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Ga 16.1B.18

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

June 9, 1967

Mr. K. E. Richard, Chief Geologist
ASARCO - New York Office

RYAN PROSPECT
PIMA CO., ARIZONA

Dear Sir:

Enclosed is Mr. Farley's report with recommendations for a drill test of an I.P. anomaly located in the Avra Valley west of the south Tucson Mountains.

The anomaly strikes NNW across the Ajo highway and has a length of 8 miles from the north boundary of the San Xavier reservation. It is believed to continue southerly for several miles, coinciding with the San Xavier mineralization trend within which lies the North San Xavier copper ore body. As Mr. Farley has pointed out, the anomaly lies along a magnetic low. This could indicate an altered intrusive, or simply relatively deep alluvium.

Another factor to be considered is the coincidence of the anomaly with a steep gravity gradient (gravity map not attached) which marks the western edge of the Tucson Mt. pediment. The alluvial clays over the pediment are dry, but lie within the water-bearing basin formed by the deeper bedrock west of the pediment. The Santa Rosa anomaly occupied a similar position--within the edge of a ground water basin. This, plus the extreme length of the Ryan anomaly, strongly suggests a clay source. However, since the anomaly lies directly on the trend of the San Xavier-Mission zone, it is possible that mineralized bedrock may have provided part of the response and a limited test consisting of two rotary holes is proposed.

We have staked 160 Federal Claims which include ground over Zones 1 and 2 representing I.P. highs on Farley's map. To drill one hole in each zone will require an expenditure of around $20,000, assuming a maximum hole depth of 1800', as follows:

3600' rotary drilling at $4.00	$14,400
Spot coring	600
Sampling, assaying, supervision	4,500
Drill mobilization	500
	$20,000

If you agree with this proposal, please request a mining authorization in the amount of $20,000.

JHC:lmi
encl.
cc: RJLacy
WESaegart
WGFarley
JRWojcik

Yours very truly,

J. H. Courtright

J. H. COURTRIGHT

J. H. C.

JUN 9 1967

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

June 9, 1967

To: J. H. Courtright

From: S. I. Bowditch

Arizona, Pima County
Ryan Project

During May, 160 claims, the Ryans, were staked in the name of Asarco by Messrs. Hoskins and Luning, on ground in which the Federal Government holds the mineral rights southeast of Ryan Field, near the junction of Ajo and Valencia roads in Sec. 7, 8, 17, 18, 19, 20 and 21, all in Township 15 South, Range 12 East.

The location of the claims and the surface ownerships are shown on the two sketch maps which accompany this memorandum. Location certificates for claims Ryan 147-156 and Ryan 171-180 were made out before it was discovered that the west half of Sec. 5, where claims 147-156 were supposed to go, was privately owned. Because the edge of the anomaly falls about on the north-south center line of the section, we decided that as long as we could not stake the west half there was no point in staking the east half.

Claims Ryan 1-22, and 53-75 were staked May 10, Ryan 23 and 24, 35-52 and 77-106 were staked May 11, Ryan 25-34 and 107-118 were staked May 12, Ryan 119-140 were staked on May 22, and Ryan 141-146 and 157-170 on May 23.

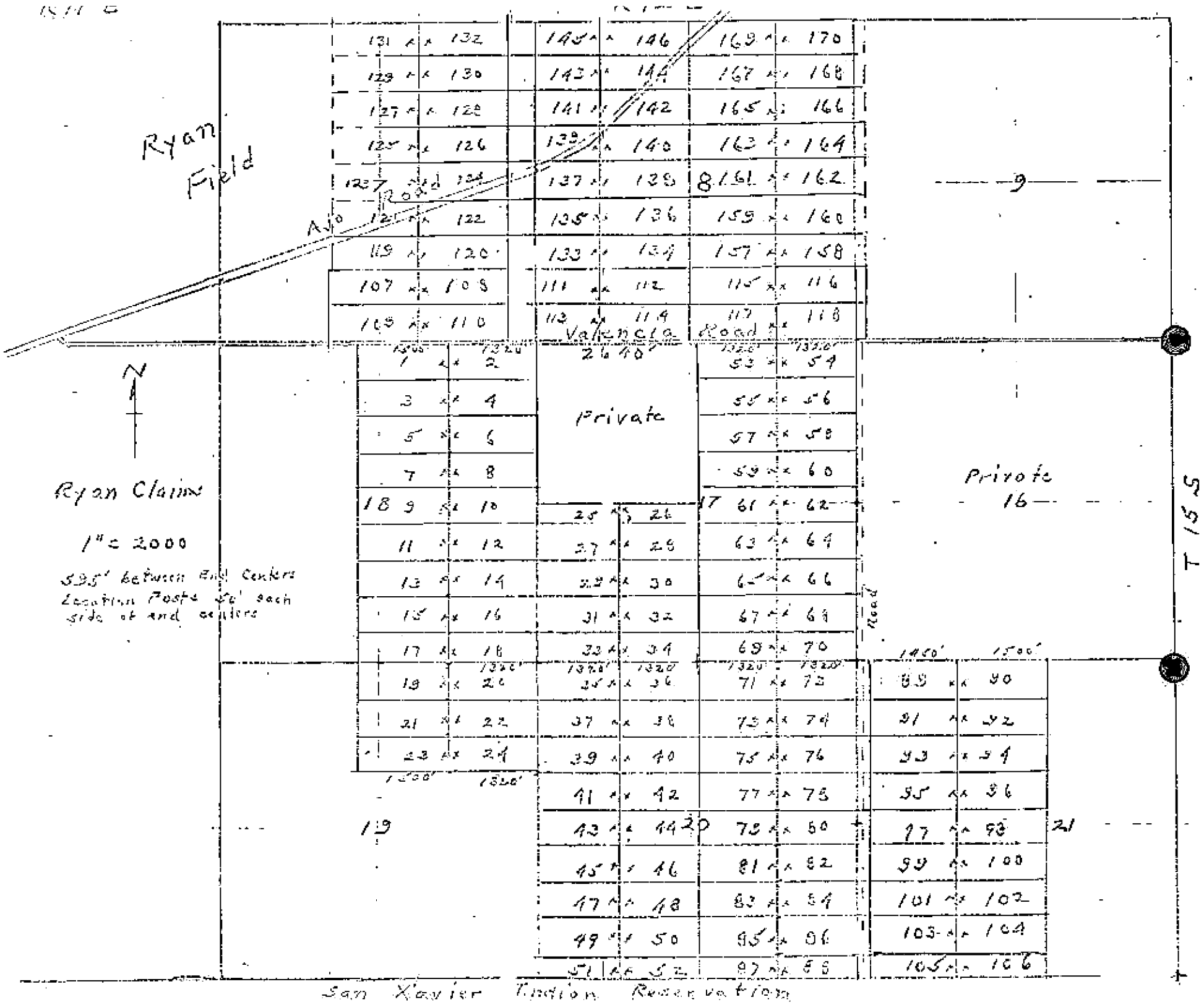
To validate these claims, corners must be set and the location certificates recorded by August 8, 9, 10, 20 and 21 respectively, and holes must be drilled for groups of 10 by September 7, 8, 9, 19 and 20.

S. I. Bowditch

S. I. Bowditch

SIB:bam
Attachment

Ryan Field (withdrawn)
Board of Regents
Ajo Road
Federal (subdivided for small tracts)
Board of Regents
Trans Amer Title Trust RH 26,536
Transamerica Title Trust RH 26,536
Federal small tracts
Valencia Road
Donald M. & Naomi W. Milleton
Transamerica Title Trust RH 26,536
Transamerica Title Trust RH 26,536
State
Federal
Federal
Subdivided
Eugene M. Felix
Ariz Land Title Trust 5749-T
Trans America Trust RH 26,536
Surface Ownership
Ryan Project
1" = 1/2 mile
Private mineral
Ryan claims



Ryan Field
Ajo Road
Valencia Road
Private
Private
Road
Ryan Claims
1" = 2000
595' between End Centers
Location Posts 50' each side of end centers
San Xavier Indian Reservation
T 15 S
9
8
16
17
18
19
20
21
131 132
129 130
127 128
125 126
123 124
121 122
119 120
107 108
109 110
145 146
143 144
141 142
139 140
137 138
135 136
133 134
111 112
113 114
169 170
167 168
165 166
163 164
161 162
159 160
157 158
115 116
117 118
1500' 1320'
1 2
3 4
5 6
7 8
9 10
11 12
13 14
15 16
17 18
19 20
21 22
23 24
1320' 1320'
25 26
27 28
29 30
31 32
33 34
35 36
37 38
39 40
41 42
43 44
45 46
47 48
49 50
51 52
1320' 1320'
53 54
55 56
57 58
59 60
61 62
63 64
65 66
67 68
69 70
71 72
73 74
75 76
77 78
79 80
81 82
83 84
85 86
87 88
1450' 1500'
89 90
91 92
93 94
95 96
97 98
99 100
101 102
103 104
105 106

AMERICAN SMELTING AND REFINING COMPANY
Tucson Arizona

June 5, 1967

JUN 8 1967

W.E.S.

JUN 8 1967

TO: J. H. COURTRIGHT

FROM: W. G. FARLEY

I. P. AND RESISTIVITY
NORTH BOUNDARY
PIMA CO., ARIZONA

With recent interest in the San Xavier Indian Reservation, Mr. C. K. Moss of the Salt Lake Geophysical Division and I thought some weak I. P. anomalies ASARCO obtained north of the reservation in 1961 might require a second look. The Amole survey in 1961 was run with a wenner 600 foot electrode separation thus we felt weak I. P. anomalies might be indicating mineralization at depth. Recently ASARCO has developed more powerful I. P. equipment which enables us to use a wenner 2000 foot electrode separation and detect sulfide mineralization to depths of 1500 feet. On the Amole survey a zone of weak anomalous I. P. response (Zone B-Amole Survey) occurred on the northwest projection of the San Xavier mineral trend. Gravity and resistivity showed this zone to be in an area where bedrock was 1000 to 1500 feet deep. This area was chosen for a repeat I. P. survey using our recently developed Huntec-ASARCO I. P. equipment.

Attachment A shows the location of the recent I. P. traverse lines that were run with the Huntec-ASARCO I. P. equipment using a wenner 2000 foot "a" and a three electrode 1000 foot "a". I. P. values from the wenner 2000 foot "a" are shown contoured on a 1.0 m.v/v interval. Values above 4.0 m.v/v are considered anomalous. A large anomalous zone was detected covering an area a couple of mines in width (NE-SW) by several miles in length (NW-SE). I have titled this anomaly the Ryan I. P. anomaly. The Ryan anomaly was not traced to its limits onto the San Xavier Indian Reservation because Phelps Dodge Corp. and Tidewater now hold exclusive prospecting rights to that portion of the reservation. Information received from Phelps Dodge geologist Andy Niven to Asarco geologist Dennis Hall states that the Phelps Dodge I. P. survey on the reservation detected a 4-6 m.v/v anomaly in sections 27, 34, 2, and 11 northwest of the San Xavier orebody. The Ryan I. P. anomaly thus continues southeast to the San Xavier copper orebody. The northern most Asarco drill holes on the reservation in section 10 and 11 penetrated weak mineralization along the anomalous I. P. trend. This was in an area where a previous Asarco I. P. survey obtained anomalous I. P. response of about 6 m.v/v with the wenner 2000 foot "a". The Ryan I. P. anomaly north of the Indian Reservation appears too large to be coming entirely from a sulfide source. Some of the anomalous I. P. response is undoubtably coming from clay and it is possible that it may all be coming from clay. It is quite common in deeper bedrock areas for clay to give an I. P. background up to seven or eight m.v/v. These has been two occasions where clay has given I. P. responses up to twelve or thirteen m.v/v. These were the Casa Grande I. P. anomaly and the Santa Rosa I. P. anomaly. These anomalies, however,

were not connected to a known sulfide zone. If the Ryan I. P. was shallower, I. P. ratio or decay measurement could be obtained to resolve the question of sulfide or clay response. With the great depth to the polarizing source large electrode separations are necessary to obtain a signal of proper magnitude for I. P. ratios or decay measurements. However, with the large electrode spreads electromagnetic coupling between the wires and ground distort the I. P. signal and make it useless for resolving sulfides from clay.

Three anomalous I. P. zones within the large anomalous area have sufficient magnitude to be of interest. These three areas are labeled Zone 1, Zone 2, and Zone 3. Attachments B and C show east - west profiles of the I. P. response over Zone 1 and Zone 2 using various electrode configurations and separations. Depths to the top of the polarizing bodies were estimated by comparing the field curves to theoretical curves Attachment D and E (Induced Polarization Curves from Two-Dimensional Bodies - C. K. Moss, March 1967). The depth to the top of the polarizer on Zone 1 is estimated to be about 1100 feet and the depth to Zone 2 about 1500 feet . Erratic response was obtained on anomalous zone 3 preventing a depth determination. These depths agree with the depths to bedrock calculated from U. S. G. S. gravity data. Because of the large electrode spread and the great depth to the polarizing bodies the surface expression is spread out to about twice the dimensions of the actual size of the polarizing bodies. The actual size of the polarizing bodies responsible for the stronger portions of the I. P. anomaly are about 1 by 1 mile for Zone 1, 1 by 1/2 mile from Zone 2, and 1 by 1/2 miles for Zone 3. These higher zones all lie on a northwest projection of the San Xavier mineral trend. The size of these higher anomalous zones are comparable to the Park Hill, Saginaw Hall, and San Xavier sulfide zones which are only a few miles away. The closest known sulfide mineralization to the higher anomalous I. P. zones is the mineralization encountered in the Kern Co. #3 drill hole which is one mile north of anomalous I. P. Zone 1. This hole penetrated tertiary alluvium from 0 to 130 feet, Claflin Ranch or Silver Bell andesite conglomerate from 130 to 315 feet and quartz monzonite porphyry with minor chalcopyrite from 315 to 453 feet. This hole falls on the edge of the broad anomaly.

Zone 1 and Zone 2 of the Ryan I. P. anomaly also fall on a U. S.G. S. aeromagnetic low trough which follows the anomalous I. P. zone from the Asarco San Xavier orebody to the limits of the aeromagnetic survey to the north (See Attachment F.) This survey was flown in 1959 at a barometric elevation of 4000 feet which puts it about 1500 feet above the ground surface. This height was ideal for rejecting near surface magnetic features and enhancing magnetic features in bedrock 1500 feet in depth in the area where the I. P. anomalies occur. It is believed by the author that this low magnetic trough could be due to the destruction of magnetite in bedrock by hydrothermal alteration. It has been suggested that the magnetic low trough might be due to the downdropped block southwest of the range front fault. The location of this fault is shown plotted on the U. S. G. S. aeromagnetic map from resistivity (Attachment G) and gravity data. If the magnetic low was due to the downdropped block the magnetic values would be even lower farther to the southwest where bedrock is deeper. The aeromagnetics shows a magnetic high ridge farther to the southwest. In addition the magnetic low follows the I. P. anomaly much closer then it follows the fualt which leads one to believe that the I. P. anomaly and magnetic low are inter-related.

Summary and Conclusions

An I. P. survey north of the San Xavier Indian Reservation has detected an I. P. anomaly lying on a northwest projection of the San Xavier Mineral trend. This anomaly appears to be coming from a depth of 1100-1500 feet in depth and is quite large. The source of the entire anomaly could be water saturated clays in the conglomerate overlying bedrock. Considering all of the geophysical and geological data it is the authors opinion that three higher zones, Zone 1, Zone 2, and Zone 3, within the broad I. P. anomaly could be coming from a sulfide source in bedrock. I strongly recommend that Asarco drill a test hole to bedrock on the high point of Zone 1 and Zone 2 to resolve the question of whether the response is coming from clay or sulfides. If sulfides are encountered more drilling will be required to determine its economic potential. If no sulfides are encountered in the first two holes, it can safely be concluded that the entire I. P. anomaly is coming from clay and interest in the property can be dropped.

Wayne G. Farley
WAYNE G. FARLEY

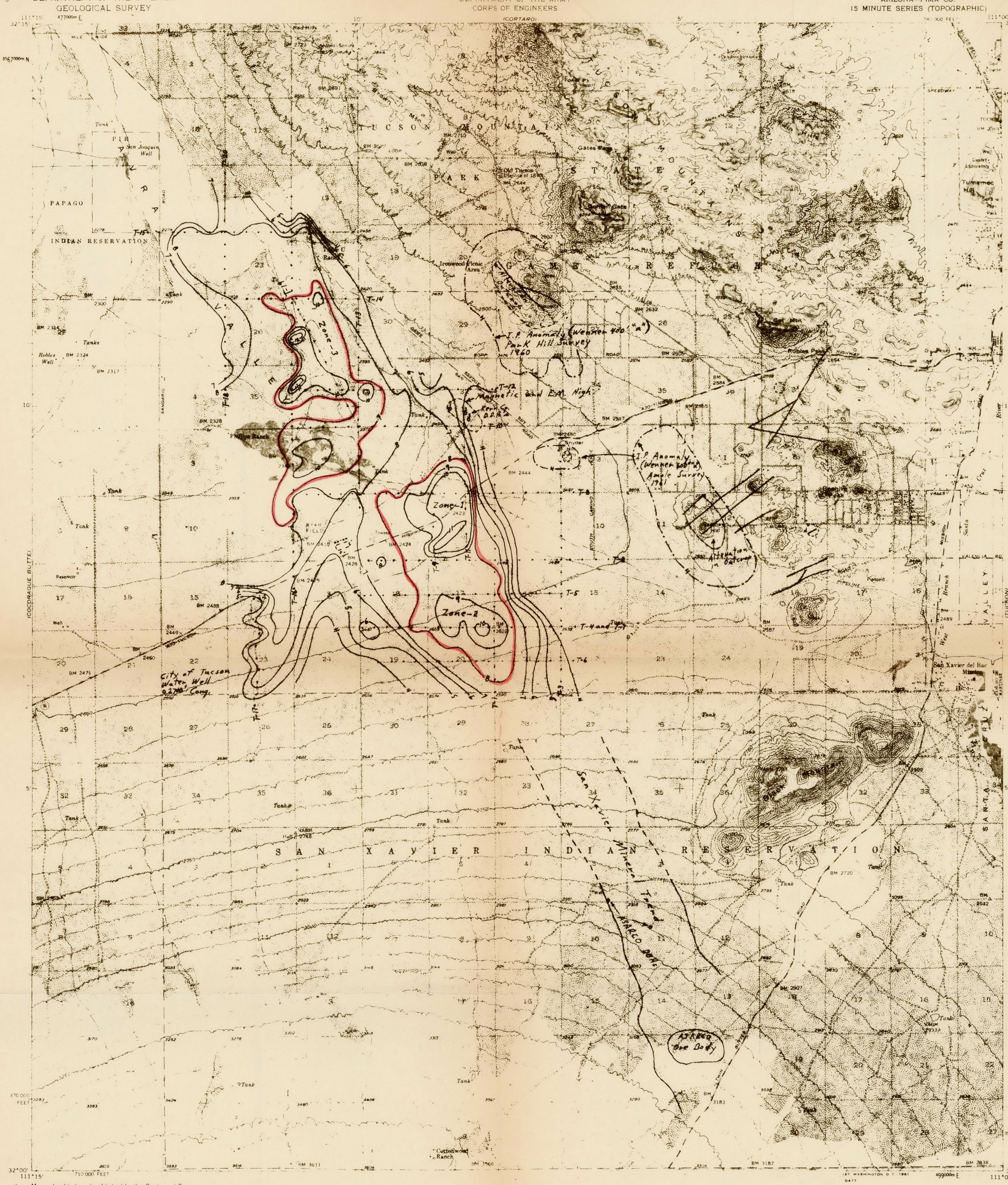
WGF/pjc
Attachments A-G
cc: CPPollock, w/ attachments
RJLacy, w/ attachments
WESaegart, w/ attachments

ATTACHMENT A

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

SAN XAVIER MISSION QUADRANGLE
ARIZONA—PIMA CO.
15 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and State of Arizona

Topography by planetable surveys 1940–41
Culture revision and field check 1957

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system central zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

Red tint indicates areas in which only landmark buildings are shown

TRUE NORTH
MAGNETIC NORTH
13°
APPROXIMATE MEAN DECLINATION, 1957

EXPLANATION

····T-1 Traverse Number
Station Location

8 Outline of Possible Sulfide Mineralization indicated by I.P

I.P. and Resistivity Survey using a Wenner 2000' "a"
NORTH BOUNDARY AREA
Pima County, Arizona

Date: June, 1967

W. G. F.

ROAD CLASSIFICATION

Medium-duty — Light duty

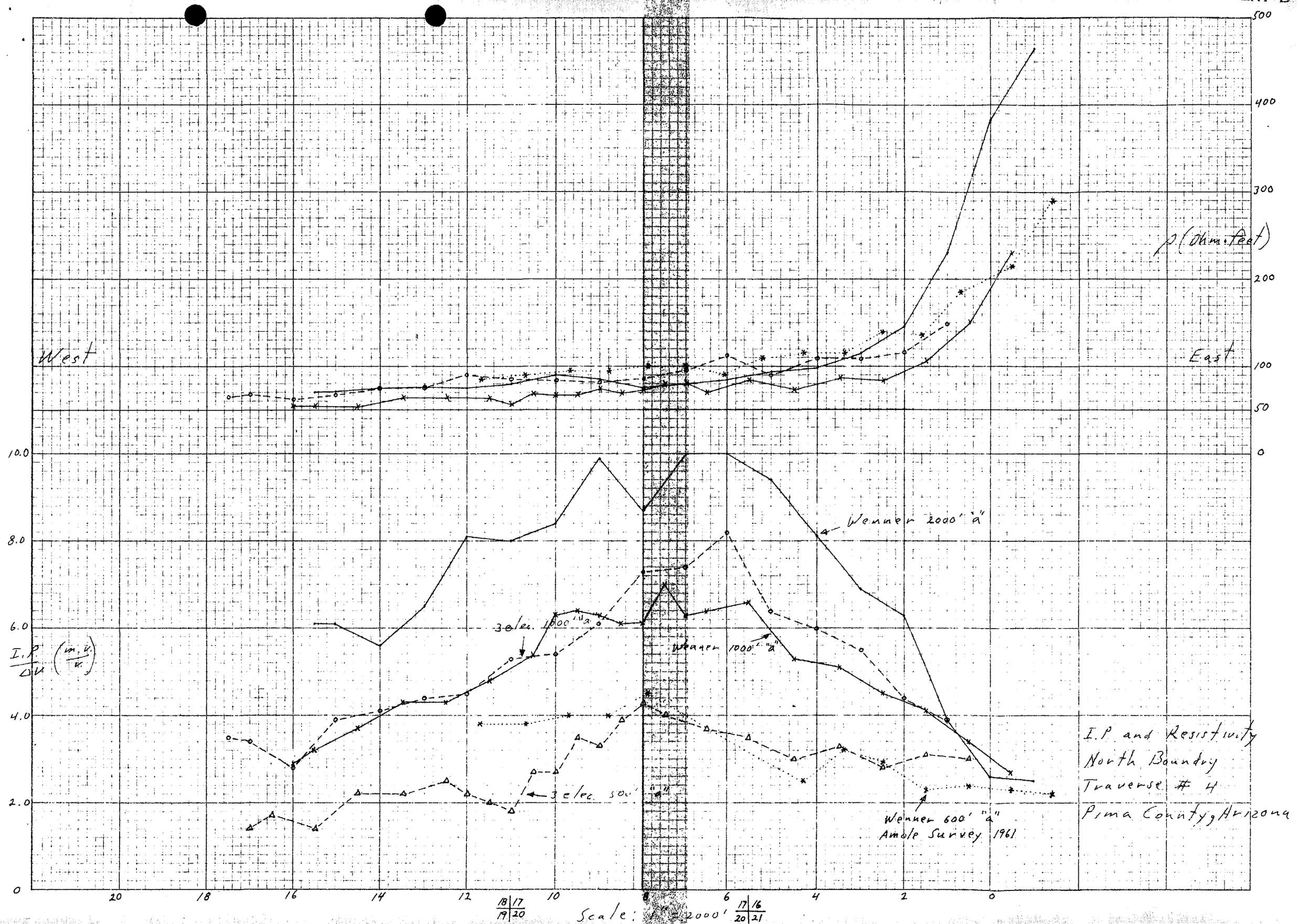
Unimproved dirt

State Route

SAN XAVIER MISSION, ARIZ.
N3200—W11100/15

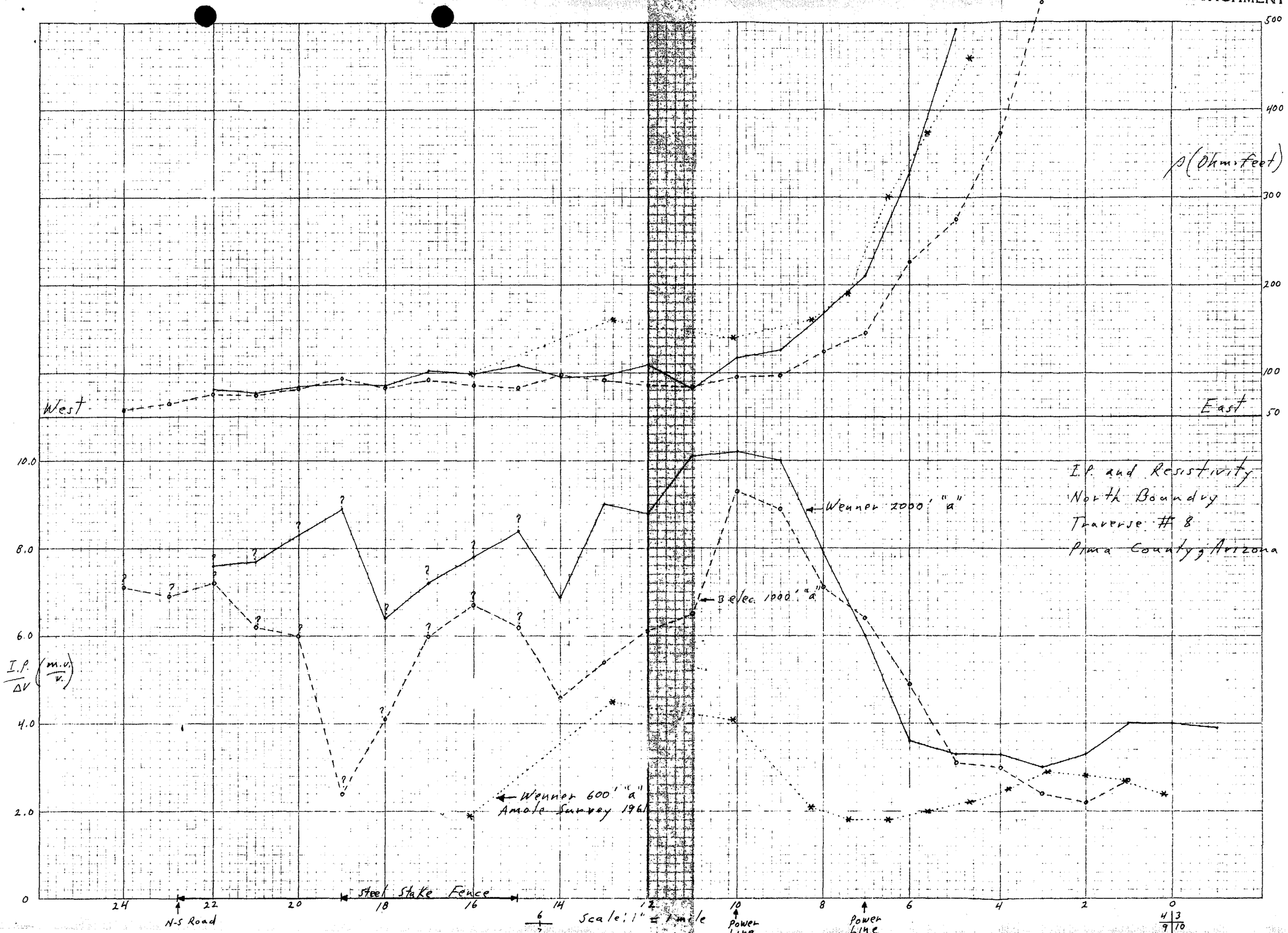
1957

ATTACHMENT B



K+E 10 X 10 TO THE INCH 46 0703
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.

ATTACHMENT C



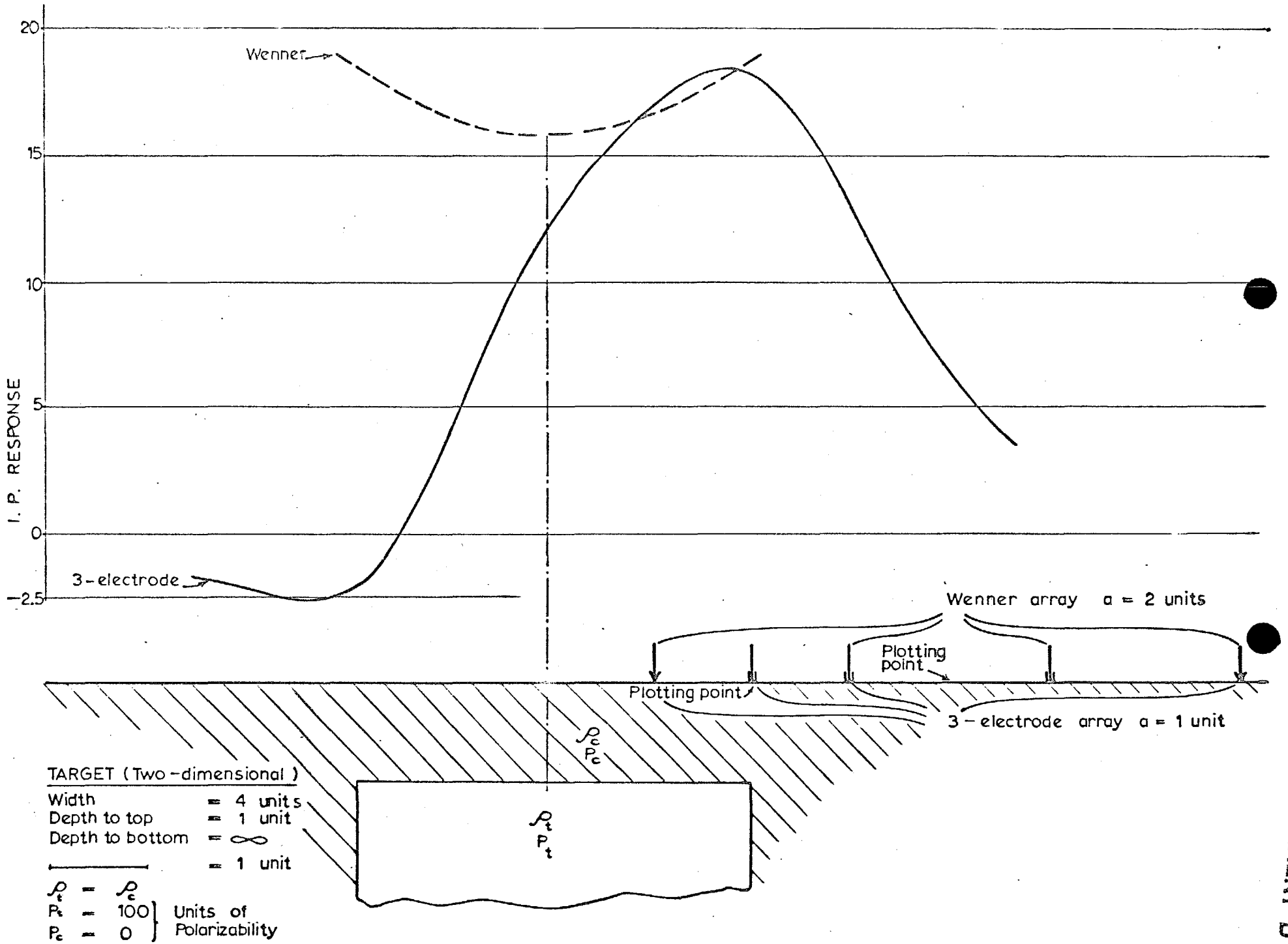


Figure 27

ATTACHMENT D

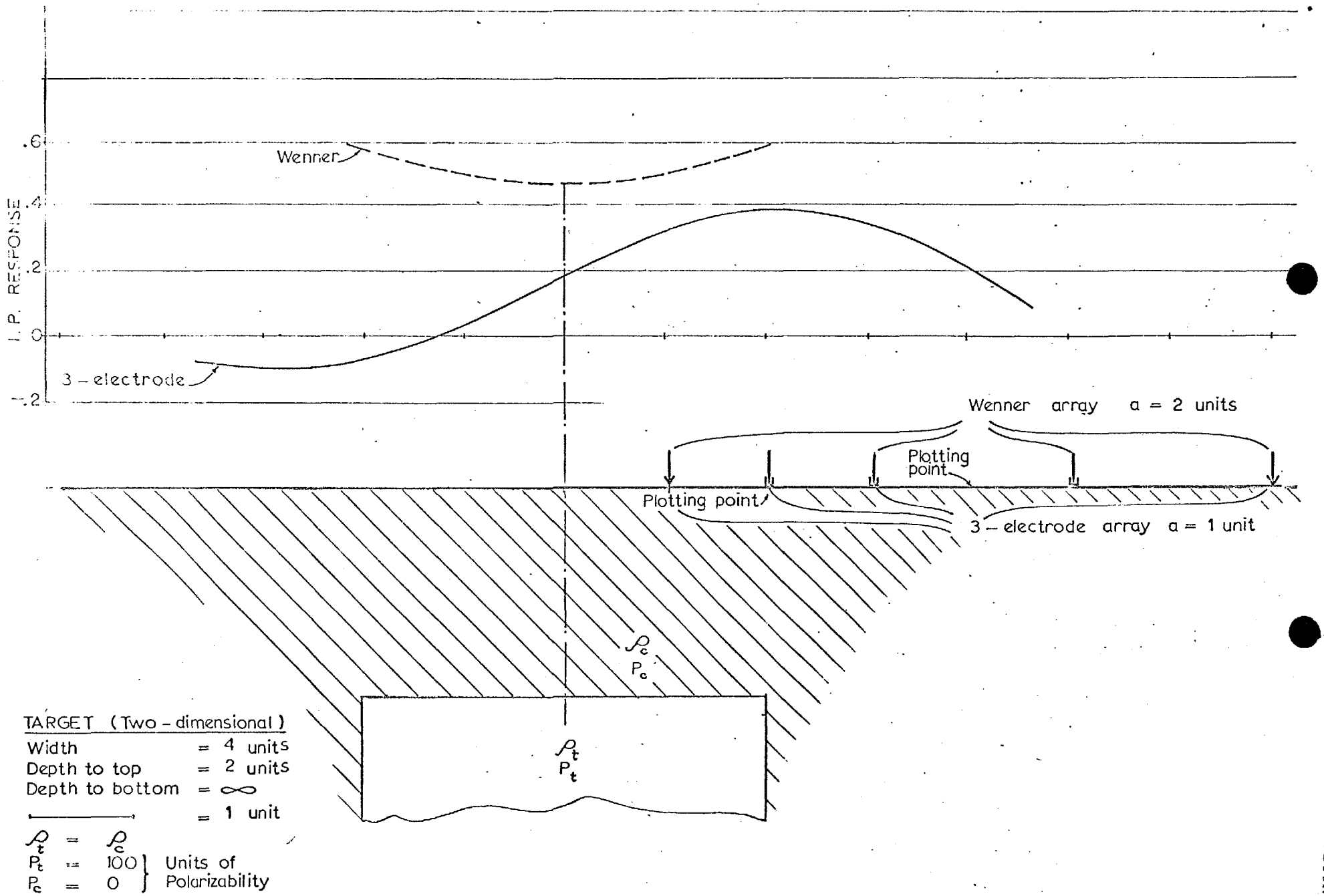


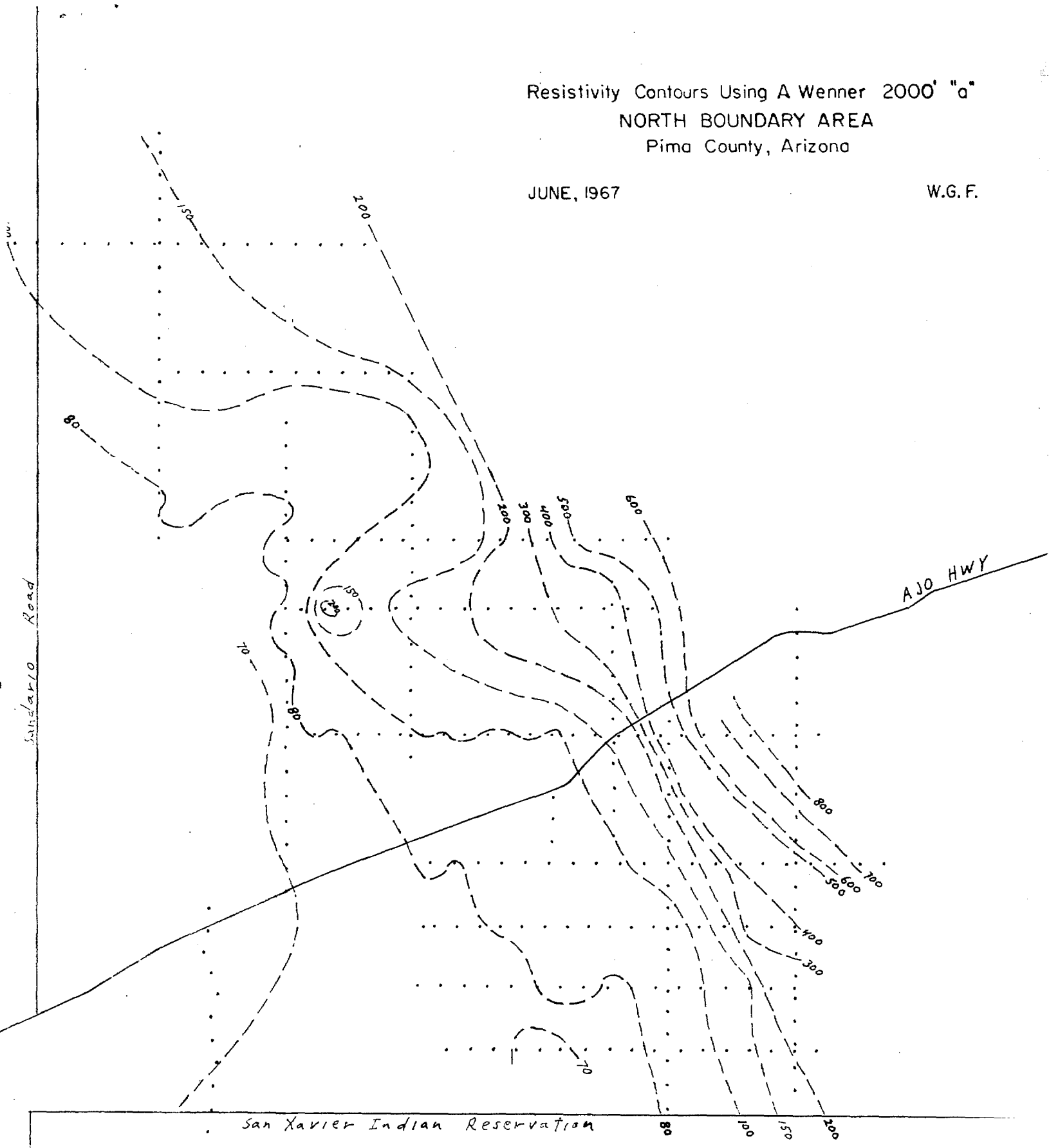
Figure 28

ATTACHMENT E

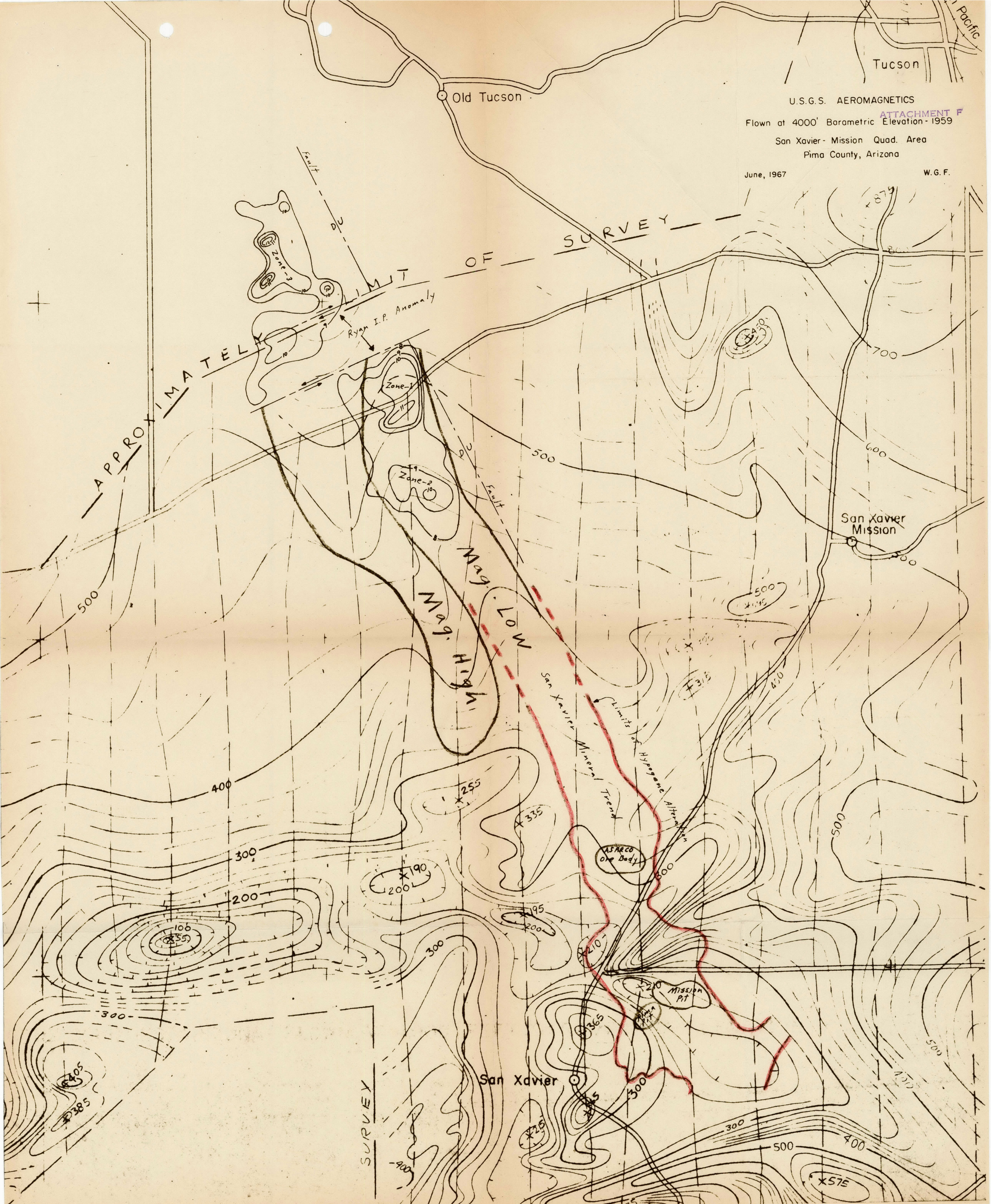
ATTACHMENT G

Resistivity Contours Using A Wenner 2000' "a"
NORTH BOUNDARY AREA
Pima County, Arizona

JUNE, 1967 W.G.F.



Scale: 1" = 1 mile


U.S.G.S. AEROMAGNETICS
Flown at 4000' Barometric Elevation - 1959
San Xavier - Mission Quad. Area
Pima County, Arizona
June, 1967
W.G.F.
ATTACHMENT F
Old Tucson
Tucson
Pacific
APPROXIMATELY LIMIT OF SURVEY
Fault
D U
Zone-3
Zone-1
Zone-2
Ryan I.P. Anomaly
Mag. High
Mag. Low
San Xavier Mineral Trend
Limits of Hypogene Alteration
ASARCO Ore Body
Mission Pit
San Xavier Mission
San Xavier
SURVEY