

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

October 14, 1964

Mr. P. A. Lewis, Superintendent
Mission Unit
American Smelting and Refining Company
P. O. Box 111
Sahuarita, Arizona

Dear Sir:

In accordance with Mr. Weiss' letter of September 29, 1964,
I am sending a group of composite samples for assaying.

The attached list sets out each composite with the requested
assays. Some of the sample envelopes have markings for assays
written directly on them, and these should be ignored as they were
intended for private assay firms.

The samples all are from San Xavier Reservation drill core
pulp, and are marked by hole number and a composite number; for
example, X-295-C-1. There are 40 samples total.

Yours very truly,

J. E. KINNISON ✓

JEK/jk

<u>Sample No.</u>	<u>Total Cu</u>	<u>N-S Cu</u>	<u>Ag</u>	<u>Au</u>	Assays <u>WO₃</u>	<u>MoS₂</u>	<u>S</u>	<u>SO₄</u>	<u>Zn</u>
X-263-C-1	x					x			
X-262-C-1	x					x			
X-262-C-2	x					x			
X-261-C-1	x		x	x		x			
X-260-C-1	x					x			
X-259-C-1	x					x	x		
X-258-C-1	x					x			
X-256-C-1	x					x			
X-255-C-1	x					x			
X-255-C-2	x					x	x		
X-254-C-1	x					x	x		
X-254-C-2	x					x	x		
X-253-C-1	x					x	x		
X-251-C-1	x					x			
X-251-C-2	x					x			
X-250-C-1	x					x			
X-250-C-2	x		x	x		x			
X-246-C-1	x					x			
X-246-C-2	x		x	x		x	x		
X-246-C-3	x					x	x		
X-245-C-1	x		x	x		x	x		x
X-245-C-2	x		x	x		x	x		x
X-245-C-3	x		x	x		x	x		x
X-242-C-1	x		x	x		x			
X-224-C-1	x		x	x		x	x		x
X-220-C-1	x		x	x		x	x		
X-215-C-1	x		x	x		x	x		x
X-215-C-2	x		x	x		x	x		x

0-7

1-4

2-1

3-2

4-3

5-1

6-2

7-1

8-2

9-1

10-2

11-1

12-2

13-1

Sample
No.

Total Cu

N-S Cu

Ag

Au

Assays

WO₃

MoS₂

S

SO₄

Zn

X-213-C-1

x

x

x

x

X-213-C-2

x

x

x

x

x

X-213-C-3

x

x

x

x

x

X-213-C-4

x

x

x

x

X-213-C-5

x

x

x

x

x

X-212-C-1

x

x

x

x

X-212-C-2

x

x

x

x

X-212-C-3

x

x

x

x

X-211-C-1

x

x

x

x

x

X-211-C-2

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x

x

x

X-202-C-1

x

x

x

x

x

x

X-202-C-2

x

x

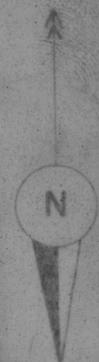
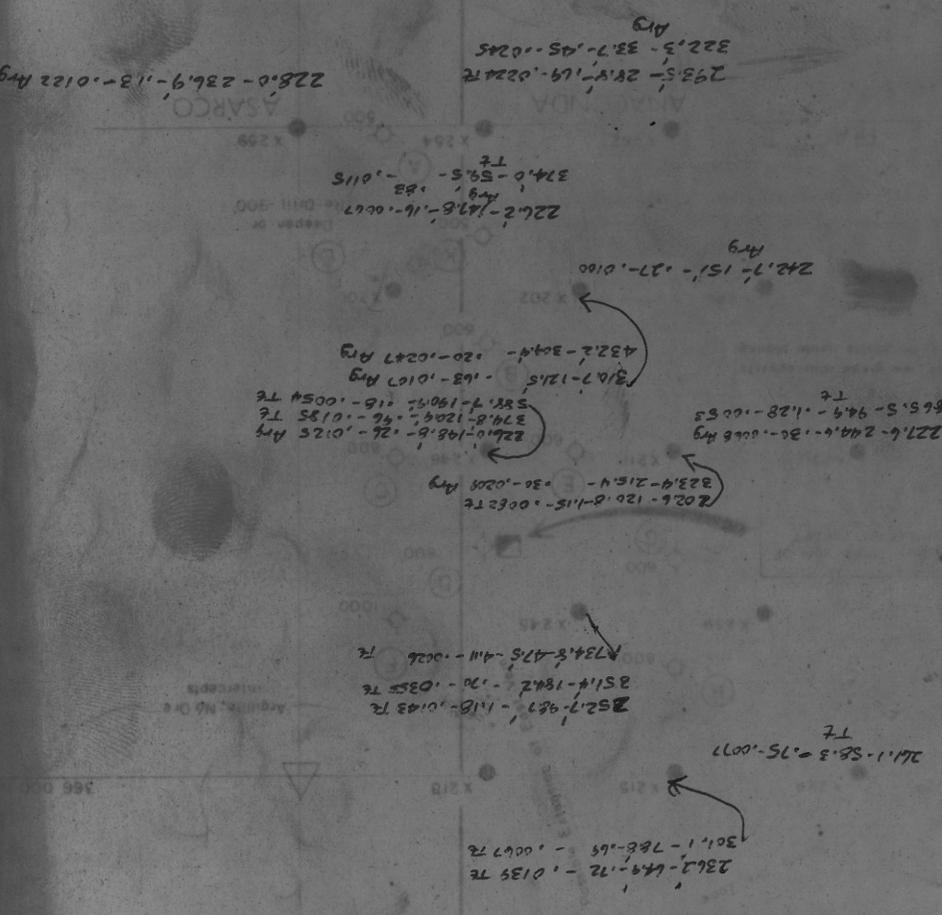
x

x

x

A F O A M I B O N D

SCALE: 300
ACTIVE ZONE
PROPOSED DRILLING
SAN XAVIER TRACT II

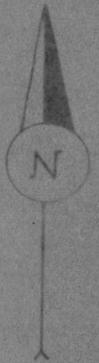


R 12 E
R 13 E

765 000 E

PROPOSED DRILLING LOCATIONS
SHOWING ESTIMATED DEPTHS
AND DISTANCES FROM SURFACE

◊ PROPOSED DIAMOND DRILL HOLE,
 SHOWING ESTIMATED DEPTH ALL
 HOLES DRILLED VERTICALLY FROM
 SURFACE



Purpose Of Drill Holes

Evaluation of chalcocite-oxide blanket.

A through K

Evaluation of minus 0.4% Cu chalcopyrite.

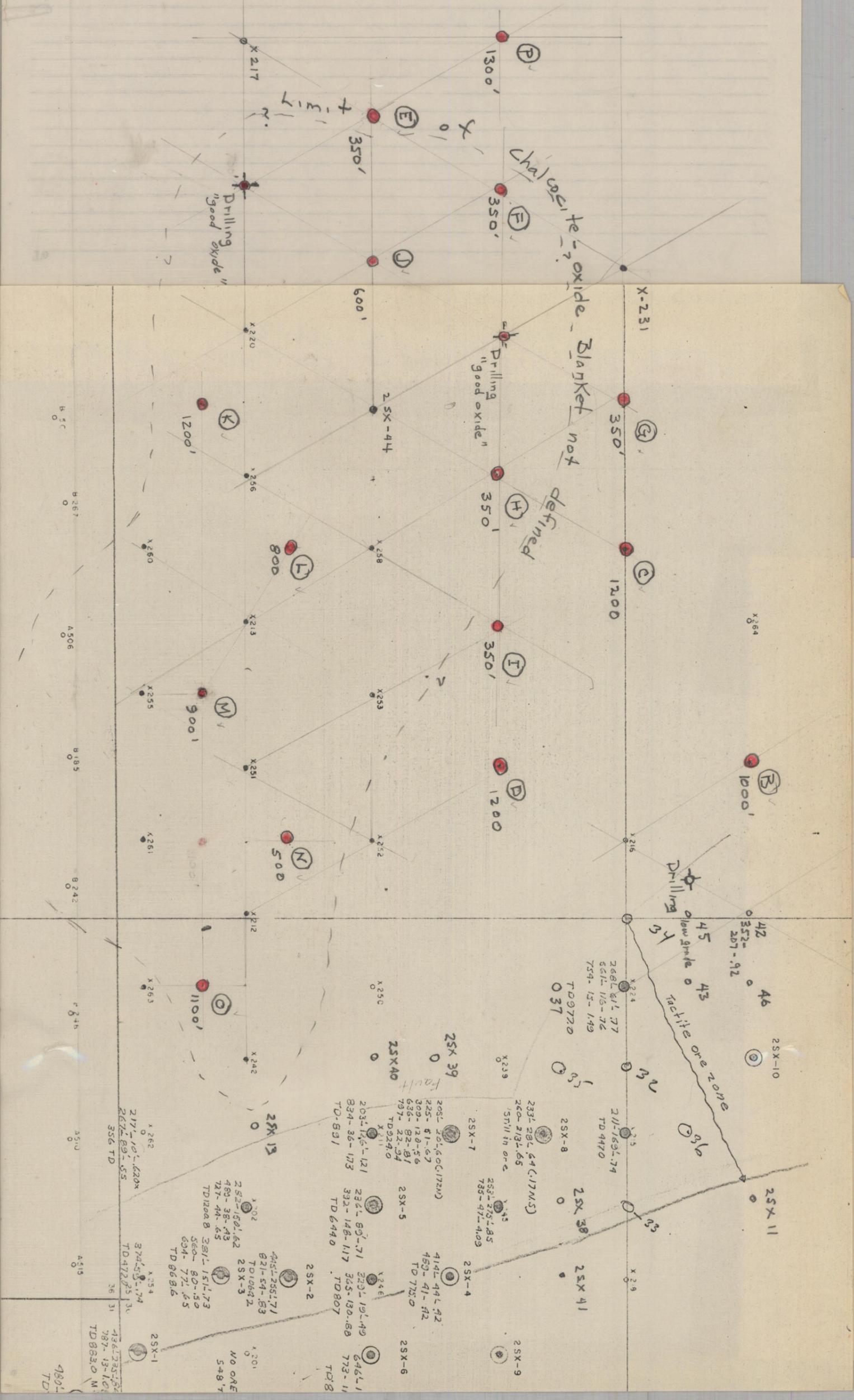
G, H, I, K

Exploration of deep-level tactite.

SAN XAVIER TRACT II
 PROPOSED DIAMOND DRILL HOLES

CHALCOHITE-OXIDE ZONE

SCALE 1" = 300'



2 SX 48
 520' - 110' - 117
 800'
 A
 X 221

Drilling
 low grade
 Mottled zone

Chalcoite - oxide - Blanket not defined
 Drilling "good oxide"

Drilling "good oxide"

25X-1
 436-733-104
 787-13-108
 TD 8830 M

25X-2
 374-58-174
 TD 4720 P 5 3

25X-3
 252-1501-62
 489-38-43
 727-44-65
 TD 1200 B

25X-4
 414-44-92
 489-41-82
 TD 7750

25X-5
 232-148-117
 325-130-88
 773-11
 TD 807

25X-6
 646-11
 773-11
 TD 8

25X-7
 203-146-121
 834-38-173
 TD-891

25X-8
 233-286-64 (17M/S)
 260-213-65
 5711 in or c

25X-9
 252-275-85
 789-97-409

25X-10
 211-169-74
 TD 4470

25X-11
 268-61-77
 561-115-76
 754-15-149
 TD 9720
 037

25X-12
 203-146-121
 834-38-173
 TD-891

25X-13
 217-101-620X
 267-89-55
 356 TD

25X-14
 445-256-71
 821-54-83
 TD 10642

25X-15
 489-38-43
 727-44-65
 TD 1200 B

25X-16
 381-151-173
 560-80-150
 694-77-65
 TD 8686

25X-17
 436-733-104
 787-13-108
 TD 8830 M

25X-18
 436-733-104
 787-13-108
 TD 8830 M

25X-19
 436-733-104
 787-13-108
 TD 8830 M

25X-20
 436-733-104
 787-13-108
 TD 8830 M

25X-21
 436-733-104
 787-13-108
 TD 8830 M

25X-22
 436-733-104
 787-13-108
 TD 8830 M

25X-23
 436-733-104
 787-13-108
 TD 8830 M

25X-24
 436-733-104
 787-13-108
 TD 8830 M

25X-25
 436-733-104
 787-13-108
 TD 8830 M

25X-26
 436-733-104
 787-13-108
 TD 8830 M

25X-27
 436-733-104
 787-13-108
 TD 8830 M

25X-28
 436-733-104
 787-13-108
 TD 8830 M

25X-29
 436-733-104
 787-13-108
 TD 8830 M

25X-30
 436-733-104
 787-13-108
 TD 8830 M

25X-31
 436-733-104
 787-13-108
 TD 8830 M

25X-32
 436-733-104
 787-13-108
 TD 8830 M

25X-33
 436-733-104
 787-13-108
 TD 8830 M

25X-34
 436-733-104
 787-13-108
 TD 8830 M

25X-35
 436-733-104
 787-13-108
 TD 8830 M

25X-36
 436-733-104
 787-13-108
 TD 8830 M

25X-37
 436-733-104
 787-13-108
 TD 8830 M

25X-38
 436-733-104
 787-13-108
 TD 8830 M

25X-39
 436-733-104
 787-13-108
 TD 8830 M

25X-40
 436-733-104
 787-13-108
 TD 8830 M

25X-41
 436-733-104
 787-13-108
 TD 8830 M

25X-42
 436-733-104
 787-13-108
 TD 8830 M

25X-43
 436-733-104

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

January 18, 1965

TO: R. B. HEEN

FROM: J. H. COURTRIGHT

SAN XAVIER
DRILLING, TRACT II

This will transmit Mr. Kinnison's proposals for drilling on the San Xavier Reservation, Tract II, accompanied by plans and sections.

The primary objective of this proposed drilling is to gain additional information in certain previously drilled areas which might provide sufficient copper ore for a small mining operation-- production from Tract II being necessary in order to fulfill terms of the lease with the Papago Indians.

A secondary objective of the drilling would be to more adequately test the deep-lying ore-bearing horizon which extends from the Eisenhower ground into the Reservation ground on the north.

I believe the drilling should logically start with the area on the east where some high-grade copper mineralization is known to exist. Should the work be successful here, the shallow holes designed to test the thin mixed oxide-sulfide zone to the west would not be necessary. However, in any event, a few deep holes should be drilled in this general area to further test the deep-lying horizon extending northerly from the Eisenhower ground. This information is needed to more firmly evaluate the possibility of expanding the Mission pit into the Reservation ground.

Original signed by
J. H. Courtright

J. H. COURTRIGHT

JHC/jak
Encl.

cc: RBMoan, 1 extra, w/encl.
PALewis, 2, w/encl.

KERichard, w/encl.
JEKinnison, w/encl. 

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

January 4, 1965

TO: J. H. COURTRIGHT

FROM: J. E. KINNISON

SAN XAVIER
DRILLING, TRACT II

As you requested, I have reviewed the geology and ore distribution in the southern portion of San Xavier Tract II, which adjoins the Eisenhower group and part of the Mission ore zone. Attached (A and B) are two plan maps (1" = 300') showing recommended drill holes and their estimated depths, and for reference to illustrate the general copper distribution please find two cross-sections (Attachments C, D; 1" = 100').

These proposed drill holes, 24 in number and which aggregate 4800 feet rotary and 12,400 feet core, will fulfill three principal objectives:

- (1) To aid in selecting a location for underground workings from which high-grade lenses of Cu, if present, could be prospected and developed.
- (2) To gain additional assay and geologic data pertinent to future pit plans.
- (3) To explore in a limited way, a deep-level tactite horizon from which some high-grade intercepts have been cut.

These objectives are discussed in more detail in the following.

General Statement

The ore-grade Cu zones may be viewed, geologically, in three principal ways:

- (1) A thin chalcocite zone bounds the Eisenhower group on the north. The northern and northwestern edge of this enriched blanket is not now closely defined, so that only a crude estimate of "ore" can be made with the presently available data. Dependent upon the location of the northern edge of enrichment, I figure the tonnage will be between 4 and 8 million tons, with a thickness of about 50 feet and grading about 1.60% copper. This ore zone contains a lesser amount of pure chalcocite, and a greater amount of oxidized material made of chalcocite, malachite, chrysacolla, and minor quantities of native copper. The top of this zone lies at about a depth of 205-225 feet; nearly all of the cover is gravel.

Since the enriched zone is contained in argillite and porphyry, there would not appear to be any difficulty in classifying it as "leach" material. The unoxidized chalcocite could no doubt be milled.

This zone is underlain by protore of which a substantial tonnage grades between .25 and .40 per cent copper.

- (2) The eastern portion of ore values consists of a segment of tactite about 150 feet wide, over 400 feet long, and of variable thickness. Copper occurs as chalcopyrite, and lies at various depths. I expect the copper there to be distributed in a manner similar to that found in the present pit; that is--erratic.

The drill holes which penetrate this zone are too widely spaced to permit a valid reserve estimate.

As interpreted from drill results, this zone is bounded on its east side by argillite with very low copper values. In the absence of direct drill penetration along this east contact, I can make no absolute statement on its nature, but certainly there is a possibility that high-grade lenses occur at the contact, just as are found in the east vein zone of the present Mission pit.

The drill holes in this tactite zone did not penetrate any high-grade zones of significant thickness, with one exception (X-245 @ 735') this does not entirely preclude the existence of small erratic pods of strong chalcopyrite, for these could easily be missed by the exploratory drill holes, and, of course, it is unlikely that a narrow vertical band of high-grade, such as might exist along the east contact, would be penetrated by surface drilling.

- (3) An ore-grade zone at considerable depth, as shown on the cross-sections, has been penetrated by a few deep drill holes. The copper values appear to be spotty, and the copper zone is only about 100 feet thick, more or less. The rock is tactite and is underlain by barren marble. This zone is most probably the northern extension of the tactite horizon in the Eisenhower group, where it is much more strongly mineralized.

Mining Considerations

I am informed that, in order to fulfill the requirements of our mining lease on the reservation ground, mining must be in progress within 10 years from the beginning of the lease; and it has been proposed that an underground mine be used to fulfill this requirement. Prior to sinking a shaft and commencing underground exploration in search of high-grade lenses in the eastern (tactite) area, some additional drilling should be done to locate more closely the east contact of tactite against argillite. At present, it is rather poorly bracketed by drill holes.

A second factor connected to the proposed drilling is that future pit plans on the reservation, which probably will be associated with mining agreements on the Eisenhower group, will require these proposed drill holes as a basis for a firm ore reserve estimate. Some holes proposed fall in the "interspace" category, and others in the "delimiting" category, but all are required for this purpose. Furthermore, should the attempt to find high-grade lenses in tactite fail, attention might then be turned to a consideration of mining the oxide-chalcocite blanket by underground methods; and in that case the proposed holes there will then be necessary.

Finally, I have proposed that some of the holes be drilled deeper than would be required for any of the foregoing reasons, in order that we may obtain a little more knowledge of the deep layer of tactite with somewhat erratic copper values. Drill penetrations at the present time are insufficient to determine whether this zone may possibly be an asset for the future.

Proposed Drill Holes

For the purpose of over-all pit planning and ore reserve estimation, little needs to be said about the proposed holes, for their object is self-evident. The proposed depths are, of course, approximate only, and the actual depth will be determined at the drill site by the resident geologic staff. I should note that the holes designed to drill out the chalcocite blanket along its northern side have estimated depths just sufficient for that purpose (Att. B) whereas, those farther south are shown to go a little deeper. This is because a large pit designed to encompass the Eisenhower group, will extend the stripping into the southern part of the chalcocite area where there is chalcopyrite grading between .25 and .40 per cent Cu. These holes should be drilled deep enough to present an opportunity to calculate this minus .4% Cu rock, because a pit, if stripped north to this area,

might produce a substantial tonnage of this low-grade copper rock at a time when the mill could profitably accomodate this nominally "not-ore-grade" rock.

In the tactite zone, several holes will help directly to bracket the east contact. If hole "D" (Att. A) penetrates argillite rather than tactite, then "F" hole would not be necessary at all, and hole "D" should be extended deeper to penetrate the deep-level tactite zone. These drill holes will not by themselves actually give the necessary data pertaining to the details of geometry of this east contact, or the existence of copper along it. They will, however, allow a better judgment to be made on the location of a shaft for underground exploration.


JOHN E. KINNISON

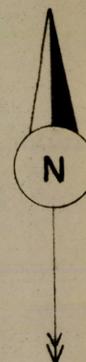
JEK/jak

765 000 E

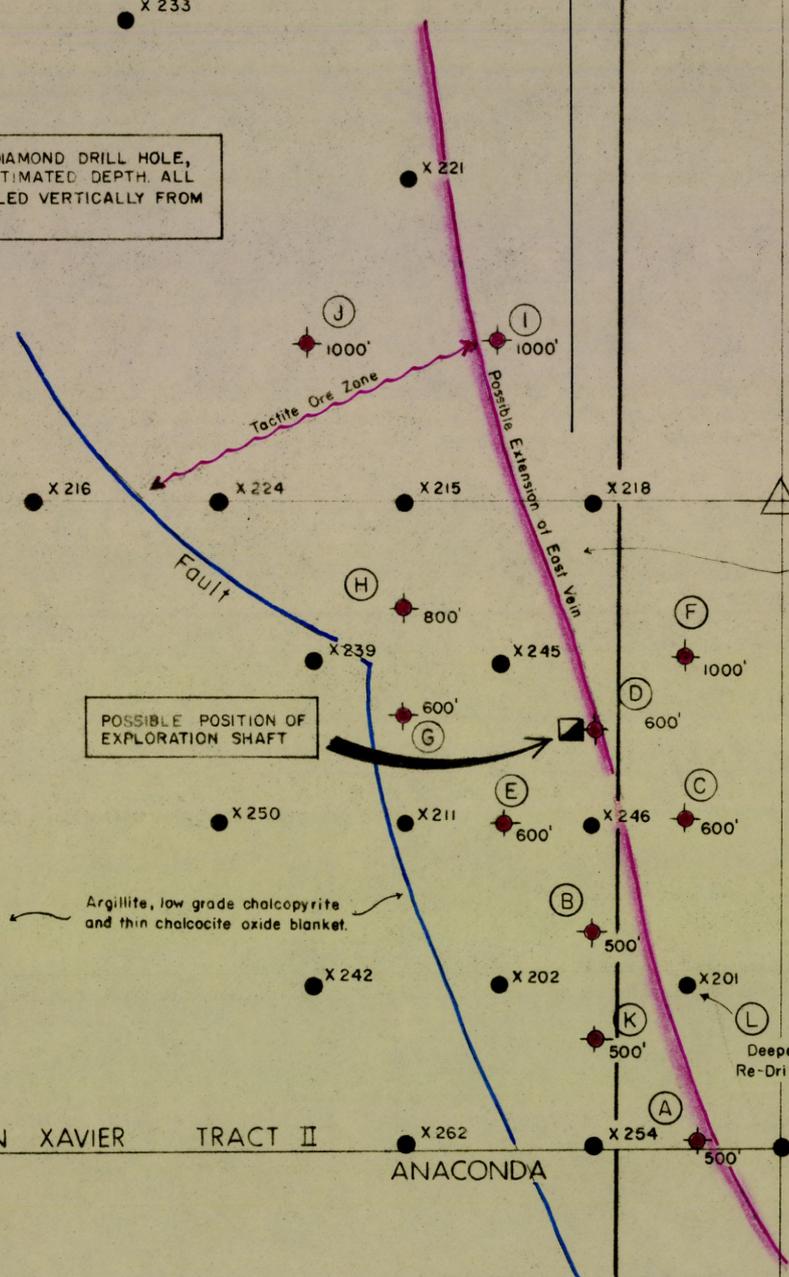
Section 3000 W

R 12 E

R 13 E



PROPOSED DIAMOND DRILL HOLE, SHOWING ESTIMATED DEPTH. ALL HOLES DRILLED VERTICALLY FROM SURFACE.



POSSIBLE POSITION OF EXPLORATION SHAFT

Argillite, low grade chalcopyrite and thin chalcocite oxide blanket.

Argillite, No Ore intercepts

SAN XAVIER TRACT II

ANACONDA

ASARCO

Purpose Of Drill Holes

To determine shaft location
A, B, C, D, E, F

To evaluate tactite ore zone at moderate depths
A through K

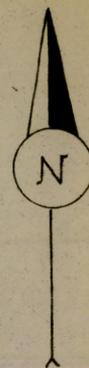
To explore deep-level tactite
F, I, J, L

SAN XAVIER TRACT II
PROPOSED DRILLING
TACTITE ZONE

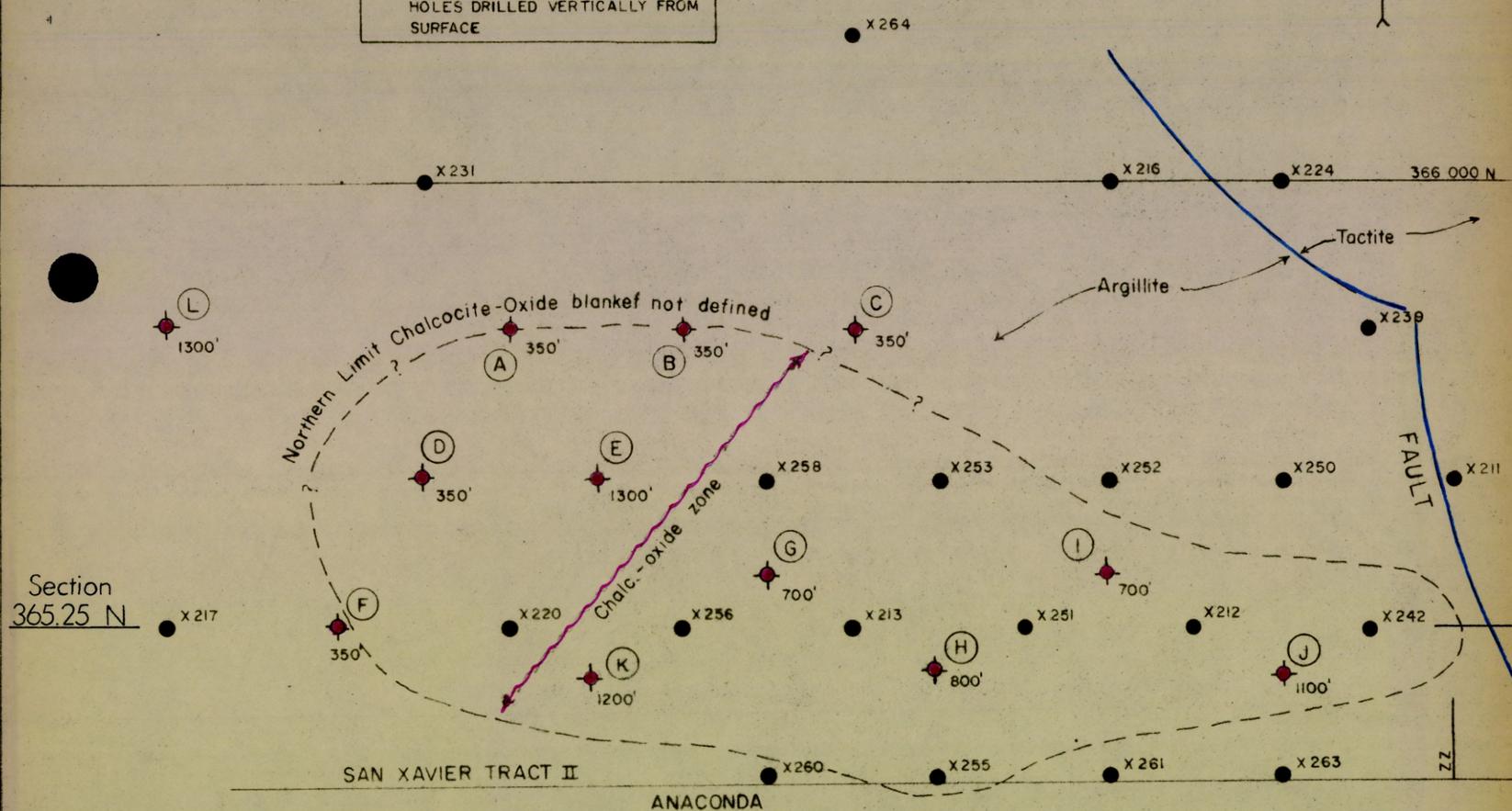
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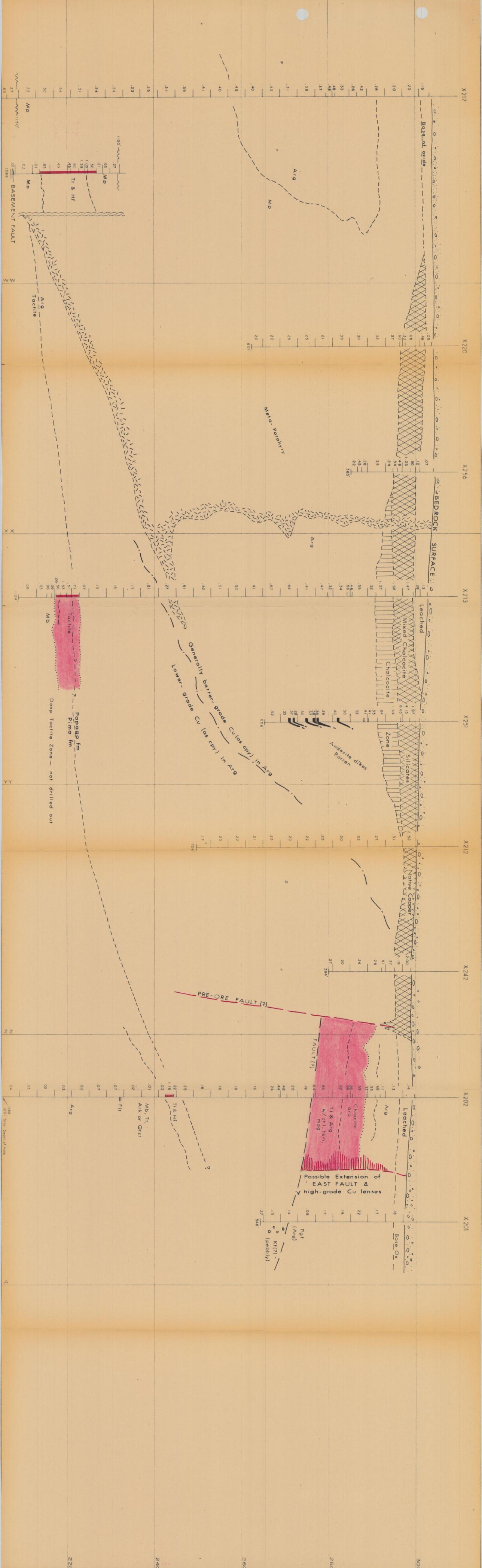
J.E.K.

NOV. 1964



 PROPOSED DIAMOND DRILL HOLE,
 SHOWING ESTIMATED DEPTH. ALL
 HOLES DRILLED VERTICALLY FROM
 SURFACE

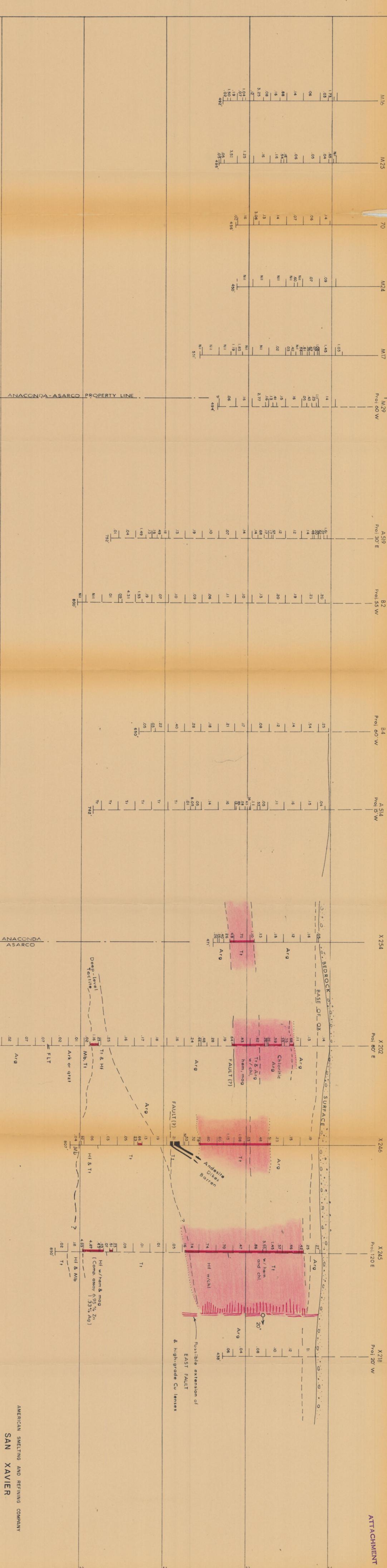




AMERICAN SMELTING AND REFINING COMPANY
SAN XAVIER
SECTION 365.25 N
 Pima Mining District, Pima County, Arizona

SCALE 1" = 100'

1445 (201) Toner Dept of mine



AMERICAN SMELTING AND REFINING COMPANY
 SAN XAVIER

SECTION 3000 W

Pima Mining District, Pima County, Arizona
 SCALE 1" = 100'