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# SOCIETY OF MINING ENGINEERS of AIME

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### ORE GENESIS IN THE MORENCI-METCALF DISTRICT

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Phelps Dodge Corporation  
Morenci Branch  
Morenci, Arizona

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## INTRODUCTION

The Morenci-Metcalf district is located on the southern slope of the White Mountains in Greenlee County, Arizona. Both porphyry copper deposits are four to six miles northwest of Clifton, the county seat, and the new Metcalf mine is situated approximately one mile northeast of the Morenci open pit (Figure 1). Chase Creek, a south-flowing tributary of the San Francisco River, dissects the district and separates the two ore bodies.

More than 1,200 exploration and development drill holes have been completed in the district and the Morenci-Metcalf ore bodies have been delineated on a 400-foot grid. Recently initiated drilling programs have revealed new data about deeper protore and associated hypogene alteration. This information, correlated with surface mapping and petrographic studies, was utilized to propose a plausible geochronologic sequence for this region. The reasoning behind this study has been helpful in locating new ore beneath leached capping indicative of only protore mineralization.

The scope of this paper is to establish a practical solution to a highly theoretical problem of ore genesis and to familiarize the reader with stratigraphic, structural, and mineralogic events responsible for localizing ore in this district. Continued research will possibly alter the proposed time span and relative displacements, but it is doubtful that the order of events will vary significantly. Geochronologic conclusions are therefore presented as general hypotheses and additional geologic mapping,

## MEMORANDUM

Dec. 28, 1970

TO: Mr. Howard Lanier

FROM: G. E. Jackson

SUBJECT: Essex-Morenci Project  
Water Resources - Preliminary Survey

On Dec. 23 and 24, 1970 a preliminary survey of water resources in the Safford/Clifton-Morenci areas was initiated. The following people were contacted: Guy Anderson, Safford; Max Rapier, Greenlee County Engineer, Clifton; George E. Greiner, Acting Gila Water Commissioner, Safford; and M.W. Edington, Area Engineer, Water Resources Division, U.S. Geological Survey, Safford Office.

### I. Surface Water - Gila River

All surface waters of the Gila River and its tributaries are controlled by decree of the U.S. District Court No. E 59 Globe, dated June 29, 1935. The court has appointed Geo. E. Greiner Acting Water Commissioner.

#### A. Decreed Acreage

The Decree is administered following the natural geographic divisions in the Gila Valley. All such decreed land totals about 148,000 acres with 102,000 acres of it below the San Carlos Reservoir in the San Carlos Project. Irrigation below the dam is from both flow and stored water, depending on requirements and rainfall.

#### B. Apportionments

Water diversions and apportionments are controlled by the decree but cannot exceed 1/80th (.0125) of a cubic foot per second for lands above the reservoir as long as there are users still not being supplied with their allotment. In general, annual apportionments do not reach this number.

In 1969 (see 34th Annual Report: "Distribution of Water of the Gila River" by the Gila Water Commissioner), the "Upper Valleys" were allotted 6.0 acre feet per acre per year, or about  $.008 \text{ ft}^3/\text{sec}$ . The San Carlos Project was apportioned 3.0 acre-feet per acre. The "Upper Valleys" used about 3.0 acre-feet per acre that year.

C. Water Diversion - 1969

The following table shows decreed acreage, acre-feet diversion and acre-feet per acre used per year for 1969:

	<u>Acres</u>	<u>Ac-Ft. Div.</u>	<u>Duty A/F/A</u>
Duncan Valley	8,061.35	15,192	1.88
Safford Valley	32,512.4	89,249	2.75
San Carlos Ind. Res.		461	
Winkelman Valley			
(Industrial)	1,335.16	15,175	
U.S.A. (San Carlos)	102,090.5	267,750	2.62

Phelps Dodge Corp. pumped 12,877 acre-ft out of the San Francisco/Eagle Creek Basin and returned 10,042 acre-ft from the Black River and Double Circle wells for a net of 2835 acre-ft pumped out of the Gila River tributary drainage.

D. Water Rights - Decreed Acreage

To acquire any surface water rights on the Gila River and/or its tributaries such as the San Francisco River, it would be necessary to purchase such rights by purchasing decreed farm acreage in the Duncan or Safford Valleys. This land would then be withdrawn from irrigation, or be put to lesser use such as pasture land, feed-lot, home sub-divisions, etc.

Mr. Greiner stated that the farmers were credited with any pumped ground water used on decreed acreage. Guy Anderson thought that acreage could be purchased in the Safford area at less than \$1,000/acre due to the fact that 1970 was a poor year for the farmers there.

## II. Ground Water

There is no formal control over ground water in the Safford/Morenci area providing a drilling permit is obtained from the State Land Office. The valleys are not in a so-called "critical area" although the ground water usage in the San Carlos Project is controlled by the Federal Government. Eventual control elsewhere of the ground water resources cannot be ruled out.

### A. Potential Sources

The Yalie drill hole situation has been detailed in a separate memo. In general, it is believed that ground water resources in the Clifton-Morenci area are sufficient only for very small scale operation. A hydrological survey there would detail the situation.

The Duncan, San Simon, and Safford Valleys offer practically unlimited potential supplies of ground water, but large investments in wells, pumps, pipelines, storage tanks, etc., will be necessary to utilize these sources effectively. A hydrological survey could pinpoint desirable drill sites.

There are aquifers with both potable and saline water flows in the Safford area. Several wells are down 400 to 500 ft which produce hot water. One well near Thatcher was put down 2640 ft in depth, and now flows artesian at a rate of 610 G.P.M. through 15 inch casing. The water is hot and saline, and at the moment, is just being allowed to run-off.

Phelps-Dodge has a water flow in their shaft estimated at 300 to 500 G.P.M. Kennecott drilled a 10-inch well near the airport from which they pumped 2,000 G.P.M. of hot water (according to Guy Anderson).

### III. Water Requirements

To put the water resource problem in its proper perspective, the following water requirements are estimated for both oxide and sulfide plants:

Assume: Capacity - 10,000 tons of ore per day  
 Oxide Losses - 300 gal water per ton of ore  
 Flotation Losses - 200 gal water per ton of ore

	<u>Water Required</u>		<u>Acres Needed</u>	
	<u>GPM</u>	<u>Acre-Ft/Yr</u>	<u>6. Ac-Ft/Yr</u>	<u>3.0 Ac-Ft/Yr</u>
Oxide Plant	2083	3354	559	1118
Sulfide Plant	1389	2236	373	745

Obviously, a 30,000 TPD flotation mill would take three times the above numbers or: 4167 G.P.M. for 6708 acres-ft per year, and 1118 acres would need to be retired. This assumes that pumped water was used for all requirements for continued land usage, and they allowed the full apportioned 6.0 acre-ft of water per acre annually.

### IV. Alternatives

#### A. Purchase Decried Land

This is the best long term method of acquiring water rights and may not be any more costly than large pump installations and long pipe lines. It is assumed that the needed water would be pumped from the San Francisco River at Clifton by either P-D or Essex.

#### B. Pump Ground Water

Based on a hydrological survey, it should be possible to develop any conceivable amount of water required for a reasonable size plant. Saline water is readily available in the Safford Valley at least, and pumping it probably wouldn't precipitate a fight over control of ground waters. The real question here is whether surface waters would be diverted to replenish the underground aquifers.

C. Combination

A combination of pumped and decreed surface water may be the best possible alternative, depending on total requirements of the legal/economic/engineerial systems involved in the project concepts.

G. E. Jackson

GEJ:td

# MEMORANDUM

28 Dec '70

TO: Mr. Howard Lanier

FROM: G. E. JACKSON

SUBJECT: ESSEX - MORENCI PROJECT  
WATER RESOURCES - PRELIMINARY SURVEY

On Dec 23 and 24, 1970 a PRELIMINARY SURVEY OF WATER RESOURCES IN THE SAFFORD / CLIFTON - MORENCI AREAS WAS INITIATED. THE FOLLOWING PEOPLE WERE CONTACTED:

GUY ANGELOIN, SAFFORD; MAX KAPLAN, GREENLEE COUNTY ENGINEER, CLIFTON; GEO. E. GREINER, ACTING GILA WATER COMMISSIONER, SAFFORD, AND M. W. EDINGTON, AREA ENGINEER, WATER RESOURCES DIVISION, U.S. GEOLOGICAL SURVEY, SAFFORD OFFICE.

## I. SURFACE WATER - GILA RIVER

ALL SURFACE WATER OF THE GILA RIVER AND ITS TRIBUTARIES ARE CONTROLLED BY DECREE OF THE U.S. DISTRICT COURT NO. E 59 GLOBE DATED JUNE 29, 1935. THE COURT HAS APPOINTED GEO. E. GREINER ACTING WATER COMMISSIONER.

### A. DECREE LANDS ACREAGE

THE DECREE IS ADMINISTERED ~~GENERAL~~ FOLLOWING THE NATURAL <sup>GEOGRAPHIC</sup> DIVISIONS IN THE GILA VALLEY. ~~TOTAL~~ ALL SUCH DECREE LAND <sup>TOTALS</sup> ABOUT 178,000 ACRES WITH ~~DOWN - VALLEY DIVISION~~ 102,000 ACRES OR LESS BELOW THE SAN CARLOS RESERVOIR IN THE SAN CARLOS PROJECT. IRRIGATION BELOW THE DAM IS FROM BOTH FLOW AND STORED WATER, DEPENDENT ON REQUIREMENTS AND RAINFALL.



## D. Water Rights - Decreed Acreage

TO ACQUIRE ANY <sup>SURFACE</sup> WATER RIGHTS ON THE GILA RIVER AND FOR ITS TRIBUTARIES SUCH AS THE SAN FRANCISCO RIVER, IT WOULD BE NECESSARY TO PURCHASE SUCH RIGHTS BY PURCHASING <sup>FARM</sup> DECREE<sup>d</sup> ACREAGE IN THE PUNCON OR SAFFORD VALLEYS. THIS LAND WOULD THEN BE WITHDRAWN ~~AND THEN RETAINED~~ ~~THAT ACRE~~ FROM IRRIGATION, OR TO PUT A LEGAL USE SUCH AS PASTURE LAND, RECO-LET, ~~ETC.~~ HOME SUB-DIVISION, ETC.

MR. GRENON STATED THAT THE FARMERS WERE CREDITED WITH ANY PUMPED GROUND WATER USED ON DECREE<sup>d</sup> ACREAGE.

GUY ANDERSON THOUGHT THAT ACREAGE ~~BE~~ COULD BE PURCHASED ~~AVAILABLE~~ IN THE SAFFORD AREA AT LESS THAN \$1,000/ACRE ~~BE~~ DUE TO THE FACT THAT 1970 WAS A POOR YEAR FOR THE FARMERS THERE.

## THE GROUND WATER

THERE IS NO FORMAL CONTROL OVER GROUND WATER IN <sup>DRILLING</sup> THE SAFFORD / MORONCI AREA PROVIDED A "PERMIT IS OBTAINED FROM THE STATE LAND OFFICE. THE VALLEYS ARE NOT IN A SO-CALLED "CRITICAL AREA" ALTHOUGH THE GROUND WATER USAGE IN THE SAN CARLOS PROJECT IS CONTROLLED BY THE FEDERAL GOVERNMENT. EVENTUAL CONTROL ELSEWHERE OF THE GROUND WATER "CANNOT BE RULED OUT.

POTENTIAL  
~~POTENTIAL~~ SOURCES - SITUATION

THE YAKIE DRILL HOLES <sup>^</sup> HAVE BEEN OBTAINED IN A SEPARATE MOUND. IN GENERAL, IT IS BELIEVED THAT GROUND WATER <sup>RESOURCES</sup> ~~SOURCES~~ IN THE CLIFTON - MARIENI AREA ARE ~~INSUFFICIENT~~ <sup>VERY</sup> SUFFICIENT ONLY FOR SMALL SCALE OPERATIONS. ~~IT~~ A HYDROLOGICAL SURVEY WOULD DETAIL THE SITUATION.

THE DUNCAN, SAN SIMON, AND SAGEIRO VALLEYS OFFER PRACTICALLY UNLIMITED ~~SUPPLY~~ POTENTIAL SUPPLIES OF GROUND WATER, BUT LARGE INVESTMENT IN WELLS, PUMPS, PIPE LINES, STORAGE TANKS, ETC WILL BE NECESSARY TO UTILIZE THESE SOURCES EFFECTIVELY. A HYDROLOGICAL SURVEY COULD PIN-POINT DESIRABLE DRILL SITES.

~~B. WATER QUALITY SITUATION~~

THERE ARE AQUIFERS WITH BOTH POTABLE AND SALINE WATER FLOWS IN THE SAGEIRO AREA. ~~FOR THESE ARE~~ <sup>ARE</sup> SEVERAL WELLS DOWN 400 TO 500 FT WHICH PRODUCE HOT WATER. ONE WELL NEAR THATCHER WAS PUT DOWN 2690 FT IN DEPTH, AND NOW FLOWS ARTESIAN AT A RATE OF 610 G.P.M. THROUGH ~~THE~~ <sup>A</sup> 15 IN CASING. THE WATER IS HOT AND SALINE, AND AT THE MOMENT, IS JUST BEING ~~ALLOWED~~ ALLOWED TO RUN-OFF. ~~WATER IS~~

PHILIPS - DRUGS NOW A WATER FLOW IN THEIR SHAFT ESTIMATED AT 300 TO 500 <sup>G.P.M.</sup> ~~TO BE~~ MARIENI DRILLED A 10 IN WELL NEAR THE AIRPORT FROM WHICH THEY PUMPED 2,000 G.P.M OF HOT WATER (ACCORDING TO GUY ANDERSON).

III Water Requirements.

To put the ~~present~~ water resource problem in its proper perspective, the following water requirements are estimated for both oxide ~~and~~ and sulfide plants:

(CAPACITY)  
 ASSUME: ~~PLANT CAPACITY~~ - 10,000 TONS OF ORE PER DAY

- OXIDE LINES - 300 GAL WATER PER TON OF ORE
- FLOTATION LINES - 200 GAL " " " "

	WATER REQUIRED		ACRES NEEDED	
	GPM	ACRES-FT/YEAR	6.0 AC FT/YR	3.0 AC FT/YR
OXIDE PLANT	2083	3354	559	1118
SULFIDE PLANT	1389	2236	373	745

Obviously a 30,000 TPD FLOTATION MILL WOULD TAKE 3 X THE ABOVE NUMBERS OR: 4167 GPM FOR 6708 ACRES FT PER YEAR, AND 1118 ACRES WOULD NEED TO BE ROTATED, ~~AND~~ THAT PUMPED WATER WOULD BE USED FOR ALL REQUIREMENTS FOR LAND USAGE, AND THE FULL APPORTIONING CONTINUED. THEY ALLOWED ~~5.0~~ 6.0 AC-FT OF WATER PER ACRE ANNUALLY.

IV ALTERNATIVES

A. PURCHASE DECEASED LAND  
 BEST LONG TERM METHOD

THIS IS THE ~~SUREST~~ <sup>WATER</sup> WAY OF ACQUIRING "RIGHTS" AND MAY NOT BE ANY MORE COSTLY THAN ~~THE~~ LARGE PUMP INSTALLATIONS AND LONG PIPE LINES. IT IS ASSURED THAT THE NEEDED WATER WOULD BE ~~DELIVERED~~ <sup>PUMPED</sup> FROM THE SAN FRANCISCO RIVER BY EITHER P-D OR EISEX.

B. Pump Ground Water

BASED ON A HYDROLOGICAL SURVEY, IT SHOULD BE POSSIBLE TO DEVELOP ANY CONCEIVABLE AMOUNT OF WATER REQUIRED FOR <sup>A</sup> REASONABLE SIZES PLANT. ~~PUMP TO SURFACE~~. TAKING WATER IS READILY AVAILABLE IN THE SAFER VALLEY PUMPING IT AT LEAST AND PROBABLY WOULD'N PRECIPITATE A FIRST OVER CONTROL OF GROUND WATERS. THE REAL QUESTION HERE IS WHETHER ~~THE~~ SURFACE WATERS WOULD BE DIVERTED TO REPLENISH THE UNDERGROUND AQUIFERS

C. COMBINATION

A COMBINATION OF PUMPED AND DECREASED SURFACE <sup>THE BEST ALTERNATIVE</sup> WATER MAY BE POSSIBLE DEPENDING ON TOTAL REQUIREMENTS OF THE LEGAL / ECONOMIC / ENGINEERING SYSTEMS INVOLVED IN THE PROJECT CONCEPTS.

G. E. JACKSON

## MOUNTAIN STATES MINERAL ENTERPRISES, Inc.

December 4, 1970

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

Dear Mr. Lanier:

We are pleased to attach a description of the work we propose doing for you in connection with your Morenci area project.

Our general understanding is that Essex International will provide a complete report on the geological information; that Messrs. Soderberg and Still will provide conceptual mining plans; and that Mountain States, in Tucson, will develop the costs and plans for the surface facilities. These three packages would be tied together by us and we would, also, provide the necessary services of the Behre Dolbear group in order to verify and confirm all material.

Details of the modus operandi are in the attached Scope of Work and Plan of Approach. Our estimate of costs for performing these functions varies between \$62,000 and \$72,000. Reimbursement for services performed by Mountain States personnel would be per the attached Schedule "E". Provision for payment of services performed by Behre Dolbear personnel or any other consultants is shown as Item #4 in the attached Schedule "E".

We are most anxious to work with you on this interesting project and are prepared to assign our most competent personnel to the job.

Very truly yours,

Edward S. Frohling  
President

ESF:el

Enclosures

MOUNTAIN STATES MINERAL ENTERPRISES, INC.

ENGINEERING DIVISION

SCHEDULE E

HOME OFFICE SERVICES

ACCOUNTING PROCEDURE

770

For engineering, purchasing and other Home Office services performed by CONTRACTOR, in accordance with the AGREEMENT to which this Schedule is attached, in the Home Office or in the field, CONTRACTOR shall charge OWNER with the cost incurred by CONTRACTOR as set forth below.

1. Employees' Compensation. Wages and salaries on an hourly rate basis plus an allowance of twenty percent(20%) as compensation to CONTRACTOR for payroll insurance and taxes, holidays, vacations, sick leave, medical insurance, group life insurance and other welfare expenses for such time as is devoted to the work by CONTRACTOR'S Home Office employees working in the Home Office or in the field.
2. Transportation of personnel in interest of the job.
3. Subsistence and other expenses of personnel while traveling or at the job site.
4. Consulting Services and expenses.
5. Reproducing and Duplicating services and materials, such as blueprints, photostates, photographs, ditto, mimeograph, printing and binding, together with drafting room and office stationery, materials and supplies.
6. Communications such as long distance telephone calls, telegrams, teletypewriter messages, cablegrams and radiograms.
7. Miscellaneous and other expenses incurred in direct performance of the work, including but not limited to freight, express and postages.
8. An Allowance equal to seventy five percent(75%) of Item 1 above to cover CONTRACTOR'S general overhead such as permanent office rent, telephone switchboard service, local telephone calls, use of permanent office furniture, machinery and equipment, maintenance of organization ready to serve and all other expenses incurred by CONTRACTOR in conducting its business that are not created by or properly chargeable to a specific job.
9. Fee for Profit of fifteen percent(15%) of the sum of Items 1, 4 and 8.

FEASIBILITY STUDY

FOR

ESSEX INTERNATIONAL

SCOPE OF WORK

The scope of work as envisioned in this proposal will include the following items and studies. We wish to point out, however, that the scope can and will be modified to meet requirements, if necessary, as the feasibility study develops. It is assumed that data on water location and availability will be provided by Essex International. No provisions for water exploration have been included in this proposal.

I CONCENTRATOR PLANT

- A. Preliminary engineering design drawings consisting of:
1. Two Plot Plans; one showing the concentrator area and the other showing a proposed layout of the project in its entirety.
  2. One Flowsheet with material balance.
  3. One Plan of the tailings area.
  4. One Plan of the townsite.
  5. Six general arrangement drawings showing the primary crushing plant, secondary crushing plant, grinding, flotation and filter sections and ancillary buildings.
  6. One single-line electrical drawing.

7. COPPER - MOLY - CIRCUITS

B. Ecological Analysis *- By whom*

C. Operating Cost

An operating cost estimate will be prepared. Included in this estimate will be:

1. Manning data for administration, maintenance, and processing units.
2. Production cost estimates by plant section including, but not limited to:
  - a. Administration and services; includes supervising staff, engineering, office and accounting personnel, shop and warehouse workers, security, etc.
  - b. Process water.
  - c. Coarse crushing.
  - d. Fine crushing.
  - e. Grinding and concentrators.
  - f. Flotation and thickening.
  - g. Tailing disposal.

3. Detailed backup data for all items of operating cost.

D. Capital Cost Estimate

There are two approaches which can be considered for making the capital cost estimate. It can be factored, or a fairly detailed estimate can be prepared. In each case, a detailed

*1. ORG HAULAGE  
2. POWER REQUIREMENTS  
3. DISPOSITION OF CONCENTRATES*

estimate of the equipment, water requirements and supply, tailings disposal and the cost of providing power would have to be made. From this point on, the cost of piping and electrical installations, steel, concrete, instrumentation, platework, site preparation and excavation could be factored from previous and similar work which has been performed by Mountain States Engineers within the past year. This type of estimate would provide no backup data other than the factoring calculations. A detailed estimate would entail a takeoff of materials and installation costs in each of the named categories except piping, which can be factored in either case. The detailed estimate would provide backup data which could be used for reference in future discussions between Essex personnel and advisers.

We estimate that the cost of the concentrator feasibility study as outlined above, using a factored capital cost estimate, will be \$49,200. The detailed estimate would increase this cost to \$59,200.

## II CASH FLOW ANALYSIS

This will be based upon criteria which will be developed through discussions with Essex International personnel. The cost of preparing the data for this analysis is estimated at \$1,800. Computer analyses of various combinations of conditions will vary

likely be desirable. This computer phase has not been included in this estimate of costs.

### III SURFACE MODEL

A model will be prepared to show the project in its entire concept, relating the various areas to each other in a manner to give visual aspect to the feasibility study. The cost of models can vary tremendously, depending upon the degree of detail, but it is estimated that \$3,500 will suffice for the present purpose.

### IV MINING AND GEOLOGICAL

The geological study, ore reserves and proposed mining plans developed by Essex's staff personnel will be reviewed in collaboration with our associate firm, Behre Dolbear and Company, Inc., of New York. The cost of this service will depend upon the amount of time required to accomplish the work and is difficult to fix at this point. For the purposes of this proposal, we believe that the work can be done in one month. We estimate the cost at \$7,000.

The total cost of the various phases of the study will amount to approximately \$62,000, using a factored capital cost estimate. A detailed estimate will increase this by \$10,000.

## PLAN OF APPROACH

Immediately upon award of this work Mountain States Engineers will assign a team of qualified engineering personnel to the project. All of these engineers have the appropriate operating, design, administrative and construction backgrounds to accomplish this work in the best interests of Essex Internaional, Inc.

A meeting will be held with Essex's personnel to establish criteria, communication channels and operating ground rules. This will be followed immediately by a trip to the site by key personnel. The purpose of this trip will be to become familiar with the topography, local ground and climactic conditions, water resources, power supply, labor availability, ecological conditions, environmental requirements and to investigate the suitability of sites for the various plants which will make up the project. An important consideration in this respect will be the possibility of future expansions as well as a smelter or chemical processing plants.

Each phase of the preliminary engineering work will be initiated as soon as sufficient data has been prepared or accumulated to permit the efficient development of the work. A close liaison will be maintained with the appointed Essex representative so that no time will be lost in communicating as the work progresses. The necessary engineering and environmental study for the planning of the townsite and tailings area will proceed

simultaneously with the development of the preliminary engineering.

It is understood that the Essex International staff is preparing a geological study of ore reserves and alternate mining plans. As soon as these are made available they will be reviewed by Mountain States Engineers in collaboration with our associate firm, Behre Dolbear and Company, Inc. Following this, a model will be prepared using the topographic data and plot plans which will have been prepared by that time.

The cash flow analysis will be prepared as soon as operating and capital cost information is available. This must necessarily be done in close cooperation with Essex personnel in order to establish parameters which will be compatible with your corporate operations.

Tucson, Arizona  
November 11, 1970

MEMO TO: Mr. Howard Lanier

From: Clyde E. Osborn

SUBJECT: SX-MORENCI  
CAPITAL COST STUDY

The estimated capital costs we used in our preliminary economic evaluation of Essex-Morenci Project, appear to be reasonably in line when one examines the following published figures on recent major copper mining-milling projects.

- #1 Phelps-Dodge, Tyrone, New Mexico  
Information source - Skillings Mining Review 5/31/69  
Ore Reserves - 195,000,000 tons  
0.85% Cu.  
Mine Development, Stripping, etc.  
Concentrator - 25,000 T.P.D.  
Scheduled Production - 55,000 Tons copper per year  
Cost - \$110,000,000
- #2 Anaconda-Twin Buttes-Arizona  
Information source - Skillings -7/4/70 & 9/5/70  
Exploration, Mine Development, Stripping & Concentrator  
Ore Reserves - 292,000,000 tons  
0.88% Cu (0.6%-1.0%)  
0.03% Mo.  
Stripping - 267,000,000 tons  
Exploration Drilling - 200 Holes  
300,000 ft.  
Deepest 4,000 ft.
- Exploration started in 1964 in old Twin Buttes Mine.  
Deepened shaft 880 ft., plus drifts & raises totalling  
17,000 ft. and 45,000 ft. in 73 holes.  
Time Elapsed - 6½ yrs. to production  
90% of stripped waste used to build tailing ponds for  
concentrator.  
Concentrator - 30,000 tons per day (initially)  
Scheduled Production - 167,000,000 lbs. copper per year.  
83,500 tons  
Cost - \$200,000,000 +

- #3 Duval-Sierrita-Arizona  
Information source-Skillings 7/4/70 and  
E/MJ 8/7/70  
Mine Development, Stripping & Concentrator  
Ore Reserves - 414,000,000 tons  
0.35% Cu.  
0.72# Mo/ton (55% Recovery)  
Stripping - 126,000,000 tons  
Drilling - 60 Exploration holes  
178 Development holes  
Concentrator - 66,000 tons per day  
Scheduled production - 65,000 tons/year  
Cost - \$131,700,000  
Working capital - \$10,000,000  
G.S.A. @ 6% - \$83,000,000, balance bank loans.
- #4 Freeport Sulfur - West Iran - Ertsburg Copper Project  
Information source - Skillings 2/14/70; 7/4/70; 9/19/70  
Ore Reserves - 33,000,000 tons  
2.5% Cu.  
Exploration, Mine Development & Concentrator.  
Concentrator - 8,000 tons/day  
Scheduled Production - 65,000 ton copper/year  
Cost - \$120,000,000  
80,000,000 Senior debt  
20,000,000 Subordinated  
20,000,000 Equity
- #5 Hecla - Lake Shore - Arizona  
Information source - Skillings 8/22/70  
Ore Reserves - 470,000,000 tons  
0.75% Cu.  
Mine Sulfides - under ground  
Concentrator - 8,000 t/d  
Acid leach Oxide surface ores  
Cost - not published to date
- #6 Bougainville (Indonesia) - Porphyry Copper Project  
*PAPUA/NEW GUINEA*  
Information source - Skillings 8/29/70  
Ore Reserves - 900,000,000 tons  
0.49% Cu.  
0.36 dwt Gold

*PAPUA/NEW GUINEA*

Bougainville (Indonesia) contd.

Open pit stripping

Drilling - 200 holes - 274,000 ft.

Concentrator - 90,000 t/d

Scheduled Production - 1300 ton concentrate 30% Cu/day  
130,000 tons copper/year

Ship cons to Japan, Germany & Spain

Computerized economic evaluation required

120 hours of computer time

Cost - \$350,000,000

#7

Asarco - Sacaton, Arizona

Information source - Skillings 6/6/70

Mine - Original open pit - 8 yrs. later underground block cave.

Concentrator - 6,000 tons/day

Cost - not published to date

#8

Cities Service - Castle Dome (Miami, Arizona)

Information source - Skillings 2/14/70

Open pit

Reserves - 350,000,000 tons  
0.45% Cu.

plus MoS<sub>2</sub>

Concentrator - 40,000 t/d

Cost - not published to date

#9

Rio Blanco - Chile

Information source E/MJ 8/70

Ore Reserves - 120,000,000 tons  
1.6% Cu.

Mine Block Caving - Underground

Concentrator - Built underground - 12,500 t/d

Scheduled production - 65,000 tons Cu/y

230,000 tons Cons. 30% Cu.

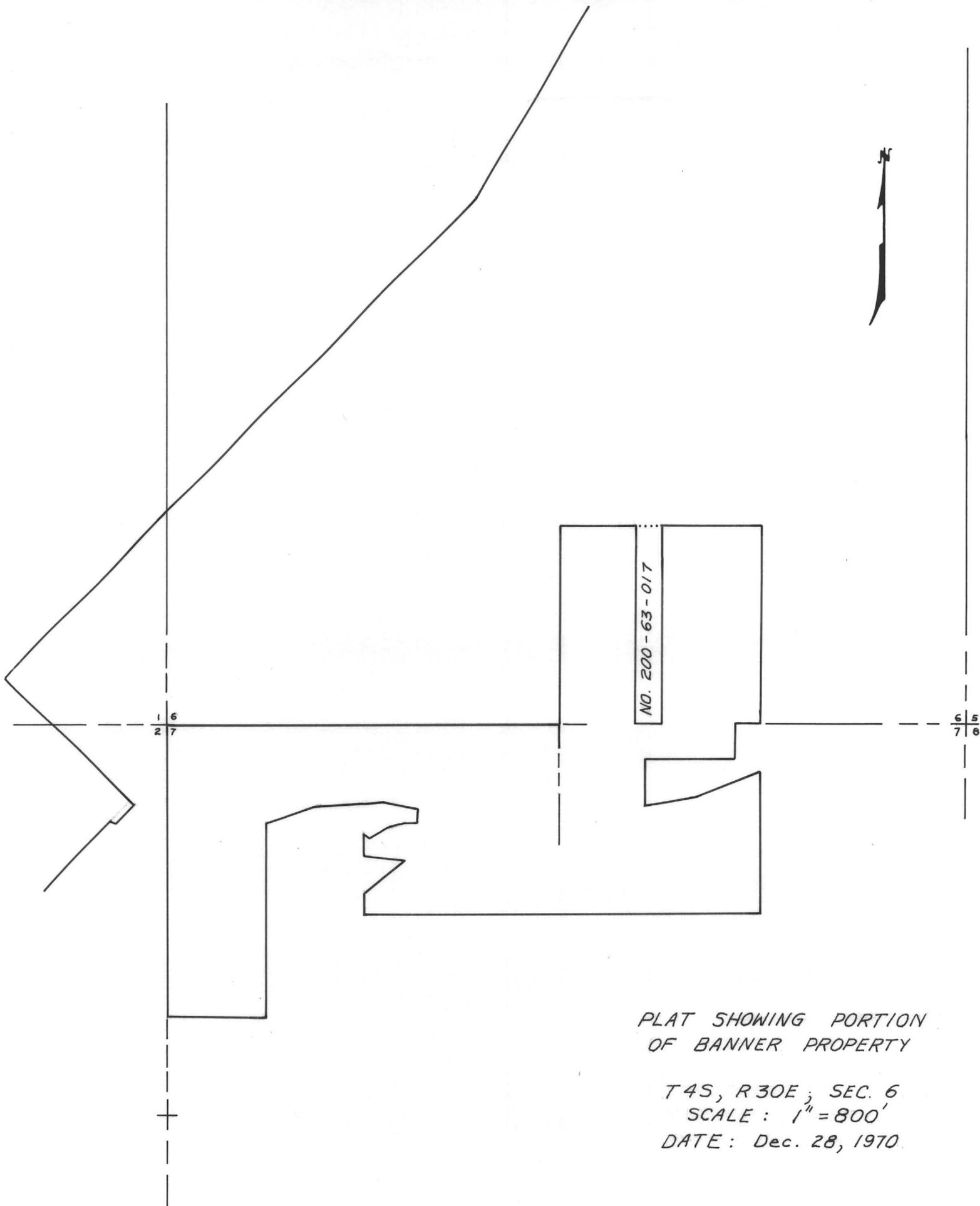
Cost - \$157,000,000

CIA. Minera Andina, S.A.

Cerro 70%

- #10 Lornex - B.C. Canada  
Information source - E/MJ - 9/70  
Open Pit  
Reserves - 300,000,000 tons  
0.427% Cu.  
0.14% MoS<sub>2</sub>  
Concentrator - 38,000 t/d  
Scheduled production - 52,500 tons copper/year  
Cost - \$125,000,000
- #11 Valley Copper Co. B.C.  
Information source - E/MJ - 9/70  
Reserves - 1,000,000,000 tons - open pit  
0.46% Cu.  
Concentrator - 100,000 tons/day  
Scheduled production - 135,000 tons copper/year  
Cost - \$265,000,000
- #12 Brenda - British Columbia  
Information source - E/MJ - 9/70  
Reserves - 177,000,000 tons  
0.183% Cu.  
0.049% Mo.  
Concentrator - 24,000 tons/day  
Scheduled Production 15,000 tons copper/year  
Cost - \$63,200,000
- #13 Utah Construction & Mining Co. -  
Island Copper Project - North End Vancouver Island  
Information source - Skillings 1/17/70  
Reserves - 280,000,000 tons  
0.522% Cu.  
0.029% MoS<sub>2</sub>  
Open Pit Mine  
Concentrator - 33,000 tons/day  
Scheduled Production - 50,000 tons copper/year  
Cost \$ 68,500,000

#14     Phelps-Dodge-Morenci, Ariz.  
Open Pit Metcalfe Mine  
Information source - Skillings 1/17/70  
Concentrator - 30,000 t/d  
Scheduled Production - 50,000 tons copper/year.  
Cost - \$100,000,000  
Ore Reserves - More than 260,000,000 tons  
                  0.55% Cu.



PLAT SHOWING PORTION  
OF BANNER PROPERTY

T4S, R30E, SEC. 6  
SCALE: 1" = 800'  
DATE: Dec. 28, 1970

MEMORANDUM

28 Dec. 1970

TO: Mr. Howard Lanier, General Manager  
Copper Operations

FROM: G. E. Jackson

SUBJECT: Essex-Morenci Project  
Tax Delinquent Parcel

Max Rapier brought a tax situation to my attention on 23 Dec. 1970 while in Clifton.

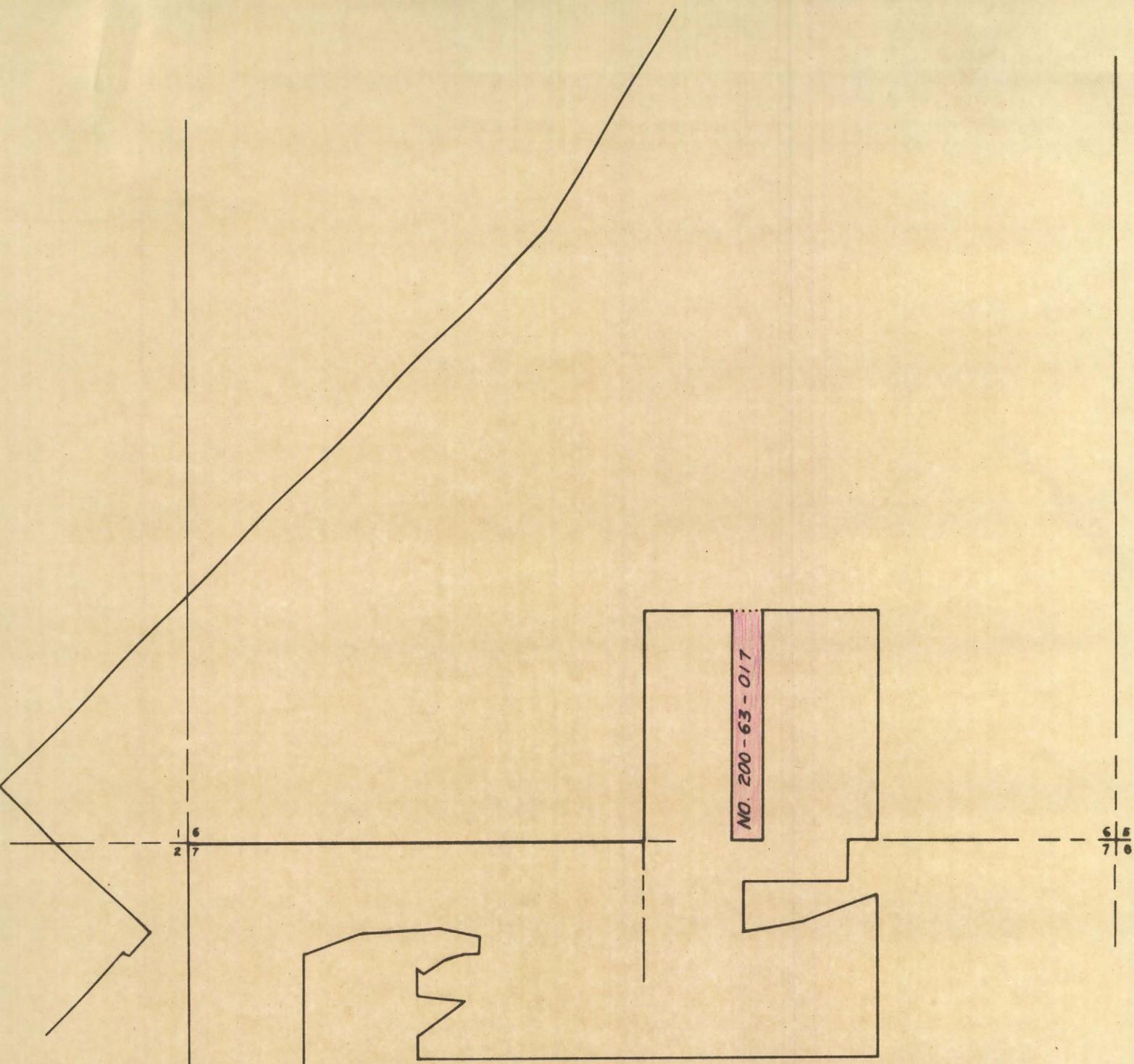
Briefly, it concerns a 15 acre parcel in Section 6, T4S, R30E, Greenlee County, which should have been included in the Banner Mining Co. holdings, but wasn't (see map). The parcel is described as follows:

Parcel No. 200 - 63 - 017  
Section 6, T4S, R30E  
E $\frac{1}{2}$  E $\frac{1}{2}$  W $\frac{1}{2}$ , SW $\frac{1}{4}$ , SE $\frac{1}{4}$   
Recorded Book 8, p. 315

The title is (was) clouded, former owners have died, and now the property has reverted to the county for delinquent taxes of \$9.53. Since this property lies in a potential mill site area, it is suggested that the property be purchased for taxes and/or have the title cleared through a quiet-title suit depending on advice of legal counsel.

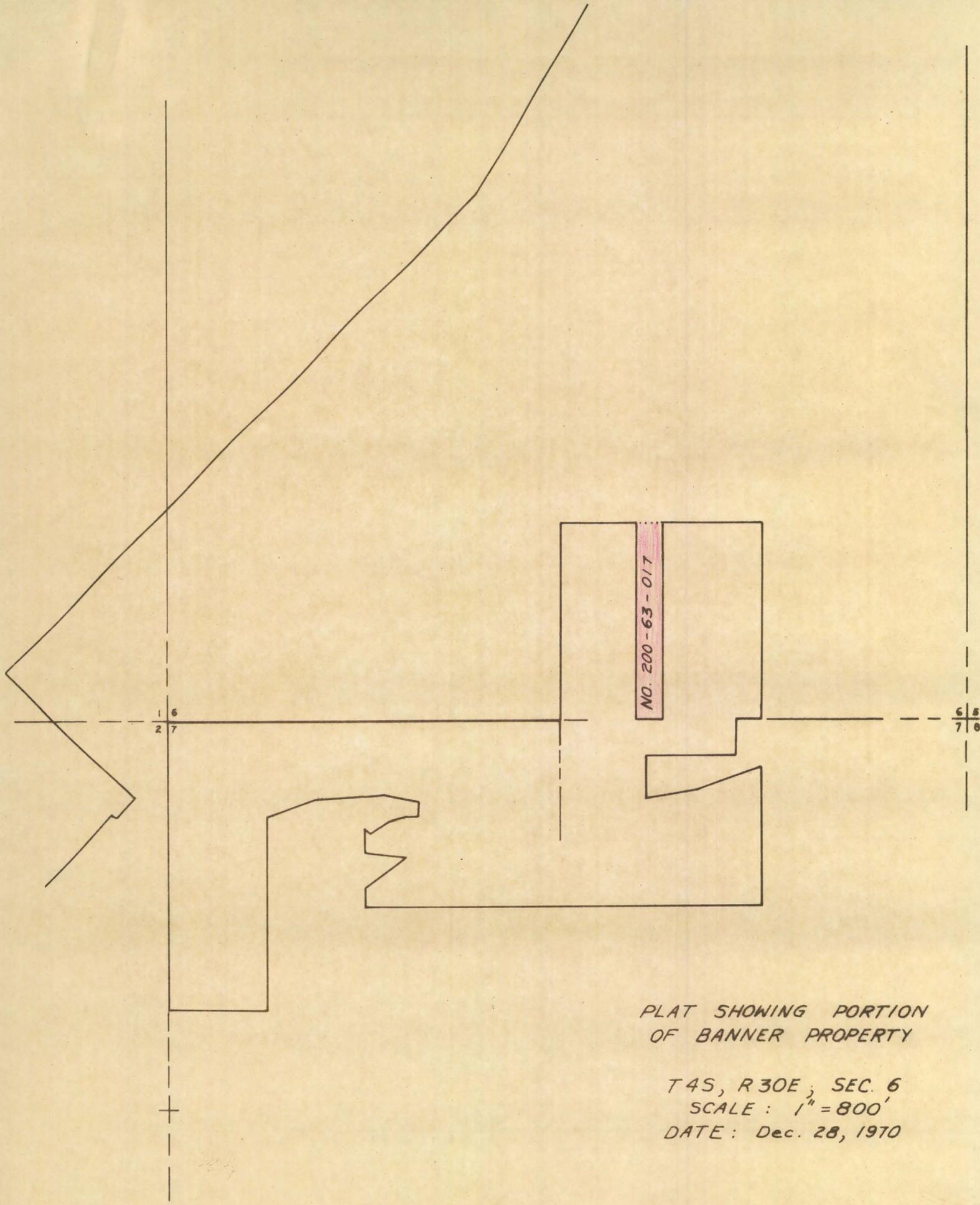
G.E. Jackson

cc: E.G. Heinrichs



PLAT SHOWING PORTION  
OF BANNER PROPERTY

T4S, R30E, SEC. 6  
SCALE: 1" = 800'  
DATE: Dec. 28, 1970



PLAT SHOWING PORTION  
OF BANNER PROPERTY

T4S, R30E, SEC. 6  
SCALE: 1" = 800'  
DATE: Dec. 28, 1970

MEMORANDUM

28 Dec. 1970

TO: Mr. Howard Lanier

FROM: G. E. Jackson

SUBJECT: Essex-Morenci Project  
Potter Group

Max Rapier brought to our attention the Potter Group of 19 patented mining claims located one mile south of the Banner property along the San Francisco River in Sec. 7 and 18, T4S, R30E. Three of the claims adjoin the river.

Potter's father was a well-known mining man in the early days of the district and had built a home along the San Francisco River just north of Clifton.

The claims are being offered on a real estate basis (by the acre) rather than for any potential mineral (copper) there. Potter apparently wants between \$150 and \$200 per acre for 351 acres, or between \$52,500 and \$70,200 total.

G. E. Jackson

MEMORANDUM

28 Dec. 1970

TO: Mr. Howard Lanier

FROM: G. E. Jackson

SUBJECT: Essex-Morenci Project  
Water Sources - Yakie Core Drill Hole

On 23 Dec. 1970, in the company of Max Rapier, Greenlee County engineer, a visitation was made to a portion of the Yakie Group to inspect a core drill hole location about 1/2 mile north from Ward Canyon Road.

This drill hole is located up a dry stream bed and is not accessible by auto. The hole is cased down about 300 ft. (according to Rapier) with unperforated 3 in. drill casing. All water to be pumped would therefore come from below this elevation. Present water elevation is about 200 ft.

In order to test this well, the following things will be necessary: 1. Rebuild road up the wash. 2. Probe the hole for casing depth and condition of hole below casing; 3. Place submersible pump to proper elevation for test. 4. Run pump for at least one week.

It is suggested that any such testing be postponed indefinitely. The hole is in a faulted zone which probably contains a substantial water course. However, trying to run a pull down test on three inch unperforated casing would not prove much except that the hole could serve as a potential source for small quantities of water.

G. E. Jackson

- Essex - morenci -

(15)

Report by - John C. Balla.

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5 8½ x 11 sheets

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aX - Land status & drill hole  
Location map -

bX - Geology map

cX - mineralization map

dX - Alteration map

eX - Cross section Through  
Markeen Mt.

---

Scale: 1" = 1000. JAN-4-71

M A P     I N D E X     N E W   M E X I C O

- 1     T Y R O N E   A R E A  
Black line (Original) showing 2 claim groups.  
Copper Mountain Mine and Copper Leaching Mine.  
John H. Trigg Company  
Sec. 16,17,20,21 & 28, T19S,R15W  
Grant County, New Mexico..... Scale: 1" = 1000'
  
- 2     Black line (Original) TRIGG  
showing topo, Claims & Pits  
Tyrone area, Grant County, New Mexico  
Scale: 1:24000.....
  
- 3     1 Vellum & 2 Black line of #2 .....
  
- 4     Geology Map of the Tyrone, New Mexico Area  
Grant County, New Mexico  
Scale: 1" = 2000' 5/19/71 .....
  
- 5     1 Vellun & 1 Black line of #4 .....
  
- 6     Topos of the Tyrone New Mexico Area  
Wind Mountain & Tyrone Quads. Spliced  
Scale: 1:24000.....
  
- 7     Additional Topos of the Tyrone, New Mexico Area  
1-Tyrone, 1-Wind Mountain, 2-Burro Peak &  
2-White Signal.  
Scale: 1:24000.....
  
- 8     Topos, CUBA, NEW MEXICO AREA  
2-Cuba Quads. Scale: 1:62500  
2-Cuba     "     "     1:24000  
2-Nacimiento Peak, Scale: 1:24000  
2-Regina, Scale: 1:24000  
2-La Ventana, Scale: 1:62500

M A P I N D E X U T A H

- 1 3-Cross Sections  
A-A', B-B' & C-C'  
American Mining Co.  
A.O. Taylor  
Beaver County, Utah  
Scale: 1" = 200' 1964.....
- 2 Bawana Pit  
American Mining Co.  
A.O. Taylor  
Beaver Co. Utah  
Scale: 1" = 500' 1964.....
- 3 Negative of a portion of a U.S.G.S. Quad Sheet  
in the Copper King Mine Area  
Milford, Utah

1/19/71  
Burtke &  
Heinrichs

①

## Standard Data

- 1954 first drilling on King: Hole #1 300' to ore — 1.5% Cu. (Moolick).
- Shallow depth to ore N. of fault in area now being stripped from King ore body.
- In King Creek just N. of fault: drill hole hit ore at 18' depth & continued to 1900' & still in ore — 1.5% Cu.
- Area covered by drill roads just S. of the fault is considered to be the center of the ore body.
- Drill hole data available is either from Tyrone or Safford orebody.
- P.D. hole at end of drill road to E. of BYU hole #3 is 2300' deep. Ore intercept from 200' to bottom of hole which ended in ore — 1.5% Cu.
- Drilling on 300' grid; target grade for mill of 0.81-1.5%.

1/19/71

Burke &  
Heinrichs

(2)

- ~~SE~~<sup>N</sup> of Fault depth to ore 200'-300'
- FURTHER ~~SE~~<sup>S.</sup> of Fault 200' to 700' to ore.
- existence of fault unknown to H.P.
- Grade change from one side of fault to the other unknown.
- Underground activity  
Tunnel connected up to STANDARD Shaft & underground drilling done
- Considerable water encountered in the Ring area & STANDARD AREA
- The P.D. Tongue area was described as very rich in Cu ore.
- One reason given for Metcalf slowdown is the increasing high cost of contract labor.

*Greenlee Property*

		COUNTY RECORD			SURVEY/PATENT		STATE LEASE		SECTION		TOWNSHIP		RANGE	
		ACRES	DATE LOCATED	BOOK	PAGE	NUMBER	NUMBER	NUMBER						
GREENLEE GOLD MOUNTAIN MINING DISTRICT GREENLEE COUNTY, ARIZONA														
POTTER GROUP - PATENTED File-AZ GE OD-1														
(H)	PARCEL NO. 1	198.281		2	7-15	4244/1115333			1, 2, 10, 11	4S			29E	
	NATIVE COPPER NOS. 1, 4, 6, 10, 14, 15			2	7-15	" "								
	CONSOLATION NOS. 2, 3, 5, 6, 10, 11			2	7-15	" "								
	CONTACT NO. 1													
(B)	PARCEL NO. 2	16.739		2	100	4255A/1124835			2, 11	4S			29E	
	NATIVE COPPER NO. 5													
(C)	PARCEL NO. 3	240.406		2	15-23	4239A/1115983			1, 12	4S			29E	
	LAST CHANCE NOS. 1-12 INCL.			2	15-23	" "			12	" "			" "	
	NATIVE COPPER NOS. 43 & 57													
(D)	PARCEL NO. 4	14.469		2	46-48	4253A/1116837			36, 1	3S, 4S			29E	
	CONTACT NO. 2													
(E)	PARCEL NO. 5	44.440		2	54-56	4246A/1118398			35	3S			29E	
	GOLD STANDARD NOS. 4, 19, 20													
(F)	PARCEL NO. 6	486.655		2	34-44	4224A/1116836			36, 1, 31, 6	3S, 4S			29E, 30E	
	EXPOSITION NOS. 1-14 INCL.			2	34-44	" "								
	ENGINEER			2	34-44	" "								
	LEXINGTON			2	34-44	" "								
	SPOT CASH			2	34-44	" "								
	BELFAST			2	34-44	" "								
	GRAND TRUNK			2	34-44	" "								
	GOVERNOR			2	34-44	" "								
	GOVERNOR NO. 2			2	34-44	" "								
	RED GIANT			2	34-44	" "								
	GLADIATOR			2	34-44	" "								
	SENATOR			2	34-44	" "								
	MASON G			2	34-44	" "								
	KEYSTONE			2	34-44	" "								

GREENLEE GOLD MOUNTAIN MINING DISTRICT  
GREENLEE COUNTY, ARIZONA

COUNTY RECORD  
OF PATENT OR  
CLAIM PAGE  
SURVEY/  
PATENT NUMBER  
STATE  
LEASE  
NUMBER  
SECTION  
TOWNSHIP  
RANGE

POTTER GROUP - PATENTED (CONT'D)

(G) PARCEL NO. 7 327.248 2 24-34 4243A/1116357 1, 2, 11, 12 4S 29E  
NATIVE COPPER NO. 2, 7, 8, 9, 11, 12, 13.  
19, 39, 40, 41, 42, 44, 45, 46, 47, 48, 54  
CONSOLATION NOS. 8 & 12

(H) PARCEL NO. 8 110.025 2 48-52 4245A/1116964 35, 36, 2 3S, 4S 29E  
GOLD STANDARD NOS. 5, 8, 16, 23, 24  
GREENLEE NO. 10

PARCEL NO. 9 203.594 1 635-642 1865/42079 1, 2, 11, 12 4S 29E  
CLIFF

(I) GOLDEN ROD 635-642 1 635-642 .. ..  
CLIFTON 635-642 1 635-642 .. ..  
GOOD LUCK 635-642 1 635-642 .. ..  
WEBB-CITY 635-642 1 635-642 .. ..  
NEVADA 635-642 1 635-642 .. ..  
TOM & JERRY 635-642 1 635-642 .. ..  
ALMO 635-642 1 635-642 .. ..  
CHESTNUT 635-642 1 635-642 .. ..  
JACK POT NO. 1 635-642 1 635-642 .. ..  
JACK POT NO. 2 635-642 1 635-642 .. ..

(J) PARCEL NO. 10 119.476 2 144-145 4254A/1122853 31 3S 30E  
BAY HORSE

(K) PARCEL NO. 11 18.236 1 369. 3302/624214 31 3S 30E  
BROWN HORSE

GREENLEE GOLD MOUNTAIN MINING DISTRICT  
GREENLEE COUNTY, ARIZONA

COUNTY RECORD  
OF PATENT OR  
CLAIM  
PAGE  
SURVEY/  
PATENT  
NUMBER  
STATE  
LEASE  
NUMBER  
SECTION  
TOWNSHIP  
RANGE

POTTER GROUP - PATENTED (CONT'D)

PARCEL NO. 13  
GOLD COIN

300.855

1 97-105 2582/406213

1, 6, 31 4S, 3S 29E, 30E

COTTONWOOD EXTENSION  
HAMMOTH NO. 1

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

HAMMOTH NUMBER EIGHT  
HAMMOTH NUMBER NINE

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

COTTONWOOD

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

HAMMOTH NUMBER TWO

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

HAMMOTH NUMBER SEVEN

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

HAMMOTH NUMBER TEN

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

LONE PINE NO. 1  
HAMMOUTH NUMBER THREE

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

HAMMOUTH NUMBER SIX

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

HAMMOUTH NUMBER ELEVEN

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

LONE PINE NO. 2

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

HAMMOUTH NO. 4

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

HAMMOUTH NO. 5

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

HAMMOUTH NO. 12

1 97-105

.. ..

1, 6, 31 4S, 3S 29E, 30E

PARCEL NO. 13  
TIP TOP

20.661

1 644 2782/242448

1, 12 4S 29E

POTTER GROUP - UNPATENTED  
FILE- AZ GE FC-1

B. V. V.

0.67 10-1-57 1 544

PAT

5.29 10-15-57 1 583

DOT

1.85 10-17-57 1 580

KAY

9.06 10-17-57 1 582

JEAN

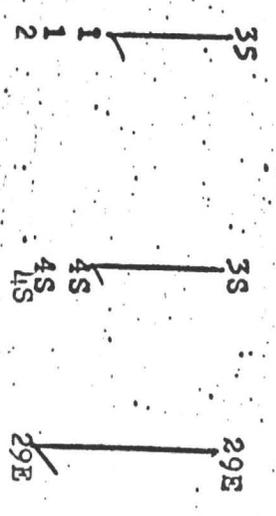
7.81 10-15-57 1 579

JESS

9.59 10-15-57 1 578

PEG

11-12-70 36 38



GREENLEE GOLD MOUNTAIN MINING DISTRICT  
GREENLEE COUNTY, ARIZONA

COUNTY RECORD  
OF PATENT OR  
CLAIM  
PAGE

SURVEY/  
PATENT  
NUMBER

STATE  
LEASE  
NUMBER

SECTION

TOWNSHIP

RANGE

POTTER GROUP - STATE LEASES

FILE	ACRES	DATE LOCATED	BOOK	PAGE	SURVEY/ PATENT NUMBER	STATE LEASE NUMBER	SECTION	TOWNSHIP	RANGE
FILE- AZ GE SL-4	3.78	9-20-57	1	546	M-858		2	4S	29E
WEDGE									
FILE- AZ GE SL-5	4.04	9-57	1	545	M-857		2	4S	29E
MARGIE /AMEND./		10-19-57	1	577			2	4S	29E
FILE- AZ GE SL-6	3.97	9-57	1	547	M-856		2	4S	29E
CAROLYN		10-19-57	1	576			2	4S	29E
CAROLYN /AMEND./									
FILE- AZ GE SL-3	22.37	10-1-57	1	543	M-855		2	4S	29E
F. A. R.		10-1-57	1	550					
W. E. R.									
F. D. M.		10-1-57	1	542					
FILE- AZ GE SL-1	11.71	10-2-57	1	553	M-853		36	3S	29E
JO		10-2-57	1	549			36	3S	29E
A. B. B.									
FILE- AZ GE SL-2	126.32	10-17-57	1	581	M-852		36	3S	29E
NAN									
LIL		10-2-57	1	541					
FLO		10-2-57	1	556					
SUE		10-2-57	1	554					
JILL		10-2-57	1	548					
JAN		10-3-57	1	551					
ANN		10-2-57	1	552					
ANN /AMEND./		11-20-57	2	24					
PAULA		10-2-57	1	555					



GREENLEE GOLD MOUNTAIN MINING DISTRICT  
GREENLEE COUNTY, ARIZONA

COUNTY RECORD  
OF PATENT OR  
CLAIM

ACRES DATE LOCATED BOOK PAGE

SURVEY/  
PATENT  
NUMBER

STATE  
LEASE  
NUMBER

SECTION

TOWNSHIP

RANGE

POLARIS GROUP - UNPATENTED (CONTD)

PARROT NO. 20 /SKA PARROT NUMBER 20/  
NO. 21 /SKA PARROT NUMBER 21/  
NUMBER 22 /SKA PARROT NUMBER 22/  
NO. 24  
NO. 24 /AMEND./

PARROT NO. 25  
NO. 25 /AMEND./  
NO. 26  
NO. 26 /AMEND./  
NO. 27  
NO. 27 /AMEND./

PARROT NO. 28  
NO. 28 /AMEND./  
NO. 29  
NO. 30  
NO. 31  
NO. 32

PARROT NO. 33  
NO. 34  
NO. 35  
NO. 36  
NO. 37  
NO. 38

PARROT NO. 39  
NO. 40  
NO. 41  
NO. 42  
NO. 43  
NO. 44  
NO. 45

ESSEX

ACRES	DATE	LOCATED	BOOK	PAGE	SURVEY/ PATENT NUMBER	STATE LEASE NUMBER	SECTION	TOWNSHIP	RANGE
2-5-16	2-5-16	3	68-69				25, 36, 26, 35	3S	29E, 30E
2-5-16	2-5-16	3	69						
2-5-16	2-5-16	3	70						
7-2-63	7-2-63	13	236						
2-5-16	2-5-16	3	71						
7-2-63	7-2-63	13	238						
2-5-16	2-5-16	3	72						
7-2-63	7-2-63	13	239						
2-5-16	2-5-16	3	72-73						
7-2-63	7-2-63	13	240						
2-5-16	2-5-16	3	73						
7-2-63	7-2-63	13	241						
2-5-16	2-5-16	3	74						
7-2-63	7-2-63	13	242						
2-5-16	2-5-16	3	74-75						
2-5-16	2-5-16	3	75						
2-5-16	2-5-16	3	76						
2-6-16	2-6-16	3	76-77						
2-6-16	2-6-16	3	77						
2-6-16	2-6-16	3	78						
2-6-16	2-6-16	3	78-79						
2-6-16	2-6-16	3	79						
2-6-16	2-6-16	3	80						
2-6-16	2-6-16	3	80-81						
2-6-16	2-6-16	3	81						
2-7-16	2-7-16	3	82						
2-7-16	2-7-16	3	82-83						
5-27-64	5-27-64	15	2						
5-27-64	5-27-64	15	3						
5-27-64	5-27-64	15	4						
10-12-70	10-12-70	35	485						
10-12-70	10-12-70	35	486						

~~350~~ ~~400~~ ~~400~~

A handwritten scribble on a piece of paper. It consists of several overlapping, roughly parallel lines that form a jagged, irregular shape. The numbers '350' and '400' are written in black ink within this scribble. '350' is on the left side, and '400' appears twice: once in the upper right and once in the lower left of the scribble. The lines are dark and somewhat messy, suggesting a quick or hurried drawing.

From the desk of

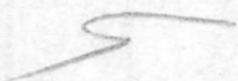
GUERDON E. JACKSON

PD - PERCENED ORG BODY

90,982,000 TONS

PD - ORG CONTROLLED BY  
R.Y.U. Ground

206,163,000 T



Essex Morenci Proj.  
P.D. Drill Info. Metcalf AREA

<u>Hole #</u>	<u>Feet to Ore</u>	<u>Footage of ore</u>	<u>Avg. Grade</u>	<u>Depth of Hole</u>
1	250	400	.90	900
2	150	450	.79	800
3	—	—	—	800
4 ✓	100	300	.72	1000
5	300	550	.93	1100
6 ✓	150	300	.99	900
7 ✓	200	50	.40	500
- 8	100	750	.80	1100
9	350	200	.64	1150
10	—	—	—	1200
11	300	600	.60	1800
12	350	700	1.03	1050
- 13	150	850	1.01	1400
14 ✓	150	400	.60	1200
15	500	450	1.03	1900
16	400	450	.75	1600
17 -	50	700	.54	1500
18	300	400	.58	1000
19	300	100	.95	1200
20	1000	200	.59	— ?
21	400	400	.61	— ?
22	350	650	.46	— ?
23	350	650	.51	— ?
24	650	1000	.47	— ?
25	600	200	.74	— ?

within above values run as high as 1.50%  
 Avg. 291.                      Avg. 480                      1168

Cu.

Ore is encountered at shallower depths but is not counted unless entire 50' level avg. Copper values run as high as 4.00% Cu.  
 Cu  
 → .40% is cut off full 50' bench

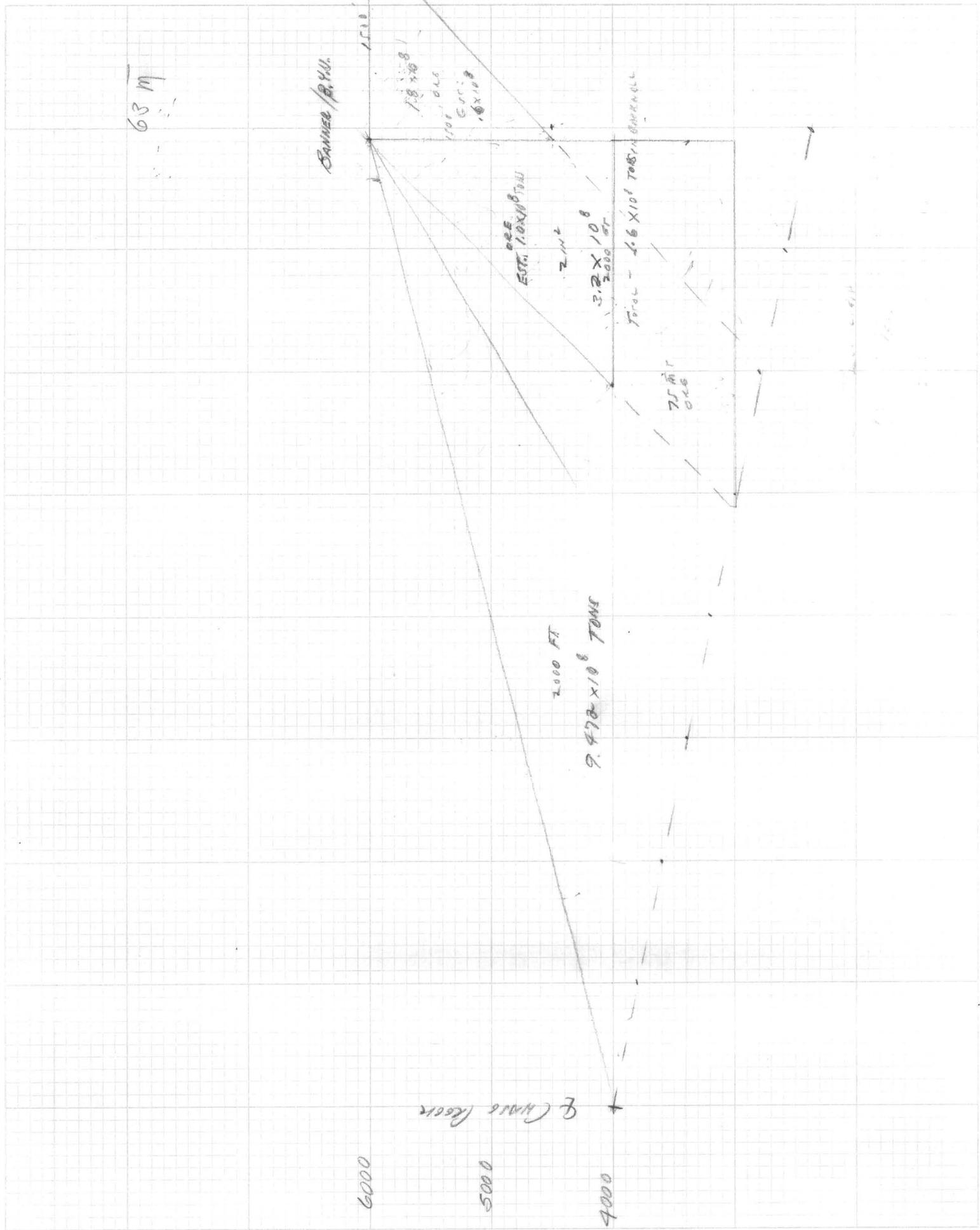
CONFIDENTIAL

<u>No.</u>	<u>Ft. to Ore</u>	<u>Ft. of Ore.</u>	<u>Avg. Grade</u>	<u>Depth of hole</u>
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	650	1.01	1100
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.



BYU

COLLAR EGGS

1. - ~~6105~~ 6130

2. - ~~6300~~ ~~6305~~ 6300

3. - ~~6299~~ ~~6300~~ 6305

4 - 5740

BANNER

1. - 6580

2 - 6485

3 - 6630

4 -

5 - 5995 - ~~2995~~ -3000 = 2995

6 - 5910 - 2500 = 3410

7 5860

8 - 6050

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

# MEMORANDUM

To: Mr. Howard Lanier

Jan. 25, 1970

From: G.E. Jackson

Subject: Essex - Morenci Project

Preliminary Ore Reserve Estimate

ATTACHED ~~THE FOLLOWING~~ IS A SUMMARY OF THE PRELIMINARY ORE RESERVE ESTIMATE FOR THE B.Y.U. CLAIMS ON MACKEN MOUNTAIN. THE ESTIMATE INCLUDES ONLY THAT ORE <sup>ON PHELPS-DODGE AND B.Y.U.</sup> ~~ESTIMATED TO BE~~ CLAIMS ~~FROM THAT AREA~~ WHICH CAN BE RECOVERED, ~~FROM THAT AREA~~ ~~FROM~~ IN THE PROBABLY POSITION OF THE B.Y.U. CLAIMS PIT 1305 ASSUMING A 45 DEGREE FINAL SLOPE ~~AND~~ NOT INCLUDING ANY BANNER MINING COMPANY GROUND.

~~Using~~ THE FOLLOWING ASSUMPTIONS WERE USED:

1. RECOVERABLE ORE <sup>ONLY</sup> ON P.-D. GROUND ~~ON~~
2. RECOVERABLE ORE <sup>ONLY</sup> ON B.Y.U. GROUND ~~ON~~
3. FINAL <sup>PIT</sup> SLOPE AT 45 DEGREES
4. BANNER GROUND IS <sup>NOT</sup> ~~FORMERLY~~ MINED

G.E. JACKSON

Essex-Morenci Project  
 Preliminary Ore Reserve Estimate

JAN. 25, 1971

0.40 % Cu CUTOFF

B.Y.U.	Tonn	GRADE (% Cu)
ORE-DRILLED	9,107,200	0.64
WASTE	33,472,000	-

PHILPS-DOUGG

ORE-DRILLED	2,848,000	.54
INFERRED B.Y.U.	205,363,200	
INFERRED-BANNER	2,822,400	
WASTE	78,291,200	

TOTALS FOR 0.40% Cu CUTOFF	Tonn	GRADE
ORE-DRILLED	11,955,200	0.62
INFERRED-B.Y.U.	205,363,200	
INFERRED-BANNER	2,822,400	
TOTAL ORE	220,140,800	217,318,400

WASTE 111,763,200

STRIPPING RATIO 4:1 0.51:1 0.51:1

Essex - Morenci Project  
 PRELIMINARY ORE RESERVE ESTIMATE

JAN. 25, 1991

0.30% Cu Cut Off

	Tonn	Grade
<u>B.Y.U.</u>		
Ore - Drilled	14,163,200	0.52
Waste	28,416,000	
<u>PHILPP DODGE</u>		
Ore - Drilled	5,600,000	0.44
INFERRED - B.Y.U.	205,363,200	
INFERRED - BANNEK	2,822,400	
WASTE	95,539,200	
<u>TOTAL FOR 0.30% Cu Cut Off</u>		
Ore - Drilled	19,763,200	0.50
INFERRED - B.Y.U.	205,363,200	
INFERRED - BANNEK	<u>2,822,400</u>	<u>OUT</u>
Total Ore	<del>227,948,800</del>	→ 225,126,400
WASTE	103,955,200	
Striping Ratio :	0.46 : 1	0.46 : 1

Essex - Morenci Project  
Factored Ore Reserve Estimate

Jan. 25, 1971

Assuming Probability of 0.50 for Inferred Reserves

.40% Cu Cutoff

	TONS	GRADE (% Cu)
<u>B.Y.U.</u>		
ORE-DRILLED	6,547,200	.62
WASTE	36,032,000	

Phelps-Dodge

ORE-DRILLED	2,848,000	.54
INFERRED - B.Y.U.	102,681,600	
INFERRED - BANNER	1,411,200	
WASTE	182,384,000	

TOTALS FOR 0.40% Cu CUTOFF

	TONS	GRADE
ORE-DRILLED	9,395,200	.596
INFERRED - B.Y.U.	102,681,600	
INFERRED - BANNER	1,411,200	
TOTAL ORE	113,488,000	112,076,800
WASTE	218,416,000	

ESTIMATED STRIPPING RATIO ~~1.92 : 1~~ 1.95 : 1

Essex - Morenci Project  
 Factored Ore Reserve Estimate

Jan. 25, 1971

Assuming Probability of 0.50 for Inferred Reserves

0.30% Cu CUTOFF

TONS

GRADE (%)

B.Y.U.

ORE - DRILLED	11,603,200	.49
WASTE	30,996,000	

PHILIPS - DODGE

ORE - DRILLED	5,600,000	0.44
INFERRED - B.Y.U.	102,681,600	
INFERRED - BANNER	1,411,200	
WASTE	179,632,000	

TOTALS FOR 0.30% Cu CUTOFF

ORE - DRILLED	17,203,200	0.49
INFERRED - B.Y.U.	102,681,600	
INFERRED - BANNER	1,411,200 → OVR	
TOTAL	121,296,000	119,884,800

WASTE - 210,608,000

STRIPPING RATIO: ~~1.74 : 1~~ 1.76 : 1

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.

**ESSEX**

ESSEX INTERNATIONAL, INC.  
1704 WEST GRAND ST., TULSON, ARIZONA 85705  
PHONE (602) 624-7421

PROJECT: **YAKIE CLAIMS**

PROSPECT NUMBER:

COUNTY, STATE: **Greenlee Co., Ariz.**

T. R. & SECTION:

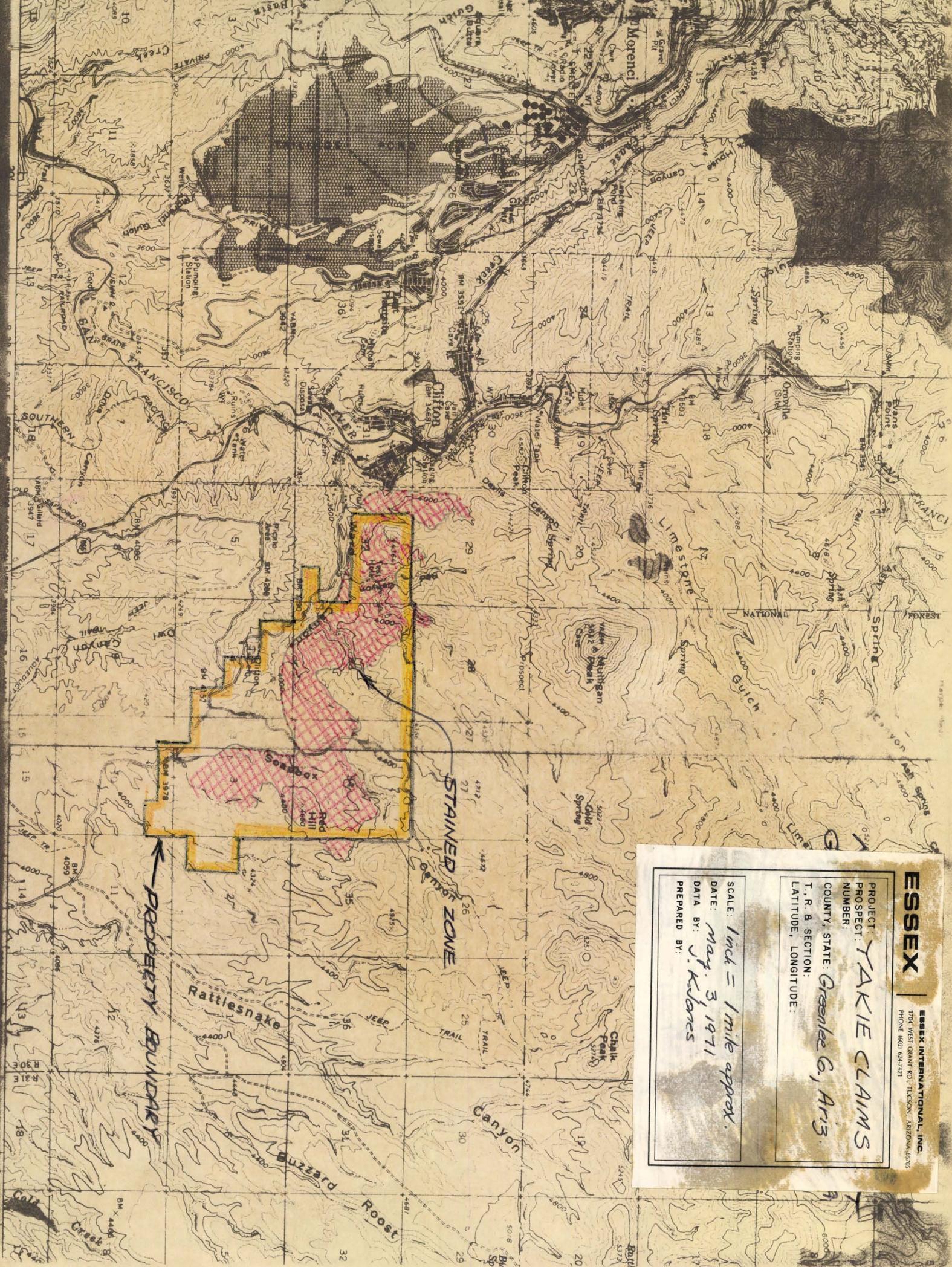
LATITUDE, LONGITUDE:

SCALE: **1 inch = 1 mile approx.**

DATE: **May. 3, 1971**

DATA BY: **J. K. Jones**

PREPARED BY:



E. Downing

Ft. Wayne, Ind.

H. Lanier

Tucson, Arizona

Leo Smith

Termination of Obligations on  
Yakie and Blue Crystal Properties

June 25, 1971

Enclosed is a letter to Mr. Guy Anderson advising him that we are terminating our interest in the Yakie and Blue Crystal mining properties near Safford and Morenci. This letter was prepared by Leo Smith.

The formal contract agreements on the Yakie and Blue Crystal properties were never consummated by Essex. After the negotiations regarding these and other mining properties of Guy Anderson, contract documents were written and signed by Mr. Anderson et al, but I elected not to proceed in finalizing the agreements.

From the outset we recognized the property probably had little mineral potential. It entered our negotiations at the time we were negotiating with Mr. Anderson for the BYU property at Morenci. It was part of my strategy to take all of Mr. Anderson's property under investigation to encourage him to a favorable position for the BYU-Morenci negotiations. There have been no property payment obligations and the understanding was no property payments were due for the first two years.

We have inspected the properties and confirmed our earlier opinion that they are not prospects for significant investment of exploration money.

Inasmuch as we have had a verbal agreement with Mr. Anderson regarding the properties, Mr. Smith has written this notice terminating our interest in the properties. We are proceeding with all aspects of returning core and information to him as if we had consummated the agreement. This is the customary procedure.

HL:td  
enclosure

June 25, 1971

Mr. Guy Anderson  
605 Main Street  
Safford, Arizona 85546

Re: Yalie and Blue Crystal  
Properties

Dear Mr. Anderson:

Please be advised that Essex International, Inc. hereby relinquishes and terminates any and all interest it has in and to the Yalie and Blue Crystal properties described in the attached Schedule of Properties.

Essex will promptly return the core which it assembled from various locations and reboxed. We shall await your instructions advising the location to which the core should be returned. In addition Essex will be returning information provided by you as well as additional information developed by Essex.

Essex appreciates the opportunity the Owners have given it to examine the properties. Essex has not filed or recorded any documents with the county recorders of the counties involved nor with the State Land Department and, accordingly, this letter shall serve to evidence Essex's termination and relinquishment of the said properties.

Sincerely,

ESSEX INTERNATIONAL, INC.

By Edward Larnier

Enclosure

REGISTERED MAIL

[Essex International, Inc. Letterhead]

June \_\_, 1971

Mr. Guy Anderson  
605 Main Street  
Safford, Arizona 85546

Re: Yakie and Blue Crystal Properties

Dear Mr. Anderson:

Pleased be advised that Essex International, Inc. hereby relinquishes and terminates any and all interest it has in and to the Yakie and Blue Crystal properties described in the attached Schedule of Properties.

*OK*  
*Change*  
Essex will promptly return the core <sup>which it assembled from various locations & records</sup> it presently has at such point as you may designate. In addition, Essex will be furnishing to you a report including all basic maps and summary of factual reports pertaining to the properties and prepared by Essex. Essex has done no drilling on either of the properties and thus is in no position to furnish any drill logs or cores other than as was furnished to Essex by the Owners. The report furnished by Essex will contain a summary of any work which may be applicable against any annual assessment work requirements on the properties. *take out*

*OK*  
Essex appreciates the opportunity the Owners have given it to examine the properties. Essex has not filed or recorded any documents with the county recorders of the counties involved nor with the State Land Department and, accordingly, this letter shall serve to evidence Essex's termination and relinquishment of the said properties.

Sincerely,

ESSEX INTERNATIONAL, INC.

By \_\_\_\_\_

Enclosure

REGISTERED MAIL

*In addition, Essex will be returning ~~you~~ information provided by you, as well as additional information developed by EX during the option period.*

SCHEDULE OF PROPERTIES

Yakie Property

66 Unpatented Mining Claims known as:

VERNA MAY Nos. 1, 3, 5, 7, 11, 13, 15, 17, 19, 21, 23 thru 42, 45, 47, 49, 51, 53, 55, 57, 58A, 59 thru 74, 76 thru 86, covering approximately 1,300 acres, which location notices are recorded in the office of the County Recorder of Greenlee County, Arizona, in 9, 16 and 14 of Records of Mines at pages 549 to 603, 318 to 329 and 264 to 267.

Arizona State Prospecting Permit No. 13699, situated in the W1/2 NW1/4, NW1/4 SW1/4 of Section 33, Township 4 South, Range 30 East, containing 116.37 acres, presently held in the name of Edward Danenhauer on the records of the Arizona State Land Department and due to expire September 17, 1971, unless renewed on or before such date.

Blue Crystal Property

<u>Name of Claim</u>	<u>Recorded</u>		<u>Name of Claim</u>	<u>Recorded</u>	
BLUE CRYSTAL No.	<u>Docket</u>	<u>Page</u>	BLUE CRYSTAL NO.	<u>Docket</u>	<u>Page</u>
1	35	577	10	46	233
2	46	231	(No. 10 Amended)	52	126
(No. 2 Amended)	52	119	11	37	586
3	46	232	(No. 11 Amended)	52	127
(No. 3 Amended)	52	120	12	37	587
4	35	449	(No. 12 Amended)	52	128
(No. 4 Amended)	52	121	13	46	234
5	48	58	(No. 13 Amended)	52	129
(No. 5 Amended)	52	122	14	46	235
6	46	243	(No. 14 Amended)	52	130
(No. 6 Amended)	52	123	15	47	16
7	47	14	(No. 15 Amended)	52	131
(No. 7 Amended)	52	124	16	47	17
8	37	585	(No. 16 Amended)	52	132
(No. 8 Amended)	52	125	17	47	18
9	47	15	(No. 17 Amended)	52	133
(No. 9 Amended)	52	102	18	47	19
			(No. 18 Amended)	52	134

Name of Claim			Recorded			Name of Claim			Recorded		
BLUE CRYSTAL No.	Docket	Page									
19	47	20	49	46	253	(No. 19 Amended)	52	188	(No. 48 Amended)	52	161
20	46	244	49	47	34	(No. 20 Amended)	52	186	(No. 49 Amended)	52	162
21	46	245	50	47	35	(No. 21 Amended)	52	137	(No. 50 Amended)	52	163
22	46	246	51	47	36	(No. 22 Amended)	52	138	(No. 51 Amended)	52	164
23	46	247	52	47	37	(No. 23 Amended)	52	139	(No. 52 Amended)	52	165
24	46	248	53	47	38	(No. 24 Amended)	52	140	(No. 53 Amended)	52	166
25	46	249	54	46	259	(No. 25 Amended)	47	21	(No. 54 Amended)	52	167
26	47	21	55	46	257	(No. 26 Amended)	52	141	(No. 55 Amended)	46	256
27	47	22	56	46	256	(No. 27 Amended)	52	142	(No. 56 Amended)	52	168
28	47	23	57	46	258	(No. 28 Amended)	52	143	(No. 57 Amended)	52	169
29	47	24	58	47	39	(No. 29 Amended)	52	144	(No. 58 Amended)	52	170
30	47	25	59	47	40	(No. 30 Amended)	52	145	(No. 59 Amended)	52	171
31	47	26	60	47	41	(No. 31 Amended)	52	146	(No. 60 Amended)	52	172
32	46	250	61	47	42	(No. 32 Amended)	52	147	(No. 61 Amended)	52	173
33	47	27	62	47	43	(No. 33 Amended)	47	27	(No. 62 Amended)	52	174
34	47	28	63	46	260	(No. 34 Amended)	52	148	(No. 63 Amended)	52	175
35	46	251	64	47	44	(No. 35 Amended)	52	149	(No. 64 Amended)	52	176
36	46	252	65	47	45	(No. 36 Amended)	52	150	(No. 65 Amended)	52	177
37	46	253	66	47	46	(No. 37 Amended)	52	151	(No. 66 Amended)	52	178
38	47	29	67	48	59	(No. 38 Amended)	52	152	(No. 67 Amended)	49	481
39	47	30	68	48	60	(No. 39 Amended)	52	153	(No. 68 Amended)	49	482
40	47	31	69	48	61	(No. 40 Amended)	52	154	(No. 69 Amended)	49	483
41	47	32	70	48	62	(No. 41 Amended)	52	155	(No. 70 Amended)	49	484
42	47	33	71	48	63	(No. 42 Amended)	52	156	(No. 71 Amended)	49	485
43	46	254	72	48	64	(No. 43 Amended)	52	157	(No. 72 Amended)	49	486
44	43	372	73	48	65	(No. 44 Amended)	52	158	(No. 73 Amended)	49	487
45	46	236	74	48	66	(No. 45 Amended)	43	374	(No. 74 Amended)	49	488
46	43	374	75	48	67	(No. 46 Amended)	52	159	(No. 75 Amended)	49	489
47	46	237				(No. 47 Amended)	52	160			

<u>Name of Claim</u>		<u>Recorded</u>		<u>Name of Claim</u>		<u>Recorded</u>	
BLUE CRYSTAL No.		<u>Docket</u>	<u>Page</u>	BLUE CRYSTAL No.		<u>Docket</u>	<u>Page</u>
76		49	499	103		48	95
(No. 76 Amended)		52	179	(No. 103 Amended)		52	202
77		48	69	104		48	96
(No. 77 Amended)		49	491	(No. 104 Amended)		52	203
78		48	70	105		48	97
(No. 78 Amended)		49	492	(No. 105 Amended)		52	204
79		48	71	106		48	98
(No. 79 Amended)		49	493	(No. 106 Amended)		52	205
80		48	72	107		48	99
(No. 80 Amended)		49	494	(No. 107 Amended)		52	206
81		48	73	108		48	100
(No. 81 Amended)		52	180	(No. 108 Amended)		52	207
82		48	74	109		48	101
(No. 82 Amended)		52	181	(No. 109 Amended)		52	208
83		48	75	110		48	102
(No. 83 Amended)		52	182	(No. 110 Amended)		52	209
84		48	76	111		48	103
(No. 84 Amended)		52	183	(No. 111 Amended)		52	210
85		48	77	112		48	104
(No. 85 Amended)		52	184	(No. 112 Amended)		52	211
86		48	78	113		48	105
(No. 86 Amended)		52	185	(No. 113 Amended)		52	212
87		48	79	114		48	106
(No. 87 Amended)		52	186	(No. 114 Amended)		52	213
88		48	80	115		48	107
(No. 88 Amended)		52	187	(No. 115 Amended)		52	214
89		48	81	116		48	108
(No. 89 Amended)		52	188	(No. 116 Amended)		52	215
90		48	82	117		48	109
(No. 90 Amended)		52	189	(No. 117 Amended)		52	216
91		48	83	118		48	110
(No. 91 Amended)		52	190	(No. 118 Amended)		52	217
92		48	84	119		48	111
(No. 92 Amended)		52	191	(No. 119 Amended)		52	218
93		48	85	120		48	112
(No. 93 Amended)		52	192	(No. 120 Amended)		52	219
94		48	86	121		49	138
(No. 94 Amended)		52	193	(No. 121 Amended)		52	220
95		48	87	122		49	139
(No. 95 Amended)		52	194	(No. 122 Amended)		52	221
96		48	88	123		49	140
(No. 96 Amended)		52	195	(No. 123 Amended)		52	222
97		48	89	124		49	141
(No. 97 Amended)		52	196	(No. 124 Amended)		52	223
98		48	90	125		49	142
(No. 98 Amended)		52	197	126		49	143
99		48	91	(No. 126 Amended)		52	224
(No. 99 Amended)		52	198	127		49	144
100		48	92	128		49	145
(No. 100 Amended)		52	199	(No. 128 Amended)		52	225
101		48	93	129		49	146
(No. 101 Amended)		52	200	(No. 129 Amended)		52	226
102		48	94	130		49	147
(No. 102 Amended)		52	201	(No. 130 Amended)		52	227

<u>Name of Claim</u>		<u>Recorded</u>		<u>Name of Claim</u>		<u>Recorded</u>	
BLUE CRYSTAL No.		<u>Docket</u>	<u>Page</u>	BLUE CRYSTAL No.		<u>Docket</u>	<u>Page</u>
131		49	140	159		49	176
(No. 131 Amended)		52	228	(No. 159 Amended)		52	253
132		49	149	160		49	177
(No. 132 Amended)		52	229	(No. 160 Amended)		52	254
133		49	150	161		49	178
(No. 133 Amended)		52	230	(No. 161 Amended)		52	255
134		49	151	162		49	179
(No. 134 Amended)		52	231	(No. 162 Amended)		52	256
135		49	152	163		49	180
(No. 135 Amended)		52	232	(No. 163 Amended)		52	257
136		49	153	164		49	181
(No. 136 Amended)		52	233	(No. 164 Amended)		52	258
137		49	154	165		49	182
(No. 137 Amended)		52	234	(No. 165 Amended)		52	259
138		49	155	166		49	183
(No. 138 Amended)		52	235	(No. 166 Amended)		52	260
139		49	156	167		49	184
		49	157	(No. 167 Amended)		52	261
140		52	236	168		49	185
(No. 140 Amended)		49	158	(No. 168 Amended)		52	262
141		52	237	169		49	186
(No. 141 Amended)		49	159	(No. 169 Amended)		52	263
142		52	238	170		49	187
(No. 142 Amended)		49	160	(No. 170 Amended)		52	264
143		49	161	171		49	188
		52	239	(No. 171 Amended)		52	265
144		49	162	172		49	189
(No. 144 Amended)		52	240	(No. 172 Amended)		52	266
145		49	163	173		49	190
(No. 145 Amended)		52	241	(No. 173 Amended)		52	267
146		49	164	174		49	191
(No. 146 Amended)		52	242	(No. 174 Amended)		52	268
147		49	165	175		50	534
(No. 147 Amended)		52	243	176		50	535
148		49	166	177		50	536
(No. 148 Amended)		52	244	178		50	537
149		49	167	179		50	538
(No. 149 Amended)		52	245	180		50	539
150		49	168	181		50	540
(No. 150 Amended)		52	246	182		50	541
151		49	169	183		50	542
(No. 151 Amended)		52	247	184		50	543
152		49	170	185		50	544
(No. 152 Amended)		52	248	186		50	545
153		49	171	187		50	546
(No. 153 Amended)		52	249	188		50	547
154		49	172	189		50	548
(No. 154 Amended)		52	250	190		50	549
155		49	173	191		50	550
(No. 155 Amended)		52	251	192		50	551
156		49	174	193		50	552
(No. 156 Amended)		52	252	194		50	553
157		49	175	195		50	554
(No. 157 Amended)		52	252	196		50	555
158		49	176				
(No. 158 Amended)		52	252				

<u>Name of Claim</u>	<u>Recorded</u>	
BLUE CRYSTAL No.	<u>Docket</u>	<u>Page</u>
197	50	555
198	50	557
199	50	558
200	50	559
201	50	560
202	50	561
203	52	104
204	50	562
205	50	563
206	50	564
207	50	565
208	50	566
209	50	567
210	50	568
211	50	569
212	50	570
213	50	571
214	50	572
215	50	573
216	50	574
217	50	575
218	50	576
219	50	577
220	50	578
221	50	579
222	50	580
223	50	581
224	50	582
225	50	583

<u>Name of Claim</u>	<u>Recorded</u>	
BLUE CRYSTAL No.	<u>Docket</u>	<u>Page</u>
226	50	584
227	50	585
228	50	586
229	50	587
230	50	588
231	50	589
232	50	590
233	50	591
234	50	592
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246	52	110
247	52	111
248	52	112
249	52	113
250	52	114
251	52	115
252	52	116
253	52	117
254	52	118

VERITY & SMITH  
ATTORNEYS AT LAW  
SUITE 902 TRANSAMERICA BUILDING  
177 NORTH CHURCH AVENUE  
TUCSON, ARIZONA 85701

VICTOR H. VERITY  
LEO N. SMITH  
JAMES E. MUELLER  
JOHN C. LACY

AREA CODE 602  
TELEPHONE 622-7445

June 23, 1971

SXM

JUN 24 1971

RECEIVED

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

Re: Yakie and Blue Crystal Properties

Dear Howard:

Enclosed is a draft of a form of letter for use by Essex in relinquishing its interest in the Yakie and Blue Crystal Properties together with three copies of the "Schedule of Properties" referred to therein. Inasmuch as the unexecuted Agreements provide that notices must be given by Registered Mail, I suggest that you send a copy of the letter to Mr. Anderson by Registered Mail even if you deliver a copy of the letter to Mr. Anderson personally.

As discussed with you in our phone conversation this morning, no Agreements were ever executed by Essex. Accordingly I have omitted any reference to any specific Agreements. Mr. Anderson drafted Agreements which were executed by the Owners and submitted to Essex. Subsequently Essex submitted revised pages and Memorandums to the Owners which were initialed and executed by the Owners and returned to this office for submission to Essex. At your request we have held the documents in this office pending determination by Essex as to its future plans with respect to the two properties. I am enclosing the executed documents herewith so that all of the documents can be retained in your office. The documents are as follows:

Blue Crystal Property Documents

1. Five copies of an undated Memorandum of Option Agreement executed by all of the Owners.
2. Five copies each of revised pages 4 and 5 to the Option Agreement initialed by each of the Owners.

Yakie Property Documents

1. Five copies of an undated Memorandum of Option Agreement executed by all of the Owners except Matthew Danenhauer.

Mr. Howard Lanier  
June 23, 1971  
Page 2

2. Five copies each of revised pages 4 and 5 to the Option Agreement initialed by each of the Owners except Matthew Danenhauer.
3. Two copies of an Application to Assign Prospecting Permit No. 13699 executed by Edward and Verna Danenhauer.

With respect to Prospecting Permit No. 13699, it was issued on September 18, 1968. Accordingly, the assessment work and rental payments will become due on September 17, 1971, well within the time limits for performance of assessment work. I checked by phone with the State Land Department and they concurred that the Permit is presently held in the name of Edward Danenhauer.

I would appreciate a copy of the final letter to Mr. Anderson so that my file will be complete.

Very truly yours,



Leo N. Smith

LNS:vs  
Enclosures

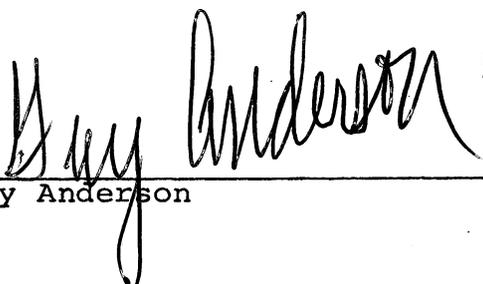
MEMORANDUM OF OPTION AGREEMENT

Under the terms of that certain OPTION TO PURCHASE AGREEMENT dated the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, by and between GUY ANDERSON and ELIZABETH ANDERSON, husband and wife; MATTHEW DANENHAUER, MAY DANENHAUER, EDWARD DANENHAUER and VERNA DANENHAUER, husband and wife; MAX RAPIER and VERNA RAPIER, husband and wife; H. CLYDE DAVIS and ANNABELLE DAVIS, husband and wife, (all of which parties are therein and hereinafter collectively designated as "Owners"), and ESSEX INTERNATIONAL, INC., a Michigan corporation authorized to do business in the State of Arizona (therein and hereinafter designated as "Essex"), Owners granted to Essex for a period of ten (10) years from the date thereof, an option to purchase the unpatented mining claims (therein and hereinafter referred to as the "Property"), all more particularly described in Exhibit A attached hereto and made a part hereof, which claims are situated in Greenlee County, Arizona, with the sole and exclusive right to enter upon and take possession of the Property with the right to drill and excavate such holes, pits and other excavations, and to conduct such surveys, sampling, investigations and other operations in such manner and to the extent as Essex in its sole judgment and discretion may deem advisable for the purpose of ascertaining any and all facts relating to the occurrence of ores and minerals in and under the Property and to the mining, milling and treatment thereof, all as fully set forth therein, and all of which rights are subject to Essex's right to terminate the Agreement upon notice given to Owners in the manner set forth in the said Agreement. The parties hereto, and each of them, do hereby incorporate by this reference all of the terms, provisions, covenants and conditions set forth in the Agreement as though the same were herein set forth in full. In addition to the rights set forth therein,

Owners hereby grant to Essex the right to receive an assignment of Arizona State Prospecting Permit No. 13699 (as more particularly described in Exhibit A) subject to the obligation of Essex to reassign to the applicable party any then interest of Essex in and to the said Permit or any renewal thereof or any state mineral lease issued thereunder in the event Essex terminates the Agreement other than by exercise of its option to purchase.

Copies of the said Agreement are in the possession of Owners, c/o Guy Anderson, 605 Main Street, Safford, Arizona, and of Essex International, Inc., c/o Verity & Smith, 902 Transamerica Building, Tucson, Arizona 85701.

IN WITNESS WHEREOF this MEMORANDUM OF OPTION AGREEMENT has been executed effective as of the date first above set forth.

  
\_\_\_\_\_  
Guy Anderson

OWNERS

  
\_\_\_\_\_  
Elizabeth Anderson

\_\_\_\_\_  
Matthew Danenhauer

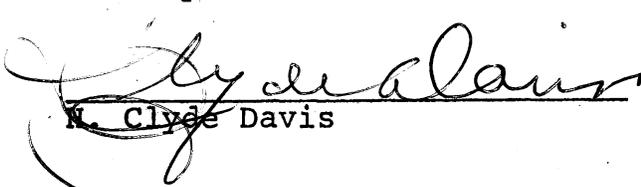
  
\_\_\_\_\_  
May Danenhauer

  
\_\_\_\_\_  
Edward Danenhauer

  
\_\_\_\_\_  
Verna Danenhauer

  
\_\_\_\_\_  
Max Rapier

  
\_\_\_\_\_  
Verna Rapier

  
\_\_\_\_\_  
N. Clyde Davis

  
\_\_\_\_\_  
Annabelle Davis

ESSEX

ESSEX INTERNATIONAL, INC.

By \_\_\_\_\_

ATTEST: \_\_\_\_\_

STATE OF ARIZONA

County of Graham

} ss.

On this the 15th day of January, 19 71, before me, the undersigned Notary Public, personally appeared Guy Anderson, Elizabeth Anderson & May Danenhauer known to me (or satisfactorily proven) to the person(s) whose name(s) [he, she, they] subscribed to the within instrument and acknowledge the execution thereof for the purposes therein contained.

IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:

June 22, 1972

*Annelia Sanz*  
Notary Public

STATE OF ARIZONA

County of Graham

} ss.

On this the 15th day of January, 19 71, before me, the undersigned Notary Public, personally appeared Edward Danenhauer, Verna Danenhauer, Max Rapier and Verna Rapier known to me (or satisfactorily proven) to be the person(s) whose name(s) [he, she, they] subscribed to the within instrument and acknowledge the execution thereof for the purposes therein contained.

IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:

June 22, 1972

*Annelia Sanz*  
Notary Public

STATE OF ~~ARIZONA~~ UTAH

County of Utah

} ss.

On this the 19th day of January, 19 71, before me, the undersigned Notary Public, personally appeared H. Clyde Davis and Annabelle Davis known to me (or satisfactorily proven) to the person(s) whose name(s) [he, she, they] subscribed to the within instrument and acknowledge the execution thereof for the purposes therein contained.

IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:

July 30, 1972

*Clyde Weeks*  
Notary Public

STATE OF ARIZONA

County of \_\_\_\_\_

} ss.

On this the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, before me, the undersigned Notary Public, personally appeared \_\_\_\_\_ known to me (or satisfactorily proven) to be the person(s) whose name(s) [he, she, they] subscribed to the within instrument and acknowledge the execution thereof for the purposes therein contained.

IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:

\_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_

County of \_\_\_\_\_

} ss.

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IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:

\_\_\_\_\_

\_\_\_\_\_  
Notary Public

EXHIBIT "A"

66 Unpatented Mining Claims known as:

VERNA MAY Nos. 1, 3, 5, 7, 11, 13, 15, 17, 19, 21, 23 thru 42, 45, 47, 49, 51, 53, 55, 57, 58A, 59 thru 74, 76 thru 86, covering approximately 1,300 acres, which location notices are recorded in the office of the County Recorder of Greenlee County, Arizona, in 9, 16 and 14 of Records of Mines at pages 549 to 603, 318 to 329 and 264 to 267.

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MEMORANDUM OF OPTION AGREEMENT

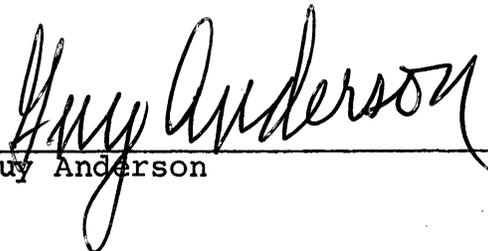
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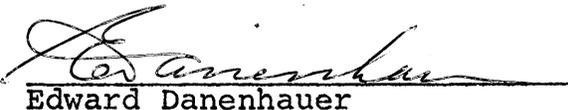
OWNERS

  
Guy Anderson

  
Elizabeth Anderson

Matthew Danenhauer

  
May Danenhauer

  
Edward Danenhauer

  
Verna Danenhauer

  
Max Rapier

  
Verna Rapier

  
Clyde Davis

  
Annabelle Davis

ESSEX

ESSEX INTERNATIONAL, INC.

By \_\_\_\_\_

ATTEST: \_\_\_\_\_

STATE OF ARIZONA  
Graham

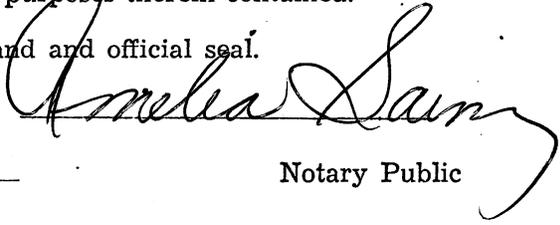
County of \_\_\_\_\_

} ss.

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IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:  
June 22, 1972



Notary Public

STATE OF ARIZONA  
Graham

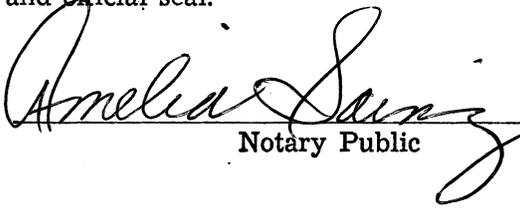
County of \_\_\_\_\_

} ss.

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Notary Public

STATE OF ~~ARIZONA~~ UTAH

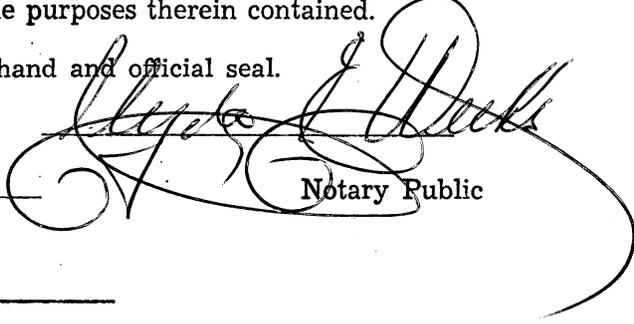
County of Utah

} ss.

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My commission expires:  
July 30, 1972



Notary Public

STATE OF ARIZONA

County of \_\_\_\_\_

} ss.

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\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_

County of \_\_\_\_\_

} ss.

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\_\_\_\_\_

\_\_\_\_\_  
Notary Public

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VERNA MAY Nos. 1, 3, 5, 7, 11, 13, 15, 17, 19, 21, 23 thru 42, 45, 47, 49, 51, 53, 55, 57, 58A, 59 thru 74, 76 thru 86, covering approximately 1,300 acres, which location notices are recorded in the office of the County Recorder of Greenlee County, Arizona, in 9, 16 and 14 of Records of Mines at pages 549 to 603, 318 to 329 and 264 to 267.

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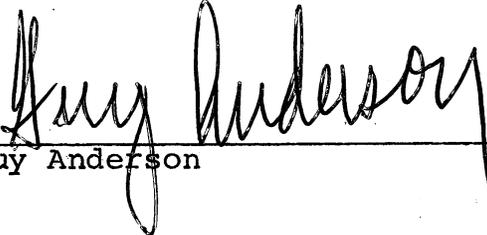
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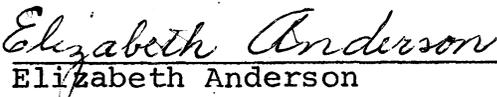
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\_\_\_\_\_  
Guy Anderson

OWNERS

  
\_\_\_\_\_  
Elizabeth Anderson

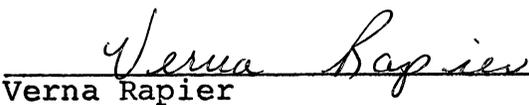
\_\_\_\_\_  
Matthew Danenhauer

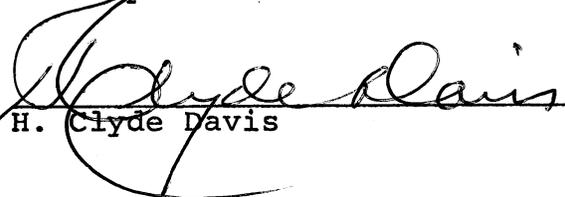
  
\_\_\_\_\_  
May Danenhauer

  
\_\_\_\_\_  
Edward Danenhauer

  
\_\_\_\_\_  
Verna Danenhauer

  
\_\_\_\_\_  
Max Rapier

  
\_\_\_\_\_  
Verna Rapier

  
\_\_\_\_\_  
H. Clyde Davis

  
\_\_\_\_\_  
Annabelle Davis

ESSEX

ESSEX INTERNATIONAL, INC.

By \_\_\_\_\_

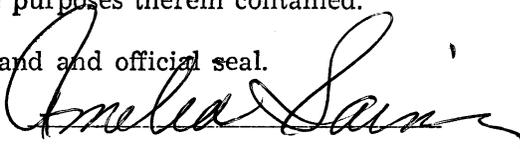
ATTEST: \_\_\_\_\_

STATE OF ARIZONA  
County of Graham } ss.

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My commission expires:  
June 22, 1972

  
Notary Public

STATE OF ARIZONA  
County of Graham } ss.

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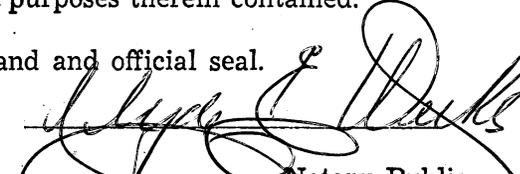
  
Notary Public

STATE OF ~~ARIZONA~~ UTAH  
County of Utah } ss.

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July 30, 1972

  
Notary Public

STATE OF ARIZONA

County of \_\_\_\_\_

} ss.

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\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_

County of \_\_\_\_\_

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\_\_\_\_\_  
Notary Public

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MEMORANDUM OF OPTION AGREEMENT

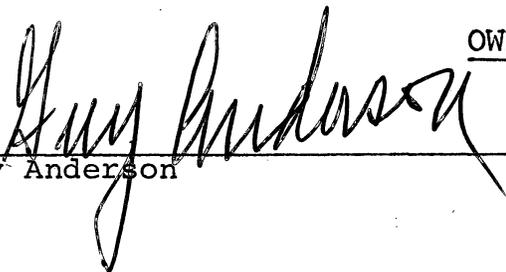
Under the terms of that certain OPTION TO PURCHASE AGREEMENT dated the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_, by and between GUY ANDERSON and ELIZABETH ANDERSON, husband and wife; MATTHEW DANENHAUER, MAY DANENHAUER, EDWARD DANENHAUER and VERNA DANENHAUER, husband and wife; MAX RAPIER and VERNA RAPIER, husband and wife; H. CLYDE DAVIS and ANNABELLE DAVIS, husband and wife, (all of which parties are therein and hereinafter collectively designated as "Owners"), and ESSEX INTERNATIONAL, INC., a Michigan corporation authorized to do business in the State of Arizona (therein and hereinafter designated as "Essex"), Owners granted to Essex for a period of ten (10) years from the date thereof, an option to purchase the unpatented mining claims (therein and hereinafter referred to as the "Property"), all more particularly described in Exhibit A attached hereto and made a part hereof, which claims are situated in Greenlee County, Arizona, with the sole and exclusive right to enter upon and take possession of the Property with the right to drill and excavate such holes, pits and other excavations, and to conduct such surveys, sampling, investigations and other operations in such manner and to the extent as Essex in its sole judgment and discretion may deem advisable for the purpose of ascertaining any and all facts relating to the occurrence of ores and minerals in and under the Property and to the mining, milling and treatment thereof, all as fully set forth therein, and all of which rights are subject to Essex's right to terminate the Agreement upon notice given to Owners in the manner set forth in the said Agreement. The parties hereto, and each of them, do hereby incorporate by this reference all of the terms, provisions, covenants and conditions set forth in the Agreement as though the same were herein set forth in full. In addition to the rights set forth therein,

Owners hereby grant to Essex the right to receive an assignment of Arizona State Prospecting Permit No. 13699 (as more particularly described in Exhibit A) subject to the obligation of Essex to reassign to the applicable party any then interest of Essex in and to the said Permit or any renewal thereof or any state mineral lease issued thereunder in the event Essex terminates the Agreement other than by exercise of its option to purchase.

Copies of the said Agreement are in the possession of Owners, c/o Guy Anderson, 605 Main Street, Safford, Arizona, and of Essex International, Inc., c/o Verity & Smith, 902 Transamerica Building, Tucson, Arizona 85701.

IN WITNESS WHEREOF this MEMORANDUM OF OPTION AGREEMENT has been executed effective as of the date first above set forth.

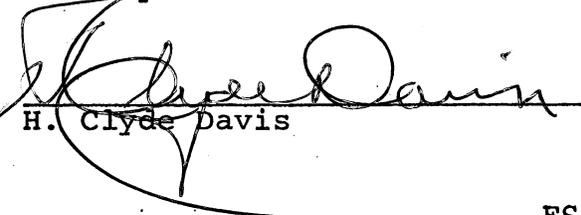
OWNERS

  
\_\_\_\_\_  
Guy Anderson

Matthew Danenhauer

  
\_\_\_\_\_  
Edward Danenhauer

  
\_\_\_\_\_  
Max Rapier

  
\_\_\_\_\_  
H. Clyde Davis

  
\_\_\_\_\_  
Elizabeth Anderson

  
\_\_\_\_\_  
May Danenhauer

  
\_\_\_\_\_  
Verna Danenhauer

  
\_\_\_\_\_  
Verna Rapier

  
\_\_\_\_\_  
Annabelle Davis

ESSEX

ESSEX INTERNATIONAL, INC.

By \_\_\_\_\_

ATTEST: \_\_\_\_\_

STATE OF ARIZONA

County of Graham

} ss.

On this the 15th day of January, 19 71, before me, the undersigned Notary Public, personally appeared Guy Anderson, Elizabeth Anderson & May Danenhauer known to me (or satisfactorily proven) to the person(s) whose name(s) [he, she, they] subscribed to the within instrument and acknowledge the execution thereof for the purposes therein contained.

IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:

June 22, 1972

Notary Public

STATE OF ARIZONA

County of Graham

} ss.

On this the 15th day of January, 19 71, before me, the undersigned Notary Public, personally appeared Edward Danenhauer, Verna Danenhauer, Max Rapier and Verna Rapier known to me (or satisfactorily proven) to be the person(s) whose name(s) [he, she, they] subscribed to the within instrument and acknowledge the execution thereof for the purposes therein contained.

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My commission expires:

June 22, 1972

Notary Public

STATE OF ~~ARIZONA~~ UTAH

County of Utah

} ss.

On this the 19th day of January, 19 71, before me, the undersigned Notary Public, personally appeared H. Clyde Davis and Annabelle Davis known to me (or satisfactorily proven) to the person(s) whose name(s) [he, she, they] subscribed to the within instrument and acknowledge the execution thereof for the purposes therein contained.

IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:

July 30, 1972

Notary Public

STATE OF ARIZONA

County of \_\_\_\_\_

} ss.

On this the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_\_, before me, the undersigned Notary Public, personally appeared \_\_\_\_\_ known to me (or satisfactorily proven) to be the person(s) whose name(s) [he, she, they] subscribed to the within instrument and acknowledge the execution thereof for the purposes therein contained.

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My commission expires:

\_\_\_\_\_

\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_

County of \_\_\_\_\_

} ss.

On this the \_\_\_\_\_ day of \_\_\_\_\_, 19\_\_\_\_\_, before me, the undersigned Notary Public, personally appeared \_\_\_\_\_ who acknowledged himself to be the \_\_\_\_\_ of ESSEX INTERNATIONAL, INC., a corporation, and that he as such officer, being authorized so to do, executed the foregoing instrument for the purposes therein contained, by signing the name of the corporation by himself as such officer.

IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:

\_\_\_\_\_

\_\_\_\_\_  
Notary Public

EXHIBIT "A"

66 Unpatented Mining Claims known as:

VERNA MAY Nos. 1, 3, 5, 7, 11, 13, 15, 17, 19, 21, 23 thru 42, 45, 47, 49, 51, 53, 55, 57, 58A, 59 thru 74, 76 thru 86, covering approximately 1,300 acres, which location notices are recorded in the office of the County Recorder of Greenlee County, Arizona, in 9, 16 and 14 of Records of Mines at pages 549 to 603, 318 to 329 and 264 to 267.

Arizona State Prospecting Permit No. 13699, situated in the  $W\frac{1}{2}$   $NW\frac{1}{4}$ ,  $NW\frac{1}{4}$   $SW\frac{1}{4}$  of Section 33, Township 4 South, Range 30 East, containing 116.37 acres.

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*Guy Anderson*  
Guy Anderson

OWNERS

*Elizabeth Anderson*  
Elizabeth Anderson

Matthew Danenhauer

*May Danenhauer*  
May Danenhauer

*Edward Danenhauer*  
Edward Danenhauer

*Verna Danenhauer*  
Verna Danenhauer

*Max Rapier*  
Max Rapier

*Verna Rapier*  
Verna Rapier

*H. Clyde Davis*  
H. Clyde Davis

*Annabelle Davis*  
Annabelle Davis

ESSEX

ESSEX INTERNATIONAL, INC.

By \_\_\_\_\_

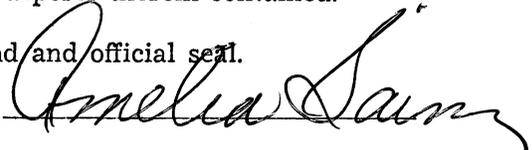
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County of Graham } ss.

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My commission expires:  
June 22, 1972

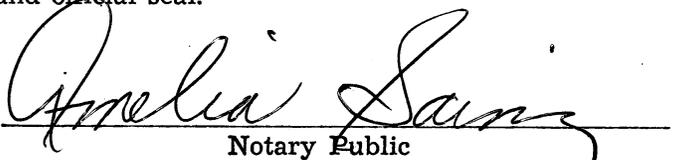
  
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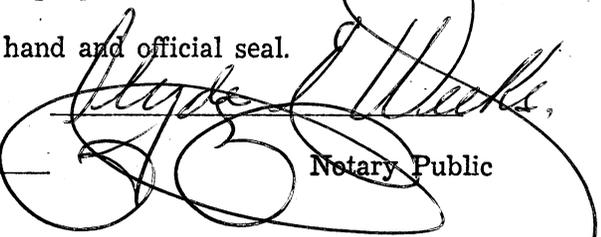
  
Notary Public

STATE OF ~~ARIZONA~~ UTAH }  
County of Utah } ss.

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IN WITNESS WHEREOF I hereunto set my hand and official seal.

My commission expires:  
July 30, 1972

  
Notary Public

STATE OF ARIZONA }  
County of \_\_\_\_\_ } ss.

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Notary Public

STATE OF \_\_\_\_\_ }  
County of \_\_\_\_\_ } ss.

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Arizona State Prospecting Permit No. 13699, situated in the  $W\frac{1}{2}$   $NW\frac{1}{4}$ ,  $NW\frac{1}{4}$   $SW\frac{1}{4}$  of Section 33, Township 4 South, Range 30 East, containing 116.37 acres.

be a credit against payments described in Section 1 and against the total purchase price in the event ESSEX elects to purchase the Property. OWNERS agree not to encumber title to the Property while this Agreement is in effect. If title to any of the Property is contested or questioned by any person, corporation, or governmental agency (upon grounds other than grounds arising from ESSEX's failure to perform its obligations herein set forth), ESSEX, at its own election, may defend or initiate litigation to protect the title before any court or administrative body. If ESSEX elects to protect or perfect OWNERS' title, all customary costs of such defense, including, but not limited to, attorneys' fees, shall be a credit against payments described in Section 1 and against the total purchase price in the event ESSEX elects to purchase the Property, unless the title dispute arises from ESSEX's failure to perform obligations hereunder (in which case such costs shall be borne by ESSEX). If OWNERS' title to any of the Property is defective or less than represented herein, all payments to be made to OWNERS hereunder as set forth in Section 1 shall be reduced to the same proportion thereof as the undivided interest of OWNERS in the Property hereunder bears to the entire undivided title thereto. Nothing herein contained, and no notice or action which may be taken under this Section 9, shall limit or prevent ESSEX's right to terminate this Agreement at any time, as hereinafter provided.

10. Amendment, Relocation and Patent of Claims

ESSEX shall have the right to amend or relocate any of OWNERS' unpatented mining claims which ESSEX, in its sole discretion, deems advisable to so amend or relocate. ESSEX shall not be liable to OWNERS for any act (or failure to act) by it or any of its agents in connection with the amendment or relocation of claims as long as such act (or omission) is not made in bad faith. Upon request by ESSEX in writing, OWNERS shall apply for a patent to any of the unpatented lode mining claims so designated by ESSEX and shall execute all necessary applications and documents in connection therewith, and shall cooperate fully with ESSEX in securing such patents. All expenses incurred or authorized by ESSEX in connection with such patent proceedings shall be borne by ESSEX. The rights of ESSEX under this Agreement shall extend to any of the amended, relocated or patented

*F.D.* *M.D.*

*Elizabeth Anderson*

*A.B.U.*

affidavits of such performance for any assessment year in which this Agreement has not expired or been terminated prior to two (2) months before the end of such assessment work year. ESSEX shall not be liable on account of holdings by any court or governmental agency that the effects of work so elected and performed by ESSEX do not constitute the required annual assessment work for purposes of preserving title to such claims, provided that the work so done is of the kind generally accepted as assessment work and that ESSEX has expended a total amount sufficient to meet the minimum requirements with respect to all of the unpatented claims.

6. Protection from Liens and Damages

ESSEX agrees to pay all expenses incurred by it in its operations on the Property hereunder and to permit no liens arising from any act of ESSEX to remain upon the Property, and to indemnify OWNERS against any liability to third persons resulting from ESSEX's operations hereunder.

7. Taxes and Assessments

ESSEX agrees to pay all taxes, assessments and other governmental charges imposed upon the Property while this Agreement is in effect.

8. Delivery of Data

If this Agreement is terminated, ESSEX, upon request given by OWNERS within thirty (30) days of said termination, shall furnish OWNERS copies of all basic maps, drill logs and summaries of factual reports pertaining to the Property prepared by ESSEX.

9. Title Defects; Title Defense; Lesser Interest

If, in the opinion of counsel for ESSEX, OWNERS' title to any of the Property is defective or less than as warranted in Section 2, ESSEX may deliver to OWNERS written notice stating its objections to the title and if OWNERS are unable or unwilling to promptly correct the defects in title, ESSEX may attempt, with all reasonable dispatch, to perfect the title. In that event, OWNERS shall execute all documents and shall take such other actions as are reasonably necessary to assist ESSEX in its efforts to correct the defects in title. All costs and expenses of perfecting title, including, but without being limited to, the cost of attorneys' fees, and the cost of releasing or satisfying mortgages, liens and encumbrances shall

*[Handwritten initials]*

*mk  
or*

*MD.*

*JR E.A.*

*[Handwritten signature]*

STATE LAND DEPARTMENT  
400 Arizona State Office Building  
Phoenix 7, Arizona

Partial Assignment \_\_\_\_\_

Complete Assignment \_\_\_\_\_ X

APPLICATION TO ASSIGN, AND ASSUMPTION OF PROSPECTING PERMIT  
FOR STATE LANDS

- Note: 1. If person assigning this lease is married, both husband and wife must sign assignment.
2. If transfer of more than one section describe on reverse side.
3. In order to complete this assignment, assignor's original lease must accompany this application and any delinquent rental will have to be paid.
- 4.\*See reverse side for fees.

APPLICATION FOR ASSIGNMENT OF PROSPECTING PERMIT

I (We) EDWARD DANENHAUER and VERNA DANENHAUER, husband and wife not being in default for rent or purchase payments for State lands, do hereby apply for permission to assign to ESSEX INTERNATIONAL, INC. of Tucson, County of Pima, State of Arizona, Permit No. 13699, dated \_\_\_\_\_, 19\_\_\_\_, for the Lots 1, 2 and 3, Sec. 33, Twp. 4 S., Rge. 30E., G&SRB&M in Greenlee, County, Arizona, containing 116.37 acres, more or less.

By and with the consent of the State Land Commissioner, and in consideration of the sum One Dollars, \$ 1.00 lawful money of the United States to me (us) in hand paid, receipt whereof is hereby acknowledged, I (we) do hereby assign, transfer and sell unto the said Essex International, Inc. his (their) heirs, successors, and assigns, all my (our) right, title, interest and claim in and to the above described land or land described on the reverse side, and in and to said permit.

Given under my (our) hand and seal at Safford, County of Graham, State of Arizona, this \_\_\_\_\_ day of \_\_\_\_\_, A.D., 19\_\_\_\_.

STATE OF ARIZONA )  
County of Graham ) ss Mr. [Signature]  
Mrs. [Signature]  
Post Office Address \_\_\_\_\_

Before me, Amelia Sainz, a Notary Public in and for the State and County aforesaid, on this day personally appeared Ed Danenhauer and Verna Danenhauer known to me to be the person whose name is subscribed to the foregoing Application for Assignment of Permit, and acknowledged to me that he executed the same for the purpose and in consideration therein expressed.

Given under my hand and seal of office, this 15th day of January, A.D., 19 71.

[Signature]  
Notary Public

(My Commission Expires June 22, 1972)

APPLICATION FOR TRANSFER AND ASSUMPTION OF PERMIT

I (We) \_\_\_\_\_  
(Married) \_\_\_\_\_ (Single) \_\_\_\_\_  
being \_\_\_\_\_ years of age, a native born (or naturalized) citizen of the United States (if not a native born or naturalized citizen of the United States, but an applicant to become a citizen of the United States, state when and where declaration of intention was made) \_\_\_\_\_ of \_\_\_\_\_  
County of \_\_\_\_\_ State of \_\_\_\_\_  
do hereby apply for transfer of the foregoing permit numbered \_\_\_\_\_  
to me (us), embracing the lands herein above described, and for permission to hold the land under the terms and conditions of said permit.



STATE LAND DEPARTMENT  
400 Arizona State Office Building  
Phoenix 7, Arizona

Partial Assignment \_\_\_\_\_

Complete Assignment  X

APPLICATION TO ASSIGN, AND ASSUMPTION OF PROSPECTING PERMIT  
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# ESSEX

**ESSEX INTERNATIONAL, INC.**

1704 WEST GRANT RD., TUCSON, ARIZONA 85705

PHONE (602) 624-7421

May 20, 1971

SXM  
MAY 24 1971  
RECEIVED

Mr. Guy Anderson  
Anderson & Welker  
605 Main Street  
Safford, Arizona 85546

RE: Yakie, Cuprite and  
Blue Crystal Prospects;  
Greenlee and Graham  
Counties, Arizona

Dear Guy,

Enclosed is the data loaned to Essex by you and your office on the above described prospects.

If you have any questions please let me know.

In the space provided below please acknowledge receipt of the data by signing as indicated and return to us.

Very truly yours,



E. Grover Heinrichs  
Asst. Manager of Exploration

ESSEX INTERNATIONAL, INC.

EGH:td

  
\_\_\_\_\_  
Guy Anderson

P.S. We have been intending to give this to you at some time when you were in our office, but each time you have been here we failed to remember it.

E.G.H.

List of maps, papers, and documents pertaining to the Yakie, Blue Crystal, and Cuprite Properties of Guy Anderson, et al, returned to Guy Anderson on May 20, 1971.

\* \* \* \* \*

#### YAKIE CLAIM GROUP

1. Copper Prospect Map - Scale = 1" = 2000' - Greenlee County, Arizona.
2. Partnership Agreement dated February 15, 1968.

#### BLUE CRYSTAL CLAIM GROUP

3. Geology Map dated Aug. 26, 1961 - Scale approx. 1" = 1000' - Graham County, Arizona.
4. Option and Contract to Purchase Agreement dated April 1, 1959.

#### CUPRITE CLAIM GROUP

5. Claim Map showing claim ownership dated March 20, 1967 - Scale 1" = 400' - Greenlee County, Arizona.
6. Sketch Map - plan and profile sketch of fault vein to Cuprite shaft - Scale 1" = 200' - Greenlee County, Arizona.
7. Set of Claim Maps (3) showing ownership of patented, unpatented and state lease claims and of state lot leases - Scale approx. 1" = 10 Chains - Greenlee County, Arizona
8. Claim Map showing state lot leases and acreage - Scale approx. 1" = 30 Chains. Greenlee County, Ariz.
9. Claim Map - showing Cuprite Group and outlining P.D. border claims. Scale approx 4" = 1 mile - Greenlee County, Arizona.
10. Claim Map - Scale approx. 4" = 1 mile - Greenlee County, Arizona.
11. Plat - 2 mineral survey plats No. 2834 - Kirksville, etc. and McClave, etc. dated Oct 6, 1940 - Scale 1" = 500' - Greenlee County, Arizona.
12. Agreement dated Oct. 6, 1969 - Greenlee County, Ariz.
13. Judgment No. 3748-B dated July, 1958.

14. Report on Cuprite Claims dated April, 1960 - location, history, geology - Greenlee County, Arizona.
15. Supplementary Report on Cuprite Claims dated July 1, 1964 by Donald E. Cole - Greenlee County, Arizona.
16. Prospecting Permit - P.P. No. 10558 - dated Dec. 19, 1967.
17. Mineral Lease dated Feb. 8, 1967.

May 20, 1971

Mr. Guy Anderson  
Anderson & Welker  
605 Main Street  
Safford, Arizona 85546

RE: Yakie, Cuprite and  
Blue Crystal Prospects;  
Greenlee and Graham  
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Asst. Manager of Exploration  
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11. Plat - 2 mineral survey plats No. 2834 - Kirksville, etc. and McClave, etc. dated Oct 6, 1940 - Scale 1" = 500' - Greenlee County, Arizona.
12. Agreement dated Oct. 6, 1969 - Greenlee County, Ariz.
13. Judgment No. 3748-B dated July, 1958.

14. Report on Cuprite Claims dated April, 1960 - location, history, geology - Greenlee County, Arizona.
15. Supplementary Report on Cuprite Claims dated July 1, 1964 by Donald E. Cole - Greenlee County, Arizona.
16. Prospecting Permit - P.P. No. 10558 - dated Dec. 19, 1967.
17. Mineral Lease dated Feb. 8, 1967.

*YAKIE etc. J*

VERITY & SMITH  
ATTORNEYS AT LAW  
SUITE 902 TRANSAMERICA BUILDING  
177 NORTH CHURCH AVENUE  
TUCSON, ARIZONA 85701

VICTOR H. VERITY  
LEO N. SMITH  
JAMES E. MUELLER  
JOHN C. LACY

*XM*

*[Handwritten mark]*

AREA CODE 602  
TELEPHONE 622-7445

December 10, 1970

DEC 14 1970

RECEIVED

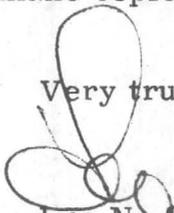
Mr. Grover Heinrichs  
Essex International, Inc.  
1704 West Grant Road  
Tucson, Arizona 85705

Re: Maps, Papers and Documents Pertaining to Anderson, et al. Yakie, Blue Crystal and Cuprite Properties

Dear Grover:

Enclosed are all of the documents which you left with me on December 8th pertaining to the above-captioned title matters. I have made copies for our records of all except the document designated as "Cuprite 1522," and the large Blue Crystal claim group map dated August 26, 1961. I would have no objection to your returning this material to Mr. Anderson. However, if you should obtain any additional information, please give me an opportunity to make copies before returning the same to Mr. Anderson.

Very truly yours,



Leo N. Smith

LNS:cj  
Enclosures

Certified Mail  
Return Receipt Requested

November 16, 1970

Mr. Guy Anderson  
Safford  
Arizona

Dear Guy:

Enclosed are two rough drafts of the mineral lease for the Cuprite.

After you have had an opportunity to review it and have compiled your recommendations, I suggest that we meet on this lease and the other two contracts for the Blue Crystal and the Yakle.

In addition to the Exhibit A property description it will be necessary to prepare a Memorandum Assignment of State Leases (on the State Land Department forms) and a memorandum for filing in the State Land Department. We are compiling the descriptions for Leo Smith which will be necessary for this work; however, I would like to have you check it before we finalize the documents.

Very truly yours,

ESSEX INTERNATIONAL, INC.

Howard Lanier, General Manager  
Copper Operations

HL:td  
enclosures

October 9, 1970

MEMO TO FILE

The following preliminary agreements were reached with Guy Anderson in Safford, Arizona on Wednesday, October 7, 1970, regarding property other than the BYU-Morenci holdings.

Blue Crystal

Essex will take a 2-year option with no cash payments but an obligation to perform assessment work. Following the initial 2-year option a second 2-year option period would be taken at the rate of \$2,500 per month. At the close of the 4-year option Essex would purchase the mineral rights payable by production royalty at 5% net smelter return. The final price would be \$3.5 million. A minimum of \$60,000 per year would be paid prior to commencement of production.

Yakie

Essex would take a 2-year option with no cash payment and will perform assessment work. An additional 2-year option would be taken at \$1,000 per month. If Essex elects to opt, the end price would be \$1.5 million with payment out of production royalties of 5% of net smelter return. After the 4-year option and prior to the commencement of production royalty the minimum payment would be \$2,000 per month.

Cuprite

Essex will immediately assume a lease at \$1,000 per month. If the property is developed, Essex will pay 10% of net smelter return as a continuing royalty.

H. Lanter  
9 Oct. 1970

P. W. O'Malley

Ft. Wayne, Indiana

H. Lanier

Tucson, Arizona

RFA's for Cuprite, Yakie and  
Blue Crystal Properties

Dec. 3, 1970

Coincidental with negotiations with Mr. Guy Anderson on the BYU property, agreements were developed on three other properties, all of which have potential for mineral exploration. They also have strategic significance to negotiations with Anderson and ultimately with Phelps Dodge. The attached RFA's cover the three groups of claims.

The Blue Crystal and Yakie have no property costs for two years and our only obligation will be to do assessment work. The Cuprite has a \$1,000 per month rental as well as an obligation to do assessment work. The attached summary outlines the essential factors of the three agreements.

All three of these options can be terminated on 90 days notice, thus, if the BYU-Banner project terminates at the end of 6 months or a year, these three options could be terminated if investigation indicates they do not merit further exploration.

HL:td

SUMMARY OF AGREEMENTS WITH GUY ANDERSON

CUPRITE, BLUE CRYSTAL AND YAKIE PROPERTIES

The following preliminary agreements were reached with Guy Anderson in Safford, Arizona on Wednesday, October 7, 1970, regarding property other than the BYU-Morenci holdings.

Blue Crystal

Essex will take a 2-year option with no cash payments but an obligation to perform assessment work. Following the initial 2-year option a second 2-year option period would be taken at the rate of \$2,500 per month. At the close of the 4-year option Essex would purchase the mineral rights payable by production royalty at 5% net smelter return. The final price would be \$3.5 million. A minimum of \$80,000 per year would be paid for 2 years prior to commencement of production. The payout period is 10 years after the option period.

Yakie

Essex would take a 2-year option with no cash payment and will perform assessment work. An additional 2-year option would be taken at \$1,000 per month. If Essex elects to opt, the end price would be \$1.5 million with payment out of production royalties of 5% of net smelter return. After the 4-year option and prior to the commencement of production royalty the minimum payment would be \$2,000 per month.

Cuprite

Essex will immediately assume a lease at \$1,000 per month. If the property is developed, Essex will pay 10% of net smelter return as a continuing royalty.

H. Lanier

File Guy Anderson

YAKIE, <sup>Caprite</sup> Blue Crystal

Oct. 9, 1970. ①

Received Oct 8, 1970 from Guy Anderson  
of Safford, Az. - hand delivered to  
Steve Cruise of Gevey:

① Mining Partnership Agreement dated 15 Feb. 68  
signed by Guy Anderson, H. Clyde Davis, Matt  
Dorenhauser, Ed Dorenhauser + M. J. Papier.

② Map No.  $\frac{62-227}{B-50}$  "Bear Creek Mining Co.  
Southwest District Yakie Claims. Scale:  
1" = 1000' dated 2/12/63

③ Joint Claim Deed. H. Earl Rogge, Sr to Guy  
Anderson dated 7 August 1957.

① Blue line "Former Mineral Survey"  
Tr. 4255-A. Scale 1" = 200' Elsiebeth Claims

② Blue line Els - Beth No. 6. Scale 1" = 200'

④ Agreement (Carbon Copy) dated April, 1969  
between H. J. Peters, Clyde Peters, Paul Ramirez  
Leta Tibbetts + Guy Anderson, and  
American Metal Company, Inc. (19 pages)  
(Lone Star Mining Dist.)

⑤ Geology map. Blue Crystal Claim Group, <sup>Figure 1.</sup>  
Aug 26, 1961 by W. C. Lacy - H. C. Davis.  
Geochem sampling study - Blue line.

⑥ Blue Crystal Claim Group (blue line) Figure 2  
"Claims - first order - second order"  
by W. C. Lacy - H. C. Davis.

⑦ Mineral lease # 3016 (Machine Copy)  
dated 8 Feb. 1967 to Clyde Davis.  
3 sheets stapled together.

- ⑧ Prospecting Permit (Machine Copy) # 10558  
dated Dec. 19, 1967 to Clyde Davis  
(3 pieces stapled together)
- ⑨ ~~Statement~~ State of Ariz. Land Dept. lease  
no 11-03018 dated Oct 30, 1967 - Lessee  
H. Clyde Davis. (1 machine ~~copy~~)
- ⑩ State of Ariz. Land Dept. Lease # 11-03021  
dated 30 Oct, 1967 - Lessee H. Clyde Davis  
(1 machine ~~copy~~).
- ⑪ State of Ariz. Land Dept. Lease # 11-03022  
dated 30 Oct 1967 - Lessee H. Clyde Davis  
(1-machine copy page).
- ⑫ State of Ariz. Land Dept Lease # 11-03023  
dated 30 Oct, 1967 - Lessee H. Clyde Davis  
(1-machine copy page)
- ⑬ State of Ariz. Land Dept Lease # 11-03050  
dated 30 Oct 1967 - Lessee H. Clyde Davis  
(1 machine copy page)
- ⑭ Agreement dated 6 October 1969 between  
Guy Anderson + Elizabeth Anderson + Stan  
Tanner. Machine copy. No signatures.
- ⑮ Mineral Survey plat No. 2854 T. 35 R. 29E.  
Cuprite - Ironsides, etc.
- ⑯ Mineral Survey Plat No. 2834 T. 35 R. 29E.  
Cuprite, White Butte, etc.

PROPERTY SUMMARY

Nov. 13, 1970

YAKIE PROSPECT

LOCATION

Portions of Sec. 2, 3, 4  
T. 5 S. R. 30 E.

Portions of Sec. 32, 33  
T. 4 S., R. 30 E.  
Greenlee County, Arizona

60 unpatented mining claims.

Verna May Nos. 1, 3, 5, 7, 9, 11, 13, 15, 19, 21  
23 thru 42 inclusive  
45, 47, 49, 51, 53, 55, 57  
58 Amended  
59 thru 74 inclusive  
76 thru 86 inclusive

State Prospecting Permits ?  
Active ? 10907, 10908, 10909, 10910, 10911

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

May 3, 1971

J.K. Jones

Introduction

On April 27, 1971, the Yakie claim group was inspected by J.K. Jones and Paul I. Eimon. Background data on the prospect made available by the owners includes a claim map, geologic map, and results of geochemical sampling.

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

The prospect covers a zone of striking, reddish-brown stain in pre-Cambrian granite ranging from 1000 feet to more than a mile in width and extending about three miles southeasterly from the south edge of the town of Clifton. On the south the granite is covered by post-mineral Gila conglomerate and recent alluvium. On the west, north, and east gently dipping Paleozoic sedimentary rocks and Tertiary volcanics unconformably overlay the granite.

Mineralization

Viewed from a distance the exposures of reddish-brown pre-Cambrian granite on the Yakie claims resemble a leached cap that would overlay strong sulphide mineralization. In some

Mineralization - continued

instances in the southwest such zones of strong sulphides are accompanied by copper mineralization of economic importance. Results of 34 geochemical samples as posted on a map made available by the owners 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 results are indicated for a single sample located at a prospect pit in Paleozoic sediments. The remaining 33 samples are from the pre-Cambrian granite exposure. Except for a single sample at the west edge of the area, these sample results are quite low, having a mean value of 17 parts per million of copper. Inspection on the ground reveals little evidence of sulphide mineralization. The prominent reddish-brown color appears to result from weathering of iron bearing minerals normally found in the rock type.

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  
YAKIE CLAIMS  
MORENCI MINING DISTRICT  
GREENLEE COUNTY, ARIZONA

May 3, 1971

J.K. Jones

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Mineralization

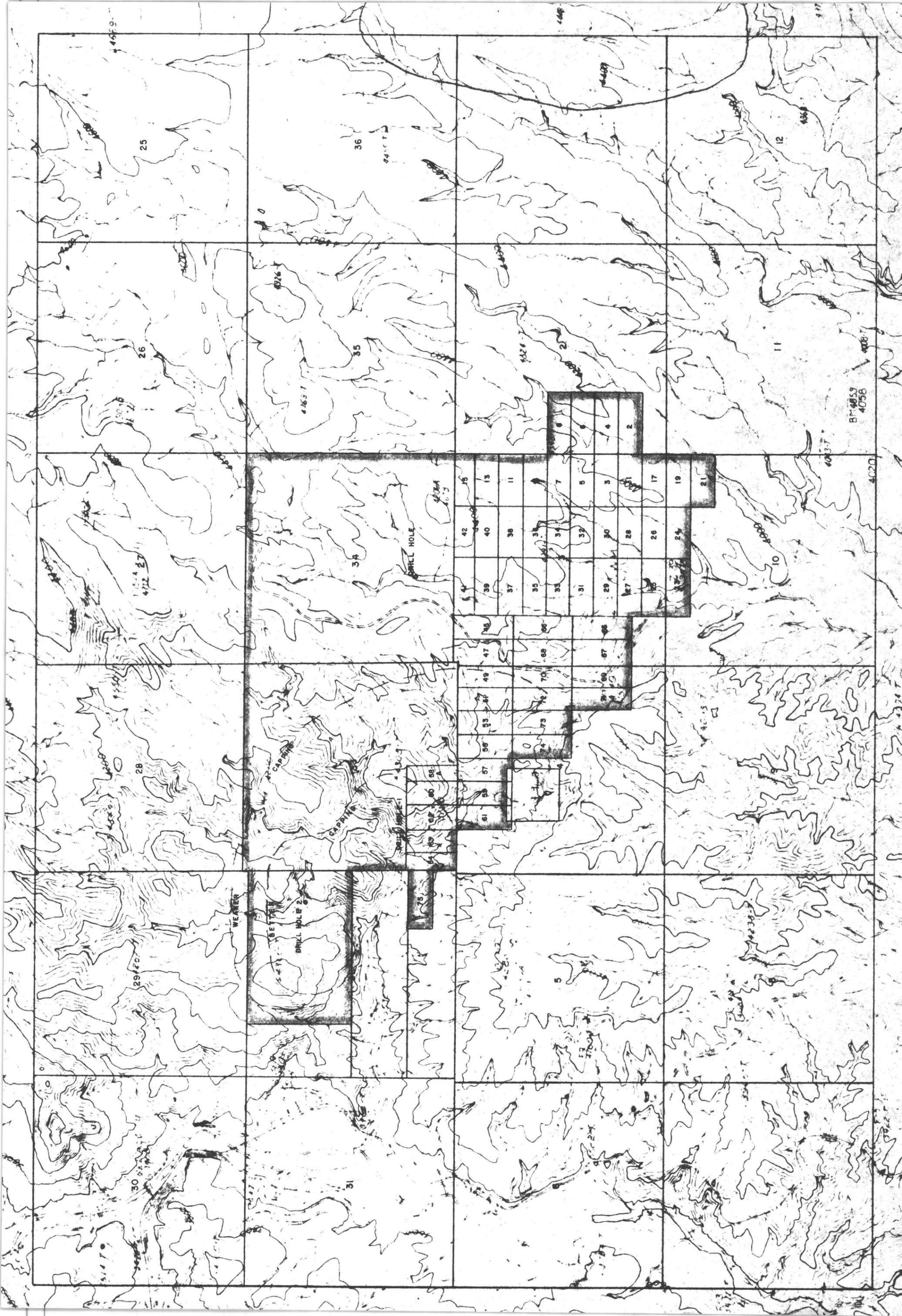
Viewed from a distance the exposures of reddish-brown pre-Cambrian granite on the Yakie claims resemble a leached cap that would overlay strong sulphide mineralization. In some

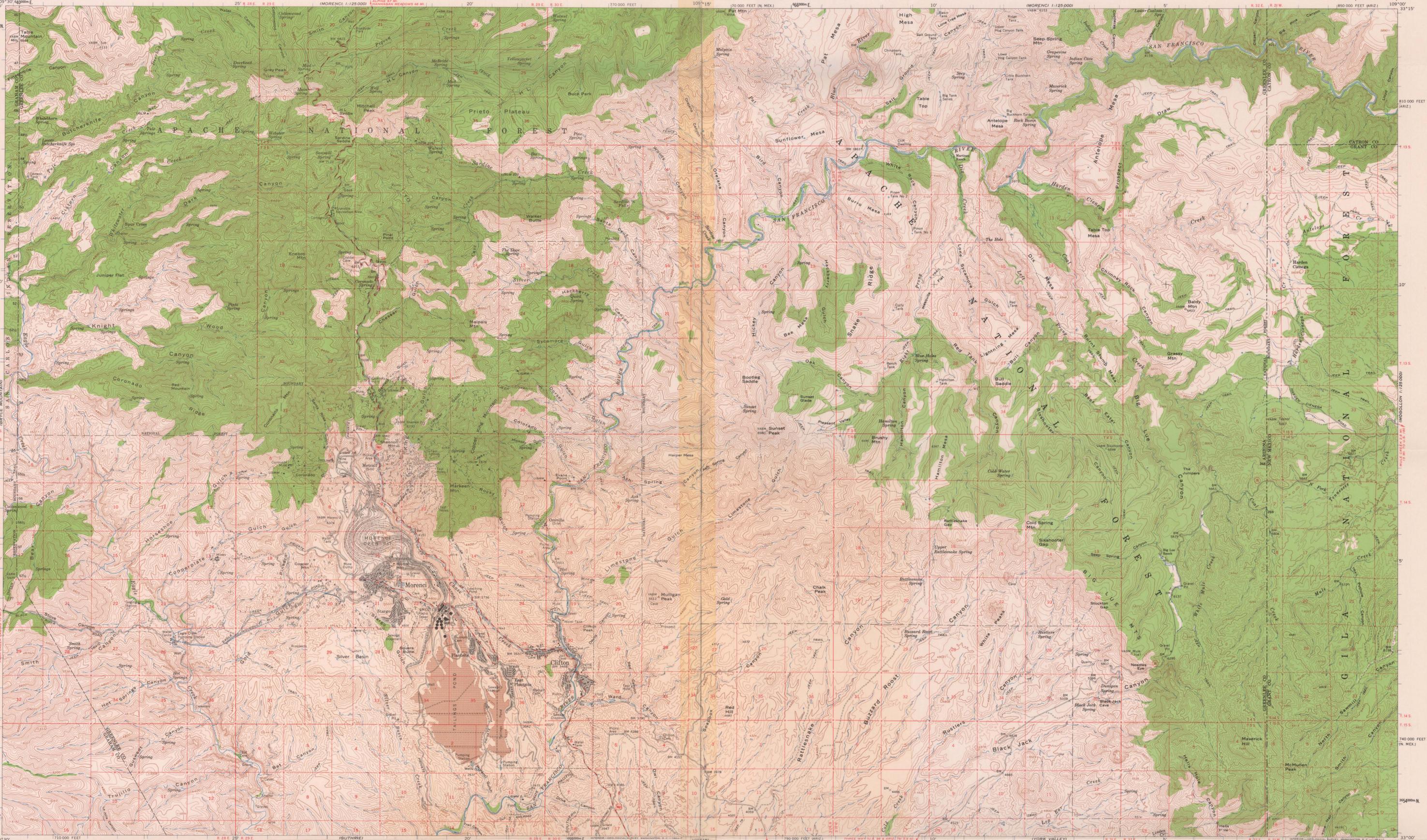
Mineralization - continued

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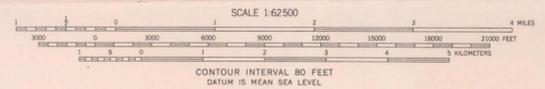
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The striking red-stained outcrops on the Yakie claims appear to result from weathering of ferromagnesian rock-forming minerals in the pre-Cambrian granite, and do not represent a leached cap overlying strong sulphide mineralization. Previous geologic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





Mapped, edited, and published by the Geological Survey  
Control by USGS, USC&GS, and U. S. Soil Conservation Service  
Topography by photogrammetric methods from aerial  
photographs taken 1959. Field checked 1962  
Polyconic projection. 1927 North American datum  
10,000-foot grid based on Arizona coordinate system, east zone  
1000-meter Universal Transverse Mercator grid ticks,  
zone 12, shown in blue  
Where omitted, land lines have not been established



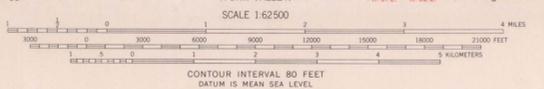
SCALE 1:62500  
CONTOUR INTERVAL 80 FEET  
DATUM IS MEAN SEA LEVEL



ROAD CLASSIFICATION  
Medium-duty — Light-duty  
Unimproved dirt — U.S. Route

CLIFTON, ARIZ.  
N3300—W10915/15  
1962

Mapped, edited, and published by the Geological Survey  
Control by USGS, USC&GS, and U. S. Soil Conservation Service  
Topography by photogrammetric methods from aerial  
photographs taken 1957 and 1959. Field checked 1962  
Polyconic projection. 1927 North American datum  
10,000-foot grid based on Arizona coordinate system, east zone  
and New Mexico coordinate system, west zone  
1000-meter Universal Transverse Mercator grid ticks,  
zone 12, shown in blue  
Where omitted, land lines have not been established



SCALE 1:62500  
CONTOUR INTERVAL 80 FEET  
DATUM IS MEAN SEA LEVEL



ROAD CLASSIFICATION  
Light-duty — Unimproved dirt  
State Route

BIG LUE MTS., ARIZ. - N. MEX.  
N3300—W10900/15  
1962

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 25, COLORADO OR WASHINGTON 25, D. C.  
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST



EXPLANATION

- |                     |     |                      |
|---------------------|-----|----------------------|
| QUATERNARY          | Qal | ALLUVIUM             |
|                     | Qg  | GILA CONGLOMERATE    |
| CRETACEOUS TERTIARY | KTV | VOLCANICS            |
|                     | Ol  | LONGFELLOW LIMESTONE |
| ORDOVICIAN          | Ec  | CORONADO QUARTZITE   |
|                     | Ea  | ARKOSE               |
| PRECAMBRIAN         | pCg | GRANITE              |
- - - - - FAULTS DASHED WHERE INFERRED  
 - - - - - CONTACT DASHED WHERE INFERRED  
 Cu COPPER  
 Mo MOLYBDENUM  
 ppm PARTS PER MILLION

BEAR CREEK MINING COMPANY SOUTHWEST DISTRICT <b>YAKIE CLAIMS</b> GREENLEE CO. ARIZONA GEOLOGIC MAP SCALE 1"=1000'		MAP NO <b>62-227</b> B-50
DRAWN BY TLM	DATA BY FFG, JCB	DATE 2/12/63