was very clear that no drill holes had ever been put into it. This feature clearly indicated that a major exploration effort on the property was warranted.

PROPERTY

The property (earlier known as the Ellsworth Property) consists of twenty-six (26) Federal claim locations, plus twenty-six (26) Arizona State mining claims (now leases), all contiguous and located in southern Cochise County, adjacent to the Mexican border. Frank J. Frankovich obtained a lease, with an option to purchase the property, and has assigned it to Border Silver.

SILVER-LEAD MINERALIZATION

Although no commercial ore is exposed on the surface, there are many widespread, inconspicuous occurrences of silver-lead values both as sulphides and oxidized minerals. Many of the lead occurrences were mapped by Cominco American in 1973, and are shown on the 1"=500' geological map (Cominco did not assay for silver even though silver is always present in the lead). The higher grade specimens of sulphides have assayed in the range of 30 to 80 ounces of silver per ton.

In the Border King area there are about 15 tons of stockpiled ore that assays about 20 ounces of silver per ton and about 36% lead.

In the Great Arizona area of the property is an old mine once known as The Grand Arizona Copper Company which was reported in the Copper Handbook of 1910 as having produced $75,000 of silver ore before closing in 1910. The shaft is now caved. Abundant disseminated argentiferous galena is found in the Windmill area, Johnson area, Cindy Hill area and others.

BEDDED GOSSANS

By far the most promising feature in the property is the existence of thick, solid, bedded gossans. They have the classical appearance of gossans, that is, highly porous, layered masses of iron oxides with manganese oxides and minor silica. Evidence of the original metal content is found in the rare occurrence of minute, relic grains of fresh galena, and the geochemically anomalous amounts of silver, lead and zinc in the gossans. The only apparent, logical explanation for these gossans is that they are the almost completely leached residue of strata that were once nearly 100% sulphides with high values in silver, lead and zinc.

The arid climate, deep water table and stable topography of the area provide the ideal oxidizing and and leaching environment which has resulted in complete, deep leaching of the previously high sulphide strata. The writer believes, and other geologists now concur, that high grade silver-lead ore bodies might be found at depth in several different areas in the downward projections of these gossans to near the water table and below. The two best known occurrences of this type of gossan are found in the Border Queen and Great Arizona parts of the property. t appears likely that more will be found with systematic exploration.

BORDER ACE AREA (Gossanous Arkose)

A very important feature in this property has not been previously recognized, namely, the gossanous (leached) outcrops of a sulphide bearing sandstone, which the writer has informally labeled "gossanous arkose". There are several rather large areas

large areas of this type of gossan outcrop. The writer believes that these gossans may have been derived from silver-lead-zinc ore bodies in arkosic channel sandstones and are of a type not found to date elsewhere in the U.S. This type of ore body is characterized by the large sandstone-hosted lead-zinc deposits at Laisvall, Sweden, and by the large, rich silver-lead-zinc deposits at Largentiere, France. It is the writer's belief that these outcrops of gossanous arkose indicate the possibility of a great mineral potential (high in silver) similar to that of Largentiere.

"Arkose" in this particular geologic environment has an unusual significance because it means a high feldspar content in the sandstone. Feldspar is high in potassium, which ultimately breaks down through radioactive decay to its principal end product -- lead. This appears to be the best explanation for the presence of lead (and the associated silver) in all of the various parts of the property.

In the late sixties, McIntyre Mines, Ltd. and Phelps Dodge Corporation, separately made geophysical surveys over the property (see map, "Geophysical and Geochemical Surveys", which is an overlay for the geological map), but did not follow up with drilling because the pattern of anomalies developed did not fit the accepted "porphyry copper model". The geophysical work does show, however, a broad, moderate, but very definite IP (induced polarization) anomaly in the southwest part of the property. This is the type of IP anomaly which one would expect to find over a sulphide mineralized sandstone, but it would not look good from the "porphyry copper" perspective.

The prominent anomaly is over the down dip projection of the gossanous arkose and provides, in itself, compelling justification for drilling below the water table to test for possible economic mineralization in the arkose (a feldspar rich

sandstone). At worst, the mineralization may be only pyrite, but even that should be drilled to test for associated gold.

FISSURE VEINS

In addition to the bedded gossans and the gossanous arkose, there are numerous fissure veins (14 mapped by Cominco) that are promising exploration targets. These veins are thoroughly leached, but have favorable gossan and alteration characteristics with minor silver-lead-barite mineralization. A comprehensive exploration program on the property should include drilling at least two holes on each of five of the veins which could be classified as the best after detailed mapping and sampling of all of them.

THEORIES OF MINERAL ORIGIN

Hydrothermal. This theory is by far the most popular with geologists operating in the southwestern U.S., and it certainly was the basis for all past evaluations of the Border Silver property. In its simplest form, the theory states that all the metallic mineralization originated as mineral bearing solutions from within, or associated with, the intrusive igneous rocks, and that the solutions reacted with favorable intruded sedimentary rocks, forming ore bodies, usually adjacent to the intrusion. For many reasons I have little faith in the theory, and none as it is applied to the Border Silver property. Nevertheless, I also believe that adequate exploration of the property would require that a serious effort be made to prove or disprove the hydrothermal theory as it might apply to this property. This would be done by drilling into the most favorable limestone-igneous contacts below the water table in enough places to provide an effective test of the theory.

Syngenetic Theory. This theory states, in its simplest form, that the ore minerals were deposited simultaneously with the enclosing rock minerals. Subsequent to deposition, the ore minerals are often changed and/or remobilized by changing

geologic factors over eons of time. The mode of occurrence of the mineralization, and the geologic history of the sedimentary rocks, convinces me that this is the correct theory to apply in exploring this property. The igneous intrusions were a late geologic event after the minerals were deposited, and had no effect on the ore minerals other than a minor remobilization.

Throughout the geologic history of the rock strata found in Border Silver, there was an abundance of extrusive volcanic activity throughout the region. There were also transgressive and regressive seas moving in and out from the southeast in the region of Mexico. At times, closed, inland marine basins were formed which were surrounded by volcanic terranes. The volcanics were rich in feldspar which contains potassium. Potassium breaks down through radioactive decay to lead. It is postulated that the lead, silver and other metal ions were leached from the volcanic terranes surrounding the marine basins and were then transported via ground water into the basins. There the metals were deposited in layers by one of several possible mechanisms, but most probably by anaerobic bacteria precipitating the metals as sulphides.

This process can produce mineralized rock strata that vertically has a widely varying composition, grade, and thickness. However, laterally the mineralization is very uniform and often very extensive. Grade can vary from very low as disseminated sulphides, to 100%, thick, banded sulphides. Many of the world's best ore bodies are of this type. In my opinion, only leached ore bodies of this type would produce the thick, exceptional, layered gossans found in Border Silver.

If it should be proven that the origin of the mineralization and gossans is in fact syngenetic, then it is likely, from the nature of the entire geologic setting, that large tonnages of ore are present in the property.

PREVIOUS GEOLOGICAL WORK

After studying the four early geologic reports available on the property, and talking to the geologist who did the most work on the property, it is clear that none of the previous geological workers saw, nor took note of any of the gossans on the property (each of the four reports is appended to this report). Further, all previous geological evaluations were based on the concept that the widespread silver-lead mineralization present is "peripheral" (and therefore not important) to deep-seated, hydrothermal, porphyry copper mineralization. Consequently, all previous exploration work (a very limited amount 1968 and 1978) was directed toward finding a porphyry copper deposit in, and adjacent to the igneous rocks. Virtually no attention, nor effort, was directed specifically to the silver-lead mineralization in the sedimentary rocks, therefore, the principal mineral potential of the property remains untested.

Joel R. Mangham Report, March, 1983

In February and March, 1983, Geologist, Joel R. Mangham worked two weeks in the field on this property for the writer. He spent considerable additional time evaluating and analyzing the results of his field work in order to be confident of his conclusions.

His report is appended. Mangham agrees in general with the writer on the significance of the gossans and that they indicate an important silver-lead ore potential that should be drilled. His approach to the interpretation of the origin of the mineralization is somewhat more modern than the earlier geologists who relied entirely on the hydrothermal theory in their evaluations of the mineral potential.

Robert F. Schryver Report, December, 1978

During December, 1977 and January, 1978, Geologist Robert F. Schryver as consultant for a California investment company, drilled ten air-rotary holes totalling 3,070 feet in the property. Quoting from his report, the ". . . two target areas were

outlined by the coincidence of the areas of the strongest geochemical anomalies, the strongest geophysical anomalies, and the strongest surface mineralization." No ore was found, and no hole reached down to the water table. Schryver states (page 3), "The drilling indicated that minor amounts of lead and zinc mineralization are present in all of the holes throughout the entire length of nearly every hole."

The writer points out that in this particular property air-rotary drilling is an extremely poor method of exploration. The ore minerals are soft, friable and totally pulverized into a fine, heavy powder by the dry drilling action. The heavy mineral powder is then blown out into the fractures in the rock near the bottom of the hole and never blown up the hole to be caught in the samples at the surface.

Schryver's holes were located solely on the basis of anomaly-overlap and topography which provided easy drill access. Specific geologic features were not considered, therefore, the work cannot be considered as useful exploration work.

D. K. Brook Report, July, 1973

This report summarizes Cominco's work on the property which was held under option several years. Cominco mapped most of the property (except the eastern Great Arizona gossan area) at 1"=500'. They did some geochemical and geophysical work which was followed by a total of 500 feet of drilling in three holes. Their report indicates that the primary objective of their work was evaluation of the porphyry copper potential of the property. They found some encouragement, but not enough to continue work. In the entire record of their work, only one assay for silver can be found.

John N. Faick, Ph.D., Geologist Report, November, 1968

Faick prepared a report for the owners of the property and summarized the history to that date, the rock types and

mineralogy. He averaged all the many samples (good and poor) assayed up to that time from many parts of the property with the following results: 42 assays for silver averaged 5.30 ounces per ton, and 38 assays for lead averaged 15.0% lead. He concluded his report with, "RECOMMENDATION--Because of the widespread occurrence of good quality lead-silver ore on the Ellsworth [now Border Silver] property, it is highly recommended that this property be thoroughly investigated in an effort to find large ore bodies suitable for large scale mining by open pit methods".

Spencer R. Titley Report, Ph.D., Professor of Geology, Arizona

This is a two-age report written for some Phoenix, Arizona, investors in 1960. Titley's brief report contains the usual summary of geological aspects of the property. He concluded that the property is very favorable for several reasons, but his most important reference is to, "The almost ubiquitous presence of lead mineralization in sedimentary rock of the area". However, Titley did not observe that silver values are always present in the lead.

Titley concludes his report with, ". . . I believe this property to be an extremely promising prospect for further exploratory and development work . . .".

PREVIOUS EXPLORATION WORK

Drilling. In the modern sense of the word, this property has not been explored. None of the gossans have ever been drilled, and no drilling has been done in the immediate vicinity of silver-lead sulphide mineralization to determine its extent and continuity. Ten air-rotary holes with a total of 3,070 feet were drilled into the overlap areas of geophysical and geochemical anomalies without regard for geology and mineralization. Consequently, those holes have almost no exploration value. Three diamond drill holes with a total of 492 feet were similarly located with similar, almost valueless, results.

Geophysical. Geophysical surveys were made by Phelps Dodge Corporation and by McPhar Geophysics for McIntyre Mines, Ltd. (see map, "Geophysical and Geochemical Surveys). The results of this work were interpreted by both companies with the object of finding evidence of a porphyry copper deposit in the central area of the property. The small, weak anomalies found there did not indicate the possibility of a porphyry copper deposit. Neither did the broad, distinct IP anomaly found in the southwest part of the property fit the concept of a porphyry copper deposit, and so it was dismissed as unimportant. However, that anomaly is strongly indicative of layered sulphide mineralization in the gossanous arkose which should be drilled.

Geochemical. The geochemical anomalies shown on the map "Geophysical and Geochemical Surveys", are the combined results of all geochemical surveys compiled by Cominco. The results are not useful in interpreting the overall geologic picture, but they do show high metal values (note that silver was not included in the surveys). Geochemical anomalies do not provide valid drilling targets in themselves, but must be incorporated into the correct theory of mineral origin to be useful. To date this has not been done.

EXPLORATION PROGRAM

The exploration program will begin with two geologists and one diamond drill. A second drill, and more, will be added when and if practical to speed progress. As drilling progresses, a program of geologic mapping and soil sampling will continue with the principal objective of searching for buried and/or collapsed gossans. Close geological control of the drilling will be maintained and is essential to success.

Initially the drilling program will have two objectives:

1. To try and prove or disprove the hydrothermal theory.

2. To determine the continuity of the gossans and their grade at the water table and below.

These objectives will be achieved best by drilling profiles of holes perpendicular to the strike of the gossans and extending the profiles into the nearest igneous intrusions that may have been a source of the mineralization. Holes will be drilled initially within the planes of the sections to trace the gossans and mineralized limestones down to their contact with the igneous rocks, and further, explore the limestone-igneous contacts.

The first phase drilling will consist of drilling three profiles (see geologic map for location of profiles), one each through the Great Arizona gossans, the Border Queen gossans, and through the Border Ace (gossanous arkose). The amount of drilling done in each profile will vary with the geology as it is revealed and also by the amount of money available from the stock offering. The general layout of drill holes in each cross section is shown in the three geologic cross sections titled:

1. "Geologic Cross Section A-A' Through Great Arizona Prospect Area"
2. "Geologic Cross Section A-A' Through Border Queen Prospect Area"
3. "Border Ace Prospect Area Geologic Cross Section A-A'"

When these profiles of holes are completed, some reliable conclusions can be drawn on the origin of the mineralization, the kind and grade of mineralization the gossans represent, and what additional exploration work is warranted.

In addition to the profile drilling of gossans, about 50% of the fissure veins should be drilled with two inclined holes each, and also the areas of sulphide mineralization -- the Border King, the Windmill, and the Johnson.

EXPLORATION COST

The minimum effective exploration program will cost approximately $500,000 overall, and that approximately $1,000,000 would be needed to test most of the possibilities in the property within about two years time.

If the above proposed exploration program proves the existence of commercial ore, then much greater sums of money will be needed to develop an underground mine and build a mill. This can be accomplished by Border Silver Mining, Inc. selling capital stock to raise the money, or by bringing an established mining company into the project as a partner to do the job. Circumstances prevailing at that time will indicate which is the best course to take.