Form No. X-114 F.W.P.

avoid verbal orders

avo

TO P.W. O'Malley LOCATION Ft. Wayne, Indiana

FROM H. Lanier LOCATION Tucson, Arizona

SUBJ. Phelps Dodge Morenci DATE Nov. 9, 1971

COPY TO J.R. O'Hare

Attached is a letter from John Lentz advising his position on the BYU-Anderson contract.

This position is a reversal from previous stands in spite of the fact that he knew of all essential aspects of the terms except the two year option.

It is apparent that he is testing our willingness to hold onto the contract. It is possible that he believes that we would be satisfied with our current purchasing status. No doubt he feels that the negotiations in the east will satisfy our purchasing requirements and lessen our interest in retaining the lease.

He now knows what the BYU-Anderson group will settle for, therefore, he assumes he could get at least these terms if we drop the contract.

We know the tremendous value of the property to PD in terms of the Morenci mine development. Therefore we propose the following action:

1. Pay the next 6 month payment of $50,000 on Dec. 1, 1971 to comply with the contract.

2. We will negotiate a 1 to 2 year extension to the option period with Anderson, Claridge, and the Church. PD will not know of this and think that we are working to a Nov. 30, 1972 deadline before a decision.

3. Discontinue purchasing copper from them and discontinue further negotiations on copper purchases which are not related to the contract. In other words, the original understanding between you and Munroe was that Lentz and I would work out a settlement.

Another factor that is now important is our position at Safford. What we have there is many times more important than Morenci. Our position at Morenci could become an essential factor at Safford.

This letter is typical of the negotiations by Lentz and Phelps Dodge, i.e., a hard "no" but directing the negotiations to where they believe they will accomplish their best position. They have nothing to lose in taking this stand. Our buying copper from them now only plays into their hands. I strongly recommend that we hold firm and implement the above plan.

H. Lanier.

H. Lanier
Attachment

PHELPS DODGE CORPORATION

P. O. BOX 1238

DOUGLAS, ARIZONA 85607

October 29, 1971

Mr. Howard Lanier
Essex International, Inc.
2030 East Speedway Boulevard
Tucson, Arizona

Dear Mr. Lanier:

Reference is made to the meeting which we held at Douglas on September 20 at which time you provided a copy of the option and lease agreement which Essex has on the Anderson-Church claims near Morenci.

The conditions of the lease are unacceptable to Phelps Dodge, and we see no point in having further discussion in the west with you on either the Anderson-Church claims or the matter of Phelps Dodge copper sales to Essex. With respect to the latter, however, it is my understanding that Phelps Dodge Sales Company is working with Essex people in Ft. Wayne on the matter of copper supplies, and we feel that any future discussions on that subject should be carried on through the normal channels in the east.

Yours very truly,

John A. Zentz

Vice President and
General Manager

JAL:ml

cc: G. B. Munroe

3-26-71

Paul -

Please take the attached with you when you go to Salt Lake.

Toni

INVENTORY
OF MAPS FOR ESSEX-MORENCI
PRESENTATION

March 25, 1971

A - Raised Relief State of Arizona

1 - Colored Aerial Photo

2 - Typical Porphyry Zoning from Lowell

3 - Photo Geology by Knox et al

4 - Composit Diazo Overlay - Drill Roads and
Property Boundary

5 - Proposed Mining Plan - Diazo Overlay

6 - 5650 Bench Level - Proposed Mining Plan

	(1)	(2)	(3)	(4)	(5)
Mining Plan Benches -	6000	5500	5000	4500	4350

(Un-numbered - Diazo Overlay of Roads and Property
Boundary to Match Geology - By Eimon & Jones

EGH

MORENCI PROJECT

Geological studies surrounding and including BYU, Banner and Phelps Dodge ground in the Markeen Mountain area have indicated that:

1. The BYU ownership lies at the eastern edge of the King-Standard porphyry copper chalcocite blanket which is one of the large porphyry copper deposits of the world.

2. The BYU claims contain part of this chalcocite blanket but post-chalcocite fault displacement has caused an erosion history which reduces the ore tonnage potential on the BYU ground.

3. This post-chalcocite fault displacement and the present topography results in a geometrical distribution that places a large part of the Standard ore body butting up to the western boundary of the BYU ground in such a way that the BYU ground has important control over the eventual mining of the Standard ore body.

4. Based on preliminary leached capping interpretation, the Standard enriched chalcocite blanket should have ore grades above average for a USA porphyry copper deposit.

Mapping of both the BYU and Banner ground shows that the ore contained in the BYU property and the mining control of the BYU ground on the Standard ore body is presently the prime value of the Essex position. Reconnaissance mapping and study of Banner records and core has shown an area in the northern part of the Banner ground that should be mapped to ascertain if a target of commercial interest might be contained in this area.

Mr. Ken Jones has begun detailed geological mapping of the BYU-Banner and surrounding ground. He will remain full-time on this project until our information picture appears adequate for

(1) negotiations with Phelps Dodge; (2) a decision can be made on what is to be done with the Banner option. His geological studies may indicate the need for geochemical sampling, geophysics or drilling. As time is of the essence, plans for such additional work will be reported when deemed necessary.

Paul Eimon
Feb. 23, 1971

October 19, 1971

Mr. H. Clyde Davis, Director
Mineral Development
A-387-ASB
Brigham Young University
Provo, Utah 84601

Dear Clyde:

This confirms the tentative arrangements made in our telephone conversation yesterday.

You are planning to arrive Thursday afternoon, Oct. 28 and President Oaks will arrive the same day on a late flight from Salt Lake City. You have reservations at the Holiday Inn-North. I shall join you for breakfast at 7:30 a.m. Friday at the Holiday Inn.

A meeting is planned in our office following breakfast at which time we shall review with President Oaks our program at Morenci. This presentation will be limited to insure President Oaks making his other commitments.

As I understand your plans for the balance of the day, Friday, you and President Oaks will travel to Safford with Mr. and Mrs. Anderson where you will be their guests Friday night.

On Saturday Paul Eimon and I will fly to Safford in a chartered (twin engine) plane arriving at 9:00 a.m. We shall then fly over the Safford and Morenci areas to show President Oaks the property in which the Church has an interest. We shall return to Safford for lunch - and I hope that we can persuade Guy to arrange one of those superb Chinese meals.

After lunch we shall fly President Oaks to El Paso to meet his schedule there.

I am forwarding a copy of this letter to Guy. I trust that you will work out the details with him.

We look forward to the visit of President Oaks and hope Messrs. Maxwell and Lewis will have the opportunity to join President Oaks in this trip.

Best regards,

Howard Lanier, General Manager
Copper Operations

ESSEX INTERNATIONAL, INC.

HL:td

cc: G. Anderson
P.I. Eimon

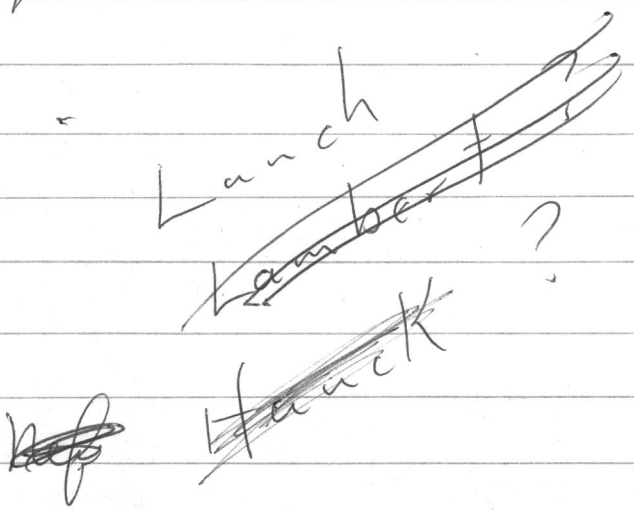
① US Smelting Report

② Safford R.F.A. -

③ Employees -

④ Cerro Verde -

⑤ Pinal Copper -



Dave Lowell

Morenci - Jack Langton

Chalcocite blanket below Chase Creek

600' thick .7% Cu

below pyritic zone

Lowell has sketch.

but ask Saegart.

.15 - .2 % dipping west

leached cap dipping east

higher grade below leached cap.

Call Saegart - high altitude photos of Safford.

EXAMINATION AND EVALUATION OF

MARKEEN MOUNTAIN AND COPPER KING MOUNTAIN

CLAIM GROUPS,

Morenci Mining District

Greenlee County

ARIZONA

By
Willard C. Lacy
Consulting Geologist

SUMMARY AND CONCLUSIONS:

The groups of 13 claim fractions which constitute the Markeen Mountain and Copper King Mountain claim groups lie northeast of the quartz monzonite stock - laccolith which contains the present Morenci open pit orebody. The Markeen Mountain group of claims includes at its northwestern end shattered and mineralized Precambrian granite that exhibits favorable capping. If mined to the valley level this mineralized area could contain approximately 120 million tons of ore. Samples of sludge taken from the tailings of churn drill holes drilled adjacent to the claim boundaries indicate a possible grade of 0.60% copper. Over a hundred year period average production of 1.2 million tons per year would yield $ 162,000 per year at a 10% royalty. It is suggested that a $ 150,000 per year guaranteed royalty payment be required, and that these claims be leased.

The Copper King Mountain group of claims lie in an area of Precambrian granite cut by widely spaced northeast trending shear zones. The value of these claims lie in their position rather than in contained ore values. They will lie within the limits of the ultimate pit. It is suggested that these claims be sold, rather than leased, at whatever price the market will bear.

SCOPE OF INVESTIGATION:

On November 4th, 1960, I spent one day in the Morenci mining district, accompanied by Mr. H. Clyde Davis, examining a group of 13 claim fractions in the Markeen Mountain - Copper King Mountain area. Areas of favorable leached capping within the claims and in the surrounding areas were deliniated.

Churn drilling had been done in adjacent claims. Samples were collected from the sludge tailings from eight of these drill holes for assay.

On the basis of field observations; geological data compiled by Lindgren (1905), Butler and Wilson (1938); and sample assay data collected during this brief examination -- an evaluation was made of the potential value of these claims. Broad assumptions as to possible scope of operations by Phelps Dodge at the Morenci mine were required.

PUBLISHED DATA:

Historical and production data for the Morenci mining district is summarized by A. B. Parsons in The Porphyry Coppers (1933) and The Porphyry Coppers in 1956 (1957). The geology of the district was thoroughly investigated by Waldemar Lindgren and his observations published in the U.S.G.S. Professional Paper #43 (1905); this was supplemented by observations of B. S. Butler and E. D. Wilson published in the Arizona Bureau of Mines Bulletin #145 (1938).

LOCATION:

The Morenci mining district lies in Greenlee county in eastern Arizona about 15 miles west of the New Mexico border. Mineralization occurs on both sides of federal highway #666 which follows Chase Creek. The Markeen Mountain - Copper King Mountain area lies about 2 miles east of the highway and can be reached by drill access roads. The highway is at an elevation of approximately 4000 feet where it passes the pit area. The claims on Markeen Mountain and Copper King Mountain lie at an elevation averaging 6000 feet.

GENERAL GEOLOGICAL SETTING:

At Morenci a quartz monzonite stock - laccolith, 6 miles long and 2 to 3 miles wide in outcrop with accompanying dikes and sills, has intruded Precambrian granite and a sedimentary sequence ranging in age from early Paleozoic to Cretaceous. Both the intrusive and later sulphide mineralization have been localized by a system of northeast trending fractures which parallel the long axis of the intrusive.

Early production from the district came from high grade deposits in limestone along the contact of the quartz monzonite intrusive and from veins within the intrusive. However, the bulk of production from the area has been disseminated, low grade ores from shattered and breccia areas within the intrusive southwest of Chase Creek.

The disseminated orebody exploited at Morenci is irregular in form and distribution of values but generally has: (1) a barren leached capping about 210 feet thick, (2) an enriched sulphide zone carrying about 1% copper and averaging about 350 feet thick over most of the area, (It parallels the slope of the valley.) (3) a primary sulphide zone of unknown thickness carrying about 0.5% copper. The ores contain unimportant quantities of gold and silver and erratic molybdenum.

Parsons (1957) reports Morenci's production between 1942 and 1954 as 172,568,000 tons with an average grade of 1.06% copper. Present mill heads run about 0.8% copper.

B.Y.U. MINING CLAIMS:

Brigham Young University has an interest in two groups of claims which lie 1½ to 2 miles northeast of the present Morenci pit. See Plates 1 and 3.

One group, Ells-Beth #1 to #5 (50% BYU) lies along the crest of Markeen Mountain 1½ miles northeast of Chase Creek. These are claim fractions and cover approximately 40 acres of federal land.

The other group consists of seven claims, Cornell, Princeton, Yale, Columbia, Amherst, Stanford and Tulane comprising approximately 60 acres on state land under lease to B.Y.U. They lie on the southwest slope of Copper King Mountain. Contiguous

on the north with the state leased claims is a federal claim, Els-Beth #6 (BYU 50%), which contains approximately 12 acres.

GEOLOGY OF THE B.Y.U. CLAIM GROUPS:

Both groups of claims lie northeast of the Morenci quartz monzonite intrusive within the Precambrian granite. The Markeen Mountain group (Els-Beth #1-#5) are close to the contact where the granite has been generally shattered and altered. Northeast trending fractures localize the mineralization. Examination of the leached capping reveals favorable capping in the western portion of the claim. (See Plate 4.) The eastern portion is less severely fractured and altered and the capping indicates that the mineralization was pyritic in character with very low values in copper. Road cuts and drill stations exposed sulphides a few feet below the surface in adjacent claims. These sulphides consisted of pyrite, chalcopyrite, molybdenite, and covellite. There appeared to be only minor secondary enrichment.

The Copper King Mountain group (state leases and Els-Beth #6) is erratically mineralized along northeast trending fracture zones and in narrow zones along the contact of the quartz monzonite dikes. There appears to be little chance of developing either high grade vein deposits of any magnitude or disseminated low grade mineralization of sufficient continuity to warrant development of these claims.

There are value indications that the quartz monzonite intrusive and the disseminated copper values plunge steeply to the northeast and to the southeast. This trend, if it continues in depth, will extend the area of potential ore in the Markeen Mountain claim group and may extend under the Copper King Mountain group.

POTENTIAL OF MARKEEN MOUNTAIN CLAIM GROUP:

Plate 4 shows location of churn drill holes which were drilled adjacent to the Ells-Beth #1-#5 claims on Markeen Mountain. The samples collected from the sludge tailings adjacent to these holes give an indication of the grade of the entire run and includes both the sections in ore and waste. No information is available as to the depth of these drill holes, though from the extent of the sludge tailings they must have extended to 500 to 1000 feet.

The sludge samples assayed:

Hole	Copper (%)
1	0.73
2	0.26
3	1.08
4	0.44
5	0.36
6	0.30
7	0.29
8	0.27
Average:	0.47

If one were to assume that 30% of the material encountered in the hole was waste averaging 0.15% copper, then an average grade of the ore might be approximately 0.60% copper.

No assay was made for molybdenum since sludge samples are not reliable for this component. Molybdenite tends to float off as a film on the water discharge, and the values are lost from the sludge. However, good molybdenum values were encountered in the sulphide ores exposed in the road cuts.

Scaling from the claim map the area occupied by favorable capping, Plate 4, a figure of 1,024,000 square feet is obtained. If this were extended in depth to the level of the bottom of the valley-a depth of 2000 feet - a total potential of 2×10^9 cubic feet or 170 million tons might be anticipated. Assuming that 30% of this material was waste, the potential from this block of claims might be of the order of: 120,000,000 tons at 0.6% copper.

A rough approximation was made of the length of time which would be required for an expanded Morenci pit to encompass and remove the above "guestimated" tonnage at a production rate of 100,000 tons per day, nearly double present capacity. This would require approximately 100 years.

These claims, aside from value for contained copper values, are essential to Phelps Dodge if pit operations are extended northeastward, since they would lie within pit limits.

POTENTIAL OF COPPER KING MOUNTAIN CLAIM GROUP:

The principal value of the Copper King Mountain group of claims appears to lie in its position - within and immediately adjacent to the ultimate pit limits. It is possible that better grade material may occue in depth, however, the tremendous amount of waste material that would need to be stripped in order to mine deep ores in this section by open pit methods would make it unlikely that they would be mined in the forseeable future.

VALUATION OF CLAIM GROUPS:

Assuming a potential of 120 million tons of 0.6% copper ore in the Markeen Mountain claim group that would be mined over a period of 100 years. And, assuming a 90% mill-smelter recovery of values, and $ 0.25/pound net smelter payment per pound of copper - the following return might be anticipated:

0.60% Cu x .90 recovery = 0.54% or 10.8 pounds copper/ton.

10.8# x $ 0.25/pound = $2.70 value/ton.

Material with this grade would only support a 5% royalty:

$ 2.70 x 0.05 = $ 0.135 royalty/ton.

Average production = 1,200,000 tons/year.

Average royalty return = $ 162,000 per year.

A reasonable annual guaranteed royalty payment would be approximately one-fourth the above total, or $ 40,000 per year.

There is no basis for putting a dollar value on the Copper King group of claims. These should be sold outright for whatever the traffic will bear. They should not be leased out on a royalty basis, since it is unlikely that any royalty would be paid.

Respectfully submitted,

Willard C. Lacy
Consulting Geologist

Info- DDH West of Elsabeth #1-3

No.	Ft. to Ore	Ft. of Ore	Avg. Grade	Depth of hole
1	250	400	0.90	900
2	150	450	0.79	800
3	none	none		800
4	100	300	0.72	1000
5	300	550	0.93	1100
6	150	300	0.99	900
7	200	50	0.40	500
8	100	750	0.80	1100
9	350	200	0.64	1150
10	none	none		1200
11	300	600	0.60	1800
12	350	700	1.03	1050
13	150	850	1.01	1400
14	150	400	0.60	1200
15	500	450	1.03	1900
16	400	450	0.75	1600
17	50	700	0.54	1500
18	300	400	0.58	1000
19	300	100	0.95	1200
20	1000	200	0.59	
21	400	400	0.61	
22	350	650	0.46	
23	350	650	0.51	
24	650	1000	0.47	
25	600	200	0.74	

0.40% of Copper and above is ore. Copper values run as high as 4.00% Copper.

Ore is encountered at shallower depths but is not counted unless an entire 50' level averages 0.40% or more.

Within the above the values run as high as 1.50% Cu.

MEMORANDUM

Jan. 20, 1971

TO: Howard Lanier

FROM: Paul Eimon

SUBJECT: Kenyon Richard Observations at Morenci - January 19, 1971

During the entire day of January 19, 1971 Kenyon Richard (hired as a consultant to Essex for that day) studied the outcrops including and surrounding the BYU claims.

Included in Kenyon's comments during the day were the following statements.

1. The leached cap west of the Els-Beth claims represents the leached equivalent for a chalcocite blanket that should have averaged 1% Cu or greater.

2. The Els-Beth claims at the top of the hill show the leached equivalent of chalcocite ore that approached 1% Cu in grade.

3. The copper from the above leached ground probably was transported away from the area and did not furnish copper for significant re-enrichment at depth.

4. The Els-Beth claims could contain higher grade and higher tonnages of ore than we are presently estimating.

5. The most logical geological explanation of the apparent displacement along the BYU boundary is a feature such as the "Boundary Fault" I have surmised. This "Boundary Fault" is probably a series of irregular fracture planes.

6. The leached cap in the Standard area represents the leached equivalent of extremely good porphyry copper ore.

7. The top and bottom of the chalcocite blanket in the Standard area is probably quite irregular.

TO: H. Lanier Jan. 20, 1971

FROM: P. Eimon

SUBJECT: Kenyon Richard Observations at Morenci - January 19, 1971

8. Kenyon recommends 5-6 weeks of field geologic mapping to pin down geological relationships and appraise the leached cap. He recommended against geophysical work or detailed geochemical sampling.

9. The three dimentional geometry and grade of the underlying ore body will be difficult to ascertain merely by surface geologic mapping.

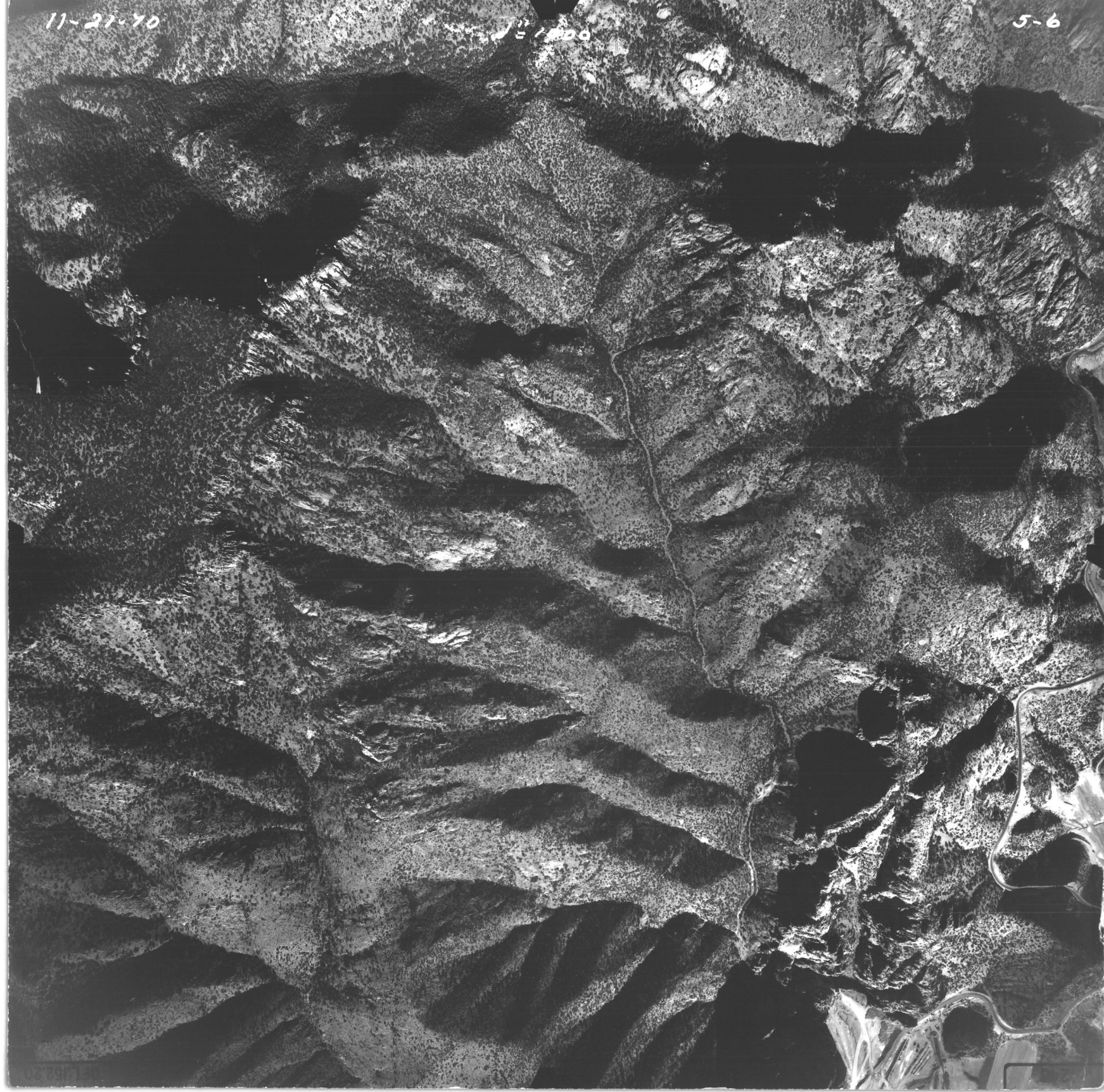
10. It is mandatory for P.D. to obtain the BYU ground soon to begin stripping in a logical manner with minimum ore and waste haulage. This need is accentuated by the geometry of the ridge leading SW from BYU D.D.H. #1.

11. Kenyon generally felt that Essex's position is extremely strong and should be profitable if negotiations remained rational.

12. The Banner ground is of very limited value for exploration. (Based on prior ASARCO mapping and evaluation).

PIE:td

17-AR-25
A-6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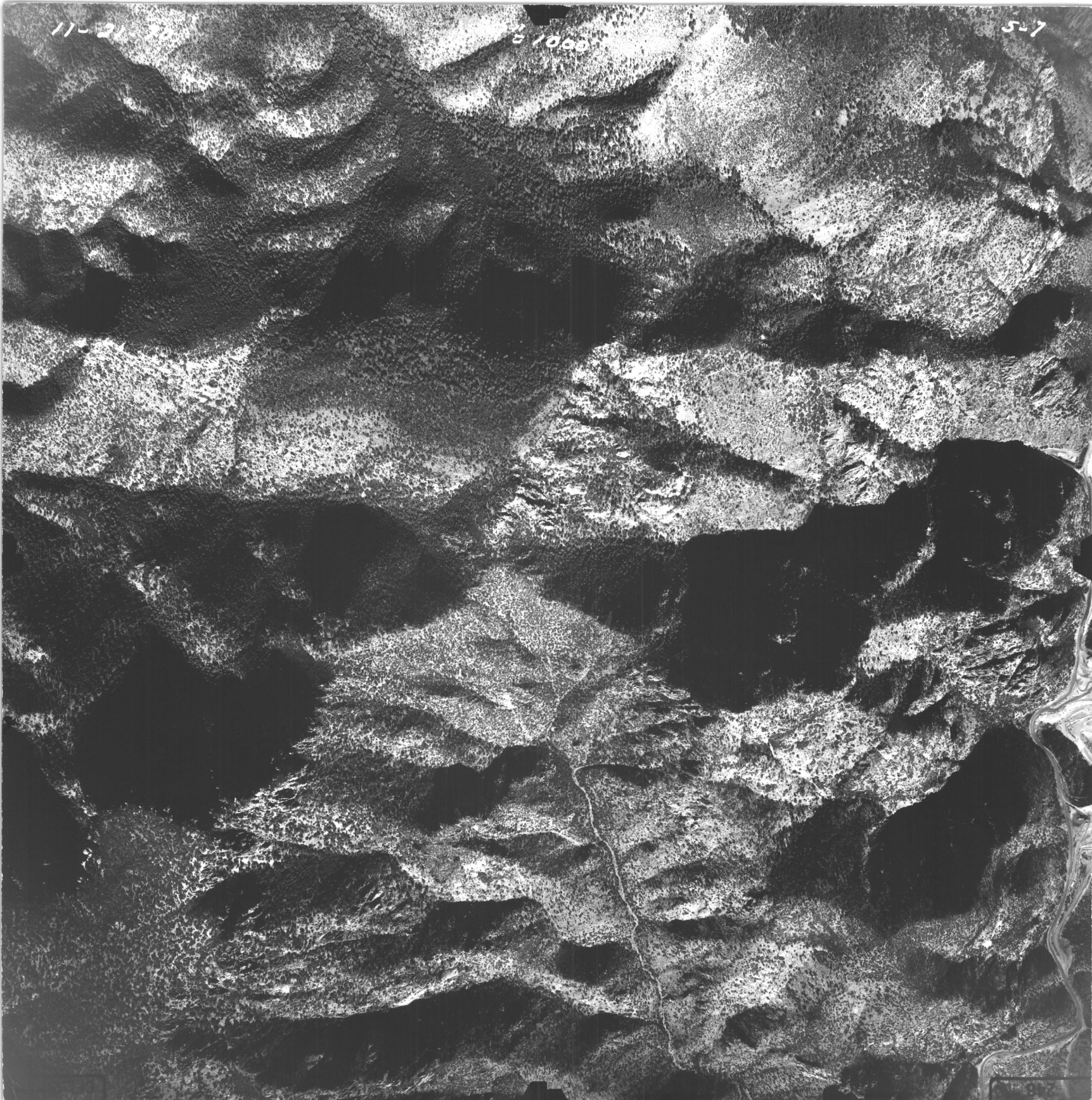


TO Mr. Clyde Davis
Brigham Young University
Provo, Utah

HEINRICHS GEOEXPLORATION COMPANY
808 W. GRANT ROAD - P. O. BOX 5671
TUCSON, ARIZONA 85703
Area Code 602 Phone 623-0578
Geophysical Exploration Research Engineering

SUBJECT: DATE: July 10, 1970

2ND FOLD

Dear Clyde:

Enclosed is a copy of the sketch map on the Banner-BYU-Morenci properties joining Phelps Dodge. If you observe any discrepancies please correct them. In observing the map in detail it looks like the Metcalf should move somewhat southerly per my dashed red line. But what I am particularly concerned about is the boundary line of Guy Anderson BYU and the Phelps Dodge property.

See you next Thursday. If you can give me a call I will meet you at the airport.

Very truly yours,

enclosure

1ST FOLD

PLEASE REPLY TO ——→ SIGNED

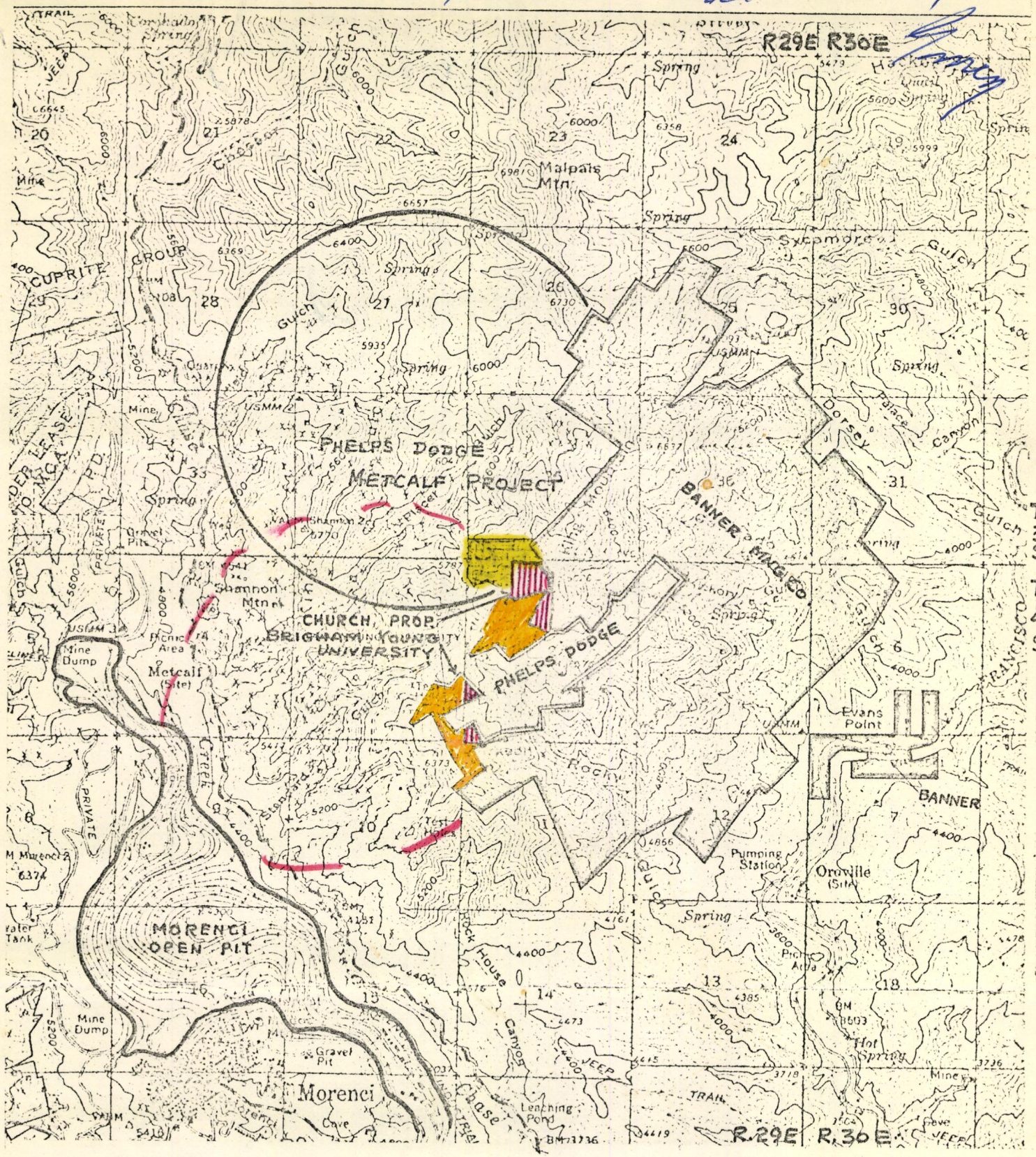
P.S. Essex will let you use the Ford Bronco while you are here.

No copy necessary

DATE SIGNED

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

Please make any corrections necessary



EXPLANATION OF PROPERTY

Indicates Phelps Dodge

Indicates Banner Mining Co.

Indicates Guy Anderson

Indicates B.Y.U. & Mormon Church

Info. from Clyde Davis

ESSEX INTERNATIONAL, INC.

Introduction

The Banner - B.Y.U. property is located about 2-3 miles northeast of Morenci, Arizona (see figure 1).

Access to the northern part of the area is by a road up Dorsey Gulch. Access to the southern part used to be via a road up Standard Gulch. This road has recently been permanently closed by the shipping operations of Phelps Dodge on hill number 6153 (elevation).

The claim group, as shown in Figure 1, consists of two groups; Banner Mining Company and B.Y.U.

General Geology

The oldest rock in the ~~area~~ claim group area is a coarse grained Precambrian granite. The rock is generally red, due to ~~the~~ iron in the feldspars.

The precambrian granite is capped by lower Paleozoic sedimentary rocks at the north end of the Banner claim group. The sedimentary rocks are only a couple of hundred feet thick or ~~pe~~less. A small block of altered sedimentary rock occurs on the northeast side of Markeen mountain. Since precambrian granite occurs just to the north on Copper King mountain, there must be a fault, with significant vertical displacement, in Rocky Gulch.

These rocks have been intruded by a Tertiary quartz monzonite porphyry stock, roughly 10 miles long and 1-4 miles wide, elongated in a northeast direction. The intrusive is reported to be both stock-like and laccolithic in shape. This intrusive complex is the source and host rock for the mineralization at Morenci.

The ~~south~~ southern B.Y.U. claim group is the only claim group which contains significant amounts of ~~the~~ quartz monzonite porphyry. The porphyry in this area is largely aplitic; presumably it represents the chilled border facies of the main porphyry intrusive.

Dikes of the porphyry occur in the southwestern part of the Banner ~~main~~ claim group. There are a few dikes of porphyry on the main Banner claim area, but there is a distinct decrease in frequency and size of the dikes in a northeasterly direction.

The dikes have been emplaced in a series of northeasterly trending shear zones. As the dikes peter out, the shear zones will continue, containing pyrite and quartz.

Structure

The main structural trend in the ~~are~~ claim area is northeasterly, commonly N50E. A subordinate ~~N10~~ northwest trend is also present, generally N10-15W. It is suspected that significant faults exist in Rocky Gulch and Horse Standard gulch. The extremely sharp decrease in mineralization and alteration between hill #6153 and the northern BYU claim group is most unusual. Also the small block of metamorphosed sediments on the ~~northeast~~ northeast side of Markeen mountain suggest that there is a fault between Markeen mountain and Copper King mountain.

Alteration

Alteration of the rocks in the Banner-B.Y.V. area is "typical" of the alteration in the porphyry copper deposits of the western U.S. However, in the Banner ~~area~~-B.Y.V area, changes in alteration types is quite abrupt. There does not appear to be a large halo zone surrounding the Morenci orebody, particularly when one considers the size of the Morenci orebody.

Stripping of quartz-sericite leached capping over ore is currently being done on hill #6153. Immediately east of this hill (less than 1000 feet away), Precambrian granite is exposed which is essentially unaltered. As mentioned under structure, this maybe due to faulting.

As shown on the alteration map, three distinct alteration types exist in the ~~Ban~~ claim area; phyllic, argillic and propylitic. ~~The argillic~~ The phyllic zone, which is associated with ore grade mineralization, occurs only on the southern B.Y.V. claim group. The location of ~~contact~~ the contact between the phyllic zone and the argillic zone is in doubt ~~in the~~ on the Phelps Dodge ground, but it's location should be ascertained adjacent to the Banner-B.Y.V. ground.

The argillic zone roughly corresponds to the pyritic zone in the Banner-B.Y.V. area. ~~Pyrite content is very high, while the copper (primary chalcopyrite) content is~~ Alteration of the feldspars is pervasive. Quartz content is ~~more~~ ~~very~~ lower than in the phyllic zone. ~~The quartz is also more visible~~ Quartz occurs ~~is in~~ as a fine stockwork in the

phyllic zone. ~~It is more prevalent in north east trending fractures in the argillic zone.~~ In the inner part of the argillic zone the quartz occurs as a stockwork. In the outer part of the argillic zone, the quartz is generally in northeast trending fractures.

The prophyletic zone is not very well developed in the Banner - B.Y.V. (compared to some other porphyry copper deposits). The prophyletic alteration is normally confined to northeast trending fractures. Alteration generally consists of chloritization of existing mafics, or veinlets of chlorite. Manganese oxides generally accompany the chlorite.

Prophyletic alteration occurs throughout the Banner & northern B.Y.V. area, but ~~is~~ along northeast trending fracture zones, and not pervasively.

A north east trending shear zone extends across the northern part of the Banner - B.Y.V. ground. (see figure —). This zone, which is about 500 feet wide, contains moderate kaolin alteration. Alteration fades slowly along the zone, while it fades abruptly on either side. (Banner drillers most of their drill holes in this zone).

Alteration in the quartz monzonite porphyry is generally pervasive. Although the Precambrian granite is chemically and mineralogically similar, it seems to have been resistent to alteration, or the alteration halos are rather narrow, particularly for a deposit of this size.

Mineralization

Sulfide mineralization in the claim area has a pattern similar to the alteration. The transition from ore grade disseminated mineralization to barren rock is rather abrupt, ~~perhaps due to faulting~~.

Between hill #6153, where perhaps 0.8% copper is currently being readied for production, and the northern B.Y.V. ground, the mineralization decreases to almost zero in a distance of about 1000 feet.

Along the north-east trending shear zone, weak (1%) disseminated pyrite ~~mineralization~~ mineralization occurs. Outside of the shear zone, there is no disseminated sulfide mineralization.

On Copper Ring mountain there are a number of veins of quartz ~~pyrite~~ and pyrite, with minor copper. The veins have a northeast trend. There is no disseminated mineralization in the country rock.

On Marbeen mountain, a transition occurs from vein mineralization (with a northeast trend) on the north side to typical porphyry copper-type stockwork mineralization on the crest of the mountain. Along the Banner road on the northeast side of the mountain, mineralization consists of closely spaced veins of pyrite, with very minor copper (as chalcocite, less than 0.1%). Overall pyrite content is high, about 5% or more in most places.

Along the crest of Marbeen mountain, ~~from south east to northwest~~, there is a transition from low grade ~~(less than 0~~ (0.1% copper) to on the southeast to ore grade (0.5%) mineralization on the northwest.

Secondary Enrichment

Secondary enrichment ~~is not~~ is quite important in the Morenci district and has produced the Morenci orebody. In the Banner - B.Y.V. area, secondary enrichment is ~~no~~ only weakly developed. Drill hole data from holes B.Y.V. 1-3 show that the oxidized leached capping ~~varies from~~ is quite variable in thickness on Markeen mountain. In B.Y.V. #1, the leached capping is 88 feet thick. in B.Y.V #3, about 900 feet from B.Y.V. #1, it is about 225 feet thick, and in B.Y.V. #2, 400 feet south of B.Y.V. #3, it is 86 feet thick. (see figure —)

Chalcocite and covellite ~~coat~~ replacing of pyrite.

The enriched zone is ~~to~~ low grade and erratic. Chalcocite and covellite extend to 1400 feet in B.Y.V. #1, and extend beyond the depths penetrated by B.Y.V #2 and #3.

The deepest ~~coat~~ leaching is on the top of Markeen mountain. Along the Banner road on the north side, fresh pyrite can be found in most of the road cuts.

Exploration Potential

In considering the alteration and mineralization zoning patterns, ~~and~~ two possible ~~alternatives~~ interpretations can be made. The first is that the alteration and mineralization patterns are lateral or horizontal effects of the Morenci intrusive. The other possibility is that the Morenci intrusive plunges underneath the Precambrian granite, and that the halo ~~effects are~~ patterns are vertical or semi-vertical effects from a buried extension of the mineralized intrusive.

~~Geol~~

According to Woolick and Ouret, the Morenci intrusive ~~has the shape of a stock~~ is both stocklike and laccolithic. Thus there is a possibility that the Morenci intrusive may extend under the Precambrian granite. A ~~brief~~ consideration of the extremely weak alteration and mineralization in the Copper King mountain area suggests that the possibility that the Morenci intrusive is underneath Copper King mountain is extremely remote. A brief perusal of the drill hole ~~of~~ data from the B.Y.U. and Banner drill hole does not suggest that the Morenci intrusive ~~is at~~ occurs at depth. Thus, in all probability, the ~~zoning~~ zoning patterns are lateral effects.

Southern B.Y.U. claim area

Ore grade (0.4% copper) underlies much of this claim area. Only detailed mapping of the area will delineate the amount. This area is not only extremely valuable for the contained copper, but also for the position it has relative to Phelps Dodge's mining operations on the King orebody (hill #6153). The claim area is critical to Phelps Dodge for their future mining operations, since it not only contains ore, but will be necessary for shipping operations.

This area has the most intense alteration and mineralization of any of the three areas under discussion.

Northern B.Y.U. claim area

The only disseminated mineralization which occurs on this claim area occurs in a northeast trending fracture zone in the northwest part of the claim area. Sulfide content is low (.1%), and is all pyrite. Outside of this zone there is no disseminated mineralization, and very little vein mineralization. Alteration ranges from weak propylitic, to zones of no alteration.

The only value that this area has is for possible pit slopes, at some time in the future.

Banner Mining Co. claim area.

The most intense area of alteration and mineralization on the Banner ground occurs in the southwest part, adjacent ~~to the~~ southern B.T.V ground. Unfortunately, ~~its to the Banner area~~ that part covers the pyrite halo zone around the copper deposit, so that there is no ore grade mineralization on Banner ground, As shown on figure ---. ~~the Banner ground area~~

The main part of the Banner ground has no potential ~~geologic~~ value (except for the outside chance the Morenci intrusive underlies the Precambrian granite). However, the part of the Banner ground covering Rocky Gulch has potential value as a possible waste-leach dump ~~for the~~ site for the waste being stripped off Hill 6153 and eventually Markeen mountain.

In considering leaching any ~~dump~~ waste rock dumped in Rocky Gulch, it should be ~~kept~~ noted that a significant fault exists at the Precambrian granite - alluvium contact (just below ~~the south~~ where Banner's southern property boundary covers the bottom of Rocky Gulch), and that the dumps should be placed up the gulch a sufficient distance to collect the leach water before it would cross the fault. Otherwise the leach solution would be lost in the alluvium.

AGREEMENT

THIS AGREEMENT, made and entered into this 19th day of January 1971, between PHELPS DODGE CORPORATION, a corporation hereinafter called "Phelps Dodge", and ESSEX INTERNATIONAL METALS, herein referred to as "Essex".

WITNESSETH:

WHEREAS, Phelps Dodge owns certain roads in the County of Greenlee, Arizona, and WHEREAS, Essex desires to use such roads in order to travel to the mineral leases, including claims held by Brigham Young University, in the Greenlee Gold Mountain Mining District.

NOW, THEREFORE, in consideration of the premises and the covenants of the parties herein contained, it is mutually agreed as follows:

I

Phelps Dodge grants permission to Essex to use the roads of Phelps Dodge on the east side of Chase Creek which lead up to their claims from the 19th day of January, 1971, to the 27th day of January 1971.

II

While on or passing through the property of Phelps Dodge, Essex hereby assumes the entire responsibility and liability for any and all damage, loss or injury of any kind or nature whatsoever, caused by or resulting from the use of said roads and accordingly, Essex agrees that he will indemnify and hold harmless Phelps Dodge from any and all claims, loss, damage, charge or expense to which Phelps Dodge may be subjected by reason of any act, regulation, omission or default on the part of Essex or any of Essex's agents or employees.

IN WITNESS WHEREOF, the parties hereto have set their hands the day and year first above written.

PHELPS DODGE CORPORATION

By A. H. Kimmeling
for Its Manager

ESSEX INTERNATIONAL METALS

By Paul Eimon

Paul Eimon
Grover Heinrichs
Howard Lanier
Randall Burk
David Lowell
Kenyon Richard
Kenneth Jones

SPEED MEMO

To Paul Simon — Grover | At

Subject Preliminary Normil Report | Date 2/3/71

A preliminary report on the Norsem project should be prepared including:

A General Introduction & Conclusions — H Lanier

Investigation of the Core & Assays — G. H & C.C.

~~Geology~~ Geological Interpretation — Paul.

Mine Planning & Ore Reserves — Gverdon.

PLEASE REPLY TO → Signed | At

Attached are reports written by Clem & Gverdon. Paul should prepare a section (with maps) for the Geological Section, Grover should prepare the section on ~~for~~ Core Examination (including logs). Grover should also assemble appropriate maps.

Report submitted

Copy to Grover.

Date Feb. 23, 1971 | Signed Paul Simon

REPLIER—RETAIN FOR YOUR FILES

TO: H. Lanier Feb. 12, 1971

FROM: P. I. Eimon

SUBJECT: Cuprite Prospect

I examined the Cuprite Prospect Feb. 9, 10, and 11, and will submit one of our prospect forms including location and sketch geologic maps within a few days. I was able to cover the Cuprite Prospect and almost all of the surrounding ground claimed by Guy Anderson, Clyde Davis and associates.

The Cuprite Prospect consists of a vein 2-8 ft. wide, 300-600 ft. in length. No other significant mineralization was observed. The surrounding pre-Cambrian granites are generally quite unaltered. No large tonnage potential is anticipated on this ground on the basis of this preliminary reconnaissance work. I will discuss future plans for the Cuprite Prospect with you next week.

Paul Eimon

PIE:td

P. W. O'Malley — Ft. Wayne, Ind.

H. Lanier — Tucson, Ariz.

Phelps Dodge Negotiations — Feb. 3, 1971

J. O'Hare
Ft. Wayne

P. Eimon
Tucson

The proposed schedule for opening discussions with Phelps Dodge at Morenci is as follows:

Mon. Feb. 8 - Mr. O'Malley contacts George Munroe to advise that we are prepared to initiate meetings and that I shall be in contact with Mr. Lentz.

Wed. Feb. 10 - H. Lanier contacts John Lentz to set appointment for first meeting on or about Feb. 16 or 17.

Tues. Feb. 16 - Meeting with John Lentz.

Subsequent meetings will be scheduled depending upon outcome of first meeting with Mr. Lentz.

HL:td

Paul E

INVENTORY
OF MAPS FOR ESSEX-MORENCI
PRESENTATION

March 25, 1971

A - Raised Relief State of Arizona

1 - Colored Aerial Photo

2 - Typical Porphyry Zoning from Lowell

3 - Photo Geology by Knox et al

4 - Composit Diazo Overlay - Drill Roads and
Property Boundary

5 - Proposed Mining Plan - Diazo Overlay

6 - 5650 Bench Level - Proposed Mining Plan

	(1)	(2)	(3)	(4)	(5)
Mining Plan Benches -	6000	5500	5000	4500	4350

(Un-numbered - Diazo Overlay of Roads and Property
Boundary to Match Geology - By Eimon & Jones

EGH

July 12, 1971

Mr. Howard Lanier, General Mgr.
Copper Operations
Essex International, Inc.
1704 West Grant Road
Tucson, Arizona 85705

Dear Howard,

Attached are the final reports by Ken Jones on the Blue Crystal Prospect in Graham County, Arizona and the Yakie claims in Greenlee County, Arizona, both of which have been under option to Essex by Guy Anderson.

As per your instructions, we have done more than the usual research and field investigations on these properties to find commercial exploration viability on either.

In both cases we are unable to find exploration potential to justify further Essex expenditures. In spite of our personal desire to come up with a major exploration program for Guy on either the Blue Crystal or Yakie, both Ken and I agree that surface outcrops do not show a target within our present exploration aims.

We have developed considerable knowledge in these areas and can be used as a reference by Guy if he continues to offer these claims to other parties.

Sincerely yours,

Paul I. Eimon

PIE:td
attachments

REPORT ON THE
YAKIE CLAIMS
MORENCI MINING DISTRICT
GREENLEE COUNTY, ARIZONA

June 30, 1971 J.K. Jones

Introduction

The Yakie claim group was examined by J.K. Jones and Paul I. Eimon in April 1971. Data available includes a 1:24,000 scale claim map and a 1:12,000 scale geologic map which also shows results of 34 geochemical samples. Information from three drill holes was not available, but verbal comments were obtained on results of these holes. Geology and mineralization of the Clifton-Morenci District are described in USGS Professional Paper 43 by Waldemar Lindgren and in an article on pages 221 to 231 in "Geology of the Porphyry Copper Deposit, Southwestern North America" by R.T. Moolick and J.J. Durek.

Location

Approximately four square miles of unpatented mining claims and State prospecting permits are held along Ward Canyon in the Morenci Mining District immediately southeast of the town of Clifton. The property is situated in Sections 32, 33, and 34, T.45., R.30E., and in Sections 2, 3, and 4, T.5S., R.30E. Elevation on the ground ranges from approximately 3600 to 4680 feet.

Geology

Exposed on the claims are pre-Cambrian granite overlain by the Cambrian Coronado quartzite and the Ordovician Longfellow limestone. Unconformably overlying the pre-Cambrian granite and Paleozoic sedimentary rocks are Tertiary volcanic flows including andesite, basalt, and rhyolite, Quaternary Gila conglomerate, and Quaternary sand and gravels. In the vicinity of the claims pre-Cambrian granite is exposed along a southeasterly trending band approximately one mile in width. On the north the granite is concealed beneath gently north-dipping Paleozoic sediments and Tertiary volcanics. The Coronado quartzite may attain a maximum thickness of 250 feet, while

the overlying Longfellow limestone may be as much as 400 feet thick.

On the south the pre-Cambrian granite is covered by an unknown thickness of Quaternary Gila conglomerate.

Mineralization

The prospect covers a zone of striking red-brown colored stain in pre-Cambrian granite ranging from about 1,000 feet to more than a mile in width and extending about three miles southeasterly from the south edge of the town of Clifton. Viewed from a distance the exposures of red-brown stain on the Yakie claims resemble a leached cap that would overlie strong sulphide mineralization. In some instances in the southwestern United States porphyry copper province, such zones of strong sulphide mineralization are accompanied by copper minerals of economic importance.

Geochemical samples show copper values ranging from 3 to 540 parts per million and molybdenum values from 0 to 18 parts per million. The highest copper and molybdenum values are indicated for a single sample located at the southeast edge of the claims at a prospect pit in Paleozoic sediments, and thus are not representative of the area as a whole. The remaining 33 samples are from the pre-Cambrian granite exposure. Excluding a single sample at the extreme west edge of the exposure containing 354 parts per million copper, the samples have a mean value of 17 parts per million copper and 6 parts per million molybdenum. These results are quite low, and do not appear to represent a significant concentration of metal values.

Inspection on the ground reveals little evidence of sulphide mineralization. The prominent red-brown color appears to result from weathering and decomposition of iron bearing minerals, biotite and hornblende, which are normally found in this rock type. Although drill hole results are not available, verbal comments by persons familiar with this work indicate that no significant amounts of sulphide minerals were found.

Conclusions

The striking red-stained outcrops on the Yakie claims appear to result from weathering of ferromagnesian rock-forming minerals in the pre-Cambrian granite, and do not represent a leached cap overlying strong sulphide mineralization. Previous geologic and geochemical work and drilling by Bear Creek Mining Company would appear to represent an adequate test of this property, and additional exploration would have little chance of success.

REPORT ON THE

BLUE CRYSTAL PROSPECT

GRAHAM COUNTY, ARIZONA

June 30, 1971

J. K. Jones

Introduction

The Blue Crystal claim group was examined by J.K. Jones. Information reviewed includes 1:12,000 scale geologic and ground magnetic maps, a 1:12,000 scale geologic and geochemical map by W.C. Lacy and H.C. Davis, an unsigned geologic report, and a description of drill hole results. In addition, drill core from two holes was made available.

A description of the drill hole results is attached to this report.

Property, Location

The property consists of 254 unpatented mining claims situated in the south portion of T.5S., R.28E., and the north portion of T.6S., R.28E. Most of the claims lie east of Bonita Creek, north of the Gila River, and south of Turtle Mountain. By road the claims are reached by travelling northeasterly from Safford along the Sanchez road north of the Gila River, across Bonita Creek near its junction with the Gila River, and northerly about a mile beyond Bonita Creek to the southwest edge of the claim group.

Development

In addition to several shallow pits, five drill holes totalling 9833 feet of drilling are known. Holes 1, 2A and 3 were drilled by Phelps-Dodge Corporation to depths ranging from 1302 to 2500 feet. AMAX later drilled holes 4 and 5 to depths of 1692 and 1224 feet.

Geology

Exposed on the property are flat-lying Tertiary andesite flows overlain by basalt flows, and conglomerate of late Tertiary or early Quaternary age. The andesite and basalt flows occupy the northeast portion of the claim group and are brought in contact with the younger conglomerate exposed on the southwest portion of the claims by a northwest trending fault. Three of the drill holes encounter rock types at depth older than those observed at surface. Drill Hole 1 cut monzonite porphyry, possibly of Laramide age, at 1002 feet, and Hole 4 struck a similar rock type at 1392 feet. In Hole 2 andesite of possible Cretaceous age is reported from 872 feet to 2500 feet. Displacement on the northwest trending fault which marks the contact between conglomerate and volcanic flow rocks is unknown, but it probably exceeds 1000 feet.

Mineralization, Alteration

Only very small amounts of mineralization occur on the property. In volcanic rocks in the central portion of the claim group are widely spaced narrow veinlets containing copper minerals. One such veinlet as exposed in a road cut on the northeast portion of Claim 44 consists of a vertical fracture striking N 80° W and containing 1/2 inch of chrysocolla and chalcedony. Although the thin seam of chalcedony appears to continue at depth, the chrysocolla extends only to a depth of one foot below the surface.

On and adjacent to the southeast portion of the property are several areas of reddish brown stain that may represent oxidation of small amounts of pyrite in the volcanics. No copper minerals are recognized in this area.

In several localities visited the volcanics are relatively soft and appear to be moderately clay altered. Over much of the area, however, this alteration is not accompanied by any evidence of mineralization.

Mineralization, Alteration - continued

No mineralization is reported from the drill holes, and the older rocks encountered at depth in three of the holes are described as unaltered and unmineralized.

Conclusions

This prospect was seriously considered by Phelps-Dodge and AMAX, probably largely because of its location on a northeast trend midway between the large copper deposits at Safford and Morenci. Copper mineralization and alteration in the Blue Crystal property are quite weak and are not of the type that would be expected in or near a porphyry copper deposit. Furthermore, exposed mineralization is in rocks that are younger than all known copper orebodies in Arizona. Three drill holes penetrated into older rocks at depth that are of an age that could contain copper mineralization, but these rocks are reported to be fresh and unmineralized. An unsigned report suggests that drill holes are poorly located and that an altered area at the southeast edge of the claim group is the most obvious target. However, no significant differences in alteration and mineralization were observed in this area during the examination.

Source of the very small amounts of exotic copper mineralization in Tertiary volcanics has not been adequately explained, but considerable study and drilling by others has not encountered any evidence that would suggest the presence of a large copper deposit in the area.

SUMMARY OF DRILL HOLE RESULTS
BLUE CRYSTAL CLAIMS
GRAHAM COUNTY, ARIZONA

BC 1

This Phelps Dodge hole, drilled on a geochemical anomaly to total depth of 1,302 feet, intersected the Cretaceous at 1,002 feet (elevation 3,335). Below 1,002, for at least 300 feet, the rock is an off-white, unmineralized, unaltered monzonite porphyry containing plagioclase and biotite phenocrysts set in an apparently siliceous groundmass; rock cut by the upper 1,000 feet of the hole is dominantly Tertiary andesite, the upper few hundred feet of which may correlate with volcanics mapped on the surface.

BC 2-2a

These Phelps Dodge holes (BC 2a was drilled when BC 2 was abandoned), collared within 200-300 feet of some chrysocholla veinlets, reached maximum depth of 2,500 feet. The Cretaceous was intersected at 872 (elevation 3,134) feet. Below this elevation, for at least 1,200 feet, the Cretaceous is andesite interbedded with clay and clastic zones containing Cretaceous fragments. This andesite has abundant, chalky-white, zoned plagioclase phenocrysts set in a greenish groundmass. Epidote is present throughout. Core recovery in the upper 870 feet of the hole was poor but the few pieces available for examination appear to be Tertiary andesites and latite which do not correlate with volcanics found on the surface.

BC 3

This Phelps Dodge hole which was collared on the main Basin-Range fault and drilled to 2,015 feet did not intersect the Cretaceous. The geology of the hole is no doubt complicated by its fault location. A rock bit was used throughout and cuttings from the bottom of the hole (elevation 1,878) consisted of fresh Tertiary andesite.

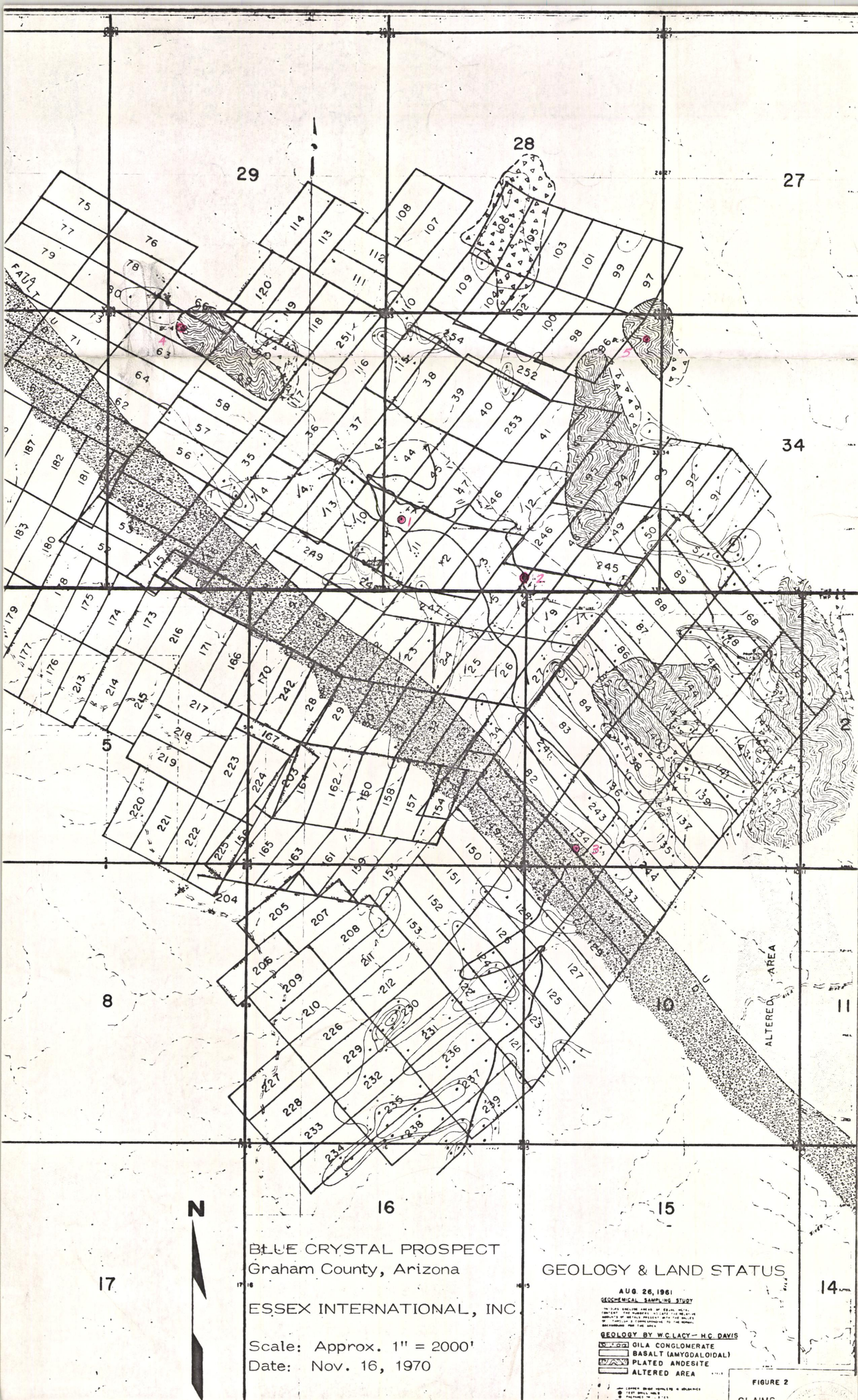
BC 4

AMAX hole BC 4 was located about midway between two northwest-trending faults, one of which is the Basin-Range fault, and on a possible magnetic low. Total depth was 1,692 feet; the

Cretaceous was intersected at 1,392 (elevation 3,238). For at least 300 feet below the top the Cretaceous is gray to red monzonite porphyry containing plagioclase, biotite, and sparse amphibole phenocrysts set in a red-dense to gray-glossy groundmass. Alteration is very slight and the rock contains less than 2 ppm in copper. Rock cut by the upper 1,300 feet of the hole is dominantly Tertiary andesite but includes a few thin clastic units. A 300-foot thickness of hornblende andesite near the top of the hole was recognized as being similar to that found on the surface.

BC 5

AMAX BC 5 was located in the northeastern part of the claim group about 1,000 feet north of the principal northeast-trending fault. Total depth was 2,324 feet (bottom elevation 2,106). Although the Cretaceous surface was not reached, a thick clastic unit containing Cretaceous fragments of andesite and monzonite porphyry was encountered at depth 834 (elevation 3,592) and continued to the bottom of the hole. This formation may represent fill in an erosional basin in the Cretaceous and could range in age from late Cretaceous to early Tertiary. In any case, the fragments undoubtedly represent erosion from a considerable Cretaceous area but they are neither mineralized nor altered beyond slight propylitization. Geochemical tests on several specimens of core indicated less than 2 ppm copper. A trachyte (Tt), which contains large, distinctive potash feldspar phenocrysts, immediately overlies the thick clastic unit; the upper 800 feet of the hole is Tertiary andesite and trachyte containing interbedded clastic units. Near the surface this rock correlates with the epidotized-hornblende andesite (Te).


28
29
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N
FAULT
ALTERED AREA
BLUE CRYSTAL PROSPECT
Graham County, Arizona
ESSEX INTERNATIONAL, INC.
Scale: Approx. 1" = 2000'
Date: Nov. 16, 1970
GEOLOGY & LAND STATUS
AUG. 26, 1961
GEOCHEMICAL SAMPLING STUDY
GEOLOGY BY W.C. LACY — H.C. DAVIS
GILA CONGLOMERATE
BASALT (AMYGDALOIDAL)
PLATED ANDESITE
ALTERED AREA
FIGURE 2

AGENDA FOR MEETING JAN. 31, 1971

REVIEW OF ESSEX-MORENCI PROJECT

1. "The Porphyry Model" - A brief explanation of the characteristic of a typical porphyry copper deposit
   - Paul Eimon

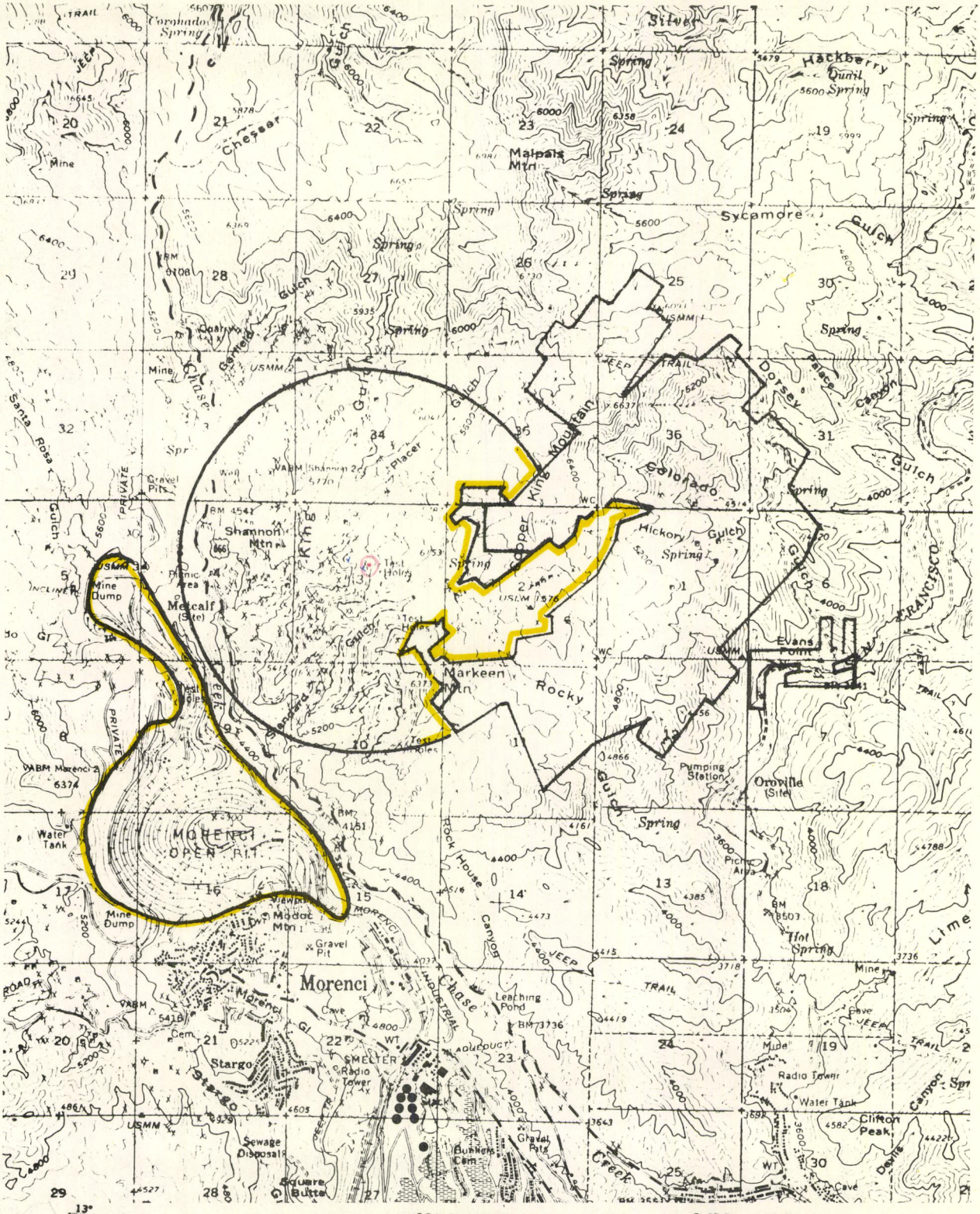
2. Evaluation of the BYU-Banner Core Samples.
   a. Re-examination of the drill logs.
   b. Re-sampling of the core
      - Grover Heinrichs
   c. Core assay comparisons and confirmation
      - Clem Chase

3. Field Geological Evaluations - An interpretation of the geological structure and leached capping to define the ore body dimensions
   - Paul Eimon

4. Mine Planning Studies - A projection of the ore body definition into estimates of ore reserves and mine plans, including:
   a. Mineable ore in the BYU property
   b. Mineralized zones in the Banner property
   c. P.D. ore controlled by the back wall created by the BYU position
   d. Stripping Ratios and Ultimate Pit Limits
      - Guerdon Jackson

5. Summary and Conclusions
   - Howard Lanier

H. Lanier/26 Jan. 71



SCALE 1:62500

0 1 2 MILES

TRUE NORTH
MAGNETIC NORTH
13°

APPROXIMATE MEAN DECLINATION, 1962

ARIZONA

QUADRANGLE LOCATION

EXPLANATION OF PROPERTY

- Indicates Phelps Dodge
- Indicates Banner Mining Co.
- Indicates Guy Anderson
- Indicates B.Y.U., Anderson Lease to Essex

Info. from Clyde Davis

BMC. BYU BNdry

Cross Section

ESSEX INTERNATIONAL, INC.

MORENCI-BANNER-BYU PROJECT

Greenlee County, Arizona

Preliminary Plans & Budget Summary

6-12-70

Exhibit B1

EGH/21 July 70