



CONTACT INFORMATION  
Mining Records Curator  
Arizona Geological Survey  
416 W. Congress St., Suite 100  
Tucson, Arizona 85701  
520-770-3500  
<http://www.azgs.az.gov>  
[inquiries@azgs.az.gov](mailto:inquiries@azgs.az.gov)

The following file is part of the  
James Doyle Sell Mining Collection

### **ACCESS STATEMENT**

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

### **CONSTRAINTS STATEMENT**

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

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

### **QUALITY STATEMENT**

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

ASARCO NY CLG

J.H.C.

DEC 29 1967

J H COURTRIGHT

ADVISORY COMMITTEE APPROVED YOUR REQUEST FOR \$200,000 FOR SACATON  
COLLINS

12/28/67

CORRECTION ON FIRST TELEX SECOND LINE FOURTH TEXT PLS READ  
AS PLEASE TNX

ASARCO TUC

W.E.S.  
DEC 28 1967

*Copy for Kudds  
12-28-67  
Jm*

*See Ao 16 A.3.19B*

J.H.C.

JAN 3 - 1968

New York, N. Y., December 28, 1967

GA 16A. 3.1913

Mr. C. P. Pollock

The following is an extract from the minutes of the meeting of the Advisory Committee held today:

Mining Authorization No. 117-67  
Sacaton Project  
Pinal County, Arizona

*Cancelled, see  
H. Hume memo to  
C.P.P. 1-5-68*

It was reported that \$1,662,881 has been expended for exploration work at the Sacaton Project - a possible copper prospect, in Pinal County, Arizona.

It was reported that Company geologists recommend further exploration to consist of a minimum of 24,000 feet of combined rotary and core drilling in 18 holes at a total expense of \$200,000.

There was approved, subject to ratification by the Board of Directors, an expenditure of \$200,000 for additional drilling at the Sacaton copper project, Pinal County, Arizona.

A. J. Gillespie, Jr.

FGHamrick  
CENelson  
HLGoodenough-2  
TASnedden  
RBMeen  
JHCourtright ✓

December 20, 1967

File: "Sacaton Prospect"  
(JHC files)  
"Nuclear Blasting for  
Underground Leaching"  
"JHC's Sec'y's files)

Mr. Gary H. Higgins  
K-Division Leader  
Lawrence Radiation Laboratory  
P.O. Box 808  
Livermore, California 94551

Dear Mr. Higgins:

This will acknowledge your letter of November 9 in reply to my letter of November 7 regarding the possibility of conducting studies to determine the feasibility of preparing a copper deposit for leaching by the use of nuclear explosives.

The delay in acknowledging your letter is due to the fact I was awaiting a reply from the San Francisco Operations Office since you stated that the questions asked in my letter of November 7 should be posed to Mr. John Philip of that office. To date I have not heard from him.

At present we are planning further drilling to more closely evaluate the aforementioned copper deposit with the objective of developing plans for ore extraction by conventional means. However, we are still interested in exploring the possibilities of leaching in-place.

Yours very truly,

J. H. Courtright  
Chief Geologist

JHC:Imi  
cc: John J. Collins, w/encs.  
John Philip  
Glenn Werth  
Milo Nordyke



AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

December 19, 1967

*Pa 16A.3.19B*  
*File Copy*

Mr. J. J. Collins, Chief Geologist  
ASARCO - New York Office

Sacaton Project  
Pinal County, Arizona

Dear Sir:

In accordance with Mr. Pollock's instruction, a plan for additional drilling of the Sacaton copper deposit has been prepared. This plan is essentially the same as that submitted February 5, 1964 (Sacaton Ore Reserves and Outcome, by J. R. Wojcik). Two plan maps and four geologic sections from this report are hereto attached for convenient reference.

The existing holes are spaced 550' to 700' apart, consequently, the estimate of ore reserves required geologic projections subject to considerable revision, particularly in view of the limited extent of ore mineralization in the horizontal plane. For instance, nearly 50% of the ore in the eastern deposit rests on one hole, No. 37. Under these conditions the results of closer spaced drilling could substantially reduce, or increase, the existing estimate of tonnage and/or grade.

To provide an acceptable measurement of the two deposits, Mr. Wojcik has estimated that a minimum of 24,000' of combined rotary and core drilling in 18 holes will be required. The locations of the first 11 proposed holes are shown on a 1000 scale plan. The data from these will aid in determining the positions of additional holes. At this stage, or before, progress will be reviewed with the Mining Department to determine what drilling is needed to develop the most practical methods for mining the ore bodies (Mr. Nelson's letter to Mr. Snedden, 12-4-67).

Our estimate of the cost follows:

West (shallow) ore zone		
Rotary drilling	- 3000' @ \$ 4.50/ft	\$ 13,500
Core drilling	- 5000' @ 12.00/ft	60,000
East (deep) ore zone		
Rotary drilling	- 12000' @ 5.50/ft	66,000
Core drilling	- 4000' @ 15.00/ft	60,000
	<u>24000'</u>	<u>\$199,500</u>

These costs include site preparation, supervision, sampling and assaying.

We recommend that a mining authorization request be made in the amount of \$200,000 to cover the cost of the drilling as outlined.

cont'd. . . .

Mr. Collins,  
Sacaton Project, contd.

-2-

12-19-67

Land values may be affected by the resumption of drilling in the area, accordingly, the Mining Department may wish to secure options prior to the start of the program.

Yours very truly,

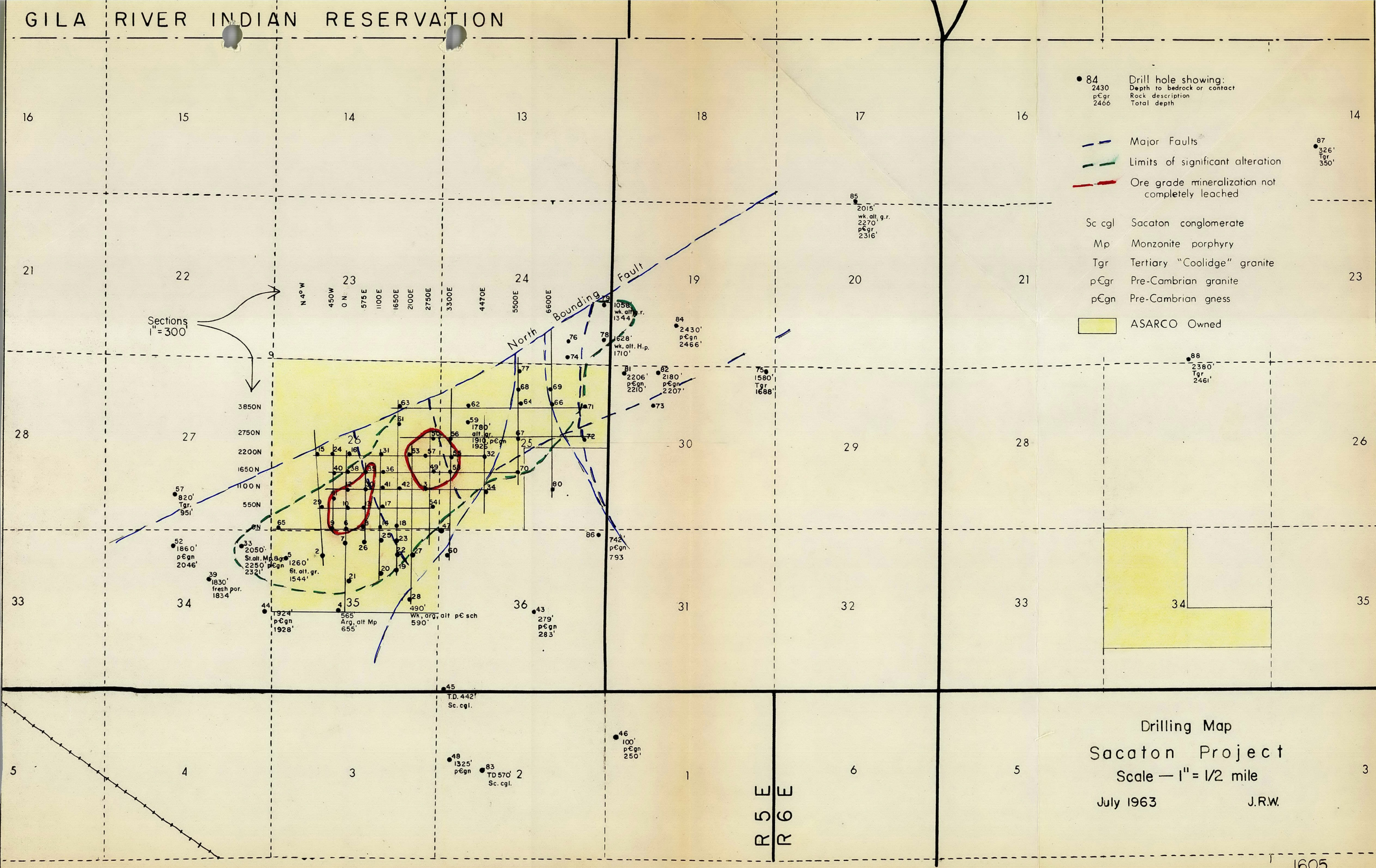
*J. H. Courtright*  
J. H. Courtright

JHC:1mi  
encls.

cc: CENelson, w/encls.  
TASnedden, "  
RBMeen, "  
JRWojcik, "



# GILA RIVER INDIAN RESERVATION

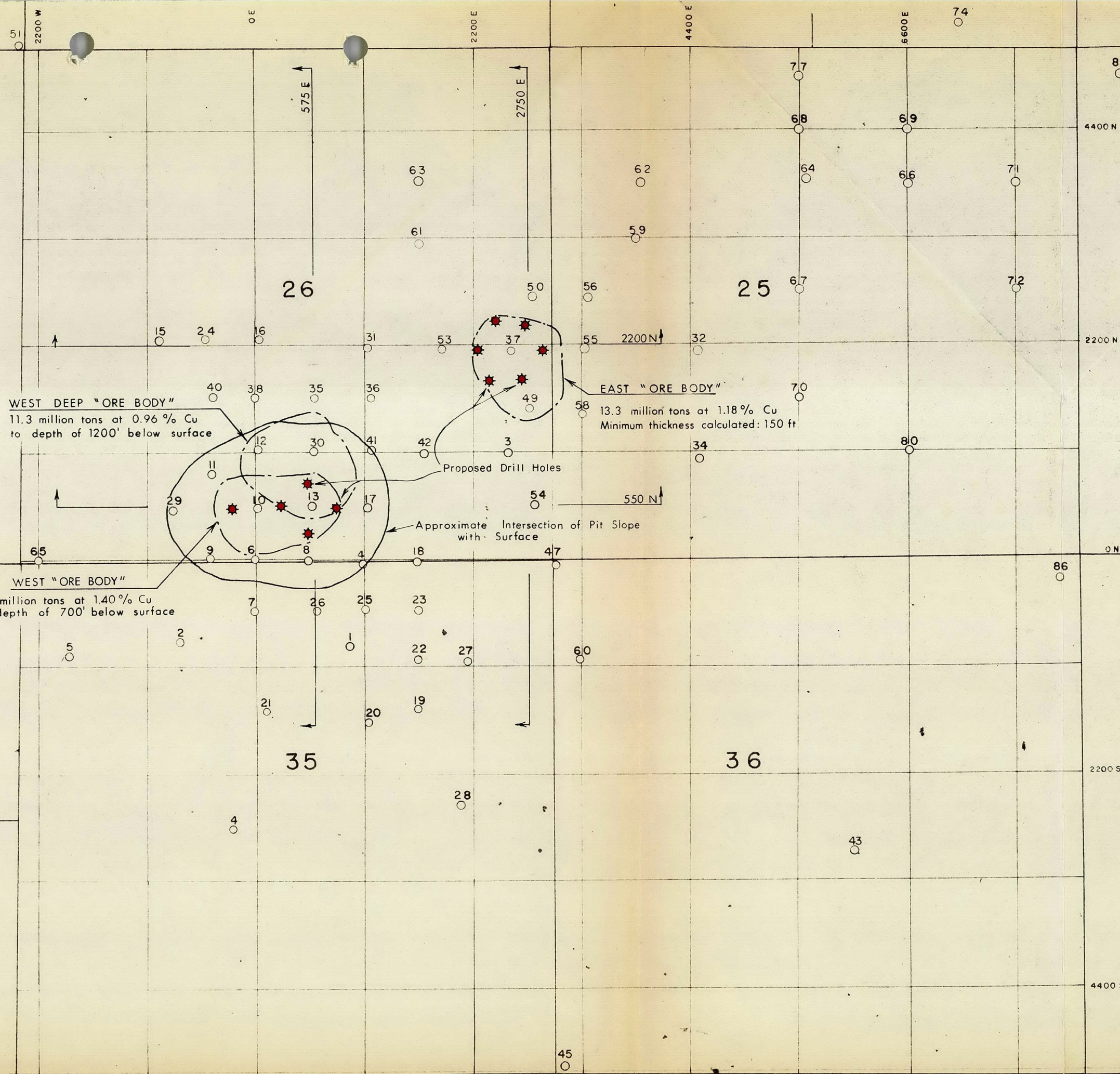


- 84  
2430  
pCgr  
2466  
Drill hole showing:  
Depth to bedrock or contact  
Rock description  
Total depth
- Major Faults
- Limits of significant alteration
- Ore grade mineralization not completely leached
- Sc cgl Sacaton conglomerate
- Mp Monzonite porphyry
- Tgr Tertiary "Coolidge" granite
- pCgr Pre-Cambrian granite
- pCgn Pre-Cambrian gness
- ASARCO Owned

Drilling Map  
Sacaton Project  
Scale — 1" = 1/2 mile  
July 1963 J.R.W.

R  
5  
E  
R  
6  
E



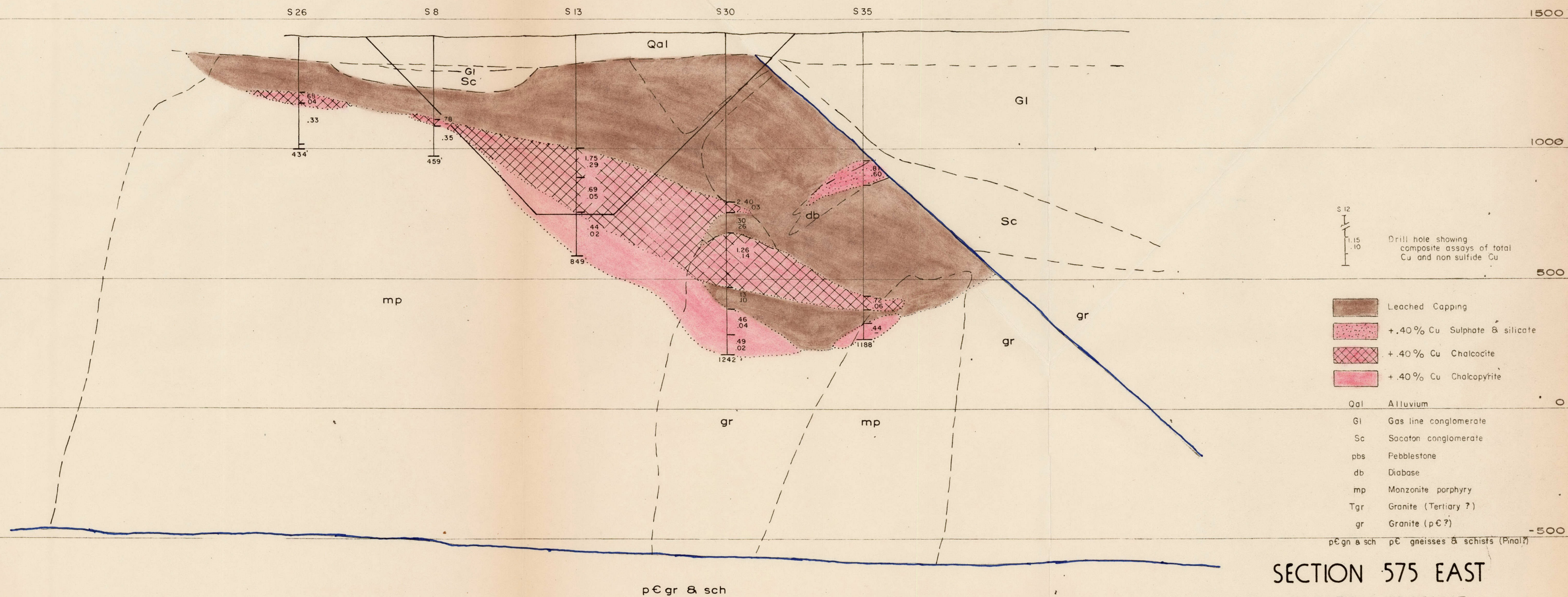


DRILLING MAP  
SACATON PROJECT  
Pinal County, Arizona  
Scale: 1" = 1000'



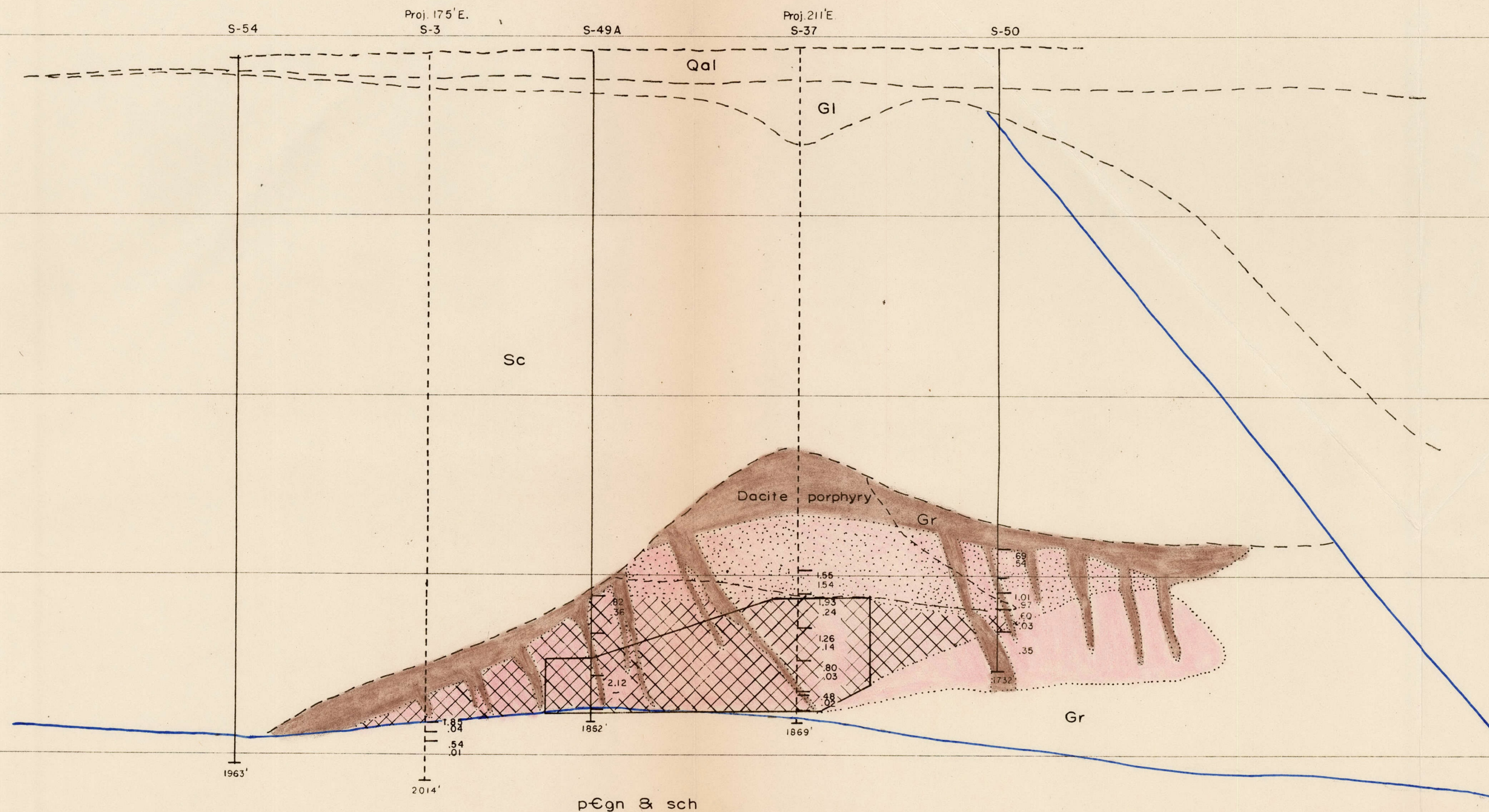






**SECTION 575 EAST**  
**SACATON PROSPECT**  
 Pinal County, Arizona  
 Scale 1"=300'  
 T(SAC)-6-1667





Drill hole showing  
composite assays of total  
Cu and non sulfide Cu

- Leached Capping
- +.40% Cu Sulphate & silicate
- +.40% Cu Chalcocite
- +.40% Cu Chalcopyrite

- Qal Alluvium
- Gl Gas line conglomerate
- Sc Sacaton conglomerate
- pbs Pebblestone
- db Diabase
- mp Monzonite porphyry
- Tgr Granite (Tertiary ?)
- gr Granite (pC ?)

## SECTION 2750 EAST

SACATON PROSPECT

Pinal County, Arizona

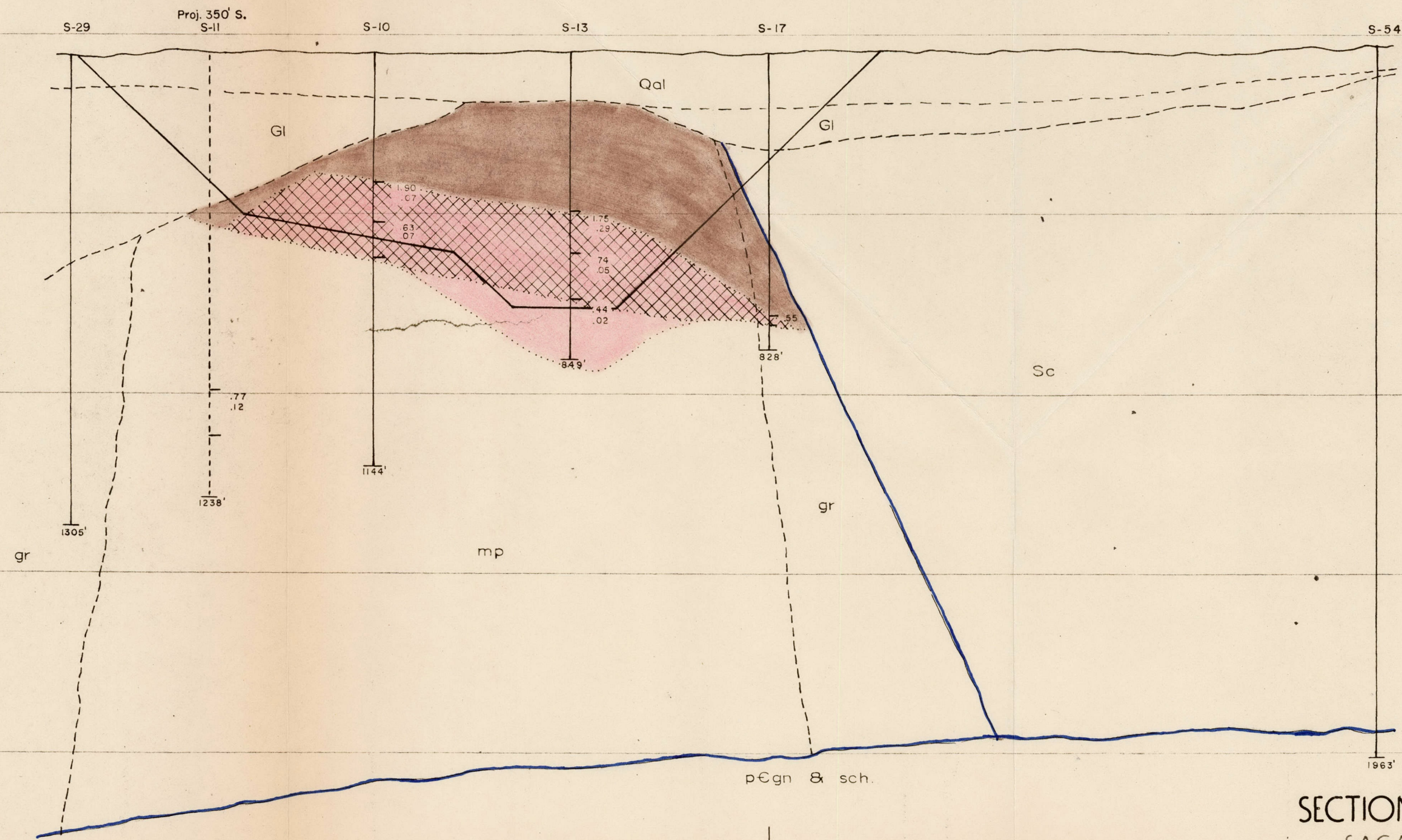
Scale 1"=300'  
T(SAC)-6-1671



S-12  
1.15  
.10  
Drill hole showing  
composite assays of total  
Cu and non sulfide Cu

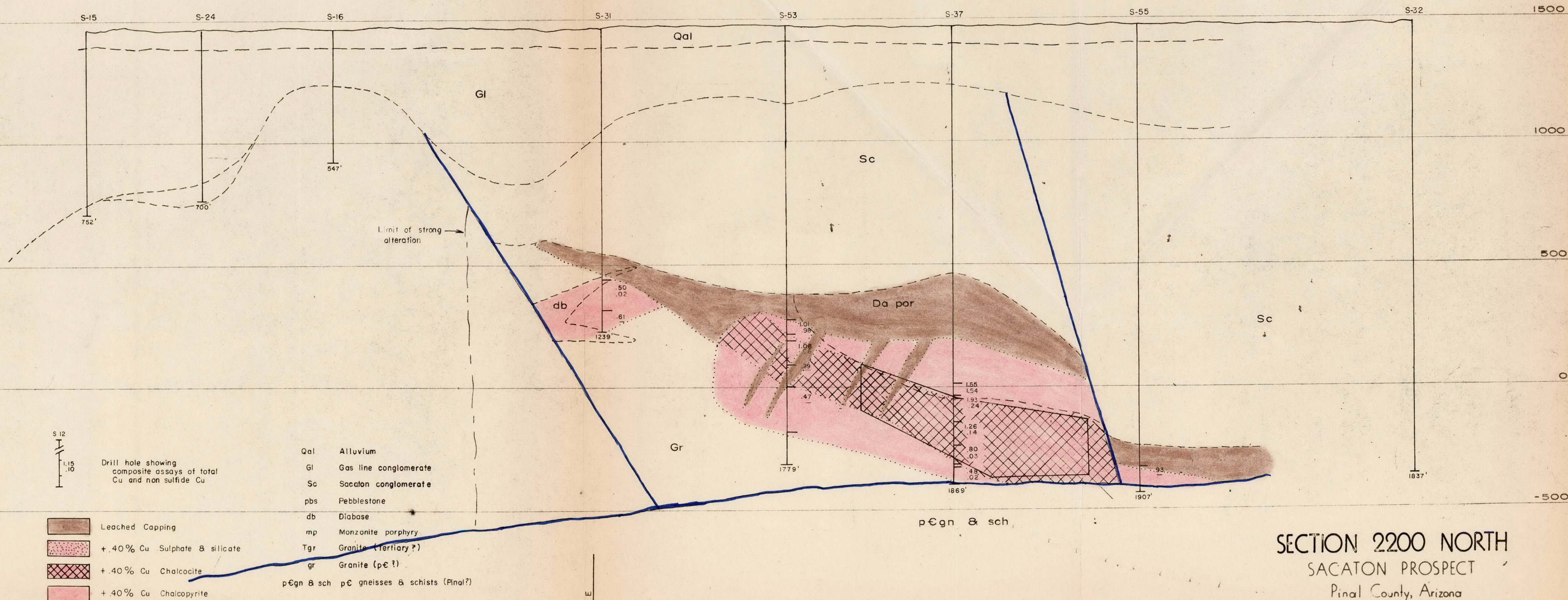
- Leached Capping
- +.40% Cu Sulphate & silicate
- +.40% Cu Chalcocite
- +.40% Cu Chalcopyrite

- Qal Alluvium
- Gl Gas line conglomerate
- Sc Sacaton conglomerate
- pbs Pebblestone
- db Diabase
- mp Monzonite porphyry
- Tgr Granite (Tertiary?)
- gr Granite (p.c.?)
- p.c.gn & sch p.c. gneisses & schists (Pinal?)



SECTION 550 NORTH  
SACATON PROSPECT  
Pinal County, Arizona  
Scale 1"=300'  
T(SAC)-6-1659





SECTION 2200 NORTH  
SACATON PROSPECT  
Pinal County, Arizona  
Scale 1"=300'  
T(SAC)-6-1662



AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

J. H. C.

DEC 6- 1967

December 4, 1967

TO: Mr. J. H. Courtright

FROM: J. R. Wojcik

SACATON ESTIMATE

No. 2 shaft could be drilled at substantial savings.

Additional tonnage is available to shrink stoping or Swedish sublevel method where thickness is less than 150' if capital is not recovered from this tonnage (stripped cost).

Perched chalcocite zones would be dump leach "ore" tonnage not estimated.

von den Steinen won't be happy with the 40% indirect cost if you will recall his comments at the time of calculation of the 1964 outcome.

Desvaux's estimate for mining equipment was based on 2500 tpd from open pit and 3500 tpd from underground. Subsequently, the mining plan as calculated required contracting the mining to eliminate this capital expenditure. Our \$12 million capital plus \$1.5 million for equipment and \$4.2 million for underground investment is \$17.7 million compared to mining department's \$21 million.

I would think that drilling costs could be held to the 1964 estimate or even a little below.

JRW:lmi

*JR Wojcik*  
J. R. Wojcik



AMERICAN SMELTING AND REFINING COMPANY  
SOUTHWESTERN EXPLORATION DEPARTMENT  
P. O. BOX 5795, TUCSON, ARIZONA 85703

J.H.C.  
MAY 22 1967

J. H. COURTRIGHT  
CHIEF GEOLOGIST  
L. P. ENTWISTLE  
ASSISTANT CHIEF GEOLOGIST  
W. E. SAEGART  
ASSISTANT CHIEF GEOLOGIST

May 19, 1967

1150 NORTH 7TH AVENUE  
TELEPHONE 602-792-3010

Mr. Quentin G. Whishaw  
DeNiza Mining Corporation  
1024 South Plumer  
Tucson, Arizona

Dear Mr. Whishaw:

I am enclosing some information concerning the limits of alteration-mineralization of our Sacaton copper deposit. I am also enclosing descriptive information concerning the depth to top of sulfides in various localities within the limits of the deposit.

Please accept my apology for the time involved in providing you with this information. The best excuse I can offer is that it always takes time to obtain formal approval through channels to release confidential property data.

I hope this data will be of some help to you. We naturally would like to have a copy of the INPUT test survey results as soon as they have been evaluated in terms of the spacial distribution of the Sacaton deposit.

Very truly yours,

W. E. SAEGART

WES/pjc

Enclosures

cc: KERichard, w/ encls.

JHCourtright, w/ encls.

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

J. H. C.  
MAY 22 1967

May 18, 1967

TO: J. H. COURTRIGHT

FROM: J. E. KINNISON

DENIZA MINING CORP.  
SACATON GEOLOGIC INFORMATION

Mr. Saegart asked me to handle the request made to you in a letter from Mr. Richard on April 12. Attached are generalized depths to the top of sulfides at Sacaton, referenced to surveyed sections. Also find attached, at the suggestion of Mr. Saegart, a topographic map with the alteration limits plotted thereon.

*John E. Kinnison*  
JOHN E. KINNISON

JEK/pjc  
Attachments  
cc: WESaegart

Depth to top of Sulfide Zone  
Sacaton Prospect

1. SW 1/4 Sec. 26  
NW 1/4 Sec. 35 . . . . From 400 to 2000', sloping west
2. N 1/2 Sec. 35  
situated under and  
circling altered outcrop . . . . Ave depth 150'
3. E 1/2, SW 1/4 Sec. 26 . . . . From 120 to 300'
4. SE 1/4 Sec. 26 . . . . From 500 to 1800', sloping south
5. NW 1/4 Sec. 25 . . . . 1700' to 2200'
6. NE 1/4 Sec. 25 . . . . 1200' to 1500'

MESA 32 MI.  
17 MI. TO ARIZ. 87

FLORENCE 20 MI.  
6 MI. TO ARIZ. 87

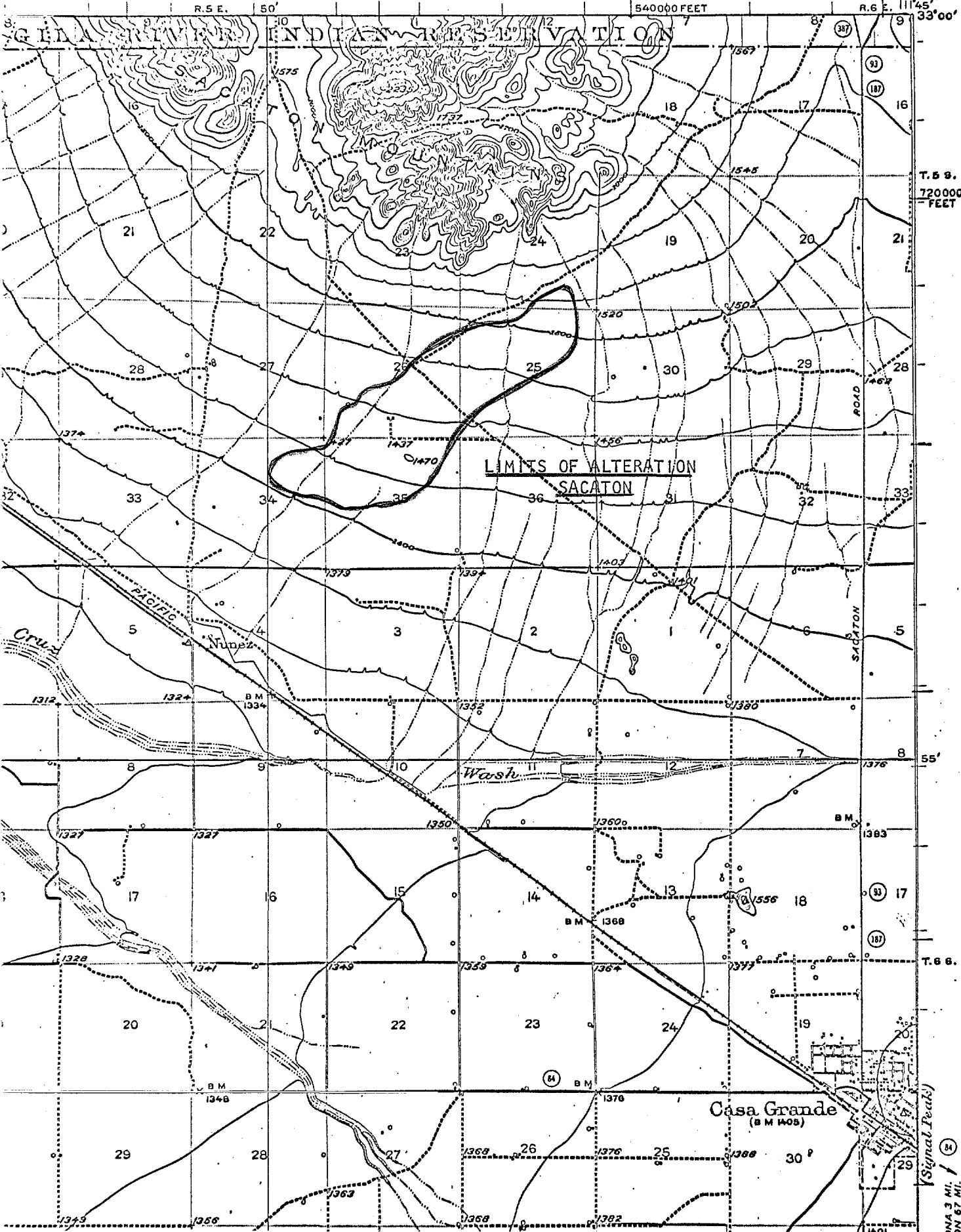
ARIZONA

(PINAL COUNTY)

CASA GRANDE QUADRANGLE

540000 FEET

R. 6 E. 111° 45' 33" 00'



**AMERICAN SMELTING AND REFINING COMPANY**  
Tucson Arizona

**J. H. C.**  
**MAY 10 1967**

May 10, 1967

Mr. R. J. Lacy, Chief Geophysicist  
American Smelting and Refining Company  
Geophysical Division  
3422 South 700 West  
Salt Lake City, Utah 84119

Dear Bob:

Mr. Gordon Wieduwilt of Canadian Aero Service called me today asking if we had any core samples of extraneous rock polarizers. I immediately thought of the large (areal) I. P. anomaly we obtained several years ago east of the Sacaton deposit and the hole, Geo No. 1 which we drilled on this anomaly. It is my understanding that several short core runs were taken in this hole at about 500 feet and sent to your office for study.

If these core samples are still in tact, I would appreciate your sending me one or two specimens which I could loan to Mr. Wieduwilt for laboratory testing.

For your reference, hole Geo No. 1 was drilled in December 1962 and deepened in March 1963, was located approximately 50' N of the 1/4 corner of Section 16 and 21, T5S, R6E.

Very truly yours,

W. E. SAEGART

WES/pjc

cc: JHCourtright ✓



AMERICAN SMELTING AND REFINING COMPANY

EXPLORATION DEPARTMENT  
120 BROADWAY, NEW YORK, N.Y. 10005

KENYON RICHARD  
CHIEF GEOLOGIST

Air Mail

CONFIDENTIAL

J.E.K.

MAY 16 1967

J.H.C.

MAY 10 1967

May 9, 1967

W.E.S.  
MAY 12 1967

Mr. J. H. Courtright  
American Smelting & Refining Company  
P.O. Box 5795  
Tucson, Arizona

Sacaton

Dear Sir:

I have some misgivings about applying a nuclear device to prepare the rock for leaching but this certainly is a point that can have a variety of opinions.

In any case, at the present time, we do not want to identify Sacaton to the Lawrence Radiation Laboratory and the A.E.C. Therefore, please let this matter remain dormant, for the time being.

Yours very truly,

Kenyon Richard

*Edmont*



AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

May 5, 1967

CONFIDENTIAL

Mr. K. E. Richard, Chief Geologist  
American Smelting and Refining Company  
120 Broadway  
New York, N. Y. 10005

SACATON

Dear Sir:

Enclosed is a clipping from The Arizona Republic regarding Kennecott's copper deposit at Safford and the possibility of applying a nuclear device to prepare the rock for leaching.

Last year we submitted to the Lawrence Radiation Laboratory a plan and sections of a hypothetical orebody to get some idea of the feasibility of the application of nuclear explosion to the Sacaton East orebody. Their findings (copy enclosed) indicate that the deposit is well suited to the use of nuclear explosives and that one 20 kiloton device would probably produce sufficient fragmentation for leaching.

They estimate that no structural damage would be caused in the Casa Grande buildings, but state that some seismic shock damage, such as cracking of plaster, might occur.

To acquire additional information from the Lawrence Radiation Laboratory, it would be necessary to identify the deposit. In view of the very high rate of return that could be obtained by leaching of the East orebody (Mr. Wojcik's report of April 13, 1964), I believe consideration should be given to this approach. I presume the Lawrence Radiation Laboratory and the AEC would conduct studies without any obligation on the part of Asarco.

Yours very truly,

  
J. H. COURTRIGHT

JHC/kw  
Enclosures

...retted in  
... J. Du-  
... Arnold Olsen  
... William F.

... J. Sten-  
... the House  
... nitee ap-  
... action. He  
... not one of  
... of heading  
... could para-  
... nomy and  
... ment of war  
... l.

... Springer of  
... epublican on  
... agreed with  
... said there  
... in existing  
... ge 4, Col. 6)

ONE REPORTED method of sidestepping previous Sino-Soviet frictions, officials said, was for Hanoi to take title to the Soviet shipments as they reached the Sino-Soviet frontier and then to safeguard them as they passed by rail across south-western China to North Vietnam. The officials who provided this analysis declined to be identified.

The reported arrangement followed persistent Soviet charges that Peking was hampering the Communist war effort in Vietnam by interfering with the passage of Soviet missiles, jet planes, antiaircraft guns and other military equipment moving on the Chinese railways.

maker from making a single campaign appearance in this nation.

Voting was reported "below normal" during the first hours after the 6 a.m. poll opening. But officials said that with brisk, sunny weather it began to pick up around midday.

Although his opponents made an attempt at campaigning, neither was given any chance to topple Powell.

Powell's forces toured the streets of Harlem in sound trucks and distributed handbills while Mrs. Williams appeared at occasional Republican gatherings and Yearling tried, and failed, to make street-corner speeches over the catcalls of Powell backers.

## Fingerprints Found at Death Scene, Police Say

PI)—A police officer yesterday that Richard were found on which eight led to their

... e Giese was  
... o-last witness  
... he prosecution  
... trial.

... xpected to be-  
... save the 25-  
... om the elec-

... go to the jury  
... r early next

... he compared  
... ints found on  
... uth bedroo  
... y apartment  
... s were slain  
... gerprints on  
... Coast Guard.

... ion that (the  
... Coast Guard  
... cal and were  
... the same in-  
... commander of  
... department's  
... on, said.

... he shaken in  
... munication un-  
... of intensive  
... n by John  
... mer Federal  
... gation agent  
... at de

GRAMENOS asked whether one of the fingerprints found on the door was similar to that of Suzanne Farris, one of the victims, and whether two others were similar to those of Gloria

Jean Davy—whom Speck is accused of raping and strangling. But Giese said:

"If you are speaking of ac-

(Continued on Page 4, Col. 2)

## Apollo Wiring Faulty, Space Engineer Admits

WASHINGTON (UPI)—A space engineer who helped build the Apollo capsule conceded yesterday that its electrical wiring was deficient, possibly because it was designed when there was a pressing need to reduce weight.

Dale D. Myers, manager of the Apollo program for North American Aviation, testified before the House subcommittee investigating the fire that killed three astronauts at Cape Kennedy Jan. 27.

In related testimony before the Senate Space Committee, astronaut Frank Borman said he knew of wiring problems in Apollo I, but would have willingly entered the capsule the day it burned because he thought the difficulties had been corrected.

A special review board of the National Aeronautics and Space Administration reported Sunday that the fire that killed the astronauts might have been caused by sparks from a bundle of wires under the couch of Command Pilot Virgil (Gus) Grissom.

The report said there was no chafing guard to protect the bundle from contact with a door.

Myers admitted that 20 miles of wiring in Apollo I were not adequately protected. But he said steps were being taken to correct the deficiency, including strong metal covers for wire clusters.

When Apollo I was designed initially, Myers said, "weight was much more critical in the command module than it is now." Then,

(Continued on Page 10, Col. 3)

## Possible Site Of Atom Test

A DEPOSIT of low grade copper ore northeast of Safford may be the test site for a new mining technique using underground nuclear explosions, it was reported yesterday.

Engineers for Kennecott Copper Corp. and the U.S. Atomic Energy Commission said there are a number of possible sites for the proposed test and denied a report in a national trade journal that the Safford area is the prime location.

HOWEVER, other informed sources consider the site the most likely for such a test.

Harold Curtis of Berkeley, Calif., a project engineer for AEC's special projects division, and Peter Zimmer of Salt Lake City, a Kennecott engineer, said their agencies are cooperating with the Bureau of Mines in a feasibility study.

Nuclear explosions in the 20 to 30 kiloton range, several hundred feet underground, would crush ore that is too low in copper to justify open pit mining.

ACID would be poured through the crushed rock, in a method similar to the present above-ground leaching process. The acid would carry away the copper and be pumped back to the surface with its valuable load.

Metals Weekly, a trade journal, reported recently that the feasibility study was being conducted with the Graham County site in mind for its first test.

ZIMMER acknowledged that Kennecott has properties a dozen miles northeast of Safford where the ore content is too low to pay for profitable operation by present mining methods. He said that while Kennecott officials are interested in

(Continued on Page 4, Col. 2)

## Bulletin

ALGIERS (AP) — An Algerian airliner crashed last night in southern Algeria, killing 35 passengers, the Algerian news agency reported today.

G1

A SUP-  
day that  
A. Bush-  
of interes-  
from a fin

S

WIND A-  
Brittany; d

Federal S  
tionnaire on  
Service. Pag

Appeal filed  
Malumphy ch  
for determinin

Pag  
Astrology 11  
Bridge 17  
Comics 51  
Crossword 68  
Dear Abby 36  
Dedera 21

ED  
Circuit court  
state courts ...  
aid.

## Indi

Washington

NEW DELHI  
seeking to ob-  
antee from th  
and the Soviet  
nuclear attack,  
minister Mah  
Chagla has discl  
view.

By guarantee,  
out, he means  
which would sta-  
time to "deter"  
threat. Communis  
making an attack  
mitment for imm  
American reprisal  
na decided not to  
"WE ARE une-  
threat by a countr  
come nuclear," ex-  
la, a former Indian



AMERICAN SMELTING AND REFINING COMPANY  
EXPLORATION DEPARTMENT  
120 BROADWAY, NEW YORK, N.Y. 10005

J.H.C.  
APR 14 1967

KENYON RICHARD  
CHIEF GEOLOGIST  
Air Mail

April 12, 1967

Mr. J. H. Courtright  
American Smelting & Refining Company  
Box 5795  
Tucson, Arizona

W.E.S.  
MAY 19 1967

DeNiza Mining Corporation and  
Barringer Research Ltd.

Dear Sir:

Reference is made to Mr. Whishaw's letter to Mr. Saegart dated March 23. You sent me a copy of this letter with your handwritten note regarding release of the requested information. As a matter of fact, Whishaw does not clearly state what information he would like to have. Enclosed are two copies of a letter from Mr. Lacy to Mr. Barringer dated November 21, 1962. This letter contains generalized geophysical information but essentially and appropriately, no geology. Mr. Lacy advises me that instead of Barringer running their Input System Tests on the Sacaton area in 1962, they did the work at Poston Butte. Within the past few months, Mr. Stebbins, for whom the Barringer people did the test work on Poston Butte in 1962, returned certain information on the geology there which we had loaned to him in 1962. I believe I forwarded this information back to you. The only reason I mentioned these Barringer tests on Poston Butte is that Mr. Lacy says that he does not have any of their results there. If you can find any of the Barringer results, it would be well for you to send them to Mr. Lacy.

In addition to a copy of Lacy's letter of November 21, 1962 to Barringer, we should supply them with a bit more geological information. Mr. Pollock explains that the companies backing DeNiza have been helpful, in the past, in providing us with information and we should cooperate to a certain extent. In this connection, I would suggest that Whishaw could be given the depths to sulphides in the area of Sacaton where our drilling was somewhat more concentrated. For example, you could state that within sections \_\_\_\_\_ to \_\_\_\_\_, depths to sulphides were \_\_\_\_\_ to \_\_\_\_\_, and so on for the various main structural blocks.

7 1

April 12, 1967

In return for our supplying DeNiza with these data, request that they should supply Mr. Lacy and you with generalizations of the results of Barringer's geophysical work over Sacaton.

Yours very truly,

*Kenyon Richard*  
Kenyon Richard

Attachment

CC:RJLacy  
WESaegart

J. H. C.  
MAR 21 1967

March 21, 1967

Mr. Quint Wishaw  
1024 South Plumer  
Tucson, Arizona

Blind Subject  
Sacaton Property  
Pinal Co., Arizona

Dear Mr. Wishaw:

This will verify your telephone request of last week for information concerning our Casa Grande copper property.

Mr. Barringer was given permission to test his INPUT System on this property by letter from Mr. R. J. Lacy, dated August 13, 1963. In view of the elapsed time, I believe that approval must be again secured from our New York Office before I can release any information regarding the nature of our Casa Grande property. In this connection I should know the identity of the participants in this particular test program. Is this work being conducted solely by and for Barringer Research Limited. Is there an American affiliate such as Stebbins Mineral Surveys participating in these investigations.

I would also like to know the proposed distribution of the INPUT System results from our Casa Grande property together with any information which we might supply concerning the nature of the occurrence.

Following your reply I will refer this matter to our New York Office.

Yours very truly,

W. E. SAEGART

WES/pjc

cc: KERichard

JHCourtright

Blind Note on Asarco copies: It is my understanding that a new test survey (airborne) of Barringer's INPUT System was recently made over our Sacaton property. Mr. Wishaw, who I believe is associated with Stebbins Mineral Surveys, has requested data concerning the extent and degree of mineralization for the purpose of evaluating the survey results. Copies of previous correspondence concerning the Barringer INPUT System test at Sacaton are enclosed for your reference.

WES

REC.  
AUG 20 1963

August 9, 1963

AIR MAIL

Mr. R. J. Lacy, Chief Geophysicist  
American Smelting and Refining Company  
3422 South 700 West  
Salt Lake City, Utah 84119

Barringer IMPUT System Field Tests

Dear Mr. Lacy:

I have talked with Mr. Richard and we see no reason not to extend the arrangement with Mr. Barringer for testing his IMPUT R. & D. and E. M. Systems in accordance with your letter of August 7th to Mr. Barringer.

Very truly yours,

C. P. Pollock

CC-TASnedderi A/M  
JHCourtright A/M  
WESaagar A/M ✓

W.E.S.  
AUG 19 1963

August 13, 1963

Mr. A. R. Barringer  
Barringer Research Limited  
145 Belfield Road  
Rexdale, Toronto  
Ontario, Canada

R&D., E.M.  
BARRINGER INPUT SYSTEM

Dear Tony:

With reference to my letter of August 7, Company  
officials have extended their permission for testing your  
INPUT System on our disseminated sulphide prospect near  
Casa Grande.

Kind regards,

Very truly yours,

ORIGINAL SIGNED BY  
R. J. LACY

R. J. LACY

RJL:ao

cc: C. P. Pollock  
T. A. Snedden  
J. H. Courtright  
W. E. Saegart  
C. K. Moss

1. Original copy of Form 172 must be forwarded to the Comptroller promptly after the end of each month in which expenditures are made. A report for December must be submitted in any event. The report need not be typewritten and may be submitted in duplicating machine form. Amounts shall be reported to nearest dollar. Totals shall be shown in Columns 5 to 10, inclusive.

2. Total expenditures reported in Column 7 must agree with actual entries reflected on plant's or unit's books. For plants whose property is carried on the New York Office books the total reported in Column 7 of the December report must agree with the amount charged to the New York Office in December accounts.

3. If it becomes evident that an amount appropriated will not cover the anticipated cost a revised estimate shall be made. The difference between the revised estimate and the amount expended to date shall be entered in Column 10.

# PROPERTY PROGRESS REPORT (FORM 172)

PLANT OR MINE UNIT Sacaton Prospect

J.H.C.

MONTH December, 1966 JAN 24 1967

1 Appropriation No.		2 Date Appropn. Approved	3 Chargeable to	4 DESCRIPTION	5 Amount Appropriated	6 Amount Expended This Month	7 Amount Expended This Year (2)	8 Amount Expended To Date	9 Balance of Appropriation Unexpended	10 Estimated Amt. Required to Complete (3)	11 Estimated Date of Completion
Plant	N. Y.										
1	1317	3/16/66	Land, Other than Mineral	Purchase of NW-1/4 and N-1/2 S-1/2, Sec. 34, T. 5 S., R. 6 E., Pinal County, Arizona	\$137,000.	\$ -	\$136,271.	\$136,271.	\$729.	-	Completed
				<u>Segregation of Expenditures, Year 1966</u>							
				(1) Buildings			\$ -				
				(2) Equipment			-				
				(3) Land, Other than Mineral			136,271.				
				(4) Mineral Land			-				
							<u>\$136,271.</u>				
Orig:		HLGoodenough, att: HShapiro									
cc:		CPPollock JHCourtright File									



UNIVERSITY OF CALIFORNIA

LAWRENCE RADIATION LABORATORY  
P. O. BOX 808  
LIVERMORE, CALIFORNIA

W.E.S.  
AUG 29 1966

~~W.E.S., F.E.K., S.V.F.~~  
J.E.K. *Very interesting response J.E.K.*  
AUG 03 1966

SDK 66-24

July 21, 1966

S. V. F.  
AUG 8 1966

Mr. John J. Collins  
American Smelting and Refining Company  
Southwest Exploration Department  
P. O. Box 5795  
Tucson, Arizona 85703

Sacaton

Dear Mr. Collins:

We have reviewed the information on the copper prospect you submitted to us for evaluation as a possible site for a nuclear explosive copper leach development experiment. The enclosed memorandum summarizes our conclusions.

We feel that the property has merit as a site for a project of this type. If your company has a desire to participate in a joint copper leach project, you should submit a letter of intent or a proposal to Mr. John Philip, Chief; San Francisco Operations Office; U. S. Atomic Energy Commission; Berkeley, California 94704.

Should you wish to explore the possibility first on an informal basis before contacting the AEC, we will be pleased to cooperate with you in every way. Perhaps an informal conference either here at Livermore or in Tucson between members of our respective technical staffs would be appropriate.

We look forward to hearing from you again.

Sincerely,

*Gary H. Higgins*  
Gary H. Higgins  
Division Leader  
K DIVISION

GHH:SMH:mc  
Enclosure: UOPKC 66-121

LIVERMORE: LAWRENCE RADIATION LABORATORY  
T-105, Room 123, L-45

UOPKC 66-121

July 15, 1966

SDK 66-24

MEMORANDUM FOR THE RECORD

Subject: PRELIMINARY EVALUATION OF CONDITIONS FOR A COPPER LEACH  
EXPERIMENT - submitted by AMERICAN SMELTING & REFINING CO.

By: S. M. Hansen

---

Mr. John J. Collins of AS&R<sup>1</sup> has submitted to us some data related to an orebody which might be suitable for development with nuclear explosions. The data, which Collins refers to as conditions, includes maps and vertical cross sections through the mineral deposit. Collins did not state whether the deposit is real or imaginary, but his communication implied that it is real, owned by AS&R, and that they do not yet wish to divulge this fact or the actual location. However, Mr. Collins responded to a request for further information as if he were answering a question in fact about a real property.

Below are summarized the pertinent data available to us at this time, plus our inferences with regard to the geology and regional setting of the mineral deposit.

I. Size and Shape

The orebody is roughly the shape of a buried half mound that has an oval projection on the horizontal plane. The maximum dimensions are about 2500 ft east-west, and about 1500 ft north-south. The thickest portion of the orebody is in the center with a vertical dimension of about 600 ft. The ore thins outward from the center in every direction. A 200-ft thickness contour may be drawn on the

---

<sup>1</sup>American Smelting and Refining Company, Southwestern Exploration Department, P. O. Box 5795, Tucson, Arizona.

plan projection. The dimensions of this 200-ft-thickness contour are 1,750 ft in an east-west direction and about 1,200 ft in north-south direction. The base of the orebody is defined by fault plane and is reasonably flat.

## II. Geologic Setting

The orebody occurs within an altered granitic intrusive. In some places the ore reaches the top of the buried granite mass, but in most places it is overlain by 100 ft or more of altered granite or dacite porphyry. The granite is overlain by 1000 ft or more of conglomerate, which in turn is overlain by about 100 ft of alluvium. The fault plane which forms the base of the orebody has a thick gouge zone which is expected (by Collins) to be impervious. Gneiss and schist are found on the lower side of this basal fault.

## III. Mineralogy of the Ore

The ore may be divided into three main zones; these are:

- a. an upper zone of soluble copper sulphates and oxidized copper minerals;
- b. a zone of secondary copper enrichment (chalcocite- $\text{Cu}_2\text{S}$ );
- c. a zone of primary ore containing the mineral chalcopyrite ( $\text{CuFeS}_2$ ).

At the center of the orebody, the sulphate and oxidized zone has a thickness of about 225 ft, and the chalcocite zone is about 350 ft thick, giving a total thickness of highly leachable copper ore of about 575 ft. The chalcopyrite occurs as an irregular lens-shaped body within the ore itself, but on the eastern side. Although the thickness of the ore decreases to the west, there is a zone of approximately 1000 ft in length (shown in cross section 5N) where the thickness of the oxidized and chalcocite zones together comprise over 350 ft.

IV. Thickness of Overlying Rock

The thickness of overlying rock and alluvium at the center of the orebody is approximately 1300 ft. The thickness of overlying rock and alluvium at the 200-ft ore thickness boundary on the western side of the ore is about 1625 ft.

V. Proximity to Communities and Engineering Structures

Very little information was provided by AS&R; however they did indicate that a town with a population of 10,000 is located approximately 5 miles away. The locations of no other engineering structures or population centers are given.

VI. Seismic Damage Considerations

Preliminary estimates of seismic shock damage to the community of 10,000 people located at a distance of about 5 miles from the proposed explosion site are as follows:

1. Estimates of Peak Surface Velocity - For an explosion situated in crystalline rock, peak surface velocities of 1.5 cm per second for a 10 kt explosion and 2.0 cm per second for a 20 kt explosion should result. The maximum credible values of peak surface velocity are estimated to be 4 cm per second for a 10 kt explosion and 7 cm per second for a 20 kt explosion.
2. Type of Damage - These values of peak surface velocity are well below the level where structural damage will occur. However, architectural damage, i.e., minor cracking in masonry and plaster, will result.
3. Extent of Damage - At these levels of peak surface velocity, the ground motion will serve to precipitate at an earlier time cracks that will result anyway over a longer period. Investigations at NTS and elsewhere have indicated that a natural cracking rate prevails in each area and is a function of such

factors as type of construction, age of buildings, geologic nature of foundation materials, etc. It is estimated that ground motion of the magnitude noted above will precipitate at one time 80 to 200 days of natural cracking, depending on the yield and other factors. This will probably result in minor crack damage to 15 to 35 percent of structures. In a town of 10,000 population (assuming 2000 structures), this would result in minor crack damage to 300 to 700 structures.

4. Damage Claims - The number of damage claims that would be filed and their cost would be dependent on a number of factors, including public attitude toward the project.
5. Amortization of Damage - It is clear that some damage liability will be incurred. The amount must be estimated beforehand and considered a part of the cost of the nuclear experiment or of the nuclear development of the mineral deposit.

## VII. Conclusions

Evaluation thus far conducted indicates that closer study of this deposit as a possible site for a copper leach experiment or for development of this deposit with nuclear explosives is justified.

At the present time, no fractures which clearly eliminate this site from consideration are apparent, although the seismic situation appears at this time likely to be the major difficulty. The mineralogy is extremely favorable for a leach experiment. Copper sulphate and oxidized copper minerals (probably referring to the copper carbonate and copper silicate minerals) leach quickly and completely under most conditions. Chalcocite ( $\text{Cu}_2\text{S}$ ), although a sulphide, is almost as leachable as the minerals in the oxidized zone but has the distinct advantage of being the highest grade of all the commonly occurring copper minerals, with the theoretical copper content of 79.8%. A nuclear chimney in ore of this type, providing adequate circulation and solution recovery can be achieved, could be expected under ideal conditions to yield 80% or more of the contained copper within one to two years. One bit of information that Collins did not provide is the grade of the copper in the respective zones. It is my judgement that the utilization of nuclear explosives for in-situ leaching is an environment such as that described could be economically profitable in the event the total grade is .25% or greater (5 pounds of copper per ton of ore). Further, it appears to me that an experiment would produce useful results of both technical and economic significance if the grade were at least .20% contained copper (4 pounds of copper per ton of ore).

A number of questions remain to be answered before any kind of reasonable conclusion can be reached with regard to this property as a potential site for a copper leach experiment. These are tabulated below:

1. Location and full description of the property, the geology, and the environs.
2. Availability - Before a great deal of time and effort are spent in evaluating the suitability of this site for an experiment or other project, AS&R should indicate their

feelings regarding its availability.

3. Yield - The dimensions and configuration of the orebody suggest that a yield of 20 to 25 kt in the central portion would be safe and sufficient. The shot point would probably be below the basal fault with the chimney penetrating upwards into and through the mineralized zone. From a strictly experimental standpoint (without regard to ore being wasted or rendered undevelopable), a yield as low as 10 kt would probably be satisfactory. A yield of less than 10 kt should not be considered in any case because of the questionable and unpredictable nature of the chimney collapse.
4. Water - The evaluation of both surface and ground water for safety problems will be important. Besides safety, water must be available to operate the leaching plant.
5. Characteristics of the Rock - A number of rock characteristics are of considerable importance for the experiment. These properties include: permeability of the rock (both from the standpoint of the recovery of the pregnant liquor and the non-plugability from alternation during the leaching process); chemical and mineralogic composition of the rock; and acid consumption. The leachability of the ore has been fairly well established by the mineralogic data provided, since copper sulphates, oxidized copper ores, and chalcocite can be leached quickly and with reasonable recovery in most occurrences.
6. Acid-generating Sulfides - No comment has been made regarding the presence of iron pyrites or other minerals which generate acid as they chemically decompose during leaching. If very limited quantities of other sulfide minerals are present, the leaching of the ore may consume considerable acid which will need to be added to the leach circuit at some additional expense. Also, the presence of minerals which tend to add excess iron to the leaching circuit could be a problem.

7. Culture - The nature of the town of 10,000 people has not been adequately defined. If the town were a mining community such as Globe, Arizona, the seismic problem may not be as severe as if the town were a residential community based on other industries. The population of mining communities is used to considerable large-scale blasting in the immediate vicinity. Also, it may be that 5 miles is not a correct representation of the actual distance and that this figure was provided by AS&R simply as an example. If such is the case, AS&R may have reasoned that if an explosion is safe at 5 miles, it will certainly be safe on the basis of a greater actual distance. This subject needs to be explored further.

VIII. Recommendations

This site appears promising, and the interest expressed by AS&R is reassuring. It is my recommendation that a letter be drafted in reply to this inquiry and that the matter not be allowed to atrophy from inaction on the part of IRL. Perhaps the AEC can encourage AS&R to respond in a more positive fashion--perhaps even to the point of proposing that the company and the Atomic Energy Commission cooperate in a copper leach experiment at this site. It is also possible that AS&R might make their property available for a consortium project similar to that now in the process of being formed by CER Geonuclear to sponsor an oil shale experiment. In my opinion, the consortium route is one of the most desirable ways to go since such an approach allows widespread participation by a number of companies throughout the industry and increases the likelihood of substantial financial contribution toward the total cost of the experiment by private industrial concerns.

SMH:bc/mc



MEMORANDUM FOR THE RECORD

UOPKC 66-121

Page 8

Distribution: G. Higgins (IRL)

G. Werth "

M. Nordyke "

D. Rabb "

J. Philip, AEC, SAN (2)

J. J. Collins, AS&R (2)

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

May 31, 1966

J. H. C.  
MAY 31 1966

TO: J. H. COURTRIGHT  
FROM: J. R. WOJCIK

CASA GRANDE LAB

Today I brought the De-Sander to Tucson and while in Casa Grande, I stopped at the gas, electric and water service companies in order to terminate our service. This completes the move from Casa Grande to Tucson. Consequently, this afternoon I will mail the key to the Don Mahoney Agency.

*J. R. Wojcik*  
J. R. WOJCIK *Kw*

JRW/kw  
cc: KvdSteinen

J. H. C.

MAY 23 1966

May 20, 1966

Mr. Spent M. Hansen, Geological Engineer  
Plowshore Division  
Lawrence Radiation Laboratory  
P. O. Box 808 (L-43)  
Livermore, California 94551

*Sacaton*

Dear Mr. Hansen:

In accordance with my letter of March 1st, I am attaching herewith data regarding a set of conditions which might warrant the application of nuclear explosives to an orebody. In this case the "mining" would be conducted by pumping acid solutions underground for the purpose of dissolving copper and recovering the pregnant solution for the extraction of the contained copper.

Herewith are the following illustrations:

1. Regional map, scale 1" = 1 mile.
2. Horizontal outline of the copper zone where greater than 200 feet thick.
3. Two east - west vertical sections.
4. Four north - south vertical sections.

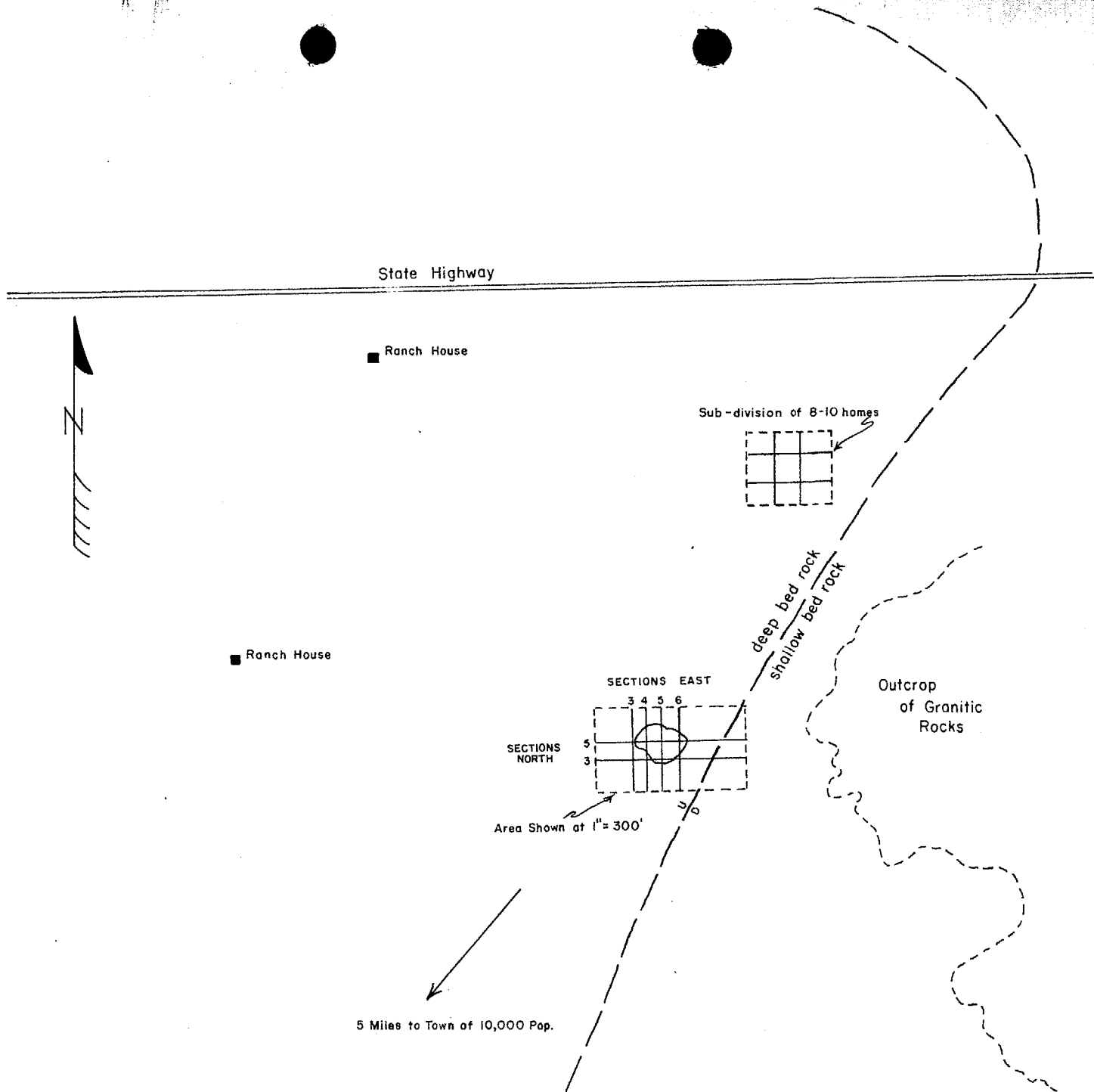
The geology is indicated on the cross-sections but it may be useful to add that the conglomerate covering this deposit is relatively impermeable and activities here would be isolated from any groundwater basin. The underlying fault has a thick gouge which is expected to be impervious.

We will be interested to have your comments on the feasibility of utilizing a series of nuclear explosions to shatter the rock in the mineralized area so that acid solutions could penetrate it sufficiently to dissolve a substantial proportion of the contained copper.

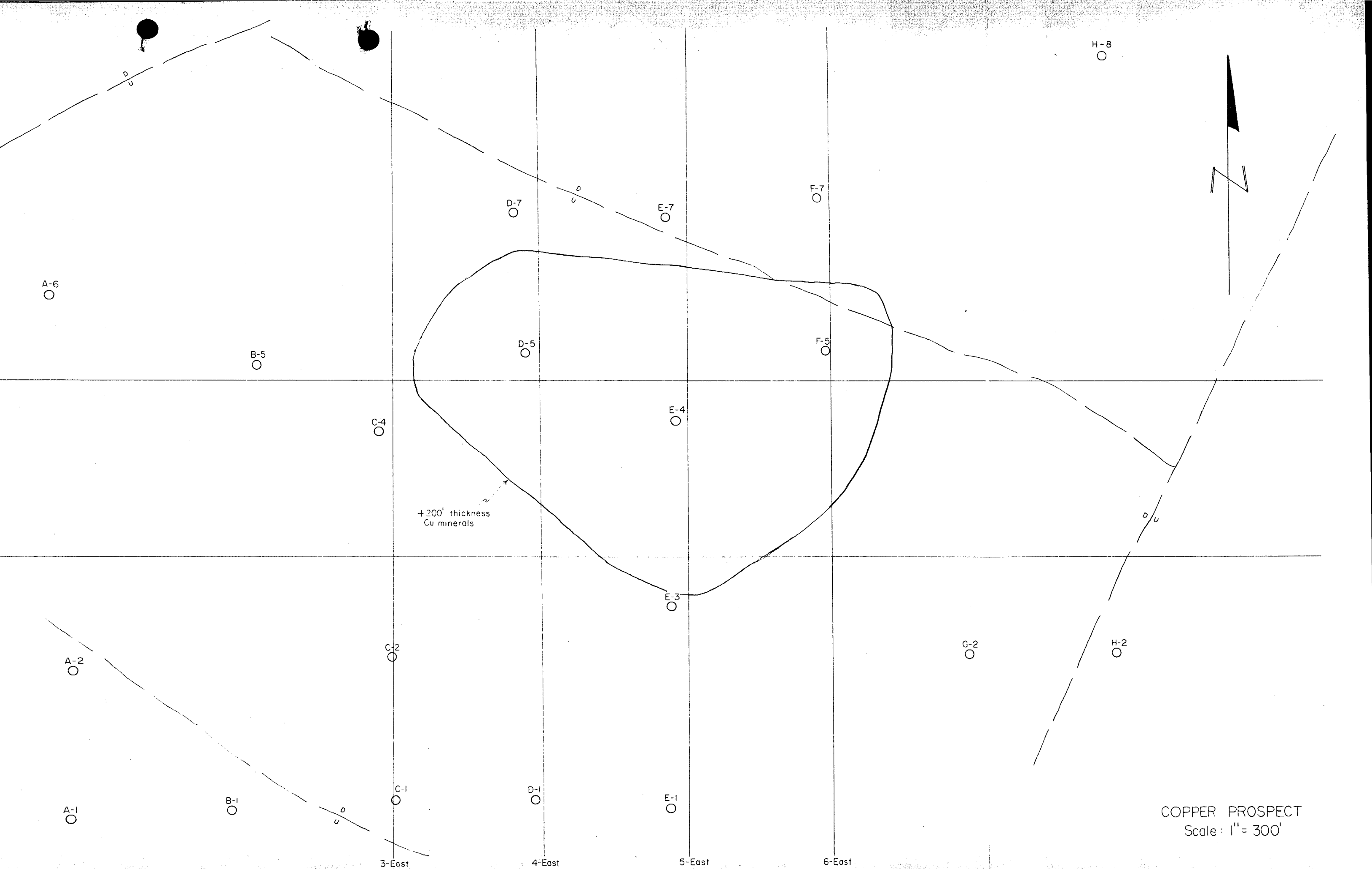
Sincerely yours,

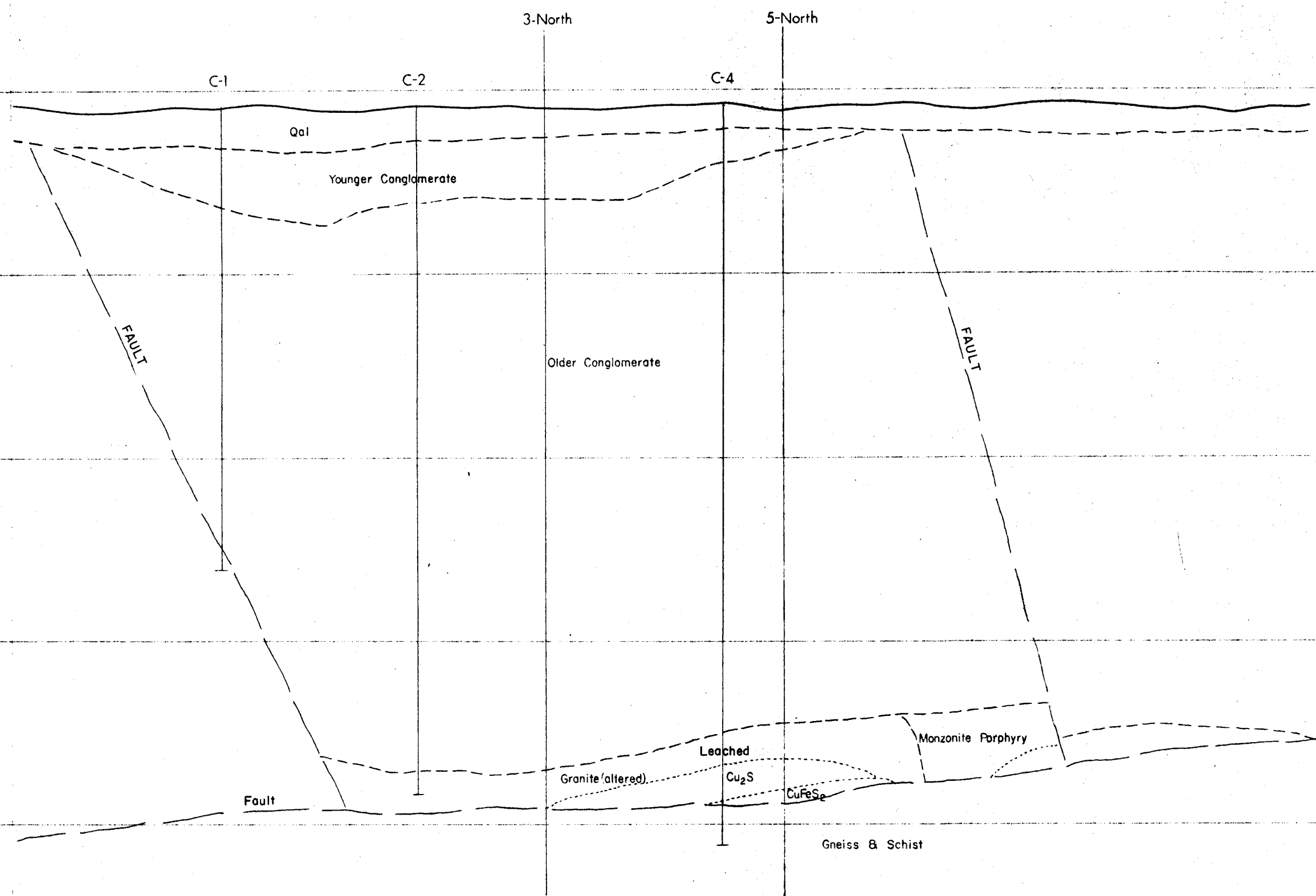
JOHN J. COLLINS

JJC/pjc  
Enclosure



COPPER PROSPECT





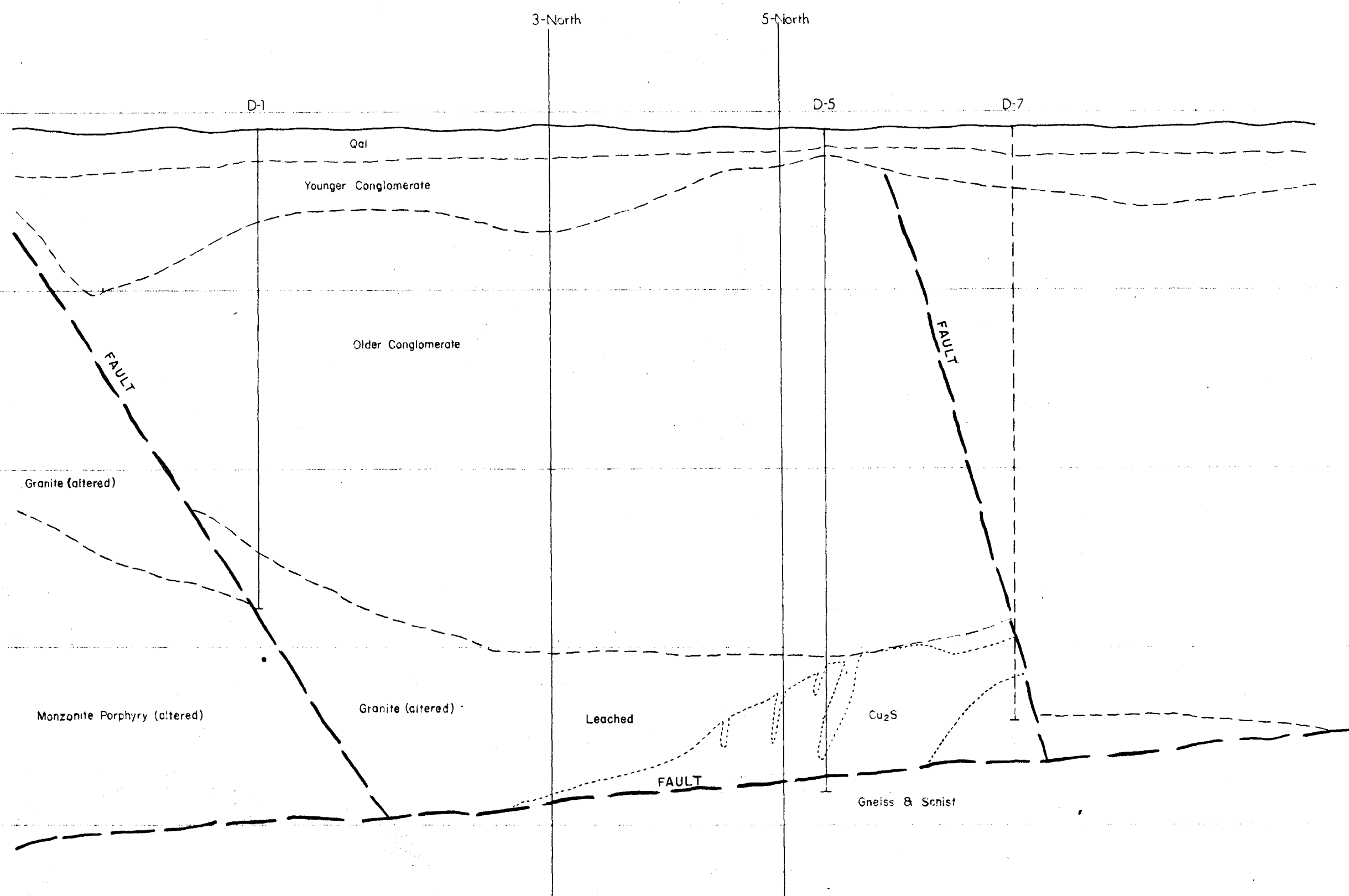
SECTION 3 EAST

COPPER PROSPECT

Scale: 1" = 300'

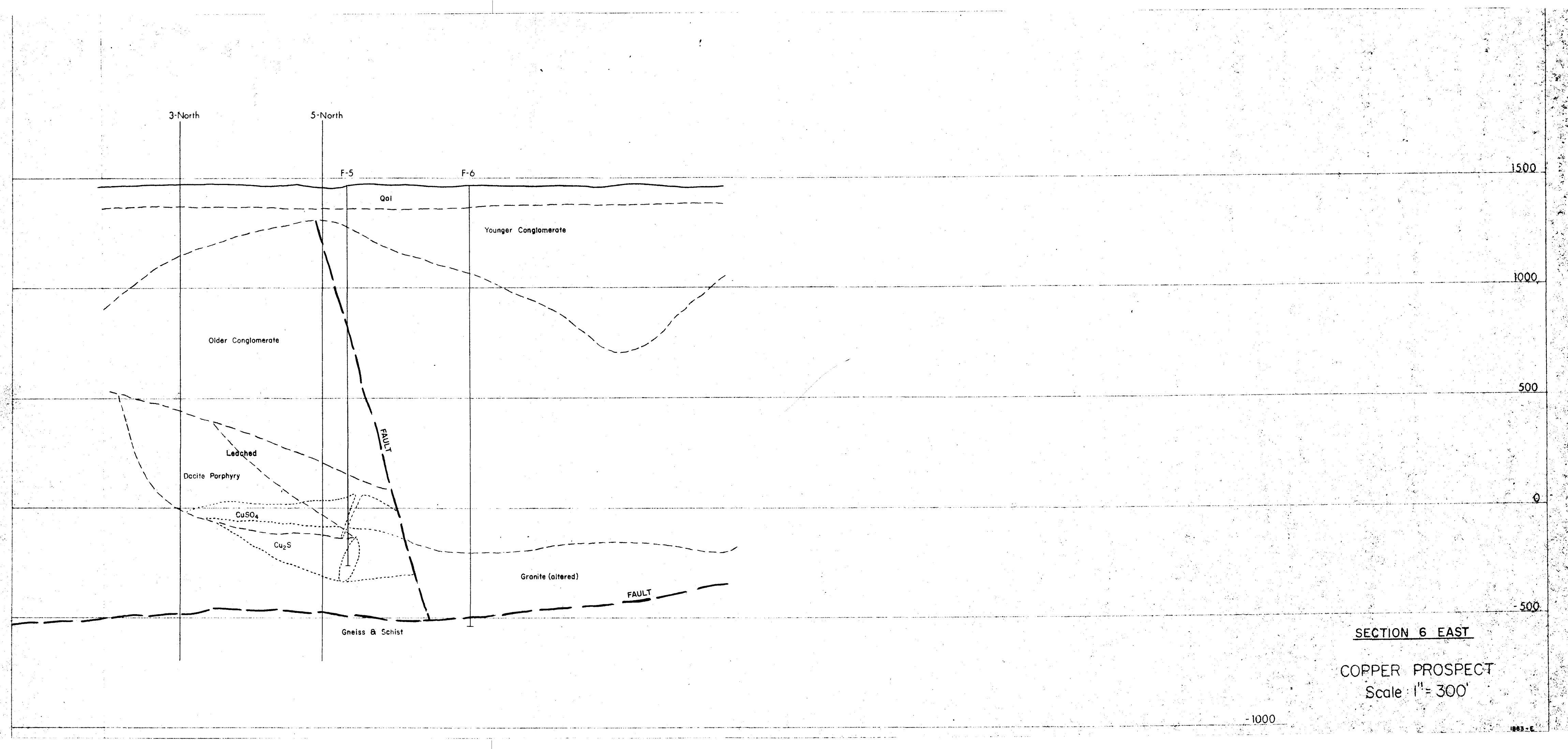
-1000

1893-H

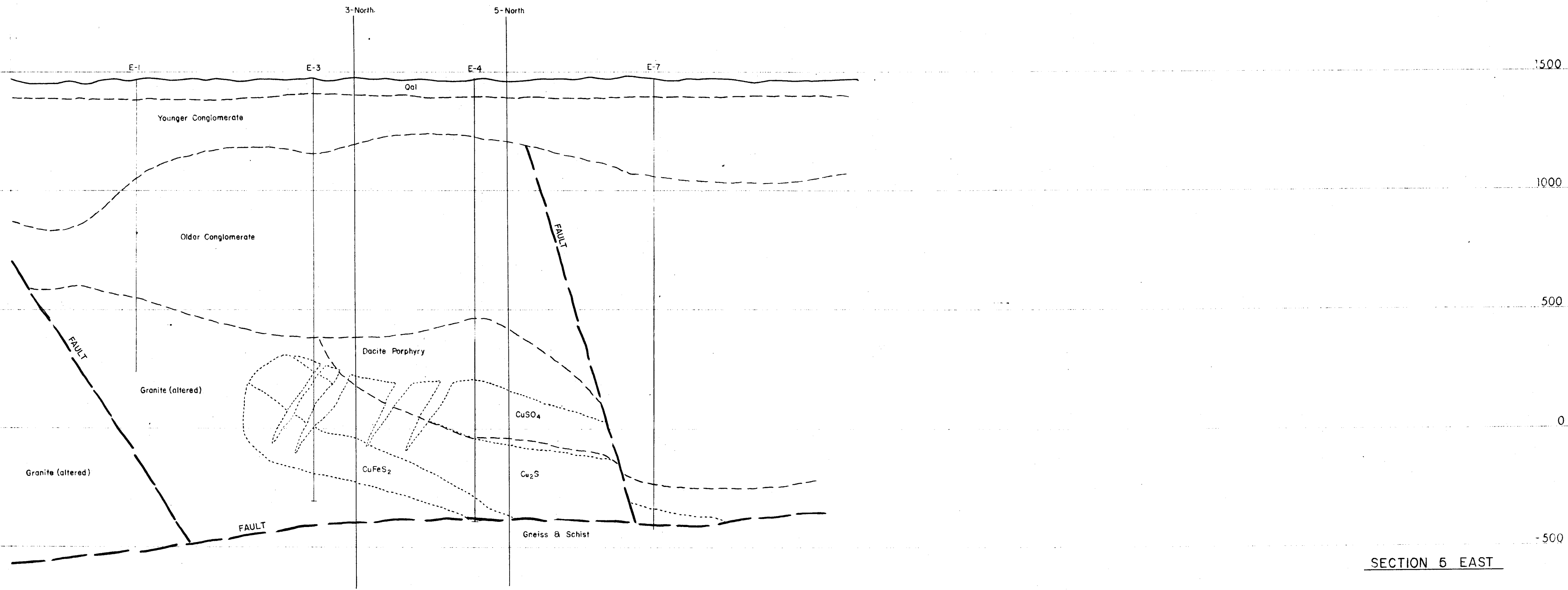


SECTION 4 EAST  
COPPER PROSPECT  
Scale: 1" = 300'

-1000

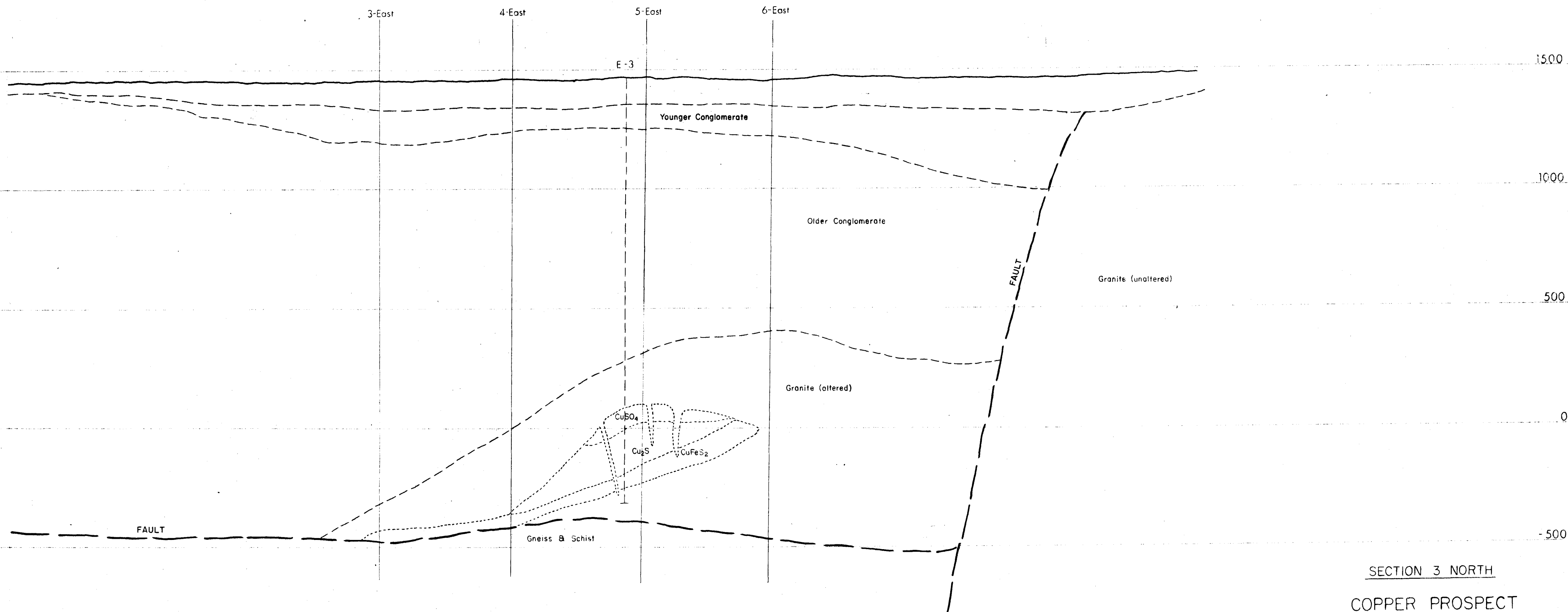


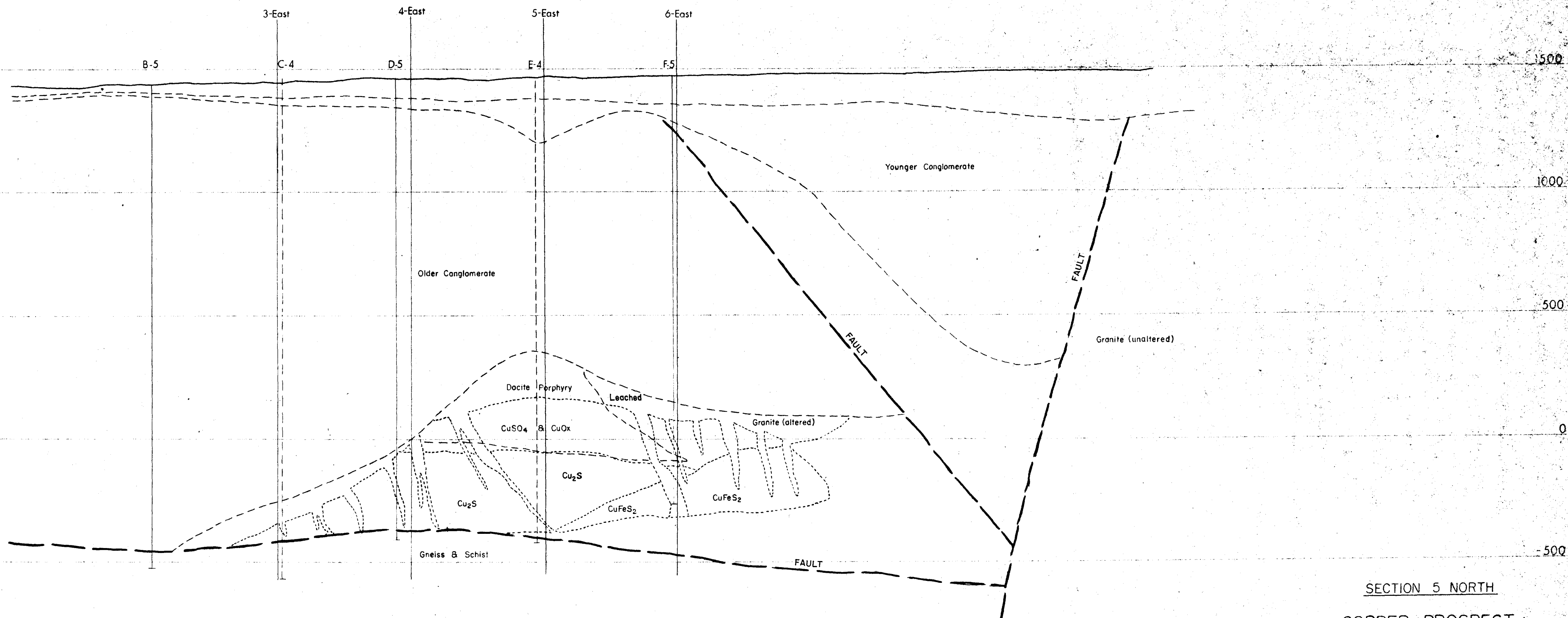




COPPER PROSPECT  
Scale: 1" = 300'

-1000





SECTION 5 NORTH  
COPPER PROSPECT  
Scale: 1" = 300'

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

March 17, 1966

AIR MAIL

Mr. P. A. Barrese  
American Smelting and Refining Company  
120 Broadway  
New York, N. Y. 10005

Dear Mr. Barrese:

Enclosed is a list of starting and completion dates for the Sacaton drill holes, logs of which were sent you previously.

In some instances two pairs of dates are listed for a single hole. This means that the hole was reoccupied and deepened.

Yours very truly,

J. H. COURTRIGHT

JHC/kw  
Enclosure  
cc: KERichard, w/o encl.

## SACATON DRILL HOLES

HOLE No.	DATE		HOLE No.	DATE	
	START	STOP		START	STOP
S-1	9-26-61	10-6-61	S-45	6-30-62	7-2-62
2	10-2-61	10-31-61	46	7-2-62	7-23-62
3	10-31-61 → 3-20-62	11-29-61 → 5-3-62	47	7-5-62	7-11-62
4	11-1-61	11-17-61	48	7-12-62	7-31-62
5	11-20-61 → 4-11-62	1-1-62 → 7-28-62	49	7-20-62	8-10-62
6	12-22-61	1-11-61	50	7-28-62	8-23-62
7	1-8-62	1-27-62	51	7-30-62	8-2-62
8	1-10-62	1-22-62	52	8-1-62	8-23-62
9	1-11-62	3-10-62	53	8-13-62	9-12-62
10	1-16-62 → 6-30-62	2-9-62 → 7-18-62	54	8-23-62	9-18-62
11	1-18-62	3-2-62	55	8-23-62	9-29-62
12	1-20-62 → 5-18-62	2-7-62 → 7-5-62	56	8-24-62	9-11-62
13	1-22-62	3-7-62	57	8-23-62	8-30-62
14	1-22-62	2-15-62	58	8-31-62	10-6-62
15	1-25-62 → 4-16-62	1-27-62 → 4-20-62	59	9-12-62	10-4-62
16	1-29-62	2-9-62	60	9-19-62	9-27-62
17	2-10-62	4-11-62	61	9-21-62	10-13-62
18	2-17-62	4-18-62	62	9-27-62	10-8-62
19	2-28-62	3-1-62	63	9-26-62	10-3-62
20	3-1-62	3-3-62	64	9-27-62	11-1-62
21	3-3-62	3-22-62	65	9-28-62	10-13-62
22	3-6-62	3-21-62	66	2-4-63	4-1-63
23	3-7-62	3-12-62	67	2-13-63	3-12-63
24	3-13-62	3-19-62	68	2-17-63	4-19-63
25	3-20-62	3-28-62	69	2-21-63	4-3-63
26	3-21-62	4-3-62	70	2-26-63	3-19-63
27	3-22-62	3-26-62	71	3-6-63	3-23-63
28	3-28-62	3-31-62	72	3-9-63	3-28-63
29	3-31-62	5-31-62	73	3-23-63	4-6-63
30	4-17-62	5-16-62	74	3-28-63	5-3-63
31	4-19-62 → 7-12-62	5-18-62 → 8-8-62	75	4-3-63	4-15-63
32	4-20-62	9-15-62	76	4-6-63	5-22-63
33	5-5-62	7-14-62	77	4-12-63	6-8-63
34	5-7-62	5-28-62	78	4-15-63	4-29-63
35	5-24-62	6-29-62	79	4-18-63	5-8-63
36	5-28-62	6-16-62	80	4-25-63	5-2-63
37	5-28-62	8-8-62	81	4-29-63	5-18-63
38	6-8-62	6-9-62	82	5-2-63	5-18-63
39	6-8-62	6-27-62	83	5-16-63	5-19-63
40	6-11-62	6-14-62	84	5-18-63	6-11-63
41	6-14-62	6-27-62	85	5-22-63	6-13-63
42	6-15-62	8-11-62	86	6-3-63	6-7-63
43	6-28-62	6-29-62	87	6-7-63	6-10-63
44	6-28-62	7-19-62	88	6-11-63	7-3-63

+ 49A

8-11-62 9-8-62

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

March 3, 1966

AIR MAIL

Mr. P. A. Barrese  
American Smelting and Refining Company  
120 Broadway  
New York, N. Y. 10005

Dear Mr. Barrese:

Enclosed is a list of abbreviations used in the drill logs of various projects, including Sacaton.

By his letter of February 25, Mr. Richard requested that I supply you with a copy to be attached to the Sacaton drill logs previously sent.

Yours very truly,

J. H. COURTRIGHT

JHC/kw  
Enclosure  
cc: KERichard, w/o encl.

New York, February 25, 1966

J. H. C.

Memorandum for: Mr. P.A. Barrese

FEB 28 1966

Sacaton Drill Holes  
Geologic - Assay Logs

Accompanying are the Sacaton drill hole logs which you requested.

These logs were prepared for the use of the men in our Tucson office who were carrying on this exploration. They contain many abbreviations which have meaning for us but not necessarily entirely understandable by anyone not closely acquainted with this drilling. Therefore, Mr. Courtright is requested to send directly to you a legend of these abbreviations.

As can be determined by reference to the text and geological sections in the report you have in hand, within most of the area of drilling the mineralized formations ("bedrock" is our field term for them) are overlain by substantial thicknesses of post-mineral formations consisting of detrital material which often contain fragments of the underlying pre-mineral rocks. We drilled through these thick layers of post-mineral formations with tricone rotary rock bits and used mud circulation. In an effort to locate the contact between post-mineral and pre-mineral rocks, we continually screened small samples of fine grained cuttings from the mud stream at the collar of the hole. This was an uncertain manner of determining the position of the contact between pre- and post-mineral rocks. Therefore, the rock bit was occasionally removed and one or more runs were made with a core barrel. The logs herewith contain, for the most part, only the record of the coring runs both in the post-mineral and in the pre-mineral formations.

Attachment

Kenyon Richard

CC: PABarrese With extra copy of memo  
JHCourtright without attachment



AMERICAN SMELTING AND REFINING COMPANY  
SOUTHWESTERN EXPLORATION DEPARTMENT  
P. O. BOX 5795, TUCSON, ARIZONA 85703

*Mc*  
*Sacaton*

J. H. C.

MAR 3 1966

J. H. COURTRIGHT  
CHIEF GEOLOGIST  
L. P. ENTWISTLE  
ASSISTANT CHIEF GEOLOGIST  
W. E. SAEGART  
ASSISTANT CHIEF GEOLOGIST

1150 NORTH 7TH AVENUE  
TELEPHONE 602-792-3010

March 2, 1966

Surety Title and Trust Company  
Florence, Arizona

Attention: Mr. Newhart

Gentlemen:

Our attorney, Mr. T. K. Shoenhair, talked with you on the telephone recently about having your company as Trustee under Trust No. 16038, make an offer for the purchase of certain unimproved land located in Pinal County. Enclosed is the form of offer that we would like you to submit as Trustee of said Trust No. 16038. If the offer is in form acceptable to you, we hereby agree to indemnify you against any loss or liability resulting from having made said offer, and if the offer is accepted we agree to deposit in escrow within the time specified the sum of \$10,000, and we also agree to deposit in said escrow the balance of the purchase price prior to the closing date.

If you have any questions about this matter, please call our attorney, Mr. Shoenhair, of the firm of Boyle, Bilby, Thompson & Shoenhair, Ninth Floor Valley National Building, Tucson, Arizona, MAin 3-8661, or the writer.

Very truly yours,

AMERICAN SMELTING AND REFINING COMPANY

By

*S. I. Bowditch*

S. I. Bowditch

SIB:bam  
Enclosure



AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

February 23, 1966

Mr. K. E. Richard, Chief Geologist  
American Smelting and Refining Company  
120 Broadway  
New York, N. Y. 10005

Dear Sir:

In accordance with your request, we are today sending  
you by air mail copies of the Sacaton geologic-assay drill  
logs, S-1 through S-88, inclusive.

Yours very truly,

J. H. COURTRIGHT

JHC/kw

Logs mailed under separate cover

UNIVERSITY OF CALIFORNIA

*Sacaton*  
J. J. C.

FEB 21 1966

LAWRENCE RADIATION LABORATORY  
BOX 808 (L-43)  
BERKELEY, CALIFORNIA 94551

J. H. C.

FEB 21 1966

February 18, 1966

(Dictated: February 15)

*Tu*  
*JHC*

Mr. John J. Collins  
American Smelting & Refining Company  
Southwestern Exploration Department  
Post Office Box 5795  
Tucson, Arizona 85703

Dear Mr. Collins:

Thank you for your letter of December 16. I am sorry it has taken so long to reply and provide you with the answer to your question regarding the limitation on proximity of ranch houses and towns and wells to a nuclear explosion project.

Unfortunately, it is not possible for me to provide you with a direct answer to this question that will be more than generally applicable. In general, for yields between the ranges of about 10 and 50 kilotons, a radius of from 5 to 10 miles surrounding the project should be free from buildings, factories, or other surface structures to which damage is to be avoided. Individual ranch houses or a few isolated buildings can usually be tolerated, since in the event damage does occur, repairs and compensation can be made, or the building purchased outright and the cost added to the expense of the project. Water wells generally will not suffer damage if they are located more than a few thousand feet from the explosion center. Information available to us indicates that no danger exists for radioactive by-products reaching ground water that might be produced from such a well except in very rare instances which can be recognized beforehand.

This is a subject that some of our most intense current research efforts are being directed. There are many factors which affect the radius of seismic damage, which include general geologic environment, regional foundation characteristics, and the presence of deep strata which might reflect seismic energy. Unfortunately, since we now have only an imperfect understanding of most of these factors, it is necessary to apply safety factors which are in most cases unrealistically large, in order to guarantee that excessive expense from seismic damage does not occur.

Danger from radioactivity is another concern which must be faced and evaluated. For mining applications, the problems of radioactivity are far

To: Mr. John J. Collins

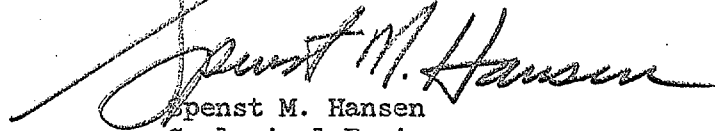
-2-

February 18, 1966

less severe than those arising from seismic shock. I have included several recent publications which discuss various aspects of this subject. I hope these will assist you in increasing your information on this aspect of nuclear explosive applications.

We shall be pleased to hear from you at any time regarding questions you may have, or application projects you may be considering.

Very truly yours,



Spensst M. Hansen  
Geological Engineer  
K-Division

SMH:bc

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

January 18, 1966

Mr. P. J. Breglia  
American Smelting and Refining Company  
Comptroller's Department - Tax Section  
120 Broadway  
New York, N. Y. 10005

SACATON PROJECT

Dear Mr. Breglia:

Reference is made to Mr. Pollock's letter of January 10 regarding segregation of the cost of our Sacaton Project according to land surface value and according to value for mining purposes.

The land owned by the Company at Sacaton amounts to two and one-quarter sections. The drilling done in the past was on widespaced intervals, and considerable more drilling will be required to determine whether or not there is an economic potential. In any event, should the property be put into production, additional ground would be required, particularly for tailings disposal. Accordingly, all ground now held by the Company should be considered as needed for mining purposes.

Yours very truly,

  
J. H. COURTRIGHT

JHC/kw

cc: CPPollock  
RRichter

TASnedden  
KvdSteinen



AMERICAN SMELTING AND REFINING COMPANY  
EXPLORATION DEPARTMENT  
120 BROADWAY, NEW YORK 5, N.Y.

JAN 12 1966

S. I. B.

January 10, 1966

JAN 12 1966

C. P. POLLOCK  
VICE PRESIDENT

AIR MAIL

Mr. J. H. Courtright, Chief Geologist  
American Smelting and Refining Company  
P. O. Box 5795  
Tucson, Arizona

MR. S. I. B. WES TRW  
READ AND RETURN \_\_\_\_\_  
PREPARE ANSWERS \_\_\_\_\_ HANDLE \_\_\_\_\_  
FILE \_\_\_\_\_ INITIALS \_\_\_\_\_

Sacaton Project

Dear Mr. Courtright:

There is enclosed copy of Mr. Breglia's self-explanatory memorandum dated January 6th in which he discusses the desirability of segregating the cost of our Sacaton Project as between the surface and mineral value.

In due course, will you please review your file and give Mr. Breglia this breakdown of the cost of our Sacaton Project.

Very truly yours,

C. P. Pollock

Enc.

CC-RRichter  
PJBreglia

S.I.B. - Please prepare data according  
to attached instruction. JPB

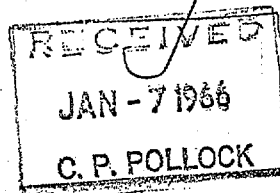
AMERICAN SMELTING AND REFINING COMPANY

COMPTROLLER'S DEPARTMENT - TAX SECTION

FILE REFERENCE

S-6

New York, N.Y.  
January 6, 1966



Segregation of Cost of  
Acquisition of Mineral  
Properties

MEMORANDUM FOR MR. C. P. POLLOCK

We recently discussed with you the desirability of segregating the cost of land which will not be devoted to mining in connection with the Missouri Project and Sacaton Prospect, as between the surface area, the mineral deposit, and any other assets acquired.

The regulations covering the natural resource industry provide that a "mineral enterprise is the mineral deposit or deposits and improvements, if any, used in mining \* \* \* and only so much of the surface of the land as is necessary for purposes of mineral extraction. The value of the mineral enterprise is the combined value of its component parts." The regulations also provide that "when a mineral enterprise is purchased as a unit the cost of any interest in the mineral deposit \* \* \* is that proportion of the total cost of the mineral enterprise which the value of the interest in the deposit \* \* \* bears to the value of the entire enterprise at the time of its acquisition".

The portion of the cost of a mineral enterprise which pertains to the mineral deposit, including "only so much of the surface of the land as is necessary for purposes of mineral extraction" is extinguishable through percentage depletion which is based on a percentage of gross income, but limited to 50% of net income from the mine. The cost of surface area of the land not necessary for purposes of mineral extraction, and other assets acquired as a part of a mineral enterprise are not extinguishable through percentage depletion and thus are either subject to depreciation or amortization or constitute basis on which gain or loss is determined on sale or abandonment. As you know percentage depletion continues as an allowable deduction even after basis of the depletable cost has been fully extinguished.

Therefore, based on the foregoing, we should avail ourselves of the right to segregate the cost of a mining project between the depletable and non-depletable parts. Accordingly we would like to have such a segregation of costs with respect to the Sacaton Prospect, and the Missouri Project.



Segregation of the property is recommended in the case of these properties on the assumption that they are in close proximity to either a commercial, industrial or residential area where some land value will be attributed to the surface area and will be available for other uses after mineral production. Also to properly assign a portion of the cost to any other assets acquired as a part of the property.

P. J. BREGLIA *PB*

PAB:JV

cc: CENelson  
HLGoodenough

*Sacaton*  
J. H. C.

SEP 28 1965

September 28, 1965

Surety Title Division  
Phoenix Title and Trust Company  
P. O. Box 609  
Florence, Arizona

Attn: Mrs. Willia Allen

Dear Mrs. Allen:

Enclosed are the three copies of the "Real Estate Holding Trust Agreement" which you recently sent us. These have now been signed by R. B. Meen for American Smelting and Refining Company. We have filled in our address and, at the advice of our attorneys, have inserted five names in paragraphs XIII and XIV as persons who may give you instructions.

After your company has signed, I presume you will return at least one fully signed copy to us.

Yours very truly,

S. I. Bowditch

SIB:bam  
Enclosures  
cc: JHCourtright  
KvdSteinen



AMERICAN SMELTING AND REFINING COMPANY  
SOUTHWESTERN MINING DEPARTMENT  
P. O. BOX 5795, TUCSON, ARIZONA 85703

J. H. C.

SEP 24 1965

1130 NORTH 7TH AVENUE  
TELEPHONE 602-792-3010

R. B. MEEN  
MANAGER  
A. C. HALL  
ASSISTANT MANAGER

September 24, 1965

Phoenix Title and Trust Company  
P. O. Box 2832  
Tucson, Arizona

Re: Trust No. RH27-095  
Property Taxes

Gentlemen:

With reference to Trust No. RH27-095, which covers the NE 1/4 and the W 1/2 of Section 25, Township 5 South, Range 5 East, G. & S. R. B. & M., Pinal County, Arizona, we note that 1st Half 1965 property taxes are now due and payable.

If you will provide us with a copy of the official tax notice, we will send you our check to cover the amount due so that you can make the payment.

Very truly yours,

ORIGINAL SIGNED BY  
K. A. von den Steinen

K. A. von den Steinen  
Chief Accountant

KvdS/ma  
cc: JHCourtright   
SIBowditch

J. H. C.

September 24, 1965

SEP 24 1965

Surety Title and Trust Company  
Att: Willia Allen, Trust Officer  
1207 Main Street  
Florence, Arizona, 85232

TRUST NO. 16038

Gentlemen:

With reference to the captioned Trust and your memorandum of September 17, 1965, we are enclosing our check in the amount of \$830.06 to cover: (1) the \$40.00 annual trust fee, (2) your \$12.50 charge for liability insurance, and (3) year 1965 property taxes as follows:

<u>Tax Notice Number</u>	<u>Description of Property</u>	<u>Acres</u>	<u>1965 Assessed Valuation</u>	<u>1965 Property Taxes</u>
39670	E1/2, Sec. 26, T. 5 S., R. 5 E.	320	\$3,200.	\$330.88
39671	W1/2, Sec. 26, T. 5 S., R. 5 E.	320	3,200.	330.88
39673	NE1/4, Sec. 35, T. 5 S., R. 5 E.	160	800.	82.72
39674	NW1/4, Sec. 35, T. 5 S., R. 5 E.	160	320.	33.08
Total		<u>960</u>	<u>\$7,520.</u>	<u>\$777.56</u>

When you have paid the taxes, please mail us the official tax receipts.

Very truly yours,

ORIGINAL SIGNED BY  
K. A. von den Steinen

K. A. von den Steinen  
Chief Accountant

KvdS/ma  
Encl-ck.  
bcc: HLGoodenough, w/advice  
Voucher

CENelson  
CPPollock  
TASnedden  
JHCourtright  
SIBowditch

Note to Mr. Goodenough

Inasmuch as these items pertain to the Sacaton Prospect and as all Sacaton authorizations have been closed, we are charging New York directly.

*JHC*

J. H. C.  
SEP 3 1965

Registered Mail  
Return Receipt Requested

August 30, 1965

Mr. S. I. Bowditch  
American Smelting & Refining Company  
Box 5795  
Tucson, Arizona

Sacaton Project  
Federal Claims

Dear Sir:

Enclosed are the two forms, signed and notarized, concerning a Waiver of Mineral Surface Rights on certain federal claims originally involved in the Sacaton Project. These forms were transmitted by your letter of August 26.

Yours very truly,

Attachments  
CC-JHCourtright

Kenyon Richard

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

August 26, 1965

J. H. C.

AUG 26 1965

Mr. K. E. Richard, Chief Geologist  
American Smelting and Refining Company  
120 Broadway  
New York, N. Y. 10005

Sacaton Project  
Federal Claims

Dear Sir:

When the Sacaton project was nearing its end, as far as exploration was concerned, we staked Federal claims covering the NW 1/4 of Section 23, T5S, R6E, east of the Casa Grande-Chandler highway, and took prospecting permits on several sections of State land. As you know, work in this area was negative, we relinquished our State prospecting permits and have done no assessment work on the Federal locations. However, as you know, as far as the government is concerned, as long as no one else relocates, the claims are still ours, and we could go back and resume work.

The State Highway Department now wants to use part of this Federal quarter section as a borrow pit in connection with the new Interstate Highway 10, and has sent us the enclosed "Waiver of Mineral Surface Rights". As written it is pretty stiff, for we waive not only use of the surface but also our right to explore, develop and mine until September 1970. If we had any interest in the area I would recommend some modification, but since we have now no reason to think there is any mineral present, and have abandoned the area, I see no reason to object.

Mr. Hall and I have discussed whether he could sign this waiver, under his power of attorney, but decided, from his experience in somewhat similar cases, that the State and Federal Bureau of Roads would not be satisfied without a lot of explanation, and that it would be better if it were signed in New York.

Accordingly, I am enclosing three copies of the waiver. Will you please have two of them signed and returned to me. I will then send them to the State, with the request that they return one copy showing their acceptance. This will then be sent to Mr. Grose.

Yours very truly,

*S. I. Bowditch*  
S. I. Bowditch

SIB:bam  
Enclosures  
cc: JHCourtright ✓

*Sacaton*  
J. H. C.  
AUG 26 1965

August 26, 1965

Mr. Archer W. Seaver  
Right of Way Division  
Arizona Highway Department  
Phoenix, Arizona

Dear Mr. Seaver:

I have received the waiver sent with your letter of August 24, and have sent it on the New York for signature by my company. When it is returned I will forward it to you.

For your information, the stakes your engineers found are claim stakes, for mining claims. We have no need for a permit, and your suggestion of permit #124 is not the case. We have lost interest in the area, and as far as I know the company will be willing to sign the waiver.

Yours very truly,

*S. I. Bowditch*

S. I. Bowditch

SIB:bam

bcc: JHCourtright ✓

AMERICAN SMELTING AND REFINING COMPANY  
Tucson Arizona

March 15, 1965

J. H. C.

MAR 17 1965

FILE MEMORANDUM

SACATON GEOLOGY

Dr. G. M. Schwartz visited recently in Tucson, and I discussed an alteration feature I have noted in the Sacaton deposit, whereupon he suggested the probable mineral in question--one of the clay group.

Briefly, I have seen in thin-sections in the primary sulphide zone that the feldspars have been replaced completely by a very fine-grained aggregate of a mineral possessing the general characteristics of Kaolinite. Sericite, quartz, orthoclase, and biotite are also present as alteration products. The Kaolinized feldspars were further identified precisely by John W. Anthony (University of Arizona) using x-ray diffraction patterns.

Superposed upon these alteration products, in both the leached capping and chalcocite zones, is a mineral too fine-grained to be identified in thin-section, but its brownish color in plain light and its weak birefringence under crossed nicols suggest it to be a clay mineral aggregate. Dr. Schwartz said this description of appearance and occurrence to be exceedingly suggestive of allophane, which he has identified at San Manuel and also from other deposits. The identification must be made with very high-power microscopes with "oil-immersed" objective lenses. X-ray patterns are not diagnostic apparently because the mineral is nearly amorphous.

The probability, then, is that the supergene clay at Sacaton is allophane, and perhaps this will prove to be a mineral of common occurrence in the supergene and capping zones of porphyry copper deposits.

JOHN E. KINNISON

JEK/jak

cc: JHCourtright

File copy: Route to all geologists