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LEGEND

Sedimentary Rocks

QTs — Partially Consolidated & Unconsolidated Alluvium

Pantano Formation

Igneous Rocks

QTba — Basalt Dikes

QTt — Tuff Tuffaceous Sandstone Flows

QTb — Basalt Flows

Andesite & Basalt Flows Ignimbrites & Tuffs

Ta — Quartz Diorite & Diorite Dikes

pЄm — Mescal Limestone (marble)

pЄds — Dripping Spring Quartzite

pЄgd — Antelope Quartz Diorite

pЄo — Owl Head Intrusives

pЄg — Durham Granite

Metamorphic Rocks

pЄp — Pinal Schist

pЄb — Gneiss

Quaternary

Tertiary

Younger Precamb.

Older Precambrian

Contact

Fault

Strike & Dip of Bedding

Strike & Dip of Foliation

Strike & Dip of Volcanics

Shaft

Pit

Prospect

Well

a b f Gravity Profile Points

COPY OF GEOLOGIC MAP of the OWL HEAD MINING DISTRICT

by C.F. Barter

October 1962

GEOLOGY, DRAINAGE AND CULTURE RELATIVE TO MAGNETIC STATION LOCATIONS

BRUNTON-PACE CONTROL

REFERENCES		APPROVED BY
DWG. NO.	TITLE	

ROBERT EDWARDS PROPERTY
MAGNETOMETER SURVEY

SCALE: 1" = 100' | DATE: JULY 30, 1958

POTASH COMPANY OF AMERICA
CARLSBAD, NEW MEXICO

DRAWN BY SCHAEFER | DRAWING NO.
CHECKED BY
DIRECTED BY CUMMINGS | 2

April 29, 1968

Mr. Russell Badgett, Jr.
1822 North Main Street
Madisonville, Kentucky 42431

Re: Owl Head Project

Dear Rusty:

As per our phone conversation of April 26, 1968, we have come up with some priority areas as indicated on the enclosed sketch maps and herewith discussed.

Priority 1

Anomalies 11a, 11b, Sections 17, 18, and 19, R11E, T7S, Sections 14, R10E, T7S

Anomaly 11a is on the eastern end of a string of high values which trend east-west across the survey area. There is no topographic high related to this anomaly which appears to have a source depth of about 750 feet. Because of its similarity to the magnetic high (Anomaly 12b) over the North Star Mine due west of it, and its location along the same east-west trend this anomaly takes on particular interest. Anomaly 11b is very similar in character to Anomaly 11a in that they both run parallel and adjacent to the axis of the pronounced magnetic low (Anomaly 13) just to the north. Ground investigation of this area by Don Cooley has revealed no visible outcrops and no claims or recent activity in the area. We plan to proceed with claim staking or state lease applications as may be appropriate to secure the ground for 90 days.

Priority 2

Anomaly 12a, located approximately within Sections 16, 18, and 21, R10E, T7S

Anomaly 12a trends due north-south and is terminated by the east-west low (Anomaly 15) at the north end. There is no visible geology or topographic relief to explain the anomaly.

A ground check indicated no visible outcrops. Magma Copper Company (Newmont subsidiary) has drill hole in southwest corner of Section 17 located on an unpatented mining claim named Black Hill No. 19. The drill hole was for the purpose of location work for a group of four claims (Black Hill numbers 18 through 21). Claims do not appear to be presently valid and drill hole likely very shallow.

Prior to any ground geophysical work a careful check of courthouse records is recommended to determine present interest of Magma Copper Company.

Priority 3

Anomaly 9, Section 35 and 36, R12E, T9S, and Sections 1 and 2, R12E, T10S, Apache Mine Area

This is another area of reverse polarized anomalies, previously mentioned, which are located at the intersection of at least three magnetic lineations. These anomalies appear to lie entirely within the mapped quartz monzonite and Pinal Schist. No apparent recent activity or claims in area. Much silver was reportedly taken out in the 1890's. Abundant copper sulfides was observed on the dump with no apparent geological surface expression or reason for this according to Don Cooley's visit to the area April 10, 1968.

I mentioned on the phone that the Apache Mine was within Anomaly 10 Area, this is in error. The area of interest and the mine are located in Anomaly 9.

Priority 4

Anomaly 6, Sections 11 and 14, R12E, T9S

This anomaly is over mapped outcrop (of the Pantano Formation. Apparently the Pantano in this area has intercalated volcanic flows within it all of which dip steeply to the northeast. If this is true, it would account for the rather strong magnetic gradients observed there.

Copper oxide in association with quartz veins and an occasional bleb of chalcocite makes this an area of interesting surface shows. Some recent claim activity Picabho 1 located March 27, 1968 by Thomas McCrag witness Milford Oden. These claims show as San Juan claims in University (Arizona ?) theses of area by Iles.

If you have any questions, regarding the above, please let me know.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

E. Grover Heinrichs
Vice President

EGH:jc
Enclosure: Data on samples 484 and 487
rock

sw cor #32 Blue Star
old & New Post

Glenn Allen Dec -1965
state land

Redrock claim
3605 - 3608

no address

Jean claims

opper Co. drilled
1964 133' on
No 19.

work for
claims Nos 18-21

1 July 65
Ster (sp?)

28
Randall

3 McCrog
McCroy

Milford O Den witness

#34

Lucky strike #35 smar 64
William U. Douglason
Lee C. Candelario (sp?)
nun E-W

Memo

Badgett Owl Head.

Badgett - Owl Head
Geology Recon 4/10/68

Geology vs magnetic anomlies check and ground check for land status

The purpose of this examination was to check the magnetic anomalies for geological explanations if possible, and to see on the ground if claims are present and if they seemed valid. There is no priority intended by the order of discussion
Section & 1/4 corners are in nearly everywhere.

Anomaly 11a & 11b

(1) no rock visible and no claims seen. There is a road in the middle of sec 19 that is possible except for a little work in a couple of places - runs N-S and is flagged. - South of 11a is fenced and is claimed by Sovereign Steel of Coolidge.

(2) 12a no rock visible claims in N/2 sec 17 do not seem valid. Magma Copper Co. has a hole in SW cor sec 17 ~~(1964 claims see attachment)~~ "Magma Copper Co. drilled Aug 11-14, 1964 133' on Block Hill No. 19. Discovery work for Block Hill claims Nos 18-21 inclusive." Claims do not seem valid.

12.b this is the North Star and was not checked although there are many workings showing in this area and a rude sample collected in W central part sec 7.

13 this rock is very magnetic here shows andesite & basic dikes - very minor Cu oxide show is associated with magnetic rx.

14 No rocks and no claims.

16a, 16b, not visited

16c - no rock, no claims

15. Much oxide copper showing, usually with qtz veins - mag low is weak, rubbly granitic rock - much weathering & some alteration - No exam farther west than Sec 5
many claims here and work now in progress on several - claims probably valid - needs more study this area - land check also

Anomaly 4 & Hills in Sec 36 7S, 11E are Pinal schist ~~as~~ and show some magnetites on surface although strongly weathered.

Anomaly 1 - not visited because of Arkoto claims

2 - SW part is showing basic igneous rock with magnetite showing - much lineation.

7 - not visited - already IP

5 - Pantano in this map does show andesite flows & intrusion (sills in them in all places examined)

Big Mine - Cu Ox in andesite - not exciting
Sec 18, R 12 E, T 9 S.

Blue Star Mine Sec 33, T8S, R12E. discrepancy in map - shows Pinal schist but prob gneiss or granitic gneiss. Cu oxide in fractures.

Anom 6 - here & west - Cu.Ox. in assoc. with qtz veins shows nice chalcocite at times -

New claims

(4) Picacho I → ?

27 Mar 1968

Thomas McCray (McCray), witness Milford Oden

looks interesting - shown as San Juan claim area on map by Iles.

(3) ~~8~~ 9 - Apache Mine Area - much silver reportedly take out 1890's - strange geology

Cu. sulfides on dump - I.P. - recon?

no new claims

8 & south area as about like shown on map - geologically no ready explanation from time allowed - no claims visible this trip

visits brief & certainly not a complete coverage of the area but did give an idea of what is out there.

DBC

① Owl Head

February 16, 1968

Mr. Russell Badgett, Jr.
1822 North Main Street
Madisonville, Kentucky 42431

Dear Rusty:

Below are the progress reports on Green Springs and Owl Head Areas:

Green Springs Project

Drilling is progressing rather slowly because of bad weather over the past few days, however, they are now down to 684 feet as of this morning. They have started coring at 648 feet and anticipate about 30 feet per eight hour shift and expect to advance 60 feet per day. Our geologist reports that bedrock occurred at 20 feet and they have been in andesite all the way. It got progressively harder from 500 feet on and, therefore, they had to go to the coring. At 675 feet there is a definite change in rock type and is interpreted as a contact. The rock is a green-gray dense metamorphosed material, very fine grained with pyrite stringers, and from an optimistic prospector's standpoint it looks encouraging.

Our geologist felt it important to obtain a few spot cores every 100 feet from 250 on. Because we did not interpret the rock in the same fashion as Standard Slag, we seem to disagree as to the alluvium interpretation. From an economic standpoint it is purely academic.

Owl Head Project

We have prepared a preliminary land status investigation of the Owl Head Area, the results of which are enclosed. As explained on the map, the red indicated private land of which mineral rights would have to be negotiated. This information is very general and, therefore, the private land designation may indicate surface rights only and the mineral rights may still be open for claim location. The blue is state land and may be available for leasing under Arizona state laws. The vacant land we assume is open for location as public domain. More specific information will follow.

Hope you and Jerry made it back to Kentucky without incident. We enjoyed your visit and hope you can return to Arizona as soon as we have a significant find, which I hope will be soon.

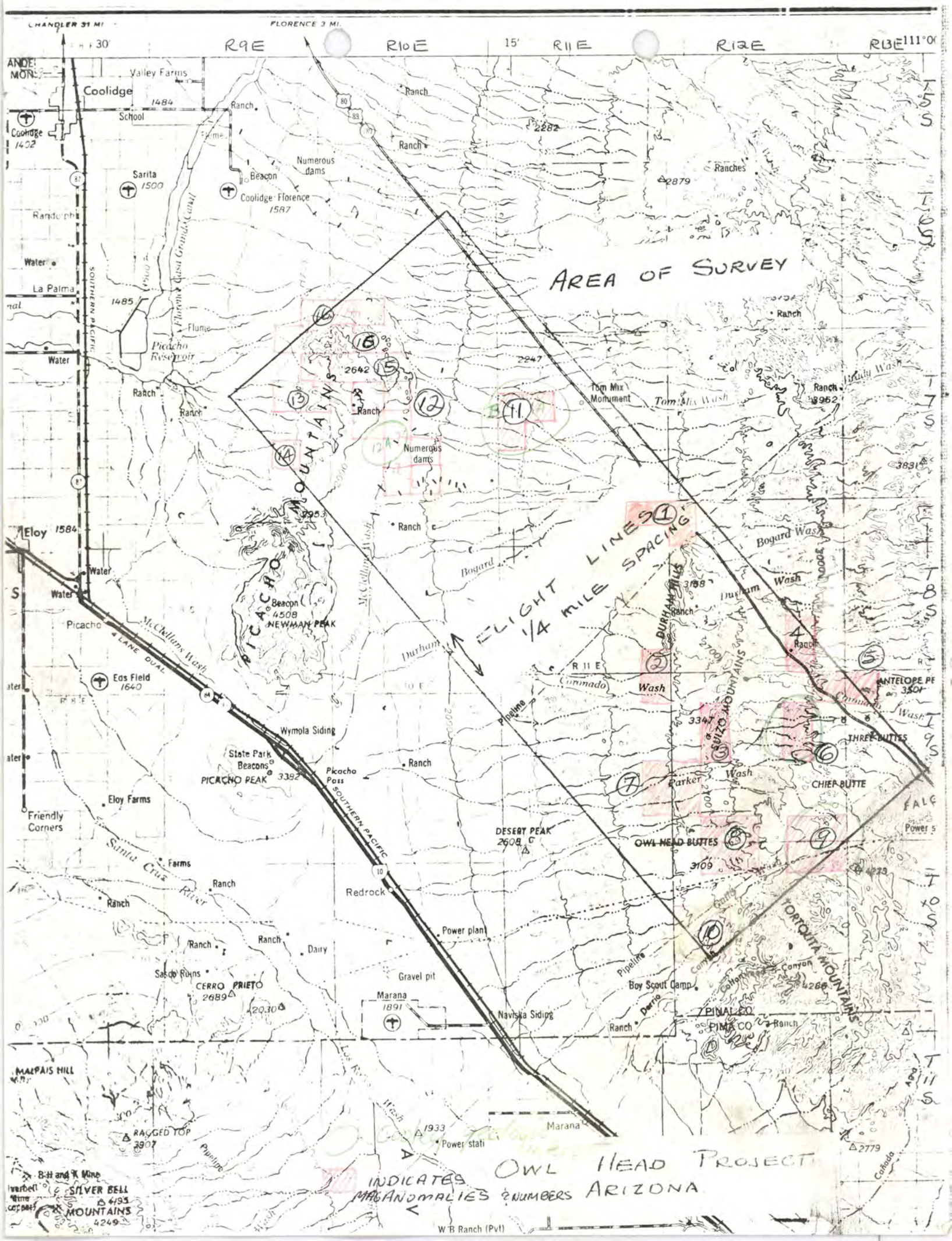
Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

E. Grover Heinrichs
Vice President

EGH:jc
Enclosure

MAJOR MINING AREAS
(PAST AND PRESENT)
TUCSON AND VICINITY
AREA OF PROPOSED AERIAL MAGNETIC SURVEY
NOTICE: MAKE LOCAL INQUIRY OF ROAD CONDITIONS IN THIS AREA. MANY ROADS ARE NOT PASSABLE FOLLOWING SEVERE WEATHER CONDITIONS
ENJOY OUR FRIENDLY NEIGHBORS IN SONORA, MEXICO
FOR BRIEF TRIPS INTO NOGALES, SONORA, A FREE PORT, NO TRAVEL PERMITS ARE REQUIRED. FOR EXTENDED TRIPS BEYOND THE BORDER, CONSULT YOUR NEAREST MEXICAN TOURIST AGENCY OR MEXICAN CONSULATE FOR DETAILED INFORMATION AND HELPFUL TRAVEL HINTS
MEXICO
TUCSON
Scottsdale
Mesa
Globe
Florence
Casa Grande
Safford
Willcox
Benson
Tombstone
Bisbee
Douglas
Nogales
NOGALES
AGUA PRIETA
CANANEA
MAGDALENA
SANTA ANA
To Hermosillo
OWL HEAD PROJECT
ARIZONA
5
6
7
8



AREA OF SURVEY
FLIGHT LINES 1/4 MILE SPACING
INDICATES MAGANOMALIES & NUMBERS
OWL HEAD PROJECT ARIZONA
PICACHO MOUNTAINS
SUIZO MOUNTAINS
TORTOLITA MOUNTAINS
DURHAM HILLS
NEWMAN PEAK
PICACHO PEAK
DESERT PEAK
OWL HEAD BUTTES
CHIEF BUTTE
THREE BUTTES
ANTELOPE PE
CERRO PRIETO
MALPAIS HILL
RAGGED TOP
SILVER BELL MOUNTAINS
Coolidge
Eloy
Picacho
Redrock
Marana
Tom Mix Monument
Numerous dams
Picacho Reservoir
Wymola Siding
Picacho Pass
Eds Field
Eloy Farms
Friendly Corners
Sasco Ruins
Gravel pit
Power plant
Navisita Siding
Boy Scout Camp
Power stati
W B Ranch (Pvt)
Santa Cruz River
Durham Wash
Bogard Wash
Parker Wash
Coronado Wash
McClellans Wash
Pipeline
Canyon
Cottonwood Canyon
Cañada
Los Reyes Wash
Flume
Beacon
Ranch
Water
Valley Farms
School
Sarita
Coolidge Florence
Randolph
La Palma
Picacho
Dairy
Farms
Power s
Ranches
Tom Mix Wash
Brady Wash
Pinal Co
Pima Co
Cerro Prieto
Marana
Coolidge
Eloy
Picacho
Redrock
Sarita
Coolidge Florence
Florence Casa Grande Canal
Southern Pacific
4 Lane Dual
Chandler 31 Mi
Florence 3 Mi
R9E
R10E
R11E
R12E
R13E
111°00'
T 5 S
T 6 S
T 7 S
T 8 S
T 9 S
T 10 S
T 11 S

Anomaly 2, Section 1, R11E, T9S, and Sections 36, R11E, T8S. This feature is probably caused by an extension of the Durham Hills Granite towards the southwest beneath the alluvium. The interesting thing about this anomaly is the fact that while the depth to bedrock is obviously greater than in the northeast where the granite outcrops, the magnetic values are higher. This would indicate that the rock type and/or mineralization is different beneath the alluvium. With these possibilities in mind this anomaly becomes a good target for additional geophysical work. At least one I.P. line should be run across the magnetic high, to determine if there are any sulfides at depth.

Anomaly 3, Sections 8, and 17, R12E, ~~T4S~~ — 9S ?

This anomaly is co-incident with the Pinal Schist and gneiss of the Suizo Mountains which represent a topographic high in the area. With this correlation it is probable that the magnetic high is simply due to minor amounts of magnetite within the Pinal Schist and gneiss.

Anomaly 4, Sections 26 and 35, R12E, T8S

This anomaly is felt to be caused by the minor amounts of magnetite within the Pinal Schist which outcrops in the vicinity of the anomaly. However, due to the magnetude of this feature (the strongest anomaly in the survey area) it should be checked on the ground by a geologist to be certain of its cause.

Anomaly 5 and 6, Section 1, R12E, T9S and R13E, T9S; and Sections 11 and 14, R12E, T9S

Both anomalies are over mapped outcrops of the Pantano Formation. Apparently the Pantano in this area has intercalated volcanic flows within it, all of which dip steeply to the northeast. If this is true it would account for the rather strong magnetic gradients observed here.

The depth to the sources of these anomalies seem to be on the order of 200 or 300 feet. It is recommended that a geologic reconnaissance of this area be made.

Anomaly 7, Sections 24 and 25, R11E, T9S and Sections 19 and 30, R12E, T9S

This anomaly consists of several magnetic highs and lows which are grouped around the intersection of at least four magnetic lineations. Because of faulting and fracturing which could be associated with these lineations, this area becomes a zone of major interest. As there is no surface geology to account for the magnetic features observed, this area should be checked further by induced polarization method.

Anomaly 8, Sections 32 and 33, R12E, T9S and Sections 4 and 5, R12E, T10S

This feature is located near the Owl Head, which are composed of volcanics and joined by Pinal Schist to the east. The magnetic high here is probably due to the volcanics rather than the schist, as the latter is typically a magnetic low here. It is interesting to note that many of the anomalies roughly on an east-west line and south of this anomaly are reverse polarized. This may be caused, at least in part, by contacts between the quartz monzonite and the Pinal Schist. Geologic field checks of several of these reverse polarized anomalies near the monzonite schist contents should be made to try and resolve this question.

Anomaly 9, Section 35 and 36, R12E, T9S, and Sections 1 and 2, R12E, T10S

This is another area of reverse polarized anomalies, previously mentioned, which are located at the intersection of at least three magnetic lineations. As these anomalies appear to lie entirely within the mapped quartz monzonite and Pinal Schist, a geologic field check of this area is in order to determine the advisibility of further work.

Preliminary

April 2, 1968

MEMO TO: W. E. Heinrichs, Jr.
FROM: J. P. MATTHEWS, JR.
SUBJECT: Interim report on interpretation of Owl Head Magnetic Survey for Mr. Russell Badgett

Lineations

There are four major lineationstrends within the survey area. These are north-south, east-west, northeast-southwest, and northwest-southeast. Several areas of interest have been indicated by intersections of lineations and these will be discussed separtely by areas.

Areas of Interest

Anomaly #1, Sections 6 & 7, R12E, T8S and Sections 1 & 2, R11E, T8S. This

This anomaly consists of at least three magnetic highs and associated lows. Due to the complex magnetic pictures seen here, one is foreed to conclude that there are several causative bodies at depth, and that the geology is quite complex. This magnetic feature continues on to the south for approximately five miles in somewhat diminished magnitude. The general magnetic high is felt to be caused by the topographic relief of the Durham Hills. The major part of the anomaly is rather sharply terminated by a strong east-west lineation which goes between the highs and the lows to the north. This lineation could be of major economic importance if it represents faulting or fracturing within the subsurface. The depth to the magnetic source of this anomaly is probably at or less than 1,000 feet. In view of the geophysical and geologic information,this area lookes like a good target for additional geophysical work.

1. What about Radiometric anomalies? Comments?

Anomaly 10, Sections 17, 18, 19, and 20, R12E, T10S

Here again there is a grouping of several anomalies which appear to be reverse polarized. Between Anomaly 9 and 10 is a rather strong magnetic lineation along which lie many of the apparent reverse polarized anomalies. This line, as mentioned previously, appears to correlate with the mapped contact between the monzonite and schist. As this lineation continues on toward the southwest beyond the mapped contact of the schist and monzonite and this could indicate a contact in the subsurface. This should be checked on the ground by a geologist.

Anomalies 11a, 11b, 11c, Sections 17, 18, and 19, R11E, T7S, Sections14, R10E, T7S

Anomaly 11a is on the eastern end,of a string of high values which trend east-west across the survey area. There is no topographic high related to this anomaly which appears to have a source depth of about 750 feet. Because of its similarity to the magnetic high (Anomaly 12b) over the North Star Mine due west of it, and its location along the same east-west trend this anomaly takes on particular interest. 12-b
Anomaly 11b is very similar in character to Anomaly 11a in that they both run parallel and adjacent to the axis of the pronounced magnetic low (Anomaly 13) just to the north. Each of these anomalies should be checked further on the ground by geologic and geophysical methods.

Anomalies 12a, 12b, 12c, located approximately within Sections 8, 9, 16, 17, 21, 22, 27, and 28, R10E, T7S

Anomaly 12a trends due north-south and is terminated by the east-west low (Anomaly 15) at the north end. There is no visible geology or topographic relief to explain the anomaly, and should be check further by geophysical methods.
Anomalies 12b and 12c are smaller magnetic features associated with Anomaly 12a but which seem to have somewhat different character. Anomaly 12b is explained by the North Star Mine which it covers. This anomaly is very similar to Anomalies 12c,

11a, and 11b and further enhances the interest in them.

Anomaly 13, Sections 11 and 12, R9E, T7S

Overlies the outcrop of the quartz monzonite and associated basic and acidic dikes. This coupled with the topographic high probably explains this anomaly. A ground check by a geologist should be sufficient to evaluate the importance of this anomaly.

Anomaly 14, Sections 23 and 26, R9E, T7S

This anomaly is co-incident with outcrops of monzonite which have been intruded by basic and acidic dikes. A ground check of the geology here is recommended.

Anomaly 15, Sections 4, 5, and 6, R10E, T7S and Section 1, R9E, T7S

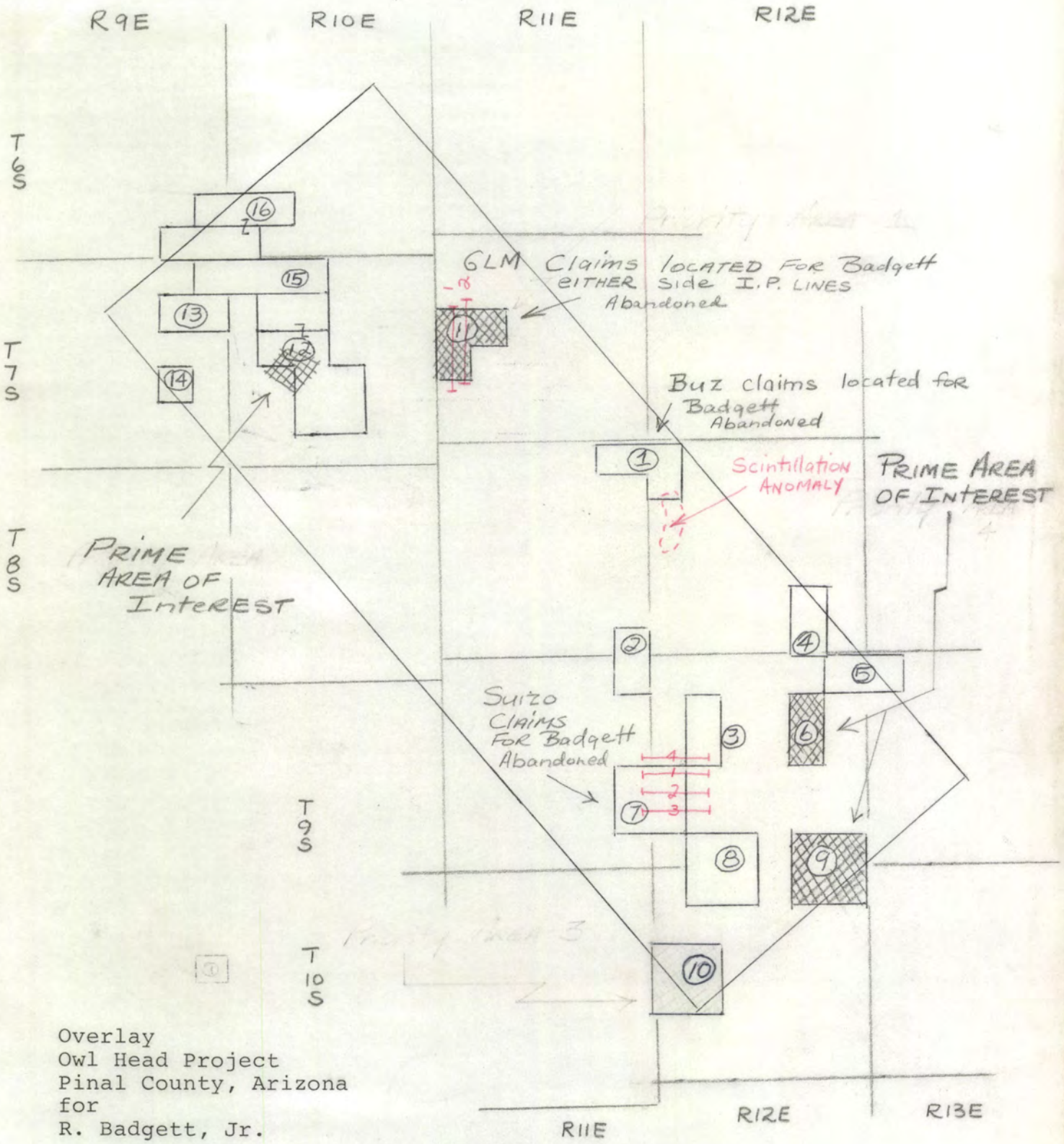
The anomaly trends east-west. It is the most pronounced low within the area of the survey. It apparently roughly maps a large zone of alteration, and in fact may be due to it, and the associated distinction of magnetite. It is possible that this low is also associated with a major structural feature which could have been instrumental in the mineralizing of nearby areas to the north and south of it. Ground geologic work is definitely recommended to determine the potential of this area.

Anomaly 16a, 16b, and 16c, Sections 29, 30, and 31, R10E, T6S, and Sections 25, 35, 36, R9E, T6S

These three anomalies all correlate with the surface outcrop of quartz monzonite as does Anomaly 15 but in this case the magnetic features are highs rather than lows. Additional ground work in conjunction with the area of Anomaly 15 is recommended to help explain the mineralization in this area.

J. P. Matthews, Jr.
Geophysicist

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36



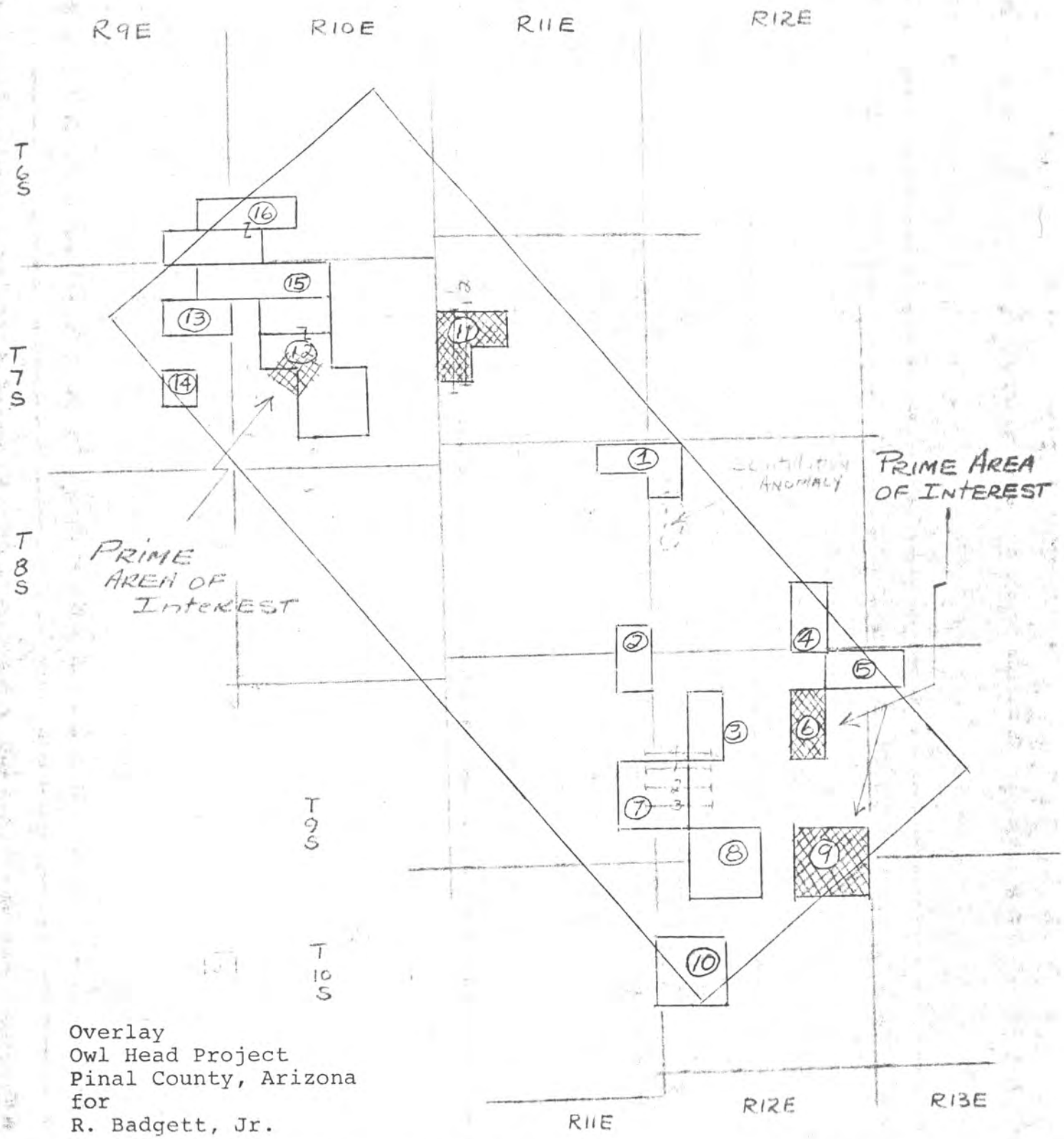
Overlay
Owl Head Project
Pinal County, Arizona
for
R. Badgett, Jr.

Indicates magnetic anomalous zones
Indicates priority areas by number
by
HEINRICHS GEOEXPLORATION CO.
P. O. Box 5671
Tucson, Arizona 85703

Scale 1:250,000

DATE 4/26/68
Revised 12/20/68
" 1/28/69

I.P. LOCATION



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Tucson, Arizona 85703

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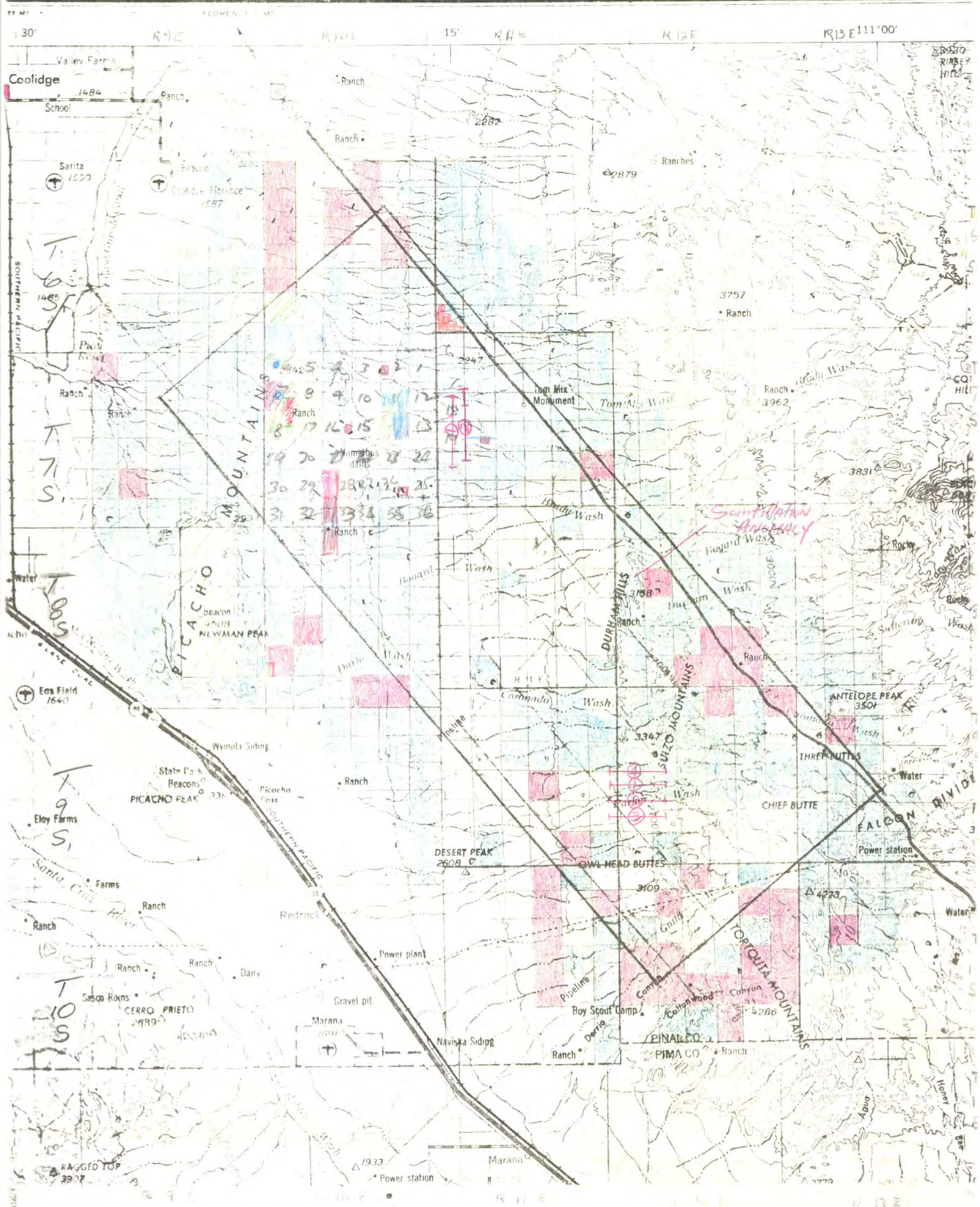
DATE 4/26/68
Revised 12/20/68

11 Feb 68

LAND STATUS
OWL HEAD AREA

TUCSON



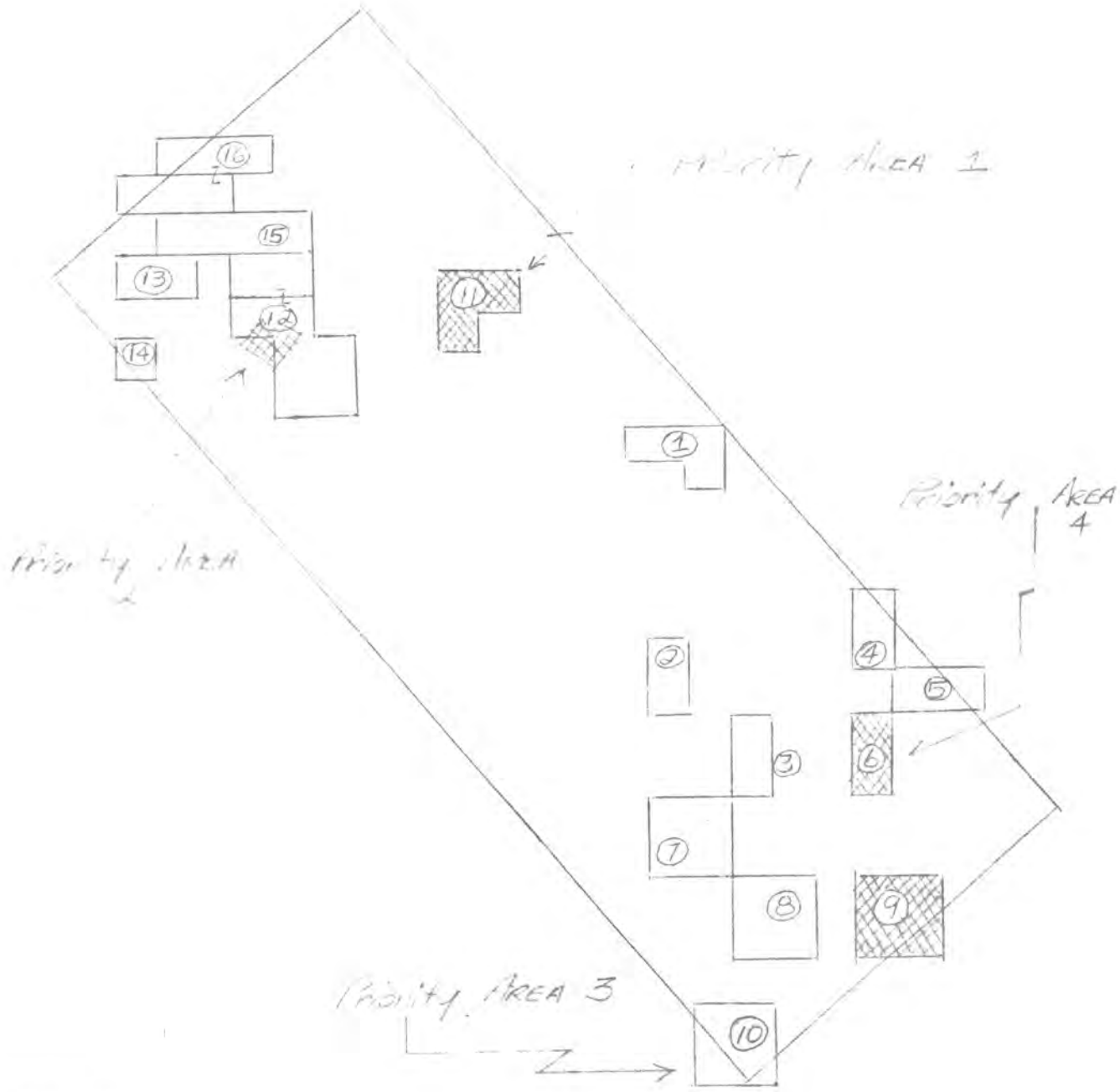
STATE LAND

PRIVATE LAND

VACANT LAND

I.P. Line & No.

From LAND STATUS
U.S. Dept of Ag



Overlay
Owl Head Project
Pinal County, Arizona
for
R. Badgett, Jr.

▨ Indicates magnetic anomalous zones
▩ Indicates priority areas by number

Scale 1:250,000

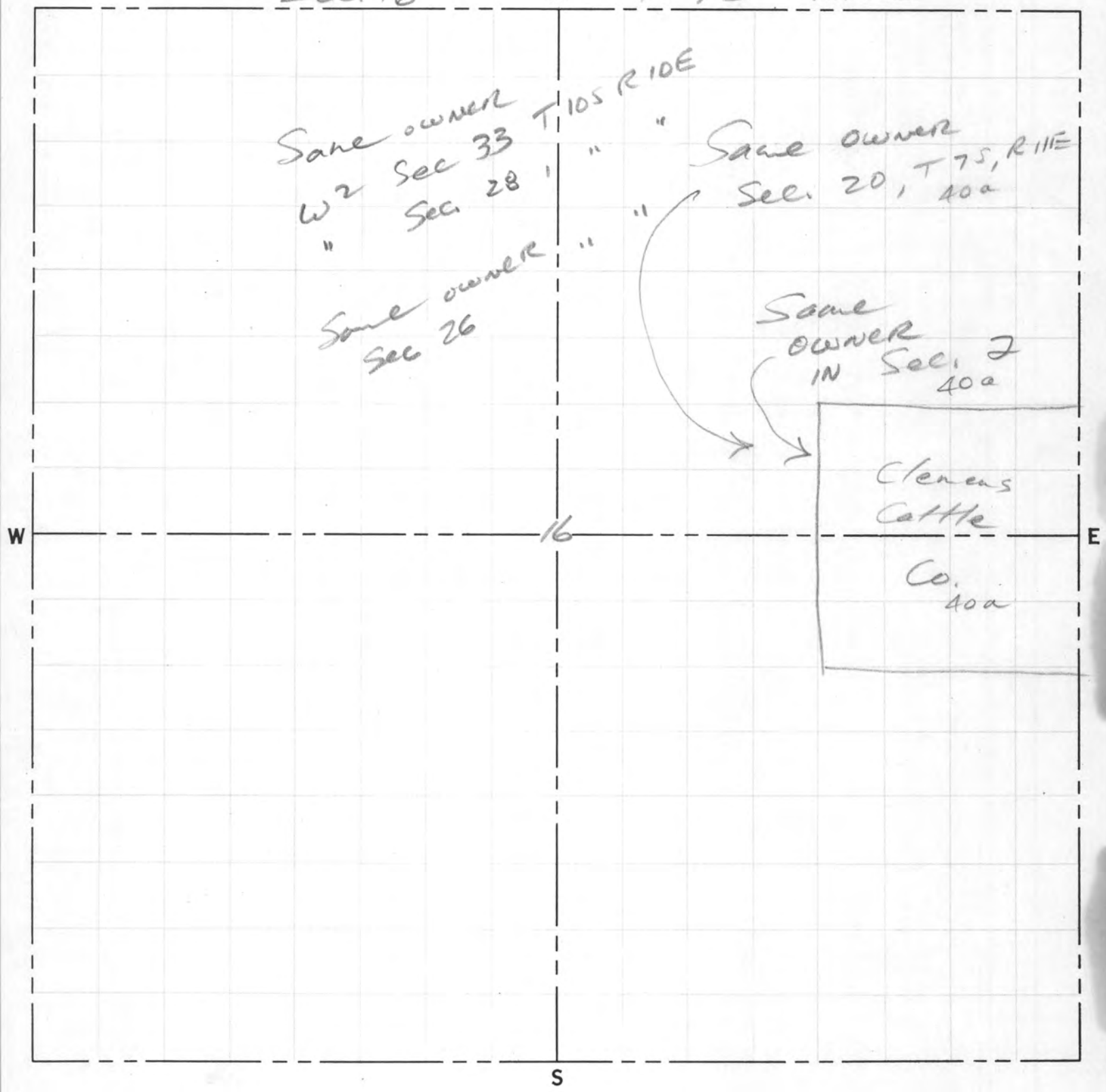
Date 4/26/63

by
HEINRICHS GEOEXPLORATION CO.
P. O. Box 5671
Tucson, Arizona 85703

Budgett - Owl Head - 5/15/68

SCALE FOR SECTION, 660 Ft.=1 Inch. { Each side large blue squares = 20 chains, 80 rods, 1320 feet; area of square 40 acres. Each side small red squares = 5 chains, 20 rods, 330 feet; area of square 2½ acres.

Sec. 16 N T 7S R10E



SCALE FOR QUARTER SECTION, 330 Ft.=1 Inch. { Each side large blue squares = 10 chains, 40 rods, 660 feet; area of square 10 acres. Each side small red squares = 2½ chains, 10 rods, 165 feet; area of square .625 of 1 acre.

PRONTO LAND MEASURE 660 - 330 MAP SHEET

PRONTO LAND MEASURE

Copyright, 1950, James Hamilton Adair, Flint, Michigan

Badgett — Owl Head 5/15/68

SCALE FOR SECTION, 660 Ft.=1 Inch. { Each side large blue squares = 20 chains, 80 rods, 1320 feet; area of square 40 acres. Each side small red squares = 5 chains, 20 rods, 330 feet; area of square 2½ acres.

5-15-68 Sec. 7 T. 7S R10E

SCALE FOR QUARTER SECTION, 330 Ft.=1 Inch. { Each side large blue squares = 10 chains, 40 rods, 660 feet; area of square 10 acres. Each side small red squares = 2½ chains, 10 rods, 165 feet; area of square .625 of 1 acre.

PRONTO LAND MEASURE 660 - 330 MAP SHEET

PRONTO LAND MEASURE

Copyright, 1950, James Hamilton Adair, Flint, Michigan

Badgett – Owl Head

SCALE FOR SECTION, 660 Ft.=1 Inch. { Each side large blue squares = 20 chains, 80 rods, 1320 feet; area of square 40 acres. Each side small red squares = 5 chains, 20 rods, 330 feet; area of square 2½ acres.

6-15-68 Sec. 18 N T7S R10E

SCALE FOR QUARTER SECTION, 330 Ft.=1 Inch. { Each side large blue squares = 10 chains, 40 rods, 660 feet; area of square 10 acres. Each side small red squares = 2½ chains, 10 rods, 165 feet; area of square .625 of 1 acre.

PRONTO LAND MEASURE 660 - 330 MAP SHEET

PRONTO LAND MEASURE

Copyright, 1950, James Hamilton Adair, Flint, Michigan

5/15/68

Owl Head

Land STATUS Magna Loc

Black Hill 1 thru 18 4-11-64

D 382 64/81

22 - 27

19 21

up to 42

Sept. of 65 - Sept 66

Sec. 16, 17, 18, T 7S

R 10E

Sec.

No affidavits filed from 1964 thru 1969

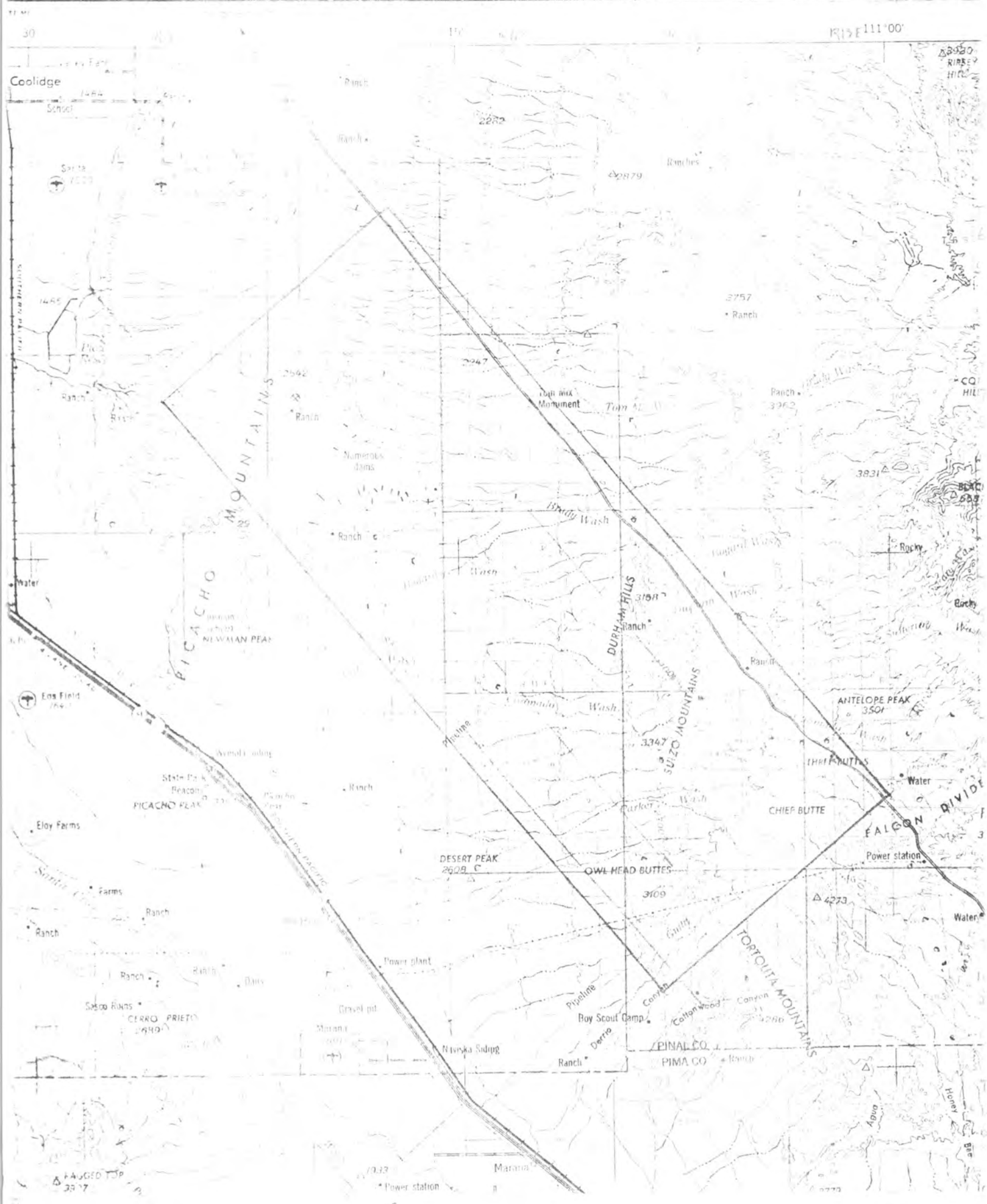
Probably abandoned

11 Aug 68

LAND STATUS

OWL HEAD AREA

TUCSON



STATE LANDS

PRIVATE LANDS

VACANT LAND

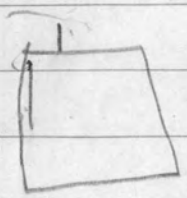
N

10.30

Badgett B 213-67

Owl Head Project

1. Twp. P.O. #359



T6S to 10S.

R-9E to 13E-

HERSH'S

1. Copy of

STATUS of PUBLIC DOMAIN LAND & MINERAL - TITLES.

ordered 11:00 tue 13th

from ACE Photo Copy Phoenix

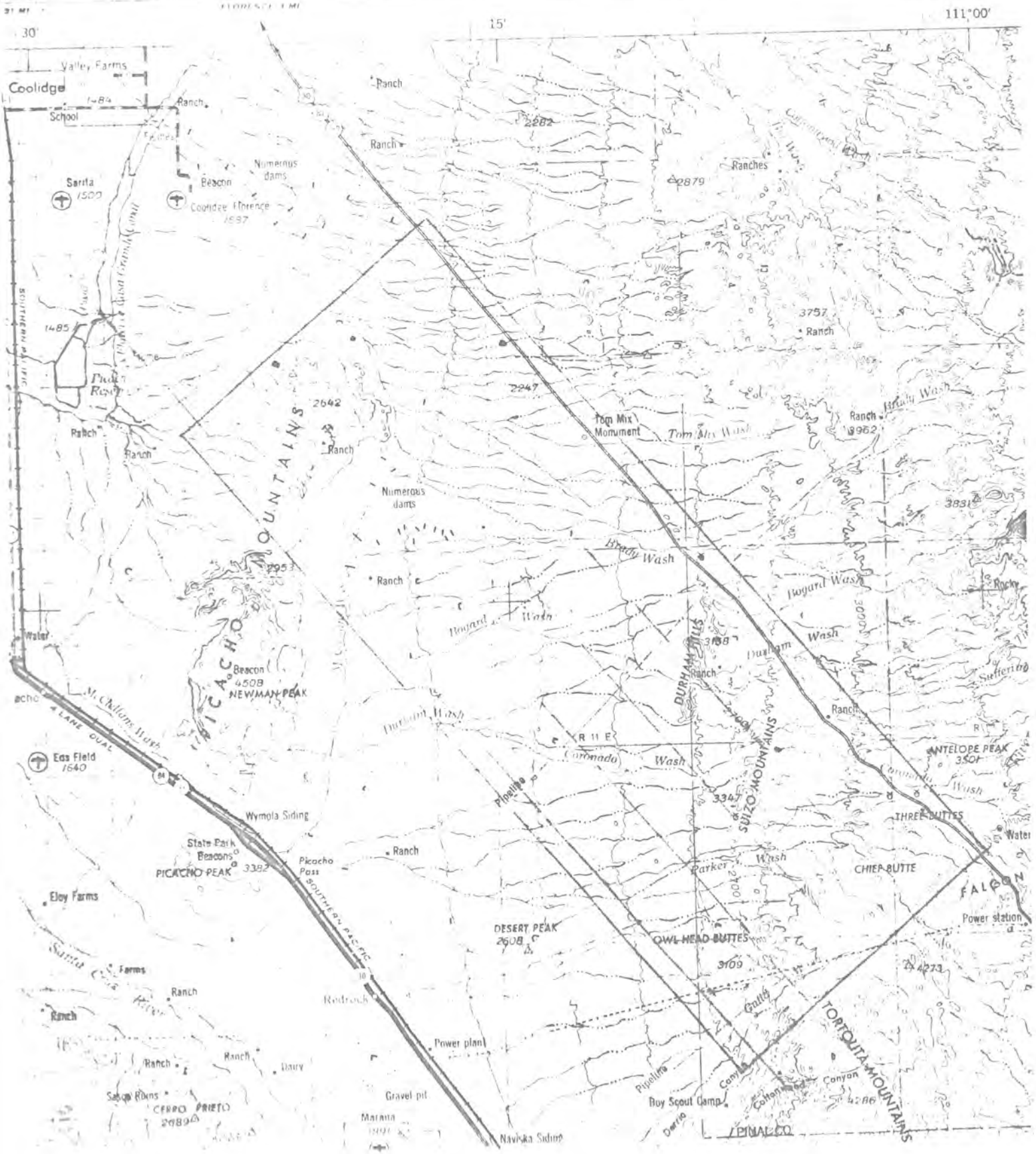
B.L.M. No office

H. G. Ex.

P.O. 5671.

T.

S



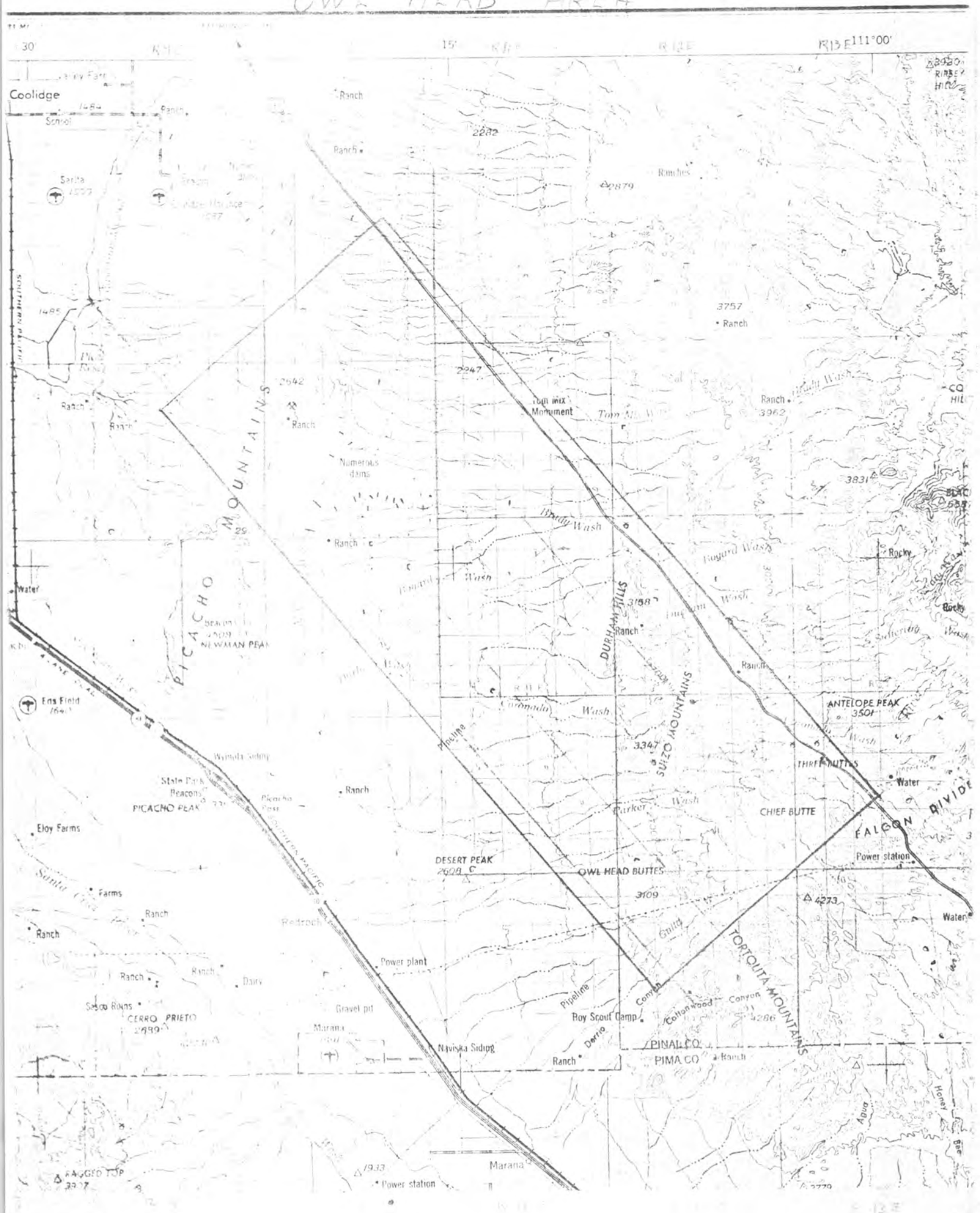
30'
15'
111°00'
Valley Farms
Coolidge
School
Ranch
Numerous dams
Beacon
Sarita
1500
Coolidge Florence
1597
Ranches
2879
2282
3757
Ranch
1485
Pinal Reservoir
2642
2247
Tom Mix Monument
Tom Mix Wash
Brady Wash
3962
Numerous dams
3831
Brady Wash
Bogard Wash
Rocky
Bogard Wash
Durham Wash
3000
Water
Beacon
4508
NEWMAN PEAK
PICACHO MOUNTAINS
DURHAM HILLS
3158
Ranch
Suffering
M. Chillans Wash
4 LANE DUAL
Durham Wash
R 11 E
Coronado Wash
SUIZO MOUNTAINS
ANTELOPE PEAK
3501
Eds Field
1640
Pipeline
3347
Wymola Siding
THREE BUTTES
Water
State Park Beacons
PICACHO PEAK
3382
Picacho Pass
Ranch
Parker Wash
CHIEF BUTTE
FALCON
Eloy Farms
SOUTHERN PACIFIC
DESERT PEAK
2608
OWL HEAD BUTTES
Power station
Farms
Ranch
Redrock
3109
4273
Ranch
Gatty
TORTOUTA MOUNTAINS
Power plant
Ranch
Ranch
Dairy
Pipeline
Canyon
Cottonwood Canyon
Sasco Ruins
CERRO PRIETO
2089
Gravel pit
Boy Scout Camp
4286
Marana
Naviska Siding
PINAL CO

11 1/26 68

LAND STATUS

OWL HEAD AREA

TUCSON



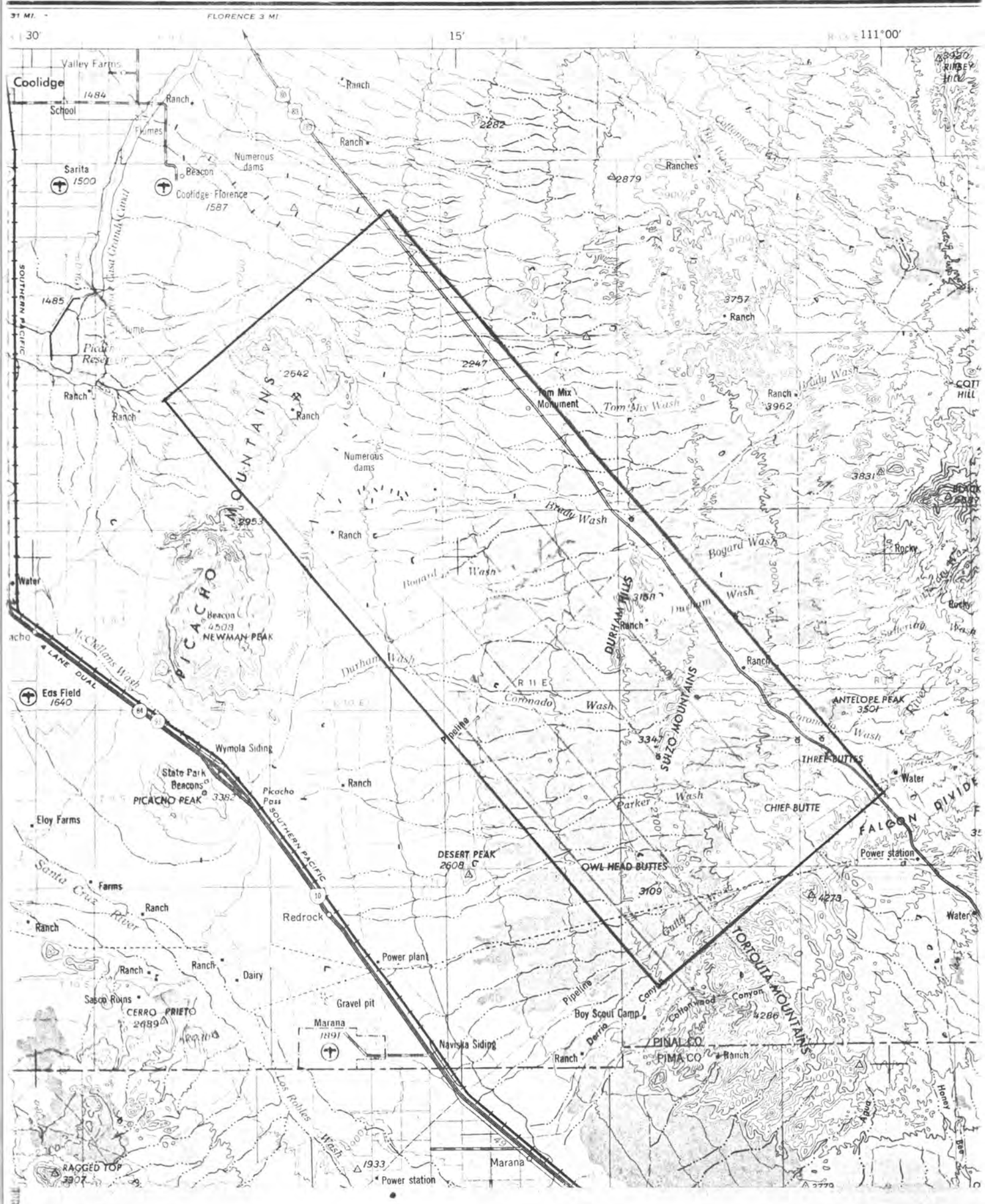
STATE LAND

PRIVATE LAND

VACANT LAND

N

TUCSON



FLORENCE 3 MI
30'
15'
111°00'
Coolidge
Valley Farms
School
Ranch
Flumes
Numerous dams
Beacon
Sarita
1500
Coolidge-Florence
1587
Ranches
2879
2282
SOUTHERN PACIFIC
1485
Picacho Reservoir
2542
2247
Tom Mix Monument
Tom Mix Wash
Brady Wash
3757
3962
3831
Numerous dams
PICACHO MOUNTAINS
2953
Bogard Wash
Rocky
Water
Beacon
4508
NEWMAN PEAK
McClellans Wash
4 LANE DUAL
Eds Field
1640
Durham Wash
DURHAM HILLS
3158
Durham Wash
R 11 E
Coronado Wash
SUIZO MOUNTAINS
3347
ANTELOPE PEAK
3501
Coronado Wash
THREE BUTTES
Water
Wymola Siding
State Park
Beacons
PICACHO PEAK
3382
Picacho Pass
Pipeline
Parker Wash
CHIEF BUTTE
FALCON DIVIDE
Eloy Farms
DESERT PEAK
2608
OWL HEAD BUTTES
3109
Power station
4273
Santa Cruz River
Farms
Ranch
Redrock
Gulch
Water
Power plant
Dairy
Sasco Ruins
CERRO PRIETO
2689
Gravel pit
Marana
1891
Navisita Siding
Pipeline
Boy Scout Camp
Cottonwood Canyon
4286
TORTOUTA MOUNTAINS
PINAL CO
PIMA CO
Ranch
Los Robles Wash
1933
Power station
Marana
RAGGED TOP
3307

TOPOGRAPHY OF A PORTION

OF THE

OWL HEAD MINING DISTRICT

FROM THE

TORTOLITA MTS. QUADRANGLE, ARIZONA
UNITED STATES GEOLOGICAL SURVEY

BY

CALVERT D. ILES

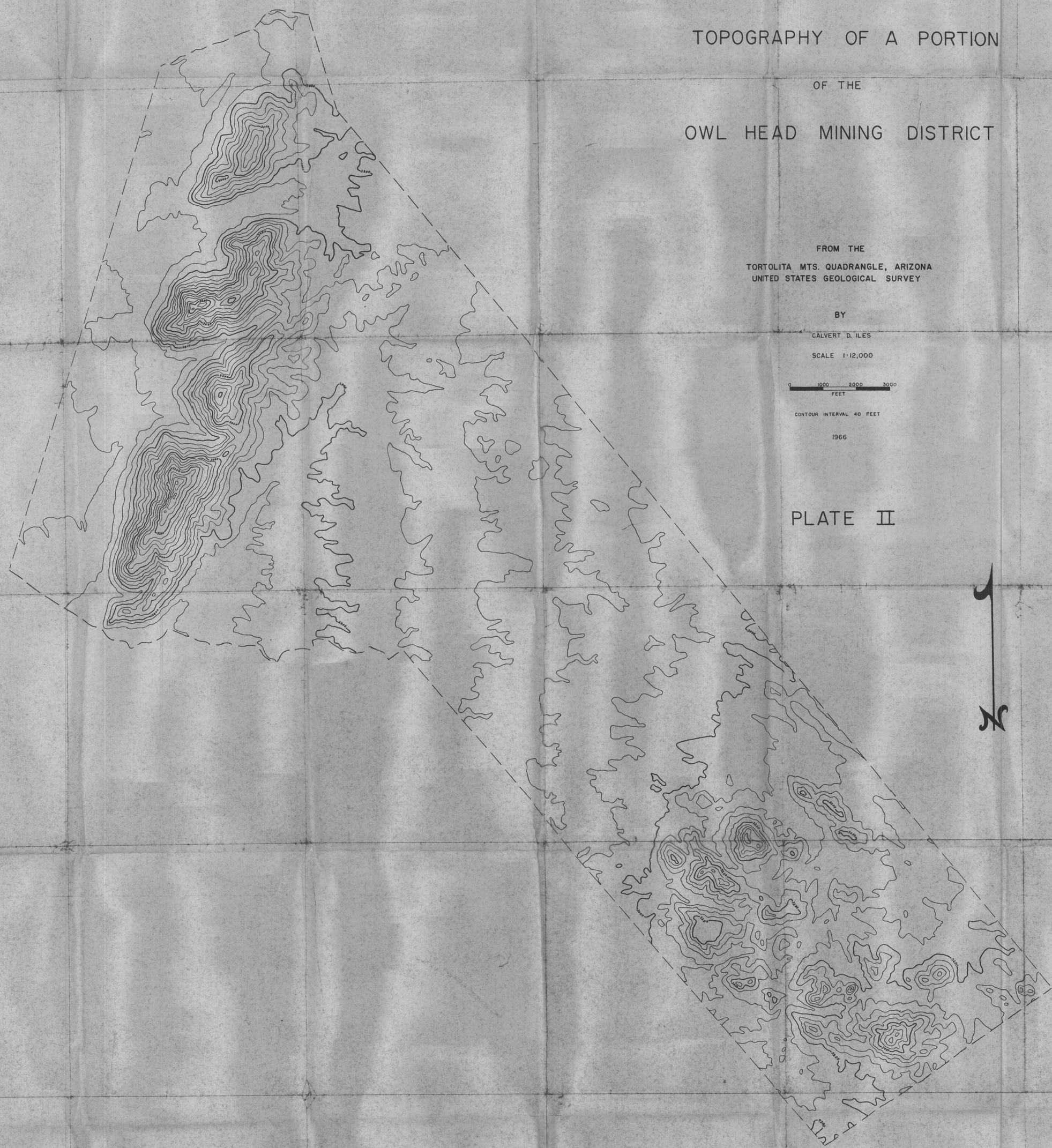
SCALE 1:12,000

0 1000 2000 3000
FEET

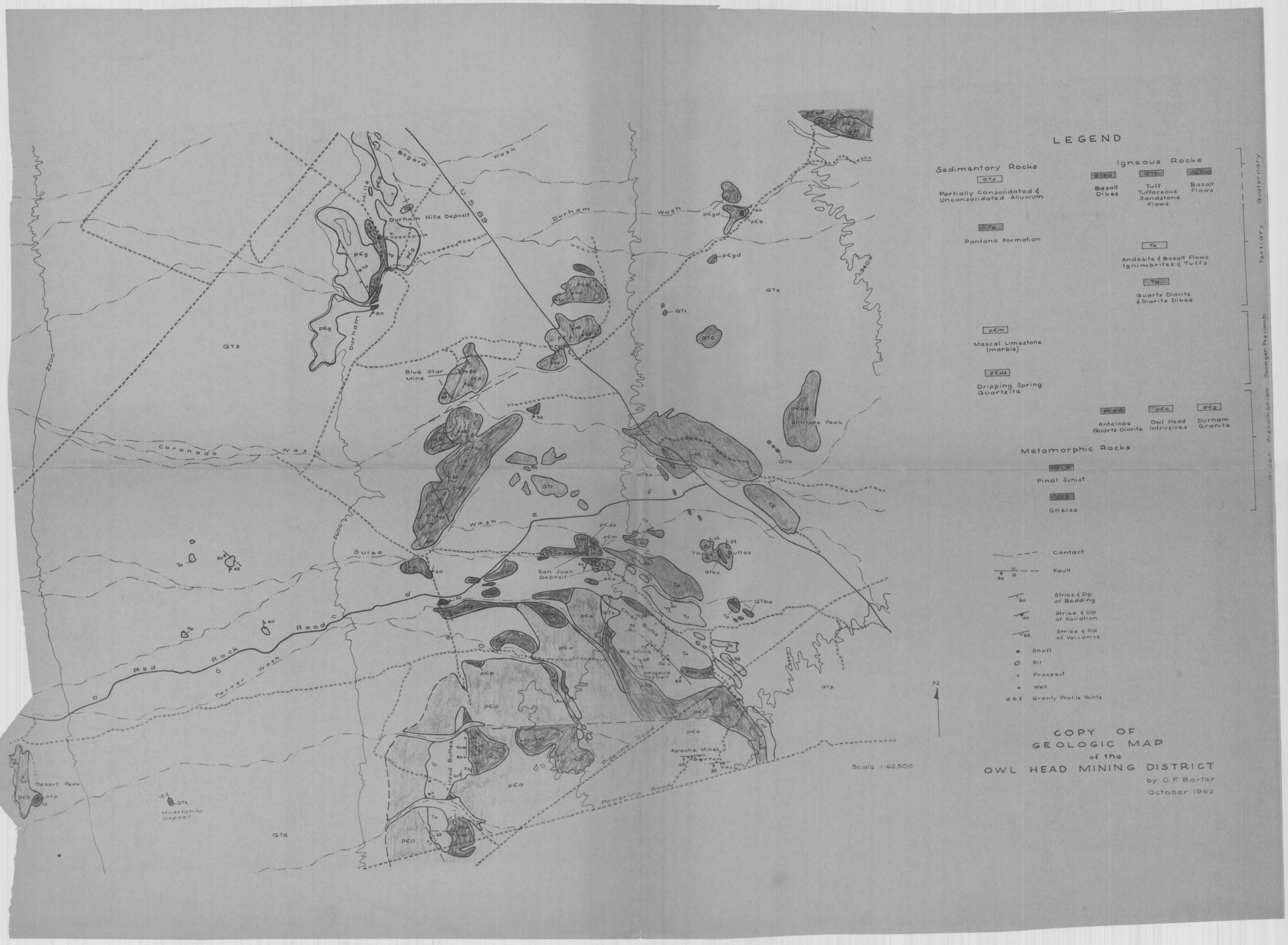
CONTOUR INTERVAL 40 FEET

1966

PLATE II



Univ. of Arizona Library


LEGEND
Sedimentary Rocks
QTs
Partially Consolidated & Unconsolidated Alluvium
Tp
Pantano Formation
p€m
Mescal Limestone (marble)
p€ds
Dripping Spring Quartzite
Igneous Rocks
QTba
Basalt Dikes
QTt
Tuff Tuffaceous Sandstone Flows
QTb
Basalt Flows
Ta
Andesite & Basalt Flows Ignimbrites & Tuffs
Td
Quartz Diorite & Diorite Dikes
p€ad
Antelope Quartz Diorite
p€o
Owl Head Intrusives
p€g
Durham Granite
Metamorphic Rocks
p€p
Pinal Schist
p€b
Gneiss
Quaternary
Tertiary
Younger Precamb.
Older Precambrian
Contact
Fault
Strike & Dip of Bedding
Strike & Dip of Foliation
Strike & Dip of Volcanics
Shaft
Pit
Prospect
Well
a b f Gravity Profile Points
N
Scale 1:62,500
Bogard Wash
U.S. 89
Durham Hills Deposit
Durham Wash
Blue Star Mine
Coronado Wash
Suizo Wash
Red Rock Road
Parker Wash
San Juan Deposit
Chief Butte
Big Mine
Amygdule Deposit
Three Buttes
Antilope Peak
Head Buttes
Pipeline Road
Powerline Road
Apache Mines
Desert Peak
Huerfanito Deposit
2200
2600
3000
3400
COPY OF
GEOLOGIC MAP
of the
OWL HEAD MINING DISTRICT
by C.F. Barter
October 1962

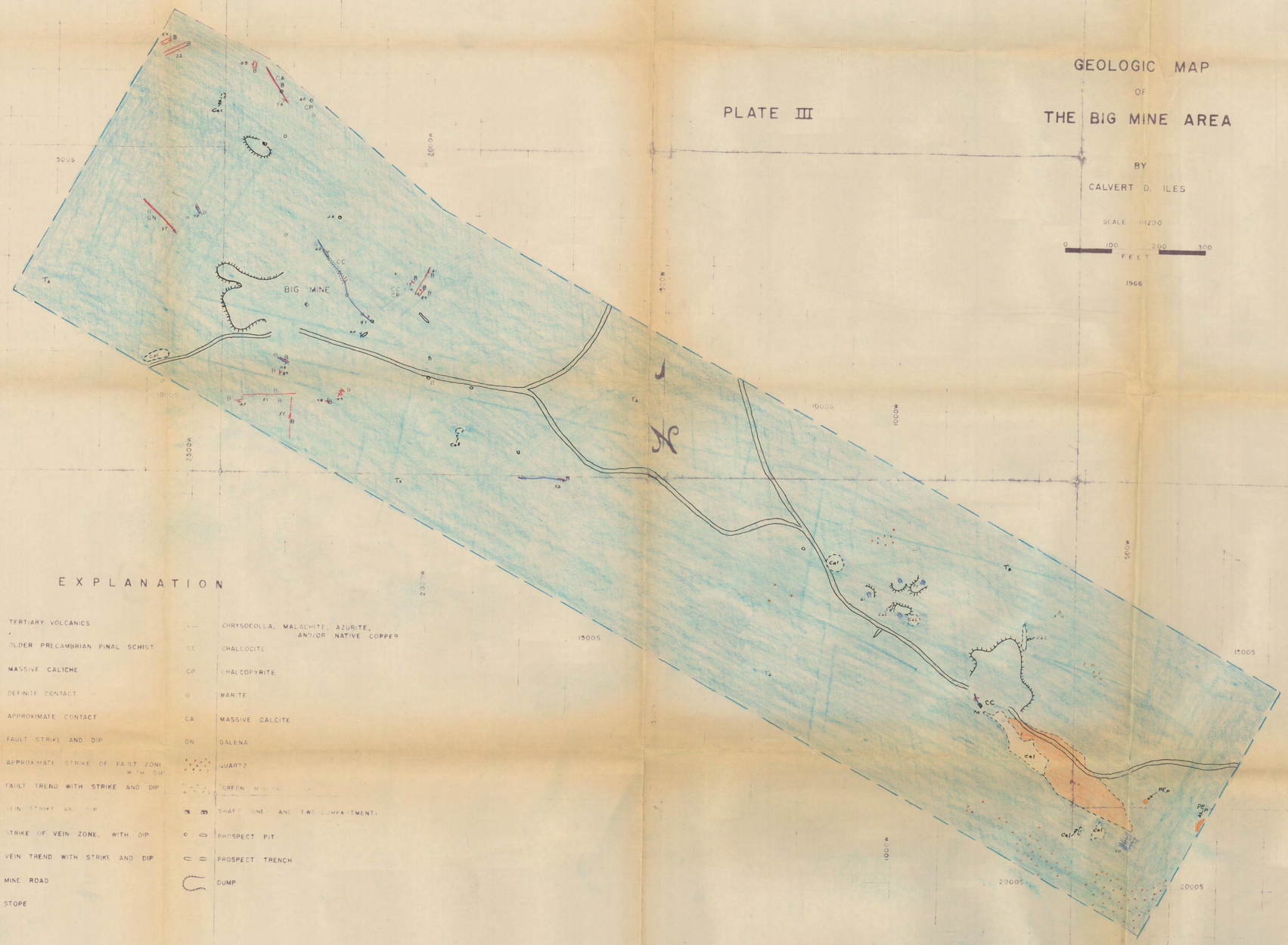


PLATE III

GEOLOGIC MAP OF THE BIG MINE AREA

BY

CALVERT D. ILES

SCALE 1:1200

0 100 200 300 FEET

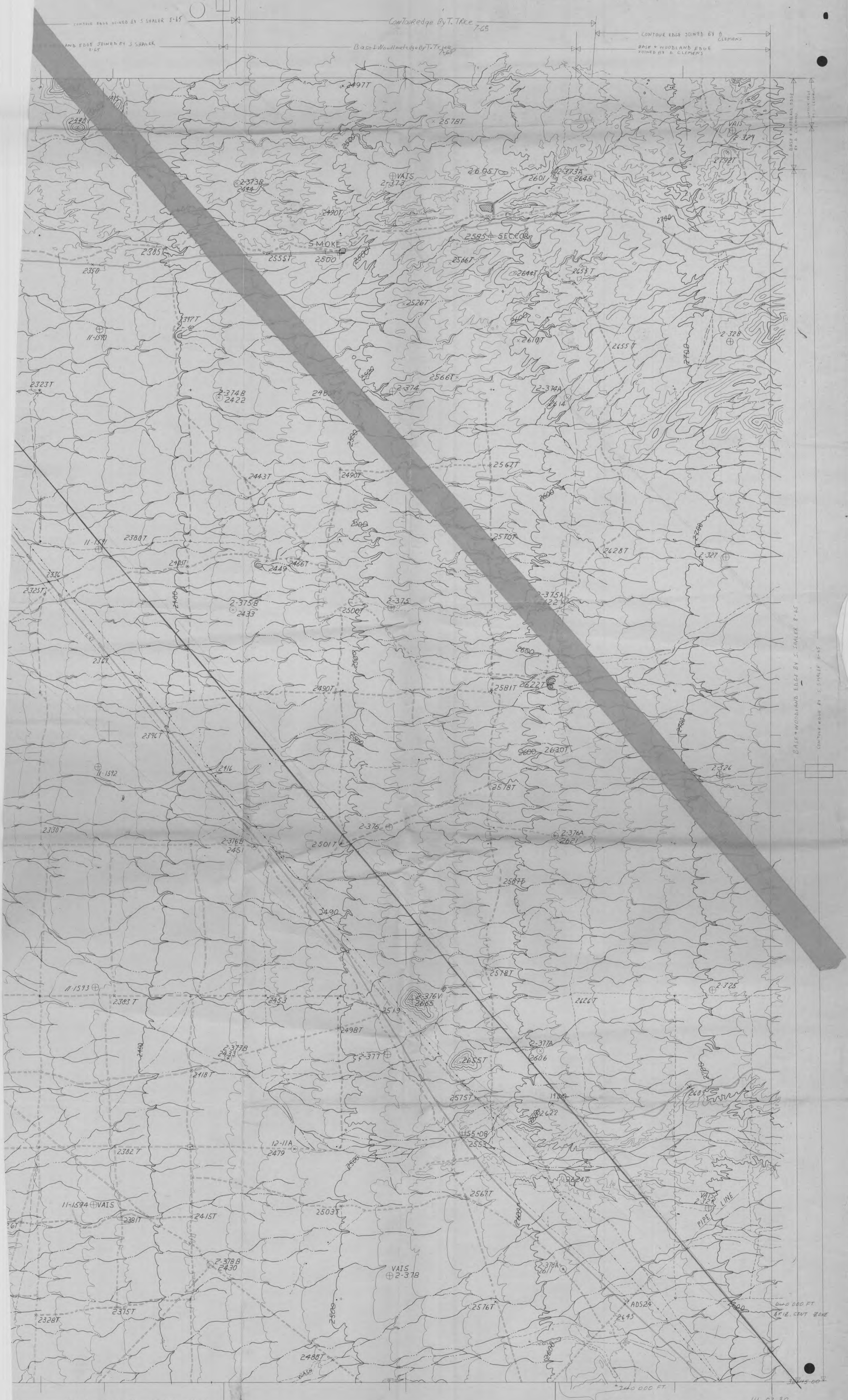
1966

EXPLANATION

- T_a — TERTIARY VOLCANICS
- PC_p — OLDER PRECAMBRIAN PINAL SCHIST
- Cal — MASSIVE CALICHE
- DEFINITE CONTACT
- APPROXIMATE CONTACT
- FAULT STRIKE AND DIP
- APPROXIMATE STRIKE OF FAULT ZONE, WITH DIP
- FAULT TREND WITH STRIKE AND DIP
- VEIN STRIKE AND DIP
- STRIKE OF VEIN ZONE, WITH DIP
- VEIN TREND WITH STRIKE AND DIP
- MINE ROAD
- STOPE
- CHRYSOCOLLA, MALACHITE, AZURITE, AND/OR NATIVE COPPER
- CC — CHALCOCITE
- CP — CHALCOPYRITE
- B — BARITE
- CA — MASSIVE CALCITE
- GN — GALENA
- QUARTZ
- GREEN MICA
- SHAFT (ONE- AND TWO-COMPARTMENT)
- PROSPECT PIT
- PROSPECT TRENCH
- DUMP

Univ. of Ariz. Library

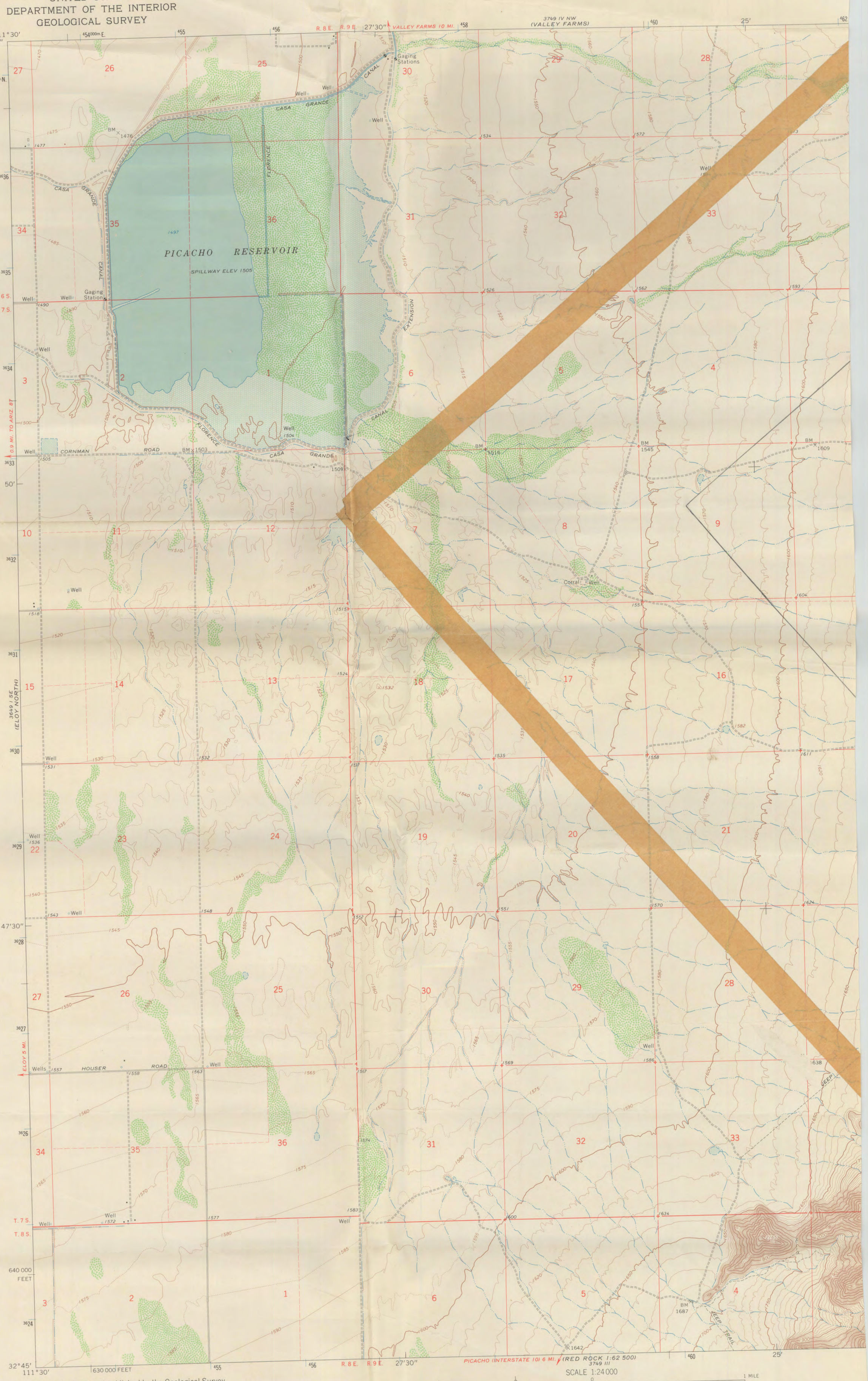
96 HILLS SW, ARIZ.
N 32 45 00 W 111 07 30
SCALE 1:24 000 / 7.5 C.I. 20'
FLORENCE "B" PROJ.
PHOTO VAIS F.H. 12,000' DATE 1962.



96 HILLS SW, ARIZ
N 32 45 00 W 111 07 30
SCALE 1:24 000 / 7.5 C.I. 20'

48
20859
68559

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



Mapped, edited, and published by the Geological Survey in cooperation with the Bureau of Reclamation

Control by USGS and USC&GS

Topography by photogrammetric methods from aerial photographs taken 1963. Field checked 1965

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

A portion of the west half of this map lies within a subsidence area
Vertical control based on latest available adjustment

Areas covered by dashed light-blue pattern are subject to controlled inundation
Fine red dashed lines indicate selected fence lines
Where omitted, land lines have not been established

UTM GRID AND 1965 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

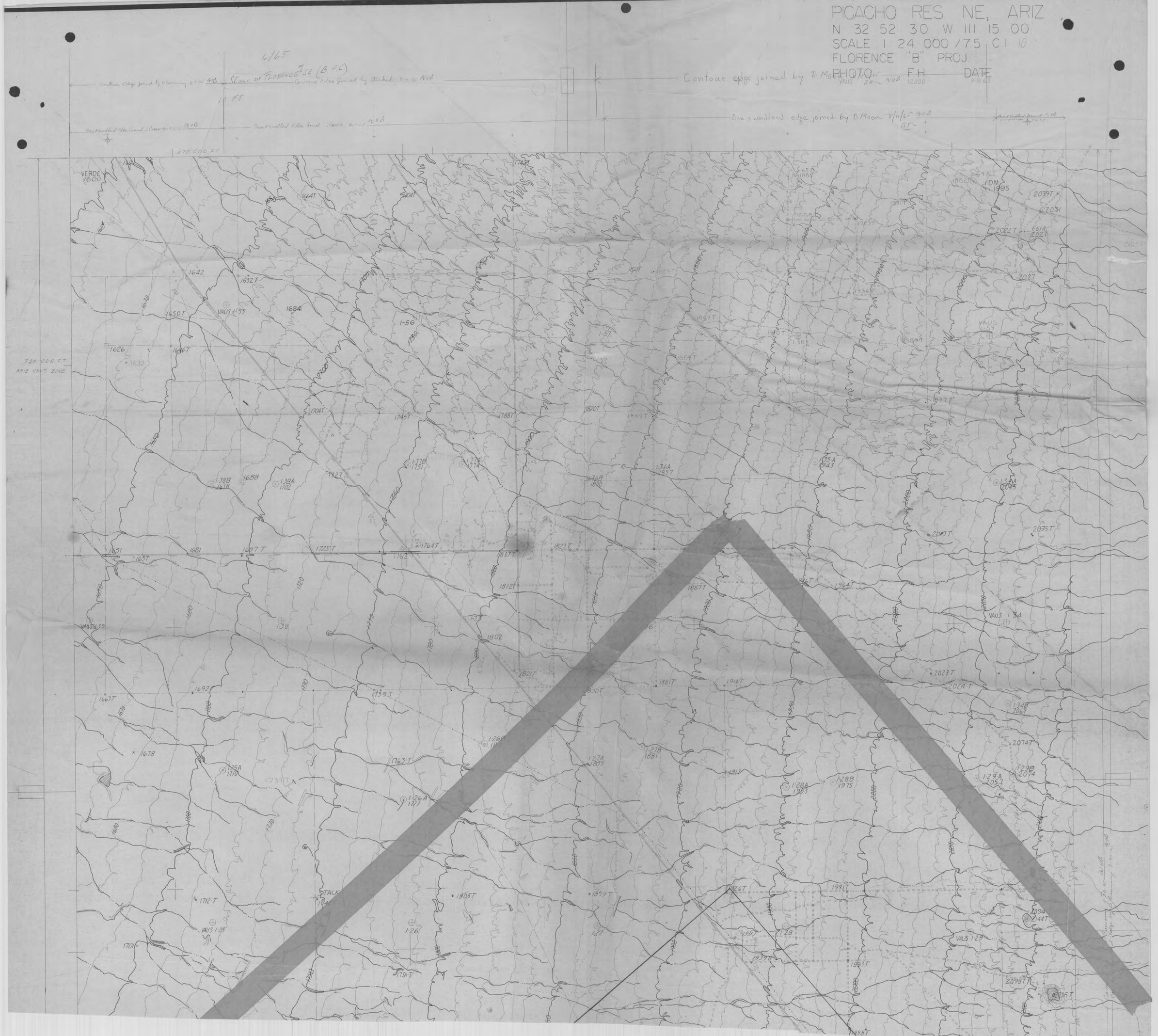
SCALE 1:24 000

CONTOUR INTERVAL 10 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR WASHINGTON, D. C. 20242
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

QUADRANGL

PICACHO RES NE, ARIZ
N 32 52 30 W 111 15 00
SCALE 1 24 000 / 7.5 C.I. 10
FLORENCE "B" PROJ.
PHOTO F.H. DATE
VAUS 12000 9-8-63



GEOLOGIC MAP OF A PORTION

OF THE

OWL HEAD MINING DISTRICT

BY

CALVERT D. ILES

SCALE 1:12,000

FEET

1966

PLATE I

EXPLANATION

SYMBOLS

- IMPROVED DIRT ROAD
- UNIMPROVED DIRT ROAD
- INTERMITTENT STREAM
- DEFINITE CONTACT
- APPROXIMATE CONTACT
- INDEFINITE CONTACT
- FAULT TREND (DEFINITE AND POSSIBLE), WITH STRIKE AND DIP
- FAULT ZONE
- VEIN TREND (DEFINITE AND POSSIBLE), WITH STRIKE AND DIP
- DIKE TREND, WITH STRIKE AND DIP
- STRIKE AND DIP OF SEDIMENTARY BEDS
- STRIKE AND DIP OF VOLCANIC FLOW LAYERS
- STRIKE AND VERTICAL DIP OF VOLCANIC FLOW LAYERS
- STRIKE AND DIP OF FOLIATION

- INFORMATION FROM BARTER (1962)
- PROSPECT PIT OR TRENCH
- LARGE PROSPECT PIT
- SHAFT
- ADIT
- CHRYSOCOLLA, MALACHITE, AZURITE, AND TENORITE
- CC CHALCOCITE
- BN BORNITE
- CP CHALCOPYRITE
- B BARITE
- MG MAGNETITE
- QUARTZ
- "GREEN MINERAL"
- BN × CP PC PROSPECT PIT, WITH ROCK TYPE AND MINERALIZATION

ROCKS

	SEDIMENTARY	IGNEOUS	METAMORPHIC
QUATERNARY	ALLUVIUM (SILT TO COBBLES)	BASALTS, ANDESITES	
TERTIARY	PANTANO FORMATION	BASALTS, ANDESITES, RHYOLITES; APLITE; MISCELLANEOUS GRANITIC ROCKS; QUARTZ DIORITE	
OLDER PRECAMBRIAN		QUARTZ MONZONITE; PINAL SCHIST; BIOTITE GNEISS	

INDEX MAP OF ARIZONA

Badgett Jr.
Owl Head Proj. F
Water
North
Hill
Bogard
Wash
Magma Well
PRIVATE
PIPE LINE
Tank
BM 2525
BM 2761
2600
2765
11
12
13
14
16
17
18
24
10

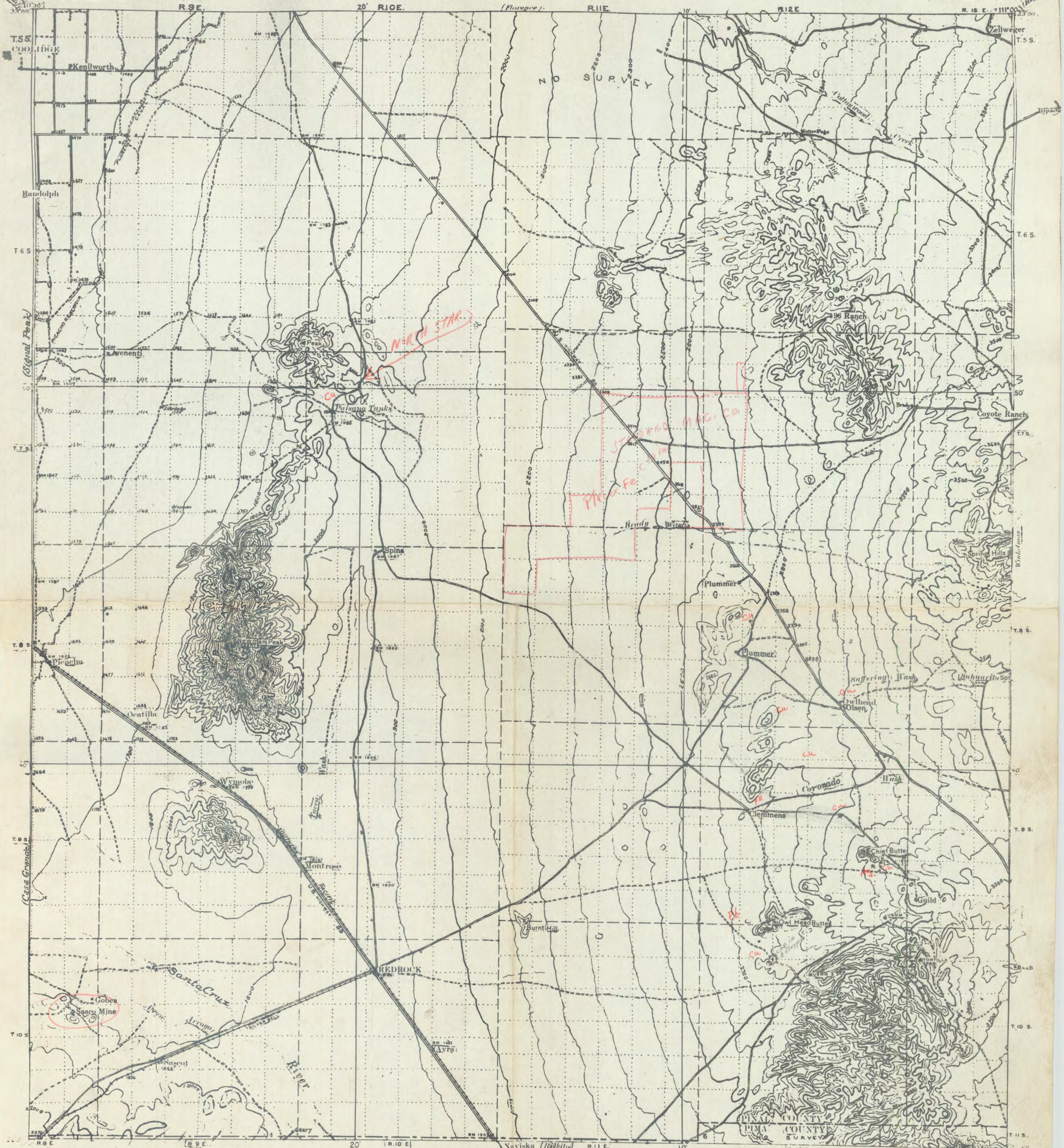
FLORENCE

Advance sheet.
Subject to correction.

HEINRICHS GEOEXPLORATION COMPANY
P. O. BOX 5671 TUCSON, ARIZONA

DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY

ARIZONA
REDROCK QUADRANGLE



Prepared by N. H. Darton
Topography from various sources and rapid reconnaissance
Contours above 1800 feet approximate
Triangulation Station
BM 2730 Bench marks, U. S. Geol. Survey
Land lines added from General Land Office records adjusted to natural features and control

Scale $\frac{1}{125000}$
1 ½ 0 1 2 3 4 5 Miles
1 ½ 0 1 2 3 4 5 Kilometers
Contour interval 100 feet
Datum is mean sea level.

TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION 1910.

DIAGRAM OF TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

Polyconic projection. To place on North American datum move projection lines 500 feet south and 270 feet west

Arizona
REDROCK

Bakgett - Owlhead

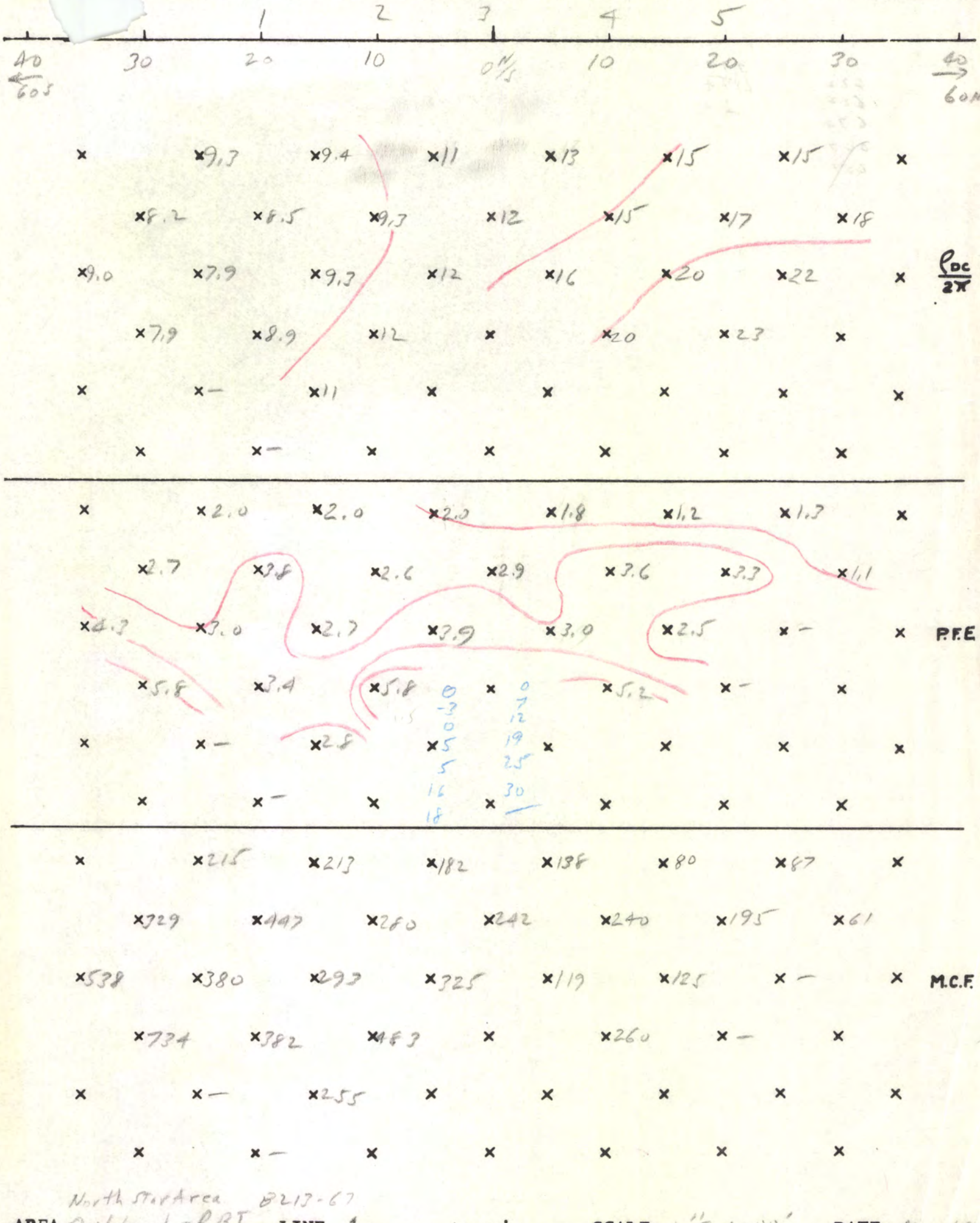
2 I.P. lines - Field notes marked
North star area

I.P. Line 1
Center 1000' South ¼ Cor. Sec 18 & 19 T7S, R11E
line oriented North, 1000' dipoles

I.P. Line 2
center @ Sec Cor 18/17 19/20
1000' dipoles - line staked

Both lines parallell
Run by Fedlchek
May 1968

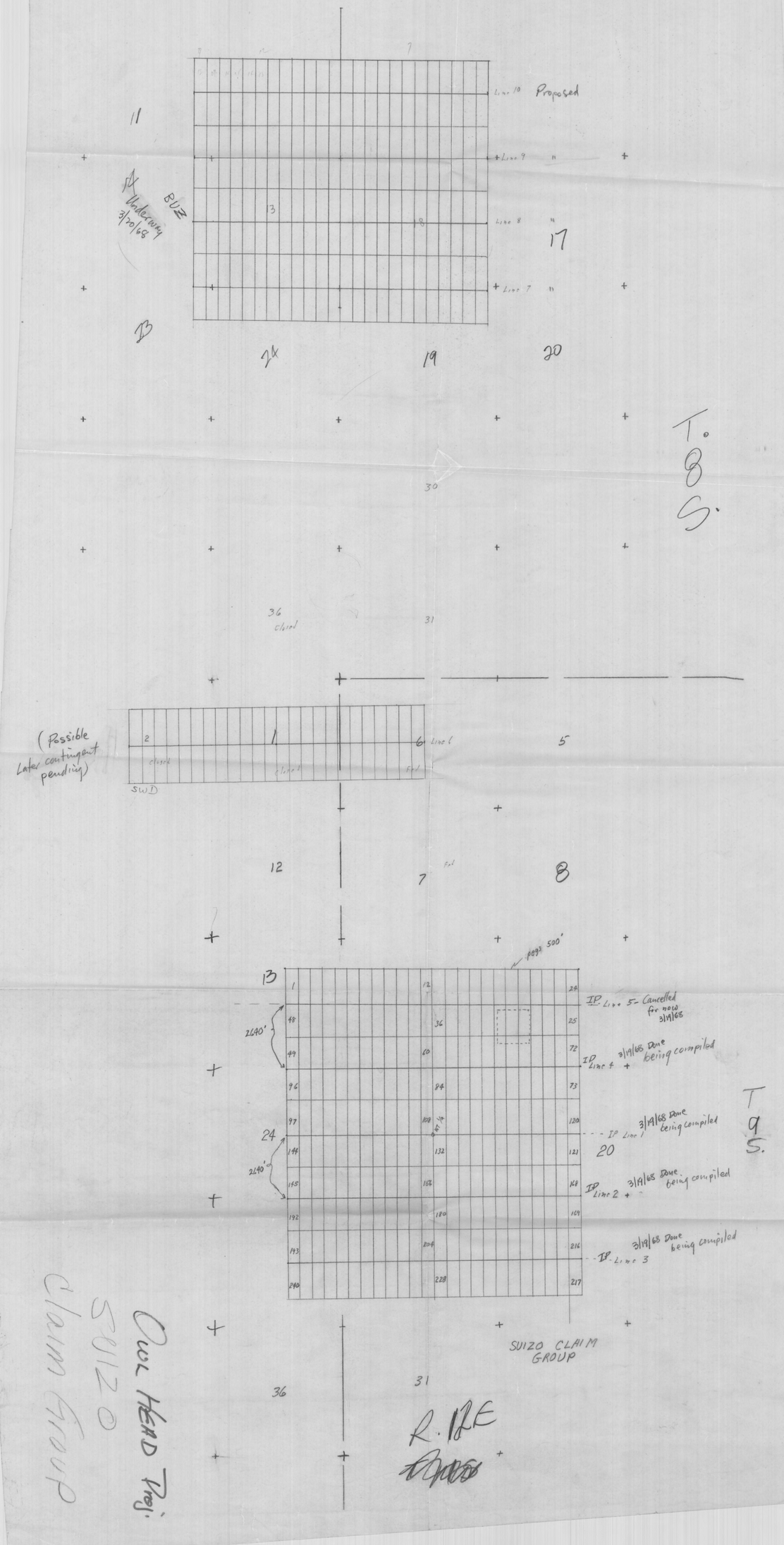
ICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING W



North Star Area 8213-67

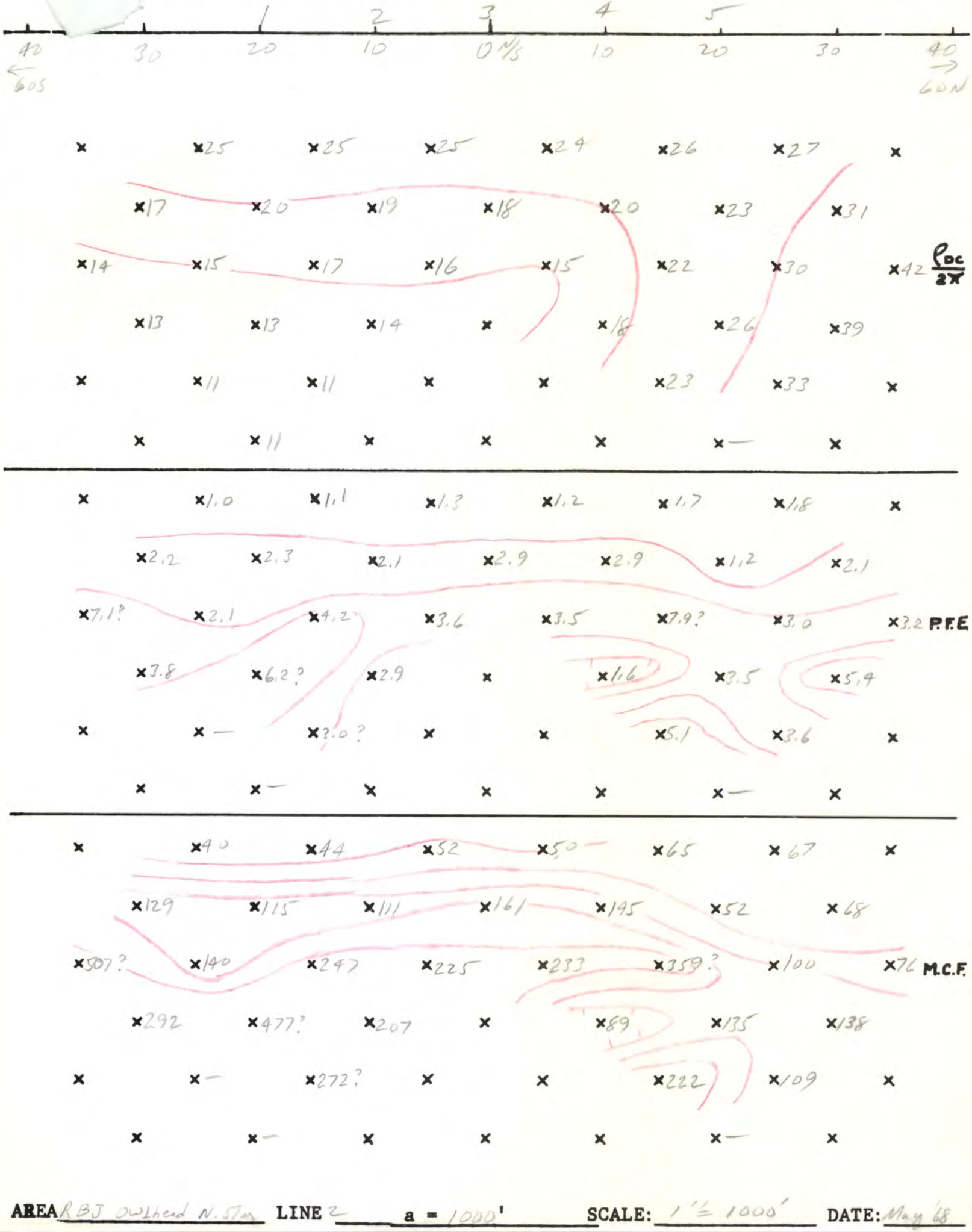
AREA Owl head - RBJ LINE 1 a = 1000' SCALE: 1" = 1000' DATE: May 68

R.11E. R.12E.



Owl Head Proj.
SUIZO
Claim Group

ICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING W



AREA RBJ Owlhead N. Star LINE 2 a = 1000' SCALE: 1" = 1000' DATE: May 68

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project 213-67 Line 151 E 1/2 Field date 3-7-68 Data page_____ Comp. date 3-8-68 Comp by_____

(A) Send	12	23	12	34	23	12	45	34	23	12		
(B) Receive	0-10 E	10-20E	—	20-30E	—	—	30-40E	—		—		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	3	—	—	—	—	—	—	—	—	—		
(E) Vdc (avg)	20.45	45.79	11.443	218.9	19.436	6.543	410.3	86.62	10.19	3.935		
(F) DCcal 0.989												
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	20.2	45	45	216	77	65	406	343	101	117		
(I) Vac Σ	20.0	45.0	11.4	216	19.65	6.40	401	84.55	10.0	3.80		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. 0.999												
(M) ρ dc/ρac=ExL/K	1.021	1.017	1.003	1.012	1.019	1.021	1.022	1.023	1.018	1.034		
(N) PFE=(M-1)(10^2)	2.1	1.7	0.3	1.2	1.9	2.1	2.2	2.3	1.8	3.4		
(O) MCF=(M-1)(10^5)/H	105	38	7	6	25	32	5	7	18	29		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	45	34	23	12	45	34	23	12	CAL	CAL		
(B) Receive	40-50 E	—	—	—	50-60E	—	—	—	23/2A	45/2A		
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	3	—	—	—	—	—	—	—	2	2		
(E) Vdc (avg)	135.28	41.529	5.575	2.361	59.935	20.3	3.016	1.457	200.5	204		
(F) DCcal 0.989									.9975	.9804	.989	
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	535	411	165	82	593	402	104	81				
(I) Vac Σ	133	40.7	5.40	2.245	58.6	20.0	2.95	1.385	200	204		
(J) AC noise x 2									.9975	1.000	.999	
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. 0.999	1.016	1.019	1.031	1.051	1.022	1.014	1.021	1.051				
(M) ρdc/ρac =ExL/K	1.6	1.9	3.1	5.1	2.2	1.4	2.1	5.1				
(N) PFE=(M-1)(10^2)												
(O) MCF=(M-1)(10^5)/H	3	5	19	62	4	3	20	63				

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 PAGE
LINE 1 HALF E SP. 1 DATE 3-7-68

SEND	12	23	12	34	23	12	45	34	23	12
RECEIVE	0-10E	10-20E	—	20-30E	—	—	30-40E	—	—	—
RANGE	30	100	30	300	30	10	1000	100	30	10
DC 1	209200	465441	124101	216221	201188	632672	410411	860875	104100	440350
DC 2	210200	481440	129 98	218221	204 181	580740	410410	860871	104 96	445345
DC 3	209198	470450	137 91	216221	206 184	620690	410410	860870	108 95	465320
DC 4			136 94		211 172	650700			111 95	320960
DC 5						610720				
DC 6										
DC 7										
DC 8										
DC AVG.	20.45	45.79	11.443	218.9	19.436	6.543	410.3	86.62	10.19	3.935
AC 1	20.0	45.0	11.4	216	19.0	6.40	401	84.5	10.0	3.7
AC 2	20.0	45.0	11.4	216	19.1	6.40	401	84.6	10.0	3.9
AC AVG.	20.0	45.0	11.4	216	19.05	6.40	401	84.55	10.0	3.80
S.P.	+6.3	+0.6	—	-6.1	—	—	-9.3	—	—	—
AC NOISE	<.1	<.1	—	<.1	—	—	<.1	—	—	—
POT RES.	700	✓	—	✓	—	—	✓	—	—	—

SOE Shale & Schist

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 PAGE
LINE 1 HALF E SP. 1 DATE 3-7-68

SEND	45	34	23	12	45	34	23	12	CAL	CAL
RECEIVE	40-50				50-60	E			23/2A	45/2A
RANGE	300	100	10	3	100	30	10	3	AC 200	AC 204
DC 1	136/135	420/415	525/590	245/212	635/574	202/206	304/340	144/155	200	204
DC 2	136/135	415/415	530/600	256/198	625/575	200/208	270/345	134/196	DC 201	DC 204
DC 3	136/134	415/415	530/560	240/226	622/572	198/207	230/390	110/159	200	204
DC 4	136/134	412/420	530/600	215/261	623/570	201/201	310/245	91/195	201	204
DC 5				244/241	630/572	206/198	350/281	111/192	200	204
DC 6				249					300	300
DC 7								~	200.5	
DC 8										
DC AVG.	135.28	41.529	5.575	2.361	59.939	20.3	3.016	1.457		
AC 1	134	40.5	5.40	2.25	58.8	20.0	2.90	1.32		
AC 2	132	40.9	5.40	2.24	58.5	20.6	3.00	1.45		
AC AVG.	133	40.7	5.40	2.245	58.6	20.0	2.95	1.385		
S.P.	+6.5				-186					
AC NOISE	<.1				<.1					
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT 213-67 LINE 1 HALF E SP. 1 DATE 3-7-68

PAGE

SEND	12	23	12	34	23	12	45	34	23	12
RECEIVE	0-10E	10-20E	→	20-30E	→	→	30-90E	→	→	→
RANGE	Hi	→	→	→	→	→	→	→	→	→
VOLTAGE	130	110	130	120	110	130	180	120	110	130
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
SEND	45	34	23	12	45	34	23	12	CAL ②	CAL ①
RECEIVE	90-50E	→	→	→	50-60E	→	→	→	4-5	T
RANGE	Hi	→	→	→	→	→	→	→	Hi	Hi
VOLTAGE	190	120	110	130	190	120	110	130	120	80
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0

FREQUENCIES .05 Hz 1.0 Hz

SENDER NO. 6644-S

OPERATOR McCoy

RECEIVER NO. 15674 R

OPERATOR King

COMMENTS: CAL ① CT 2.0A 80V. CAL ② 4-5

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project 2/3-67 Line 151 W1/2 Field date 3-7-68 Data page_____ Comp. date 3-8-68. Comp by_____

(A) Send	45	34	45	23	34	45	12	23	34	45		
(B) Receive	0-10W	10-20W	—	20-30W		—		30-40W	—	—		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	3	—	—	—	—	—	—	—	—	→		
(E) Vdc (avg)	45.8	20.34	11.39	18.03	4.93	4.623	17.93	4.147	2.183	2.893		
(F) DCcal 0.982												
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	45	20.1	45	18	19	45	18	16	21	57		
(I) Vac Σ	45.0	19.9	11.1	17.6	4.79	4.555	17.9	4.06	2.12	2.80		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. 0.989												
(M) ρ dc/ρac=ExL/K	1.007	1.011	1.015	1.013	1.018	1.004	.990	1.025	1.018	1.022		
(N) PFE=(M-1)(10^2)	0.7	1.1	1.5	1.3	1.8	0.4	-0.9	2.5	1.8	2.2		
(O) MCF=(M-1)(10^5)/H	16	55	33	72	95	9	-50	156	86	39		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	12	23	34	45	12	23	34	45	CAL	CAL		
(B) Receive	40-50W	—			50-60W	—						
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	3	—	—	—	—	—	—	→	2	2		
(E) Vdc (avg)	31.49	1.12	1.186	1.894	1.672	0.78	1.359	2.424	204	203.5		
(F) DCcal 0.982									.9804	.9828	.982	
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	12.4	11	23	65	16	15	47	75				
(I) Vac Σ	31.6	1.09	1.16	1.86	1.66	0.775	1.31	2.35	202	201		
(J) AC noise x 2									.9902	.9877	.989	
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal. 0.989												
(M) ρdc/ρac =ExL/K	1.005	1.016	1.011	1.007	.996	.992	1.026	1.020				
(N) PFE=(M-1)(10^2)	0.5	1.6	1.1	0.7	-0.4	-0.8	2.6	2.0				
(O) MCF=(M-1)(10^5)/H	4	145	48	11	-25	-53	55	27				

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 PAGE
LINE 1 HALF W SP. 1 DATE 3-7-68

SEND	45	34	45	23	34	45	12	23	34	45
RECEIVE	0-10W	10-20W	—	20-30W	—	—	30-40W	—	—	—
RANGE	100	30	30	30	10	10	30	10	3	3
DC 1	462452	201206	116 112	180 181	450540	520405	178 180	468 370	236 199	286 289
DC 2	465452	201205	116 112	180 181	440 550	515 415	178 181	441 390	238 200	295 284
DC 3	465450	202205	116 111	179 181	430560	516 410	178 181	445 385	238 200	296 284
DC 4								440 376	238 199	291 286
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.	45.8	20.34	11.39	18.03	4.93	4.632	17.93	4.147	2.183	2.893
AC 1	45.0	19.9	11.1	17.6	4.80	4.55	17.9	4.0	2.12	2.80
AC 2	45.0	19.9	11.1	17.6	4.78	4.56	17.9	4.0	2.12	2.80
AC AVG.	45.0	19.9	11.1	17.6	4.79	4.555	17.9	4.0	2.12	2.80
S.P.	-13.6	-5.9	—	-27.0	—	—	-1.2	—	—	—
AC NOISE	<.1	<.1	—	<.1	—	—	<.1	—	—	—
POT RES.	✓	✓	—	✓	—	—	✓	—	—	—

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 3-7-68
LINE 1 HALF W SP. 1 DATE

PAGE

SEND	12	23	54	45	12	23	34	45	CAL	CAL
RECEIVE	40-50				50-60	W			34/2A	12/2A
RANGE	10	3	3	3	3	1	3	3	AC 202	AC 201
DC 1	330295	114 116	109121	176 199	144 182	72 82	135 140	244 246	202	201
DC 2	341291	104 118	121 118	173 204	150 180	71 84	125 146	248 234	DC 204	DC 204
DC 3	341286	94 132	114 112	175 205	156 180	74 85	126 141	248 236	204	203
DC 4	345281	101 125	131 115	169 214	156 176	71 84	125 144	245 236	204	204
DC 5			121	170 215	169 168	69	130 146	248 236	204	203
DC 6							136	249		203.5
DC 7										
DC 8										
DC AVG.	31.49	1.12	1.186	1.894	1.672	.78	1.359	2.424		
AC 1	31.0	1.09	1.16	1.86	1.66	.775	1.31	2.35		
AC 2	31.0	1.09	1.16	1.86	1.66	.780	1.31	2.35		
AC AVG.	31.0	1.09	1.16	1.86	1.66	.7775	1.31	2.35		
S.P.	-8.5				-13.4					
AC NOISE	<.1				<.1					
POT RES.	✓				✓					

PAGE

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT 213-67 LINE 1 HALF W SP. 1 DATE 3-7-68

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-10W	10-20W	→	20-30W	→	→	30-40W	→	→	→
RANGE	Hi	→	→	→	→	→	→	→	→	→
VOLTAGE	180	120	180	110	120	180	120	110	120	180
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CAL. ①	CAL
RECEIVE	40-50W	→	→	→	50-60W	→	→	→	1-2	T
RANGE	Hi	→	→	→	→	→	→	→	Hi	Hi
VOLTAGE	120	110	120	180	120	110	120	180	80	80
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0

FREQUENCIES .05 HZ 1.0 HZ

SENDER NO. 6644-S

OPERATOR McCoy

RECEIVER NO. 15674 R

OPERATOR Kirvq

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT 213-67

LINE 2 HALF E SP. 1 DATE 3-11-68

PAGE

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-10E	10-20E	→	20-30E		→	30-40E			→
RANGE	Hi					→	Hi			→
VOLTAGE	160	180	160	240	180	160	90	240	180	160
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	1.0	3.0	3.0	3.0
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL (1)	CAL (2)
RECEIVE	40-50E			→	50-60E			→	CENTER	4-5
RANGE	Hi			→	Hi			→	Hi	Hi
VOLTAGE	90	240	150	160	90	240	150	170	120	90
CURRENT	1.0	3.0	3.0	3.0	1.0	3.0	3.0	3.0	2.0	1.0

FREQUENCIES .05HZ 1.0HZ

SENDER NO. 6694-5

OPERATOR McCoy

RECEIVER NO.

OPERATOR King

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PAGE

PROJECT 213-67

LINE 2 HALF W SP. 1 DATE 3-11-68

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-10W	10-20W	→	20-30W	→	→	30-40W	→	→	→
RANGE	Hi	→	→	→	→	Hi	→	→	→	→
VOLTAGE	90	240	90	160	240	90	160	170	240	90
CURRENT	1.0	3.0	1.0	3.0	3.0	1.0	3.0	3.0	3.0	1.0

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CAL①	CAL②
RECEIVE	40-50W	→	→	→	50-60W	→	→	→	3-4	1-2
RANGE	Hi	→	→	→	Hi	→	→	→	Hi	Hi
VOLTAGE	160	160	240	90	160	160	240	90	160	100
CURRENT	3.0	3.0	3.0	1.0	3.0	3.0	3.0	1.0	2.0	2.0

FREQUENCIES .05 HZ 1.0 HZ.

SENDER NO. 6649-S

OPERATOR McCoy

RECEIVER NO.

OPERATOR King

COMMENTS: 53 53 80 90 Ω

48 7 90 P

-1

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 PAGE
LINE 2 HALF E SP. 1 DATE 3-11-67

SEND	12	23	12	34	23	12	45	34	23	12
RECEIVE	0-10E	10-20E	—	20-30E	—	—	30-40E	—	—	—
RANGE	100	100	30	1000	30	10	100	300	30	10
DC 1	300 301	700 660	120 118	360 355	225 235	750 610	821 780	126 142	106 111	430 420
DC 2	299 312	700 660	90 134	360 351	224 211	770 630	870 790	125 144	126 115	520 270
DC 3	300 312	640 670	129 100	360 350	254 184	590 410	880 780	120 141	95 111	370 220
DC 4		680 650	96 135		241 196	710 450	870 762	122	114 x86	230 310
DC 5			100 110							370
DC 6										
DC 7	P									
DC 8										
DC AVG.	60.7	133.86	22.5	712.4	44.9	12.37	164.6	265.33	22.0 ~~22.53~~	6.91
AC 1	30.1	66.0	11.0	350	22.0	6.00	82.0	131	10.5	3.70
AC 2	30.2	66.0	11.0	350	22.0	~~5.90~~	82.0	131	10.6	3.60
AC AVG.	60.3	132.0	22.0	700	44.0	~~11.9~~	164	262	21.1	7.30
S.P.	-16.3	-0.9	—	-15.0	—	12.0	+1.2	—	—	—
AC NOISE	<.3	<.3	—	<.3	—	—	<.3	—	—	—
POT RES.	3.5	15	—	20	—	—	3.4	—	—	—

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 3-11-68
LINE 2 HALF E SP. 1 DATE

PAGE

SEND	45	34	23	12	45	34	23	12	CAL	CAL
RECEIVE	40-50E				50-60E				23/2A	45/1A
RANGE	30	100	10	3	30	30	10	3	AC 205	104
DC 1	220 185	465 425	320 360	165 180	95 122	264 275	~~256 185~~	120 102	205	104
DC 2	215 166	456 420	310 460/	135 235	94 112	261 276	260 260	90 145/	AUG	
DC 3	214/57	450 430	340	135 250	104 106	248/256	470	135 110	DC 204	104
DC 4	204	465 440			110 101	270		124/	205	103
DC 5			N	N	102 110				204	104
DC 6									205	103
DC 7										
DC 8										
DC AVG.	38.3	88.53	7.07	3.57	21.2	53.2	5.20 ~~4.75~~	2.26	409	207
AC 1	19.4	43.5	3.90	1.50	10.5	25.8	2.50	1.04		
AC 2	19.3	43.2	3.90	1.45	10.5	25.9	2.60	0.95		
AC AVG.	38.7	86.7	7.80	2.95	21.0	51.7	5.10	1.99	410	208
S.P.	-5.0				-4.8					
AC NOISE	2.3				2.3					
POT RES.	1.6				1.5					

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 PAGE
LINE 2 HALF W SP. 1 DATE 3-11-68

SEND	45	34	45	23	34	45	12	23	34	45
RECEIVE	0-10W	10-20W	—	20-30W	—	—	30-40W	—	—	—
RANGE	30	100	10	30	30	3	30	10	10	3
DC 1	226 205	316 294	400 310	110 144	145 78	230 190	232 294	380 330	550 590	120 110
DC 2	225 205	315 292	380 370	106 148	104 119	228 202	232 245	370 330	620 540	110 141
DC 3	224 202	320 299	401 370	105 151	109 120	228 166	230 245	375 335	560 620	120 151
DC 4			360 370		100 124	256	230 246	375 345	570 560	154 121
DC 5										
DC 6										
DC 7										
DC 8										
DC AVG.	42.92	61.0	7.36	25.3	22.28	4.19	47.6	7.08	11.59	2.60
AC 1	21.1	30.0	3.60	12.5	11.0	2.06	23.4	3.50	5.75	1.26
AC 2	21.1	30.0	3.60	12.5	11.0	2.06	23.5	3.50	5.80	1.30
AC AVG.	42.2	60.0	7.20	25.0	22.0	4.12	46.9	7.00	11.55	2.56
S.P.	+30.1	0	—	+3.5	—	—	−18.1	—	—	—
AC NOISE	<.1	<.1	—	<.2	—	—	<.3	—	—	—
POT RES.	2.0	1.8	—	1.3	—	—	0.6	—	—	—

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 3-11-68
LINE 2 HALF W SP. 1 DATE

PAGE

SEND	12	23	34	45	12	23	34	45	CAL	CAL
RECEIVE	40-50W				50-60W				34/2A	12/2A
RANGE	70	3	10	3	3	1	3	1	AC 204	204
DC 1	540645	160156	350445	90 101	246 192	80/75	245285	57 71	209	204
DC 2	530 640	166 145	345450	86 104	236 191		235280	72 72	AUG	
DC 3	540640	179 124	345435	90 104	225 186		245280	56 76	DC 204	204
DC 4	538640	185	350430	57 106	221		240270	66	204	204
DC 5						N			204	204
DC 6									204	204
DC 7										
DC 8										
DC AVG.	11.76	3.14	7.89	1.83	4.21	1.55	5.21	1.36	408	408
AC 1	5.80	1.55	3.90	0.90	2.14	0.78	2.54	0.66		
AC 2	5.80	1.56	3.85	0.92	2.14	0.76	2.55	0.61		
AC AVG.	11.6	3.11	7.75	1.82	4.28	1.54	5.09	1.27	408	408
S.P.	+5.3				-22.1					
AC NOISE	<.2				<.1					
POT RES.	1.1				2.2					

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Owlhead Line 2 E1/2 Field date_____ Data page_____ Comp. date_____. Comp by_____

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	3A	→	→	→	→	→	1A	3A	→	→		
(E) Vdc (avg)	60.7	133.86	22.5	712.4	44.9	12.37	164.6	265.33	~~22.53~~ 22.0	6.91		
(F) DCcal .486	.489/.483											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρdc=ExFxGx10^3/D	30	65	44	346	87	60	240	516	109	67		
(I) Vac Σ	60.3	132.0	22.0	700.0	44.0	~~11.9~~ 12.0	164.0	262.0	21.1	7.30		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.0	1.8	2.6	2.1	2.4	~~4.35~~ 3.0	0.7	1.6	~~7.2~~ 4.1	-5.0		
(O) MCF=(M-1)(10^5)/H												

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		cal	cal	
(B) Receive	40-50	→	→	→	50-60	→	→	→		center	4-5	
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	1A	3A	→	→	1A	3A	→	→		2A	1A	
(E) Vdc (avg)	38.3	88.53	7.07	3.57	21.2	53.2	5.20	2.26		409	207	
(F) DCcal										.489	.483	
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρdc=ExFxGx10^3/D	223	430	69	61	309	517	88	62				
(I) Vac Σ	38.7	86.7	7.80	2.95	21.0	51.7	5.10	1.99		410	208	
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.										1.002	1.005	
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	-0.7	2.5	-9.0	21.4	1.3	3.3	2.3	14.0		1.0035		
(O) MCF=(M-1)(10^5)/H												

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Owlhead Line 2 W/2 Field date_____ Data page_____ Comp. date_____. Comp by_____

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-10	10-20	→	20-30	→	→	30-40	→	→	→		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	1A	3A	1A	3A	→	1A	3A	→	→	1A		
(E) Vdc (avg)	42.92	61.0	7.36	25.3	22.28	4.19	47.6	7.08	11.59	2.60		
(F) DCcal	.490											
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	63	30	43	12	44	62	23	14	57	76		
(I) Vac Σ	42.2	60.0	7.20	25.0	22.0	4.12	46.9	7.00	11.55	2.56		
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000											
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.7	1.7	2.2	1.2	1.3	1.7	1.5	1.1	0.3	1.6		
(O) MCF=(M-1)(10^5)/H												

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		cal	cal	
(B) Receive	40-50	→	→	→	50-60	→	→	→				
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	3A	→	→	1A	3A	→	→	1A		2A	2A	
(E) Vdc (avg)	11.76	3.14	7.89	1.83	4.21	1.55	5.21	1.36		408	408	
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	23	15	77	94	21	15	89	112				
(I) Vac Σ	11.6	3.11	7.75	1.82	4.28	1.54	5.09	1.27		408	408	
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	1.4	1.0	1.8	0.5	-1.6	0.6	2.4	7.1				
(O) MCF=(M-1)(10^5)/H												

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 3-12-68
LINE 3 HALF E SP. 1 DATE

PAGE

SEND	12	23	12	34	23	12	45	34	23	12
RECEIVE	0-10E	10-20E	—	20-30E	—	—	30-40E	—	—	—
RANGE	100	100	30	1000	30	30	300	300	30	10
DC 1	560 560	670 701	205 215	370 365	279 289	114 146	280 280	104 106	15 124	770 690
DC 2	562 551	670 700	204 214	370 365	280 289	110 139	280 280	102 107	146 126	805 690
DC 3	561 560	669 691	205 210	370 365	272 290	114 135	280 280	102 106	141 129	815 740
DC 4	560 550	670 690	205 214	370 365	275 286	118 130	281 279	104 106	144 125	810 670
DC 5	561 561	681 680	204 211		280 286	120 130		104 106	145 131	795 685
DC 6	560 556	689 670	206 210		276 286	120 132				800 645
DC 7										830 640
DC 8										840 630
DC AVG.	111.7	136.6	41.74	735	56.46	25.18	560.1	209.3	27.13	14.83
AC 1	56.0	68.5	20.8	365	28.0	12.5	279	105	13.5	7.35
AC 2	56.0	68.5	20.8	365	28.1	12.5	279	104	13.5	7.38
AC AVG.	112	137.0	41.6	730	56.1	25.0	558	209	27.0	14.73
S.P.	-1.5	+0.2	—	+6.0	—	—	+7.7	—	—	—
AC NOISE	<.1	<.1	—	<.1	—	—	<.1	—	—	—
POT RES.	2.4	1.1	—	1.1	—	—	1.2	—	—	—
	0.8	0.4	1.3	1.8	1.7	1.7	1.3	1.1	1.4	1.8

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 3-12-68
LINE 3 HALF E SP. 1 DATE

PAGE

SEND	45	34	23	12	45	34	23	12	CAL	CAL
RECEIVE	40-50E				50-60E				23/2A	45/2A
RANGE	300	100	10	10	100	30	10	10	AC 204	204
DC 1	95 104	520600	875970	590560	AD 360	284261	520480	36 27	204	204
DC 2	96 103	520595	835995	520540	416355	279266	490470	34 34	116	
DC 3	96 102	515610	870930	605435	415360	270267	530480	27 345	DC 201	201
DC 4	96 103	505610	825990	610500	415360	269266	440590	275 37	202	204
DC 5	96 104	510602	810945	610430	420355	280261	390570	26 395	201	201
DC 6	95 104	512606	855942	560541	441354	286359	410610	353295	202	204
DC 7		512592	860900E		420		390566	325320		
DC 8			951850				440	32 305		
DC AVG.	199	111.58	17.99	10.8	77.75	54.11	9.85	6.41	403	405
AC 1	99.0	55.0	8.90	5.35	38.8	26.8	4.90	3.20		
AC 2	99.0	55.0	8.88	5.32	38.5	27.0	4.90	3.18		
AC AVG.	198	110	17.78	10.67	77.1	53.8	9.80	6.38	408	408
S.P.	+0.9				+03					
AC NOISE	<.1				<.2				1.01	0 mv
POT RES.	1.6				1.1					
	1.4	2.3	2.2	2.2	1.9	1.6	1.6	1.6		

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PAGE

PROJECT 213-67 3-12-68

LINE 3 HALF E SP. 1 DATE

SEND	12	23	12	34	23	12	45	34	23	12
RECEIVE	0-10E	10-20E	—	20-30E		—	30-40E		—	—
RANGE	Hi	—	—	→	Hi	—	—	—	—	→
VOLTAGE	200	140	200	190	140	200	210	190	140	200
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
SEND	45	34	23	12	45	34	23	12	CAL	CAL
RECEIVE	40-50E	—	—	—	50-60E	—	—	—	23/2A	45/2A
RANGE	Hi	—	—	→	Hi	—	—	→	Hi	Hi
VOLTAGE	210	140	140	200	210	190	140	200	100	150
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0

FREQUENCIES .15 HZ 1.0 HZ

SENDER NO. 6644-5

OPERATOR Don McCoy

RECEIVER NO. 15674-R

OPERATOR King

COMMENTS:

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 PAGE
LINE 3 HALF W SP. 1 DATE 3-12-68

SEND	45	34	45	23	34	45	12	23	34	45
RECEIVE	0-10W	10-20W	—	20-30W	—	—	30-40W	—	—	—
RANGE	100	100	30	100	30	30	100	30	10	10
DC 1	660 705	561 542	195 219	471 476	145 157	280 310	460 480	176 180	835 880	550 590
DC 2	660 706	562 542	194 220	470 472	149 161	287 311	458 486	176 181	841 879	548 590
DC 3	659 706	562 542	192 221	476 475	149 160	270 310	455 488	175 181	842 876	550 590
DC 4	660 705	563 541	192 220	469 476	148 159	284 311	456 490	175 181	841 872	550 589
DC 5			194 220	469 478	150 156	280 312	455 490	174 182	852 862	550 590
DC 6					151 156	281 311	451 491	174 182	858 870	550 589
DC 7						286 311	451 491	174 183	851 865	549 591
DC 8							450 492	174 184	850 871	547 590
DC AVG.	136.53	110.4	41.32	94.47	30.74	59.21	94.24	35.6	17.19	11.39
AC 1	67.4	55.0	20.5	47.4	15.1	29.5	46.9	17.5	8.50	5.62
AC 2	67.5	55.0	20.5	47.4	15.1	29.6	46.9	17.5	8.50	5.61
AC AVG.	134.9	110.0	41.0	94.8	30.2	59.1	93.8	35.0	17.00	11.23
S.P.	+1.6	-0.4	—				+2.3			
AC NOISE	<.1	<.1	—	<.1	—	—	<0.1			
POT RES.	1.1	0.8	—	1.6	—	—	0.8			

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 213-67 3-12-68
LINE 3 HALF W SP. 1 DATE

PAGE

SEND	12	23	34	45	12	23	34	45	CAL	CAL
RECEIVE	40-50 W	—	—	—	50-60 W	—	—	—	34/2A	12/2A
RANGE	30	10	10	10	10	10	3	3	AC 202	204
DC 1	176 156	849 720	421 572	260 450	640 591	310 330	241 265	211 165	202	204
DC 2	179 156	860 717	420 568	355 350	640 596	311 321	239 266	215 164	DC 201	204
DC 3	181 156	860 720	423 570	352 358	640 598	311 321	236 266	215 165	201	205
DC 4	181 155	860 714	415 580	350 359	639 600	311 322	236 265	211 170	201	204
DC 5	181 154	862 709	415 584	356 353	638 599	312 323	236 264	211 166	201	205
DC 6	182 154	872 695	410 580	349 361	639 598	315 320	241 264	210 170		
DC 7	182 154	735 838	410 580	341 361	639 600	315 320	239 265	208 171		
DC 8	183 153	736 841	409 585	346 362	640 615	315 321	239 266	207 172		
DC AVG.	33.6	15.74	9.92	7.06	12.37	6.36	5.03	3.78	402	
AC 1	16.6	7.76	4.91	3.50	6.10	3.16	2.46	1.86		
AC 2	16.6	7.79	4.90	3.50	6.10	3.18	2.48	1.86		
AC AVG.	33.2	15.55	9.81	340 362	12.20	316 320	240	170 206		
S.P.	+15.2	740	586	—	−10.3	318 320		169		
AC NOISE	<.1	—	—	—	<.1					
POT RES.	1.4	—	—	—	0.95					
	1.2	1.3	1.2	1.0	1.4	0.4	1.9	1.7		

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PAGE

PROJECT 213-67 3-12-68

LINE 3 HALF W SP. 1 DATE

SEND	45	34	45	23	34	45	12	23	34	45
RECEIVE	0-10W	10-20W	—	20-30W	—	—	30-40W	—	—	—
RANGE	Hi	—	—	→	Hi	—	—	—	—	→
VOLTAGE	210	190	210	140	180	210	190	140	190	210
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
SEND	12	23	34	45	12	23	34	45	CAL	CAL
RECEIVE	40-50W	—	—	—	50-60W	—	—	—	3-4/2A	12/2A
RANGE	Hi	—	—	—	→ Hi	—	—	→	Hi	Hi
VOLTAGE	190	140	180	210	190	140	180	210	120	130
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	2.0

FREQUENCIES .15 Hz 1.0 Hz

SENDER NO. 6644-S

OPERATOR Don McCoy

RECEIVER NO. 15674FR

OPERATOR King

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT 3641 3-12-68

LINE 3 HALF E SP. 1 DATE

PAGE

SEND										
RECEIVE										
RANGE										
VOLTAGE										
CURRENT										
SEND	45	34	23	12	45	34	23	12	CAL	4-5/2 CAL
RECEIVE	40-50E				50-60E					
RANGE	Hi								Hi	
VOLTAGE	210	190	140	200	210	190	140	200	150	
CURRENT	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.0	

FREQUENCIES .15 HZ 1.0 HZ

SENDER NO. 8644-5

OPERATOR Don McCoy

RECEIVER NO. 3641

OPERATOR King

COMMENTS:

Comparing MK2 to MK4

Don: 2 Cals at 45

2 Seq's at 40E & 50E, 2 Mins. change over

MK-3

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 3641 3-12-68
LINE 3 HALF E SP. 1 DATE

PAGE

SEND	45	34	23	12	45	34	23	12	CAL	15/2A
RECEIVE	40-50E				50-60E					
RANGE	300	100	10	10	100	30	10	10		
DC 1	96 100	56 75	85 92	52 51	385 372	261 284	40 42	36 29		
DC 2	96 99	560 566	87 91	54 56 /	382 376	264 281	64 27	25 37		
DC 3	96 100	558 556	86 98	51 54	380 378	265 276	43 61	89 27		
DC 4	98 96	560 548	88 99	51 57	380 376	270 276	43 40	33 32		
DC 5	99 97	558 546	79/88	50 54	379 380	264 285	63 24	28 30	201	
DC 6		560 545	89 87	53 55	378 376	266 267	56 44	33 32	201	
DC 7		560 548	99 81	50 60	382 375	283 269	53 41	21 41	201	
DC 8			93 97	52 51	375	274 271	53 58	28 37	201	
DC AVG.	195.7	111.0	17.95	10.66	75.7	261	9.52	6.10		
AC 1	104	57.5	9.45	5.60	39.8	28.5	5.10	3.25	215	
AC 2	104	57.6	9.45	5.60	39.8	28.6	5.05	3.28	215	
AC AVG.	208	115.1	18.90	11.20	79.6	57.1	10.15	6.53	430	
S.P.	-1.4				-4.3		49 57			
AC NOISE	<1.3				<1.3					
POT RES.	800				450					

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project B213-67 Line 3 - E½ Field date_____ Data page_____ Comp. date_____. Comp by [illegible]

(A) Send	12	23	12	34	23	12	45	34	23	12		
(B) Receive	—	—	—	—	—	—	—	—	—	—		
(C) n separation												
(D) I	3	—	—	—	—	—	—	—	—	—		
(E) Vdc (avg)	111.7	136.6	41.7	735	56.5	25.18	560	209.3	27.13	14.83		
(F) DCcal												
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	55 [illegible]	68 [illegible]	83 [illegible]	363	112	124	277	415	134	147		
(I) Vac Σ	112.0	137.0	41.6	730	56.[illegible]	25.[illegible]	558	209.0	27.0	19.73		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	0.8 [illegible]	0.8 [illegible]	1.3 [illegible]	1.8	1.7	1.7	1.3	1.1	1.4	1.8		
(O) MCF=(M-1)(10^5)/H	15	12	16	5	15	14	5	3	10	12		
	13	15	13									

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	45	34	23	12	45	34	23	12		C42		
(B) Receive	—	—	—	—	—	—	—	—				
(C) n separation												
(D) I	—	—	—	—	—	—	—	—		2000	2000	
(E) Vdc (avg)	199	111.6	17.99	10.80	77.8	54.1	9.85	6.41		403	405	
(F) DCcal										.495 avg		
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	394	552	178	187	385	535	171	178				
(I) Vac Σ	198	110.0	17.78	10.67	77.1	53.8	9.80	6.38		408	408	
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.										1.0	10 avg	
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	1.4	2.3	2.2	2.2	1.9	1.6	1.6	1.6		MK 4		
(O) MCF=(M-1)(10^5)/H	4	4	12	12	5	3	9	9			2000	
	195.7	111.0	17.95	10.66	75.7	54.5	9.52	6.10			402	
Test	388	551	178	185	375	541	165	169	ρ_2	MK 3		
	0.6	3.0	1.6	1.7	1.6	2.0	0.2	0.0	PFE			

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project B213.62 Line 3-WE Field date_____ Data page_____ Comp. date_____. Comp by [illegible]

(A) Send	45	34	45	23	34	45	12	23	34	45		
(B) Receive	—	—	—	—	—	—	—	—	—	—		
(C) n separation												
(D) I	3											
(E) Vdc (avg)	136.5	110.4	41.3	94.6	30.2	59.2	94.2	35.6	17.19	11.39		
(F) DCcal												
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	67	55	82	47	61	292	47	70	85	112		
(I) Vac Σ	134.9	110.0	41.0	94.8	30.2	59.1	93.8	35.0	17.05	[illegible]		
(J) AC noise x 2												
(K) Vac(corr) $=\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.3	0.5	0.9	-0.1	1.9	0.2	0.6	1.9	1.2	1.3		
(O) MCF=(M-1)(10^5)/H				-2	31	2	13	27	14	12		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	12	23	34	45	12	23	34	[illegible]		[illegible]		
(B) Receive	—	—	—	—	—	—	—	—				
(C) n separation												
(D) I	—	—	—	—	—	—	—	→		2000	1000	
(E) Vdc (avg)	33.6	15.74	9.92	7.06	12.37	6.36	5.03	3.78		402	409	
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168			493 avg	
(H) ρ dc=ExFxGx10^3/D	66	78	98	122	61	63	87	104				
(I) Vac Σ	33.2	15.55	9.81	7.00	12.20	6.34	4.94	3.72		404	408	
(J) AC noise x 2												
(K) Vac (corr) $=\sqrt{I^2 - J^2}$										1.00	1 avg	
(L) AC-DC cal.												
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	1.2	1.3	1.2	1.0	1.4	0.4	1.9	1.7				
(O) MCF=(M-1)(10^5)/H	18	17	12	8	23	6	22	10				

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT OWL HEAD

LINE 4 HALF E SP. ____ DATE 3-19-6

PAGE

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-10E	10-20E	→	20-30E	→	→	30-40E	→	→	→
RANGE	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi
VOLTAGE	450	460	440	470	460	440	500	460	460	440
CURRENT	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2		CAL. 4-5
RECEIVE	40-50E	→	→	→	50-60E	→	→	→		2.0
RANGE	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi		Hi
VOLTAGE	500	460	460	440	500	460	460	440		160
CURRENT	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		2.0

FREQUENCIES .15 1.0

SENDER NO. 156735

OPERATOR HIX

RECEIVER NO. MK4

OPERATOR PALMER

COMMENTS: X30-00.0-200 -

PAGE

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Owlhead
LINE 4 HALF E SP. 1 DATE 3-19

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-10	10-20	→	20-30	→	→	30-40	→	→	→
RANGE	100	100	30	100	30	30	3000	100	30	30
DC 1	250	49.6 51.4	22 20.8	76.0 70.5	195 148	86 0.90	1090	245	135 118	110 130
DC 2	220	64.0 59.2	23 22.40	64.0 63.0	175 175	10.0 16.0	1090	335 282	81 119	41 25
DC 3	25.0	49.0 50.8	20.8 21.8	696 720	155 155	9.2 10.0	1090	285 240	118 75	125 100
DC 4	23.0	63.0 61.2	25.0 21.8	680 675	164 191	10.4 11.0	1090	265 360	110 139	05 45
DC 5		46.7 48.0	20.0 21.8	720 700	199 140	12.4 49		300 265	92 80	104 125
DC 6		63.6 62.8	23.2 24.2	828 62	160 180	9.1 17		340 270	86 111	25 02
DC 7		48.2 45.2	22.0 18.2	705	138 170	9.5 6.0		240 300	140 117	125 154
DC 8		60.8 63.4	23.2 26.0	685	211 189	17.0		317 280	70 95	2.0 04
DC AVG.	48.0	110.6	44.5	136.8	37.0	20.8	2180	70.8 58.3	20.95	14.97
AC 1	24.0	55.2	22.1	68.0	16.7	10.0	1090	28.8	10.4	7.30
AC 2	24.0	55.2	22.1	68.0	16.7	10.0	1090	28.8	10.4	7.30
AC AVG.	48.0	110.4	44.2	136.0	33.4	20.0	2150	57.6	20.80	14.6
S.P.	-10.7	+11.7		-7.3			+1.0			
AC NOISE	.05	.06		.90			.40			
POT RES.	.15									→
	0.5	0.7	1.3	1.1	3.3	4.58	1.9	1.7	1.2	3.0

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Owlhead

LINE 4 HALF E SP. 1 DATE

PAGE

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	cal	cal
RECEIVE	40-50	→	→	→	50-60	→	→	→		.15
RANGE	1000	30	30	10						30
DC 1	490	210 203	74 86	801 680						204
DC 2	498	115 119	60 70	30 385						204
DC 3	490	204 198	93 66	850 955						204
DC 4	498	114 124	64 83	254 245						204
DC 5		202 191	75 76	870 905						
DC 6		122	75 60	265 270						
DC 7		198	75 90	770 900						
DC 8		120	59 68	435 185						
DC AVG.	988	72.1	14.71?	11.41?						408
AC 1	480	15.9	7.10	5.63						205
AC 2		15.9	7.20							205
AC AVG.	960	31.8	14.30	11.26						410
S.P.	-4.4									
AC NOISE	.13									
POT RES.	.15 KΩ									
	1.4	1.4	1.4?	1.4?						

[redacted]

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Owlhead Line 4 F½ Field date 3/19/68 Data page_____ Comp. date_____. Comp by G.S.L.

(A) Send	12	23	12	34	23	12	45	34	23	12		
(B) Receive	—	—	—	—	—	—	—	—	—	—		
(C) n separation												
(D) I	6											
(E) Vdc (avg)	48.0	110.6	44.5	136.8	39.0	20.8?	218.0	58.3	20.95	14.97?		
(F) DCcal												
(G) Kn x 10^{-3}	3	3	12	3	12	20	3	12	20	60		
(H) ρ dc=ExFxGx10^3/D	12	27	44	34	33	51	534	57	51	73		
(I) Vac Σ	48.0	110.4	44.2	136.0	38.4	20.0	215.0	57.6	20.80	14.60		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	0.5	0.7	1.2	1.1	2.3	4.5?	1.9	1.7	1.2	3.0?		
(O) MCF=(M-1)(10^5)/H	50	15	32	32	70	88?	4	30	24			

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	45	34	23	12	45	34	23	12				
(B) Receive	—				—							
(C) n separation												
(D) I										2.00		
(E) Vdc (avg)	38.8	32.1	14.71?	11.41?						9.08		
(F) DCcal												
(G) Kn x 10^{-3}	12	20	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	459	39	72	78								
(I) Vac Σ	960	31.8	14.30	11.26						910		
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.										1.005		
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	3.4	1.9	3.4?	1.8?								
(O) MCF=(M-1)(10^5)/H	4	18	47?	18?								

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT OWL-HEAD

LINE 4 HALF W 1/2 SP. ____ DATE 3-18-68

PAGE

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-10W	10-20W	→	20-30W	→	→	30-40W	→	→	→
RANGE	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi
VOLTAGE	500	470	500	480	470	500	460	480	470	500
CURRENT	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5		CAL-2A
RECEIVE	40-50W	→	→	→	50-60W	→	→	→		1-2
RANGE	Hi	Hi	Hi	Hi	Hi	Hi	Hi	Hi		Hi
VOLTAGE	450	470	460	490	450	470	460	490		160
CURRENT	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		2.0

FREQUENCIES .05 1.0

SENDER NO. 15673S

OPERATOR HIX

RECEIVER NO. MK 4

OPERATOR PALMER

COMMENTS: V 30 - 400 - 200 -
2 begin .05 - .15
3-19 - .15 - 1.0

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PAGE

PROJECT Owlhead
LINE 4 HALF W/2 SP. 1 DATE 3-18

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-10	10-20	→	20-30	→	→	30-40	→	→	→
RANGE	100	30	30	100	10	30	100	30	3	10
DC 1	52.0	22.5	19.5	36.1	4.46	10.0	43.2	9.50 9.70	2.59 2.14	6.43 6.90
DC 2	56.8	23.2	25.2	35.9	6.50	11.8	44.8	10.1 10.2	1.84 1.88	6.42 5.88
DC 3	51.7	23.6	18.8	36.2	4.62	10.2	43.3	9.65 9.70	2.55 2.72	6.82 6.03
DC 4	56.3	22.3	26.0	35.7	6.46	11.8	44.8	9.90 10.1	2.13 2.33	6.38 6.70
DC 5	51.8	24.9	18.8	36.4	4.70	10.0	43.3	9.00 9.90	2.10 2.55	6.38 6.00
DC 6	58.3	21.0	25.8	35.5	6.49	11.7	44.7	9.90 10.6	1.69 2.28	6.81 7.00
DC 7	52.1	25.8	19.0	36.6	4.76	10.2	43.8	9.60 9.90	2.54 2.39	6.63 6.38
DC 8	56.2	20.4	26.1	35.4	6.40	11.8	44.6	9.90 10.1	1.91 2.15	6.28
DC AVG.	108.3	46.4	44.7	72.0	11.13	21.9	88.2	19.73	4.46	12.96
AC 1	55.1	23.4	22.4	36.1	5.61	10.9	43.9	9.85	2.24	6.48
AC 2	54.9	23.4	22.4	36.1	5.61	10.9	43.9	9.85	2.55	6.48
AC AVG.	110.0	46.8	44.8	72.2	11.22	21.8	87.8	19.70	4.49	12.96
S.P.	+1.0	+41.8		-2.9			+10			
AC NOISE	.05	.04		.05			.05			
POT RES.	0.1	0.8	0.5	1.4	0.9	2.8	3.2	1.9	1.0	1.7

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Outhead
LINE 4 HALF W SP. 1 DATE 3-18

PAGE

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	Cal	Cal
RECEIVE	40-50	→		→	50-60	→		→	1-2	.15
RANGE	30	10	3	10	10	3	3	10	300	300
DC 1	730 700	232 210	082 074	420 485	280 326	190 135	025-035	348 525	203	204
DC 2	690 750	250 275	116 147	328 330	430 335	161 208	104 030	530 505	202	204
DC 3	760 700	288 205	015 115	462 400	395 395	153 114	018 080	490 305	203	204
DC 4	700 710	250 265	110 095	335 428	245 350	165 214	150 125	440 605	202	204
DC 5	720 790	198 295	118 95	438 352	480 415	220 149	060 016	420 420	.05 HZ	
DC 6	730 620	228 202	035 110	327 380	350 255	080 136	085 150	540 405		
DC 7	730 840	241 282	096 111	494 480	260 495	240 230	035-054	440 400		
DC 8	730 640	192 232	110 010	280 275	490 315	155 140	~~200~~ 220	310 510		
DC AVG.	14.47	5.08	1.63	7.82	7.34	3.37	1.60	9.23	4.05	4.08
AC 1	7.15	2.52	0.82	3.86	3.62	1.65	0.70	4.52	206	205
AC 2	7.15	2.52	0.82	3.86	3.62	1.65	0.72	4.52	206	205
AC AVG.	14.30	5.04	1.64	7.72	7.24	3.30	1.42	9.04	412	410
S.P.	+4.0				+2.7				1.017	1.005
AC NOISE	.05				.06				1.0	π avg
POT RES.	.15 HZ	→				→				

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Budgett Oilhead Line 4 - W½ Field date 3/18/68 Data page_____ Comp. date_____. Comp by C.S.L.

(A) Send	45	34	45	23	34	45	12	23	34	45		
(B) Receive												
(C) n separation												
(D) I	6											
(E) Vdc (avg)	108.3	46.4	44.7	72.0	11.13	21.9	88.2	19.73	4.46	12.96		
(F) DCcal												
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	27	11	40	18	11	54	22	19	11	64		
(I) Vac Σ	110.0	46.8	44.8	72.2	11.22	21.8	87.8	19.70	4.49	12.96		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.017											
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	0.1	0.8	1.5	1.4	0.9	2.2	2.2	1.9	1.0	1.7		
(O) MCF=(M-1)(10^5)/H				78	82	41	100	130	91	37		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	12	23	34	45	12	23	34	45		5.46		
(B) Receive												
(C) n separation												
(D) I										2.000		
(E) Vdc (avg)	14.47	5.08	1.631	7.82	7.34	3.37	1.60?	9.23		405	408	
(F) DCcal										.492 neg		
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	268				
(H) ρ dc=ExFxGx10^3/D	14	12	8	67	18	17	14	127				
(I) Vac Σ	14.30	5.09	1.64	7.72	7.24	3.30	1.42	9.04		412	410	
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.					1.005					1.017	1.005	
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	2.9	2.5	1.1	3.0	1.9	2.6	13.2 ??	2.6				
(O) MCF=(M-1)(10^5)/H	207	208	138	45	106	153	943 ??	20				

North Star

PAGE 1

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT B-213-67
LINE 1 HALF S SP. 1 DATE 5-4

SEND	1-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	1-2		2005			3005				4005
RANGE	30	30	10	3	10	3	30	10	3	3
DC 1	253 260	214 215	595 576	191 180	453 466	221 229	182 179	423 410	175	115 110
DC 2	258 255	217 215	585 595	188 177	428 437	224 224	184 177	420 408	176 193	112 106
DC 3	257 255	216 214	580 570	191 179	455 458	228 226	186 177	437 400	164 191	131 92
DC 4			593 592		458 443				168 209	
DC 5									146 207	
DC 6										
DC 7					MK	4				
DC 8										
DC AVG.	25.68	21.54	58.464	18.42	4.548	2.257	18.11	4.173	1.803	1.125
AC 1	25.1	21.1	5.70	18.0	4.42	2.16	17.7	4.01	1.75	1.06
AC 2	25.2	21.1	5.70	18.0	4.42	2.17	17.7	4.01	1.75	1.06
AC AVG.										
S.P.	-3	+3	→	+5	→	→	0	→		
AC NOISE	.03	.04	→	.04	→	→	.02	→		
POT RES.										

MK. 4

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 13-213-67
LINE 1 HALF S SP. DATE 5-3

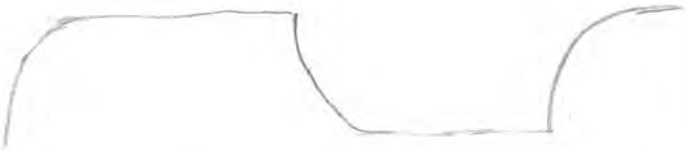
SEND	1-2	2-3	3-4	4-5	1-3	2-3	3-4	4-5	CAL	CAL
RECEIVE	400 5			5005				6005	1-2	1-2
RANGE	10	3	3	1	3	1			200	5-4
DC 1	402 396	151 162	90 87	592 710	154 161	715 850			203	306
DC 2	400 400	147 165	86 80	452 743	160 152	770 775			204	195
DC 3	398 405	143 162	99 76	430 712	150 156	753 836			203	196
DC 4		140 167	104 66	—	152 167	737 762			204	195
DC 5				616 532		810 806				196
DC 6				620 594		695 757				
DC 7				598 580						
DC 8										
DC AVG.	3.995	1.540	8.71	.5927	1.559	.7749			203.5	195.5
AC 1	3.87	1.49	8.4	.580	1.49	.730?			202	195
AC 2	3.89	1.49	8.4	.570	1.49				203	195
AC AVG.										
S.P.	+16.8				+2					
AC NOISE	.03				.03					
POT RES.										

$$\frac{.6189}{\sqrt{20}} = 0.139$$

2.2

$$\frac{.6189}{\sqrt{12}} = 0.179$$

4.3



$$\frac{.6189}{\sqrt{8}}$$

0.218 7.0

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT 03-213-67
LINE 1 HALF N SP. 1 DATE 5-5

PAGE 3

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	4-100N	—	200N	—	—	—	300N	—		400N
RANGE	30	30	10	100	10	10	100	30	10	3
DC 1	213 218	257 252	588 583	312 297	708 790	312 310	302 304	83 84	380 390	196 189
DC 2	213 218	256 252	585 590	312 295	730 757	312 318	300 306	83 85	387 398	225 189
DC 3	212 219	257 251	592 583	310 297	786 753	289 318	300 306	83 84	366 396	218 183
DC 4					720 792				367 394	194 178
DC 5										
DC 6										
DC 7										
DC 8						3.12				
DC AVG.	21.54	25.42	5.871	30.37	7.461	3.088	30.28	8.37	3.844	1.978
AC 1	21.1	25.0	5.67	30.0	7.20	3.04	30.0	8.1	3.75	1.88
AC 2	21.1	25.0	5.67	30.0	7.20	3.02	29.8	8.1	3.75	1.88
AC AVG.										
S.P.	+7	+5 →		+7	→		+6	→		
AC NOISE	.04	.06 →		.06	→		.1-.2	→		
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT B-213-67
LINE 1 HALF N SP. 1 DATE 6-5

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL	
RECEIVE	4000			3000				6000	4-5	
RANGE	10	10	3						300	
DC 1	900870	466385							195	
DC 2	885903	450418							197	
DC 3	942912								195	
DC 4	/								197	
DC 5	878								195	
DC 6									197	
DC 7										
DC 8										
DC AVG.	8.896	4.256								
AC 1	8.80	4.30	2.28						196	
AC 2	8.80	4.30							196	
AC AVG.										
S.P.	+5									
AC NOISE	.08									
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT B-213-6

LINE 1 HALF N SP. 1 DATE 5/8

PAGE

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-1000	1000 N 2000		2000 N 3000			3000 N 4000			
RANGE	Hi									
VOLTAGE	350	310	350	330	310	350	350	330	310	350
CURRENT	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL	
RECEIVE	4000 5000				5000 6000				4-5	
RANGE	Hi									
VOLTAGE	350	330	310	350	350				140	
CURRENT	6.0	6.0	6.0	6.0	6.0				2.0	

FREQUENCIES .05 1.0

SENDER NO. 6644 S

OPERATOR Bob Silva

RECEIVER NO. 5644-R

OPERATOR Bob F.

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT B-213-67

LINE 1 HALF S SP. 1 DATE 5/4

PAGE

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0 - 1000 S	1000 - 2000 S	—	2000 - 3000 S	—	—	3000 - 4000	—	—	—
RANGE	Hi									
VOLTAGE	350	340	350	310	330	350	350	310	330	350
CURRENT	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CAL	
RECEIVE	4000 - 5000 S	—	—	—	5000 - 6000 S	—	—	—	1-2	
RANGE	Hi								Hi	
VOLTAGE	350	310	330	350	350	310	330	350	160	
CURRENT	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	2.0	

FREQUENCIES .125 1.0

SENDER NO. 1644-S

OPERATOR Bob Silva

RECEIVER NO. 5644-R

OPERATOR Bob F.

COMMENTS:

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT B-213-67
LINE 1 HALF S SP. 1 DATE 5-3

PAGE 1

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-100		2008			3005				4005
RANGE	30	20	10	30	10	3	30	10	3	
DC 1	218 220	183 180	495 495	155 156	378 384	193 186	153 154	410 418	218 222	
DC 2	214 218	183 179	492 503	155 156	378 386	198 185	152 155	412 417	216 225	
DC 3	216 217	185 179	483 482		380 382	198 185	151 155	401 425	218 214	
DC 4	214 219		493 495		384 380	193 172				
DC 5										
DC 6										
DC 7						MK 2				
DC 8										
DC AVG.										
AC 1	21.4	18.0	4.80	15.3	3.72	1.83	15.0	4.03	2.07	
AC 2	21.4	18.0	4.80	15.5	3.72	1.83	15.0	4.03	2.07	
AC AVG.										
S.P.	+1	+12	→	+1	→	→	-5	→	→	
AC NOISE	.06	.04	→	.05	→	→	.08+	→ ?		
POT RES.										

TAKEN WITH MK 2 RECEIVER

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PAGE

PROJECT B-213-6J

LINE 1 HALF 5 SP. 1 DATE 5/3

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0 5 1000	1000 5 2000	—	2000 5 3000	—	—	3000 5 4000	—	—	—
RANGE	Hi	—	—	—	—	—	—	—	—	—
VOLTAGE	420	340	420	260	340	420	300	320	480	420
CURRENT	5.0	5.0	5.0	5.0	5.0	5.0	5.0	6.0	7.0	5.0
SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CAL	
RECEIVE	4000 5 5000	—	—	—	5000 5 6000	—	—	—	1-2	
RANGE	Hi	—	—	—	—	—	—	—	Hi	
VOLTAGE									160	
CURRENT									2.0	

FREQUENCIES .05 1.0

SENDER NO. 6644-S

OPERATOR Bob Silva

RECEIVER NO. 5644-R

OPERATOR Bob F.

COMMENTS:

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project B-213-68 Line 1 1/2 / N 1/2 Field date_____ Data page_____ Comp. date_____. Comp by_____

(A) Send	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2		
(B) Receive	0-100N		200N			300N				400N		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0		
(E) Vdc (avg)	21.54	25.12	5.871	30.37	7.461	~~3.088~~	3.028	8.37	3.844	1.978		
(F) DCcal	1.020					3.12						
(G) Kn x 10^{-3}	3.0	3.0	12.0	3.0	12.0	30.0	3.0	12.0	30.0	60.0		
(H) ρ dc=ExFxGx10^3/D	11	13	12	15	15	16	15	17	20	20		
(I) Vac Σ	21.1	25.0	5.67	30.0	7.20	3.03	29.9	8.1	3.75	1.88		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000											
(M) ρ dc/ρac=ExL/K						3.0						
(N) PFE=(M-1)(10^2)	2.1	1.7	3.5	1.2	3.6	~~1.9~~	1.3	3.3	2.5	5.2		
(O) MCF=(M-1)(10^5)/H	191	131	292	80	240	~~119~~ 188	87	195	125	260		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL			
(B) Receive	400N			500N				600N	4-5			
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	6.0								2.0			
(E) Vdc (avg)	8.896	4.256							196			
(F) DCcal	1.020											
(G) Kn x 10^{-3}	12.0	30.0	60.0	105.	30.	60	105	168				
(H) ρ dc=ExFxGx10^3/D	18	22	23									
(I) Vac Σ	8.80	4.30	2.28						196			
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	1.000											
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	1.1	?										
(O) MCF=(M-1)(10^5)/H	61											

$\frac{V}{I} = R$

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project B-213-67 Line 1 sp 1 S 1/2 Field date_____ Data page_____ Comp. date_____. Comp by_____

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5		
(B) Receive	0-100		200			300S				400S		
(C) n separation	1	1	2	1	2	3	1	2	3	4		
(D) I	6.0											
(E) Vdc (avg) 1	25.68	21.54	5.846	18.42	4.548	2.257	18.11	4.173	1.803	1.125		
(F) DCcal 2	1.023											
(G) Kn x 10^{-3} 3	3.0	3.0	12.0	3.0	12.0	30.0	3.0	12.0	30.0	60.0		
(H) ρ dc=ExFxGx10^3/D	13	11	12.	9.4	9.3	12.	9.3	8.5	9.2	12.		
(I) Vac Σ	25.15	21.1	5.70	18.0	4.42	2.165	17.7	4.01	1.75	1.06		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.997											
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.8	1.8	2.3	2.0	2.6	3.9	2.0	3.8	2.7	5.8		
(O) MCF=(M-1)(10^5)/H	138	164	192	213	280	325	215	447	293	483		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	CAL			
(B) Receive	400S			500				600S	1-2			
(C) n separation	2	3	4	5	3	4	5	6				
(D) I	6.0								2.0			
(E) Vdc (avg)	3.995	1.54	.871	.5927	1.559	.7749	—	—	195.5			
(F) DCcal	1.023											
(G) Kn x 10^{-3}	12.0	30.0	60.0	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	8.2	7.9	8.9	11	8.0	7.9						
(I) Vac Σ	3.88	1.49	.84	.575	1.49	.730			195			
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.997											
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	2.7	3.0	3.4	2.8	4.3	5.8						
(O) MCF=(M-1)(10^5)/H	329	380	382	255	538	734						

B213 (Job No.) Line 2 N STAR Spread 1

Looking W Date 5/10/68 A= 1000 feet

Center at 0 S/N (Label) 1.0 (Freq.)

206
199
206
01
5
11
14
13
12
11

7.8

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT B-213-LT

LINE 2 HALF S SP. 1 DATE 5-9

PAGE 3

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0-100S	—	200S	—	—	300S	—	—	—	400S
RANGE	100	100	10	100	10	3	100	10	3	3
DC 1	350 372	400 400	654 608	413 400	772 793	232 237	402 404	824 812	283 261	139 67
DC 2	347 374	400 400	652 607	413 400	762 807	221 228	401 403	827 810	286 264	132 74
DC 3	345 376		655 607	411 402	758 805	233 216	401 402	830 812	292 260	—
DC 4	[illegible]		[illegible]	413	752 809	243 218	400 403	828 812	297 258	115 86
DC 5	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	119 92
DC 6	[illegible]				[illegible]	[illegible]	[illegible]			122 91
DC 7					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	121 90
DC 8					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
DC AVG.	73.0	80.0	12.61	81.3	15.62	4.52	80.4	16.39	5.52	2.078
AC 1	35.6	37.6	6.18	40.2	7.65	2.21	39.8	8.00	2.65	1.01
AC 2	35.6	39.6	6.18	40.2	7.65	2.21	39.8	8.00	2.65	1.01
AC AVG.	71.2	79.2	12.36	80.4	15.30	4.42	79.6	16.00	5.30	2.02
S.P.	+5	-12	→	+4	→	→	+6	→		
AC NOISE	.02	.03	→	.03	→	→	.04	→		
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT B-213-67

LINE 2 HALF S SP. 1 DATE 3-[illegible]

PAGE 4

SEND	1-2	2-3	3-4	4-5	1-2	2-3	3-4	4-5	C22	
RECEIVE	4005			5005				5005	1-2	
RANGE	10	3	3	1	3	3			300	
DC 1	677 709	251 228	103 100	420 530	234 232	97 99	530 ~~520~~		196	[illegible]
DC 2	673 714	257 222	115 92	415 476	236 240	101 101	~~580~~		196	[illegible]
DC 3	/	267 215	~~134~~ 83	570 412	228 228	100 104			196	215
DC 4	690 691	276 208	/	495 420	229 237	102 106			196	215
DC 5	698 684		101 114			108 106				[illegible]
DC 6	[illegible]		105 115			111 111				
DC 7	[illegible]									
DC 8				.15						
DC AVG.	13.84	4.84	2.137	0.948	4.65	2.076			292	
AC 1	6.77	2.37	1.00	.460?	2.17	1.00	.49?	.29	196	
AC 2	6.77	2.37	1.01	.460?	2.17	1.00			196	
AC AVG.	13.54	4.74	2.01	0.920	4.34	2.00	0.98	0.58	[illegible]	
S.P.	8+4									
AC NOISE	-03									
POT RES.										

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT B-213-67

LINE 2 HALF S SP. 1 DATE 5/10

PAGE

SEND	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5
RECEIVE	0 1100	1000 2000	—	2000 3000	—	—	3000 4000	—	—	—
RANGE	Hi									
VOLTAGE	480	380	480	445	380	480	480	445	380	480
CURRENT	4.5	5.0	4.5	5.0	5.0	4.5	5.0	5.0	5.0	4.5
SEND	1-2	2-3	3-4	4-5	12	2-3	3-4	4-5	CAL	
RECEIVE	4000 N 5000				5000 6000				1-2	
RANGE	Hi								Hi	
VOLTAGE	480	445	380	480	480	445	380	480	185	
CURRENT	5.0	5.0	5.0	4.5	5.0	5.0	5.0	4.5	2.0	

FREQUENCIES .05 1.0

SENDER NO. 1644-S

OPERATOR Bob Silva

RECEIVER NO. 5644-R

OPERATOR Bob F.

COMMENTS:

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT B-213-67
LINE 2 HALF N SP. 1 DATE 5-9

PAGE 1

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	--100N		200N			300N				400N
RANGE	100	100	10	100	10	3	100	30	10	3
DC 1	480 492	485 465	840 878	304 306	547 590	179 196	427 448	94 94	310 392	147 133
DC 2	480 492	485 465	855 880	305 306	556 562	170 202	430 448	92 95	323 360	171 137
DC 3	480 492	485 465	847 865	305 306	552 562	167 194	430 448	89 99	304 390	159 139
DC 4			847 852		540 563	182 182			330 392	126 151
DC 5			845 858						355 373	131 192
DC 6										
DC 7										
DC 8										
DC AVG.	97.2	95.2	17.10	61.1	11.19	3.69	87.7	18.66	7.08	2.13
AC 1	47.8	46.8	82.2	30.0	5.43	1.78	43.0	9.2	3.27	1.44
AC 2	47.8	46.8	82.2	30.0	5.43	1.78	43.0	9.2	3.27	1.44
AC AVG.	95.6	93.6	16.4	60.0	10.86	3.56	86.0	18.40	6.54	2.88
S.P.	-10	+13	→	+22	→	→	-19	→	→	→
AC NOISE	.04	.02	→	.02	→	→	.04	→	→	→
POT RES.										

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT B-213-67
LINE 2 HALF N SP. 1 DATE 5-7

SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL	
RECEIVE	600N			500N				600N	4-5	
RANGE	30	10	3	3	10	10	3		300	
DC 1	127 133	485 457	~~278~~ 205	108 99	690 700	342 298	169 158		195	
DC 2	127 123	513 470	217 212	93 114	652 695	330 307	138 164		196	
DC 3	135 121	520 455	203 208	81 132	650 700	332 320	146		195	
DC 4	135 119	532 463	223 204	107 128	662 663	330 306			196	
DC 5			240 198	112 89	703 660					
DC 6				118 116						
DC 7				109 108						
DC 8										
DC AVG.	23.6	9.77	4.28	2.16	13.56	6.40	3.39		3.91	
AC 1	12.5	4.73	2.06	1.02	6.55	3.03	1.48		195	
AC 2	12.5	4.73	2.07	1.03	6.55	3.03	1.50		195	
AC AVG.	25.0	9.46	4.13	2.05	13.12	6.06	2.98		390	
S.P.	+11				-4					
AC NOISE	.04				.06					
POT RES.										

PAGE

HEINRICHS GEOEXPLORATION CO.

I. P. SENDER NOTES

PROJECT B-213-62

LINE 2 HALF N SP. 1 DATE 5/9

SEND	1-2	2-3	1-2	3-4	2-3	1-2	4-5	3-4	2-3	1-2
RECEIVE	0-N 1000	1000 2000	—	2000 N 3000	—	—	3000 N 4000			
RANGE	Hi	—	—	—	—	—	Lo	—	—	—
VOLTAGE								400	460	500
CURRENT	6.0	6.0	6.0	3.66	3.66	3.66	5.0	5.0	5.0	5.0
SEND	4-5	3-4	2-3	1-2	4-5	3-4	2-3	1-2	CAL	
RECEIVE	4000 N 5000				5000 N 6000				4-5	
RANGE	Lo	—	—	—	—	—	—	—	Hi	
VOLTAGE	540	400	460	500	540	400	460	500		
CURRENT	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	2.0	

FREQUENCIES .05 1.0

SENDER NO. 1694-S

OPERATOR Bob Silva

RECEIVER NO. 5644-R

OPERATOR Bob F.

COMMENTS:

HEINRICHS GEOEXPLORATION COMPANY

INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Owl pond North Star Line 2 5½ Field date_____ Data page_____ Comp. date 5/11/68 Comp by C.S.L.

(A) Send	45	34	45	23	34	45	12	23	34	45		
(B) Receive	—	—	—	—	—	—	—	—	—	—		
(C) n separation												
(D) I	4.5	5	4.5	5	5	4.5	5	5	5	4.5		
(E) Vdc (avg)	72.0	80.0	12.61	81.3	15.62	4.58	80.4	16.39	5.52	2.078		
(F) DCcal												
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	24	25	17	25	19	16	25	20	17	14		
(I) Vac Σ	71.2	79.2	12.36	80.4	15.30	4.42	79.6	16.00	5.30	2.02		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	1.1	1.0	2.1	1.1	2.1	3.6	1.0	1.3	1.2	.9		
(O) MCF=(M-1)(10^5)/H				44	111	225	53	115	247	207		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	12	23	34	45	12	23	34	45		CAL		
(B) Receive	—	—	—	—	—	—	—	—				
(C) n separation												
(D) I	5	5	5	4.5	5	5	5	4.5		2000		
(E) Vdc (avg)	13.84	4.84	2.137	0.948	4.65	2.076	—	—		392		
(F) DCcal										0.510		
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	17	15	13	11	14	13	11	11				
(I) Vac Σ	13.54	4.74	2.010	0.920	4.34	2.00	0.98?	0.58?		392		
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.										1,000		
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	2.2	2.1	6.2?	3.0?	7.1	[illegible]	—	—				
(O) MCF=(M-1)(10^5)/H	129	141	477?	272?	507	292	—	—				

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

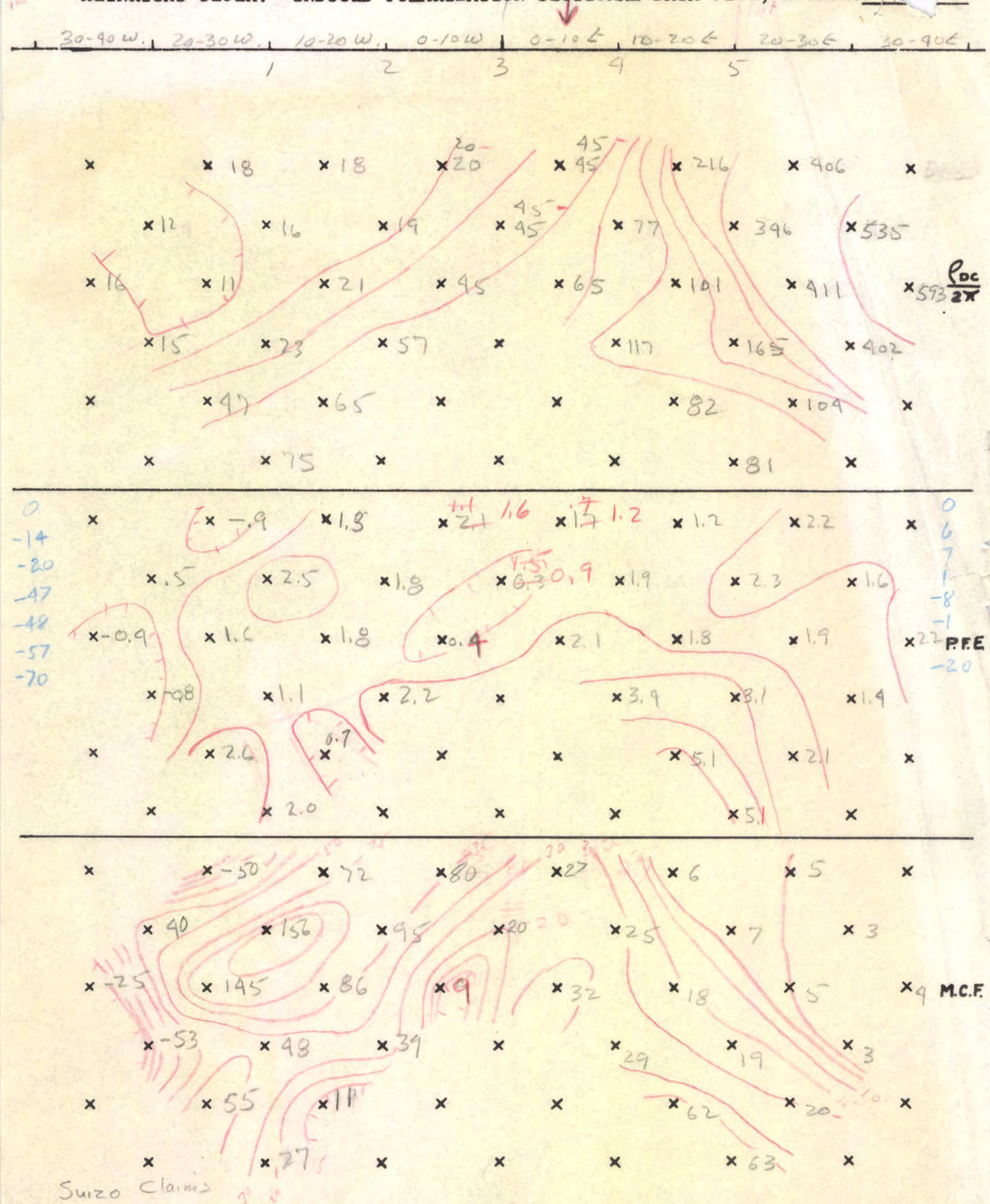
Project RBJ [illegible] N. [illegible] Line 2 - N½ Field date_____ Data page_____ Comp. date 5/11/88. Comp by [illegible]

(A) Send	12	23	12	34	23	12	45	34	23	12		
(B) Receive	—	—	—	—	—	—	—	—	—	—		
(C) n separation												
(D) I	6	6	6	3.67	3.67	3.67	5	—	—	—		
(E) Vdc (avg)	97.2	95.0	17.10	61.1	11.19	3.69	87.7	18.56	7.08	2.93		
(F) DCcal												
(G) Kn x 10^{-3}	3	3	12	3	12	30	3	12	30	60		
(H) ρ dc=ExFxGx10^3/D	25	24	18	36	20	15	27	23	22	18		
(I) Vac Σ	95.6	93.6	16.44	60.0	10.86	3.56	86.0	18.40	6.54	2.88		
(J) AC noise x 2												
(K) Vac(corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.												
(M) ρ dc/ρac=ExL/K												
(N) PFE=(M-1)(10^2)	[illegible]	1.2	[illegible]	1.7	2.9	3.5	1.8	1.2	[illegible]	1.6		
(O) MCF=(M-1)(10^5)/H	52	[illegible]	[illegible]	[illegible]	[illegible]	233	67	52	359?	89		

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	45	34	23	12	45	34	23	12		<42		
(B) Receive	—	—	—	—	—	—	—	—		—		
(C) n separation												
(D) I	—	—	—	—	—	—	—	→		2000		
(E) Vdc (avg)	25.6	9.77	4.28	2.16	13.56	6.40	3.09?	—		391		
(F) DCcal												
(G) Kn x 10^{-3}	12	30	60	105	30	60	105	168				
(H) ρ dc=ExFxGx10^3/D	31	30	26	23	42	39	33					
(I) Vac Σ	25.0	9.46	4.13	2.05	13.10	6.06	2.98			390		
(J) AC noise x 2												
(K) Vac (corr) = $\sqrt{I^2 - J^2}$												
(L) AC-DC cal.										.998		
(M) ρdc/ρac =ExL/K												
(N) PFE=(M-1)(10^2)	2.1	3.0	3.5	5.1	3.2	5.4	3.6					
(O) MCF=(M-1)(10^5)/H	68	100	135	222	76	138	109					

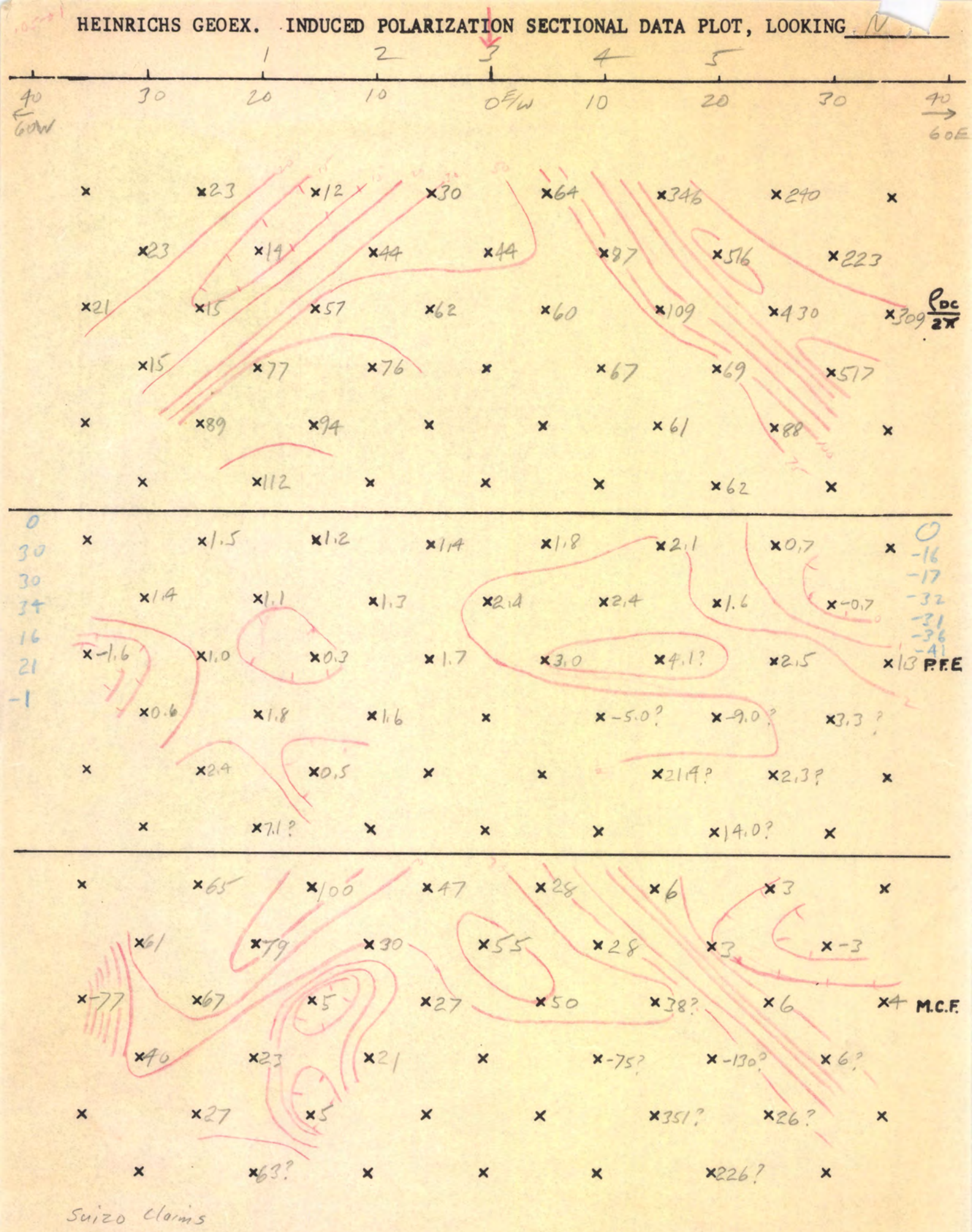
HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING



Suizo Claims

AREA 213-67 LINE 1 a = 1000' SCALE: 1" = 1000' DATE: Mar. 68

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N



Suizo Claims

AREA B213-67 LINE 2 a = 1000' SCALE: 1" = 1000 DATE: Mar. '68

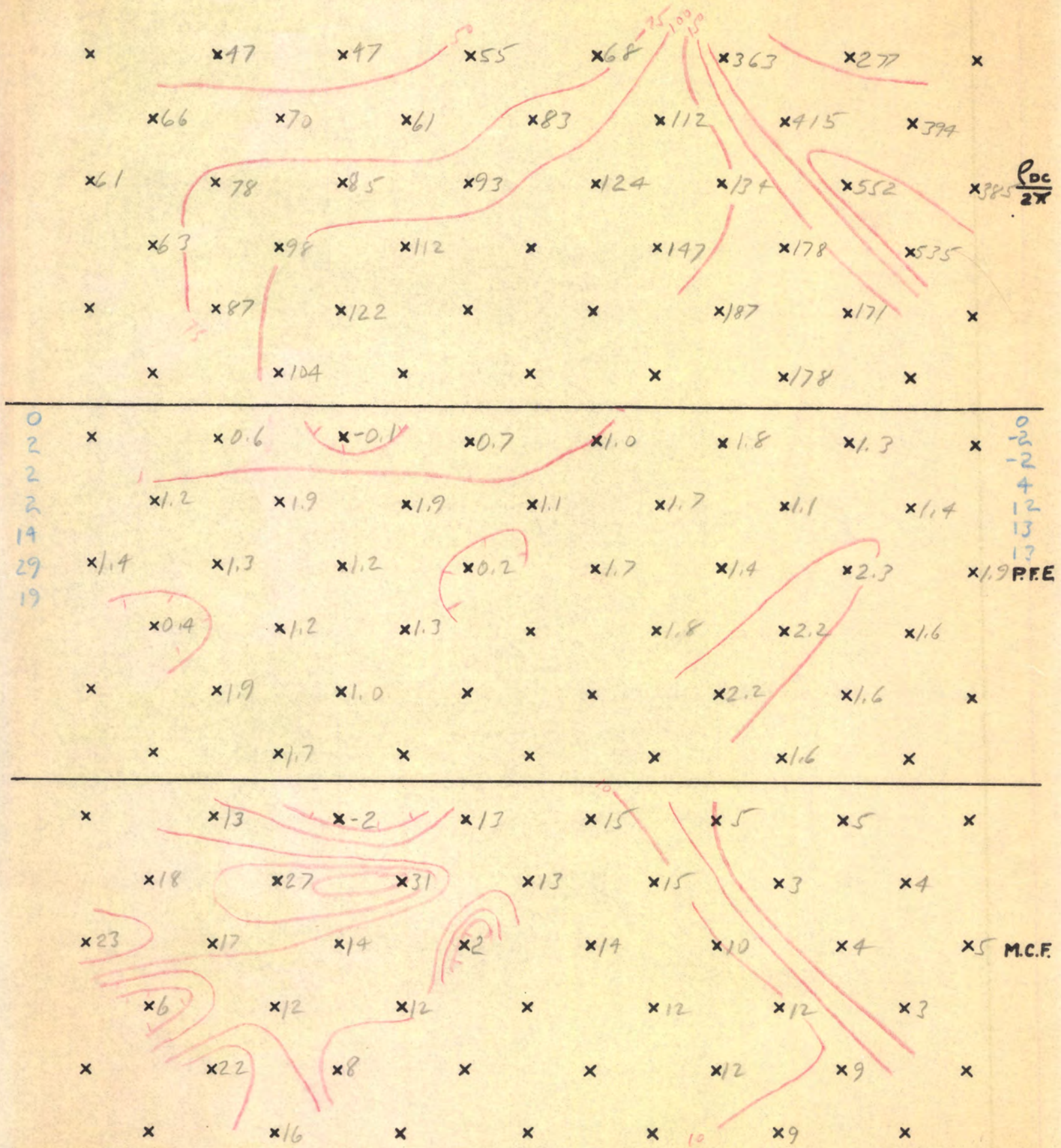
HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N

.15 → 1Hz MK-4

1 2 3 4 5

40 30 20 10 0 E/W 10 20 30 40

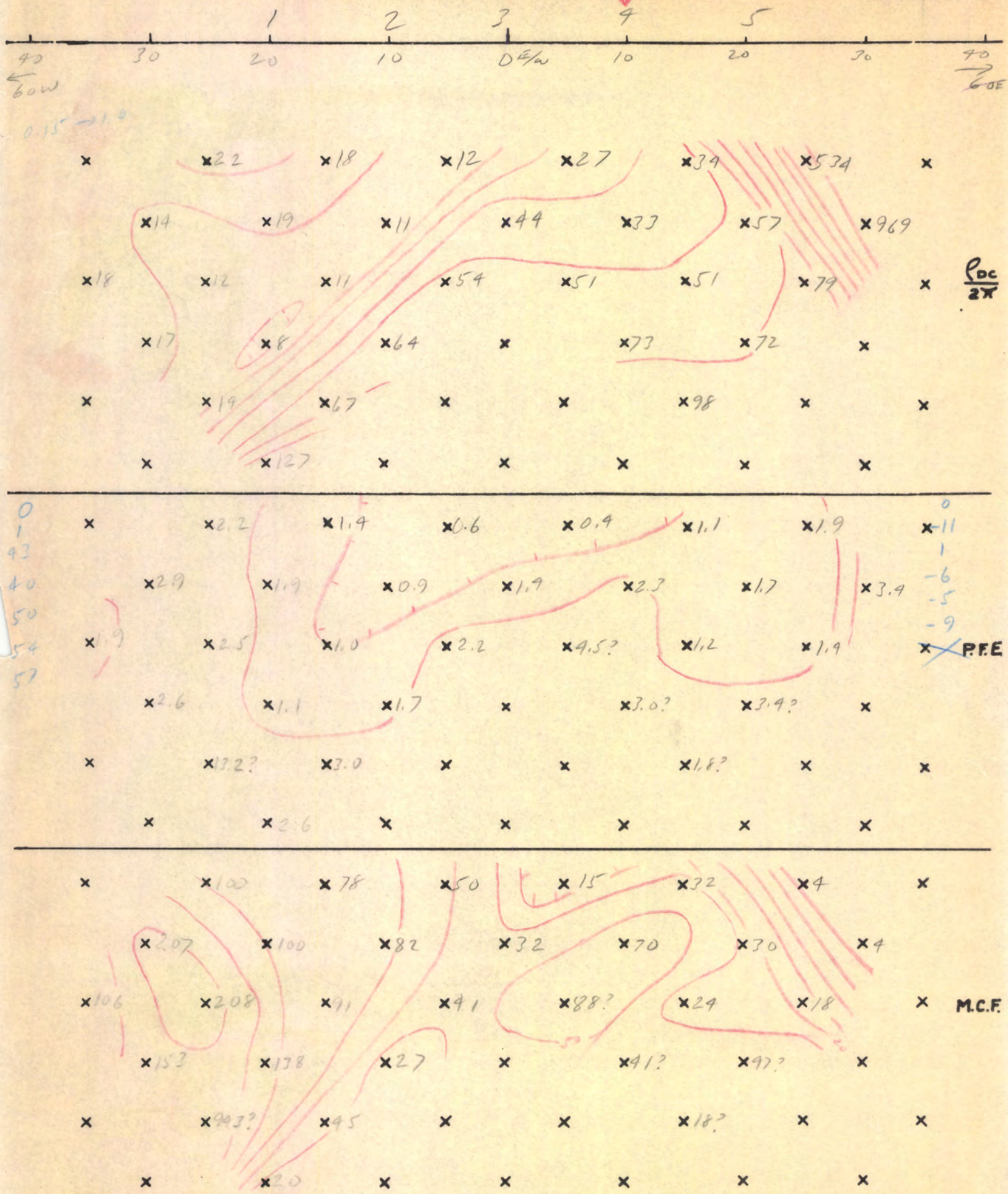
← 60W 60W →



Suizo claims

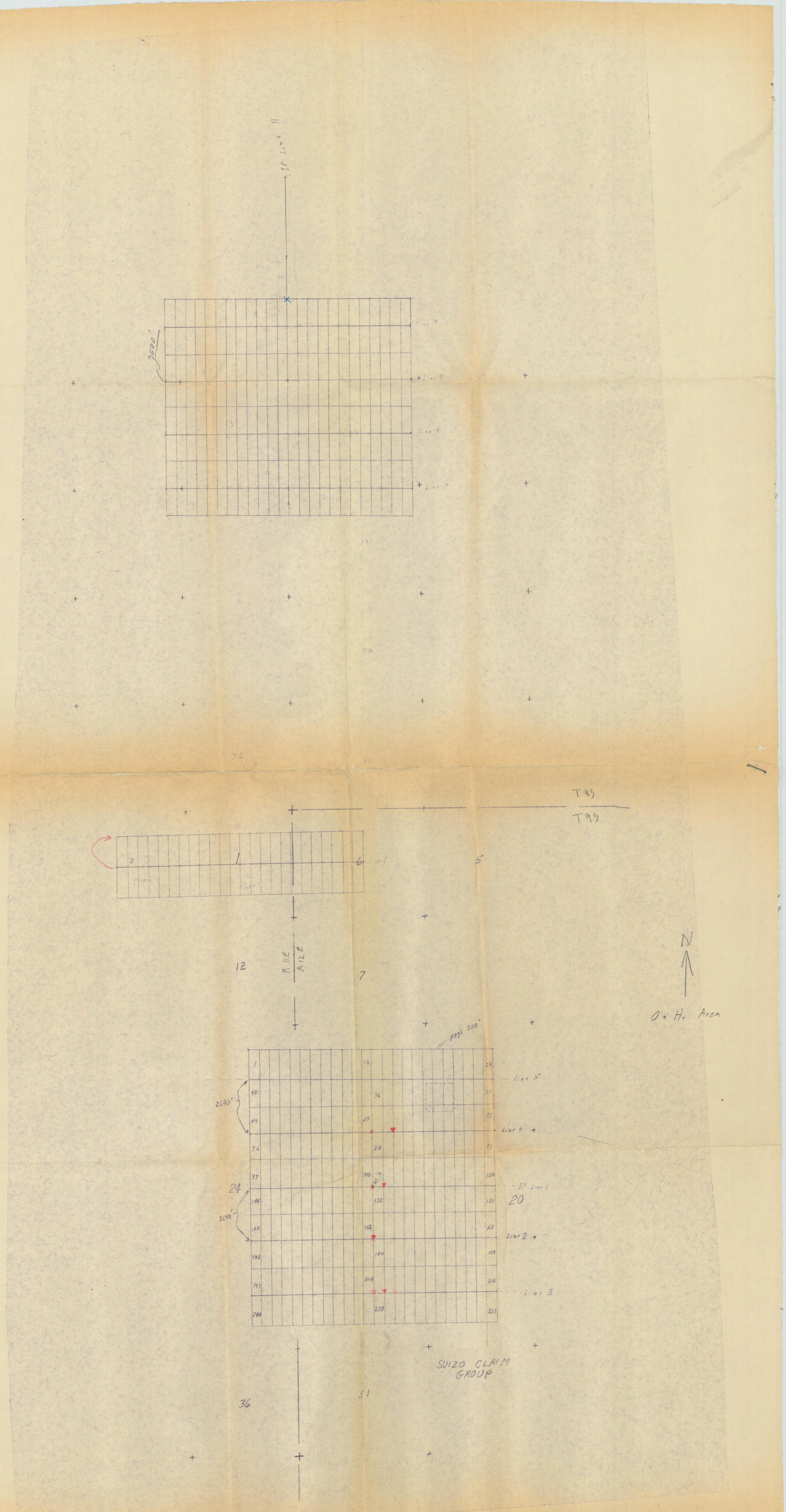
AREA B213-67 LINE 3 a = 1000' SCALE: 1" = 1000' DATE: Mar. '68

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N



Suizo Claims

AREA Owlhead - Budgett LINE 4 a = 1000' SCALE: 1" = 1000' DATE: Mar. '68



II Line 11
3000'
Line 10
Line 9
Line 8
Line 7
13
19
30
36
31
T 8S
T 9S
2
1
6
Line 6
5
12
R 11E
R 12E
7
N
O. H. Area
pegs 500'
Line 5
Line 4
IP Line 1
Line 2
Line 3
2640'
2640'
24
20
1
12
24
48
36
25
49
60
72
96
84
73
97
108
120
144
132
121
145
156
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204
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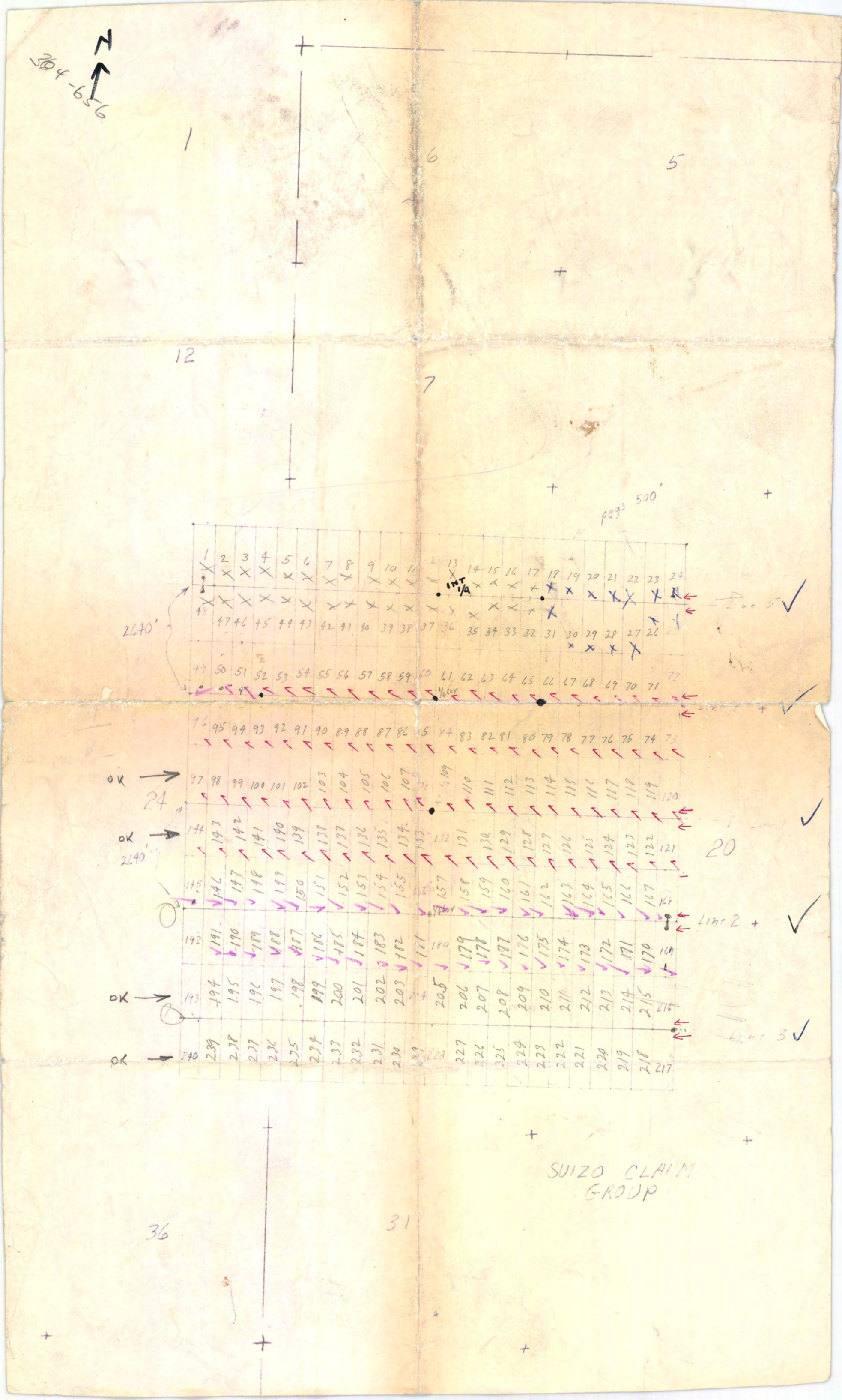
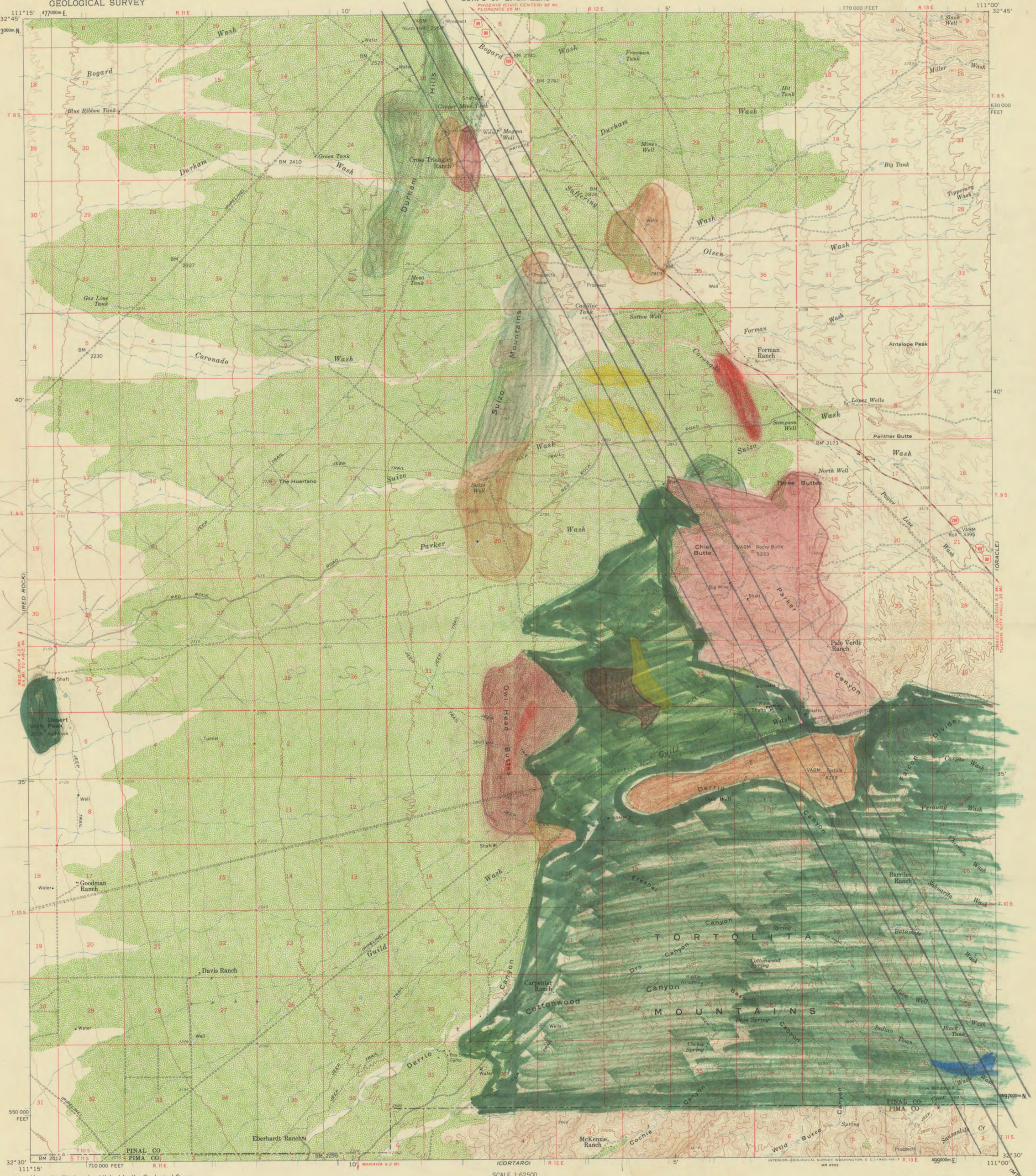
240
228
217
SUIZO CLAIM GROUP
36
31


N
364-656
1
6
5
12
7
pegs 500'
INT 1/4
2640'
OK
24
20
Line 2
Line 3
SUIZO CLAIM GROUP
36
31

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

TORTOLITA MTS. QUADRANGLE
ARIZONA
15 MINUTE SERIES (TOPOGRAPHIC)



Mapped, edited, and published by the Geological Survey

Control by USGS and USC&GS

Topography from aerial photographs by photogrammetric methods
Aerial photographs taken 1958. Advance field check 1959

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

13½°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1959

SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 25, COLORADO OR WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ARIZONA
QUADRANGLE LOCATION

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

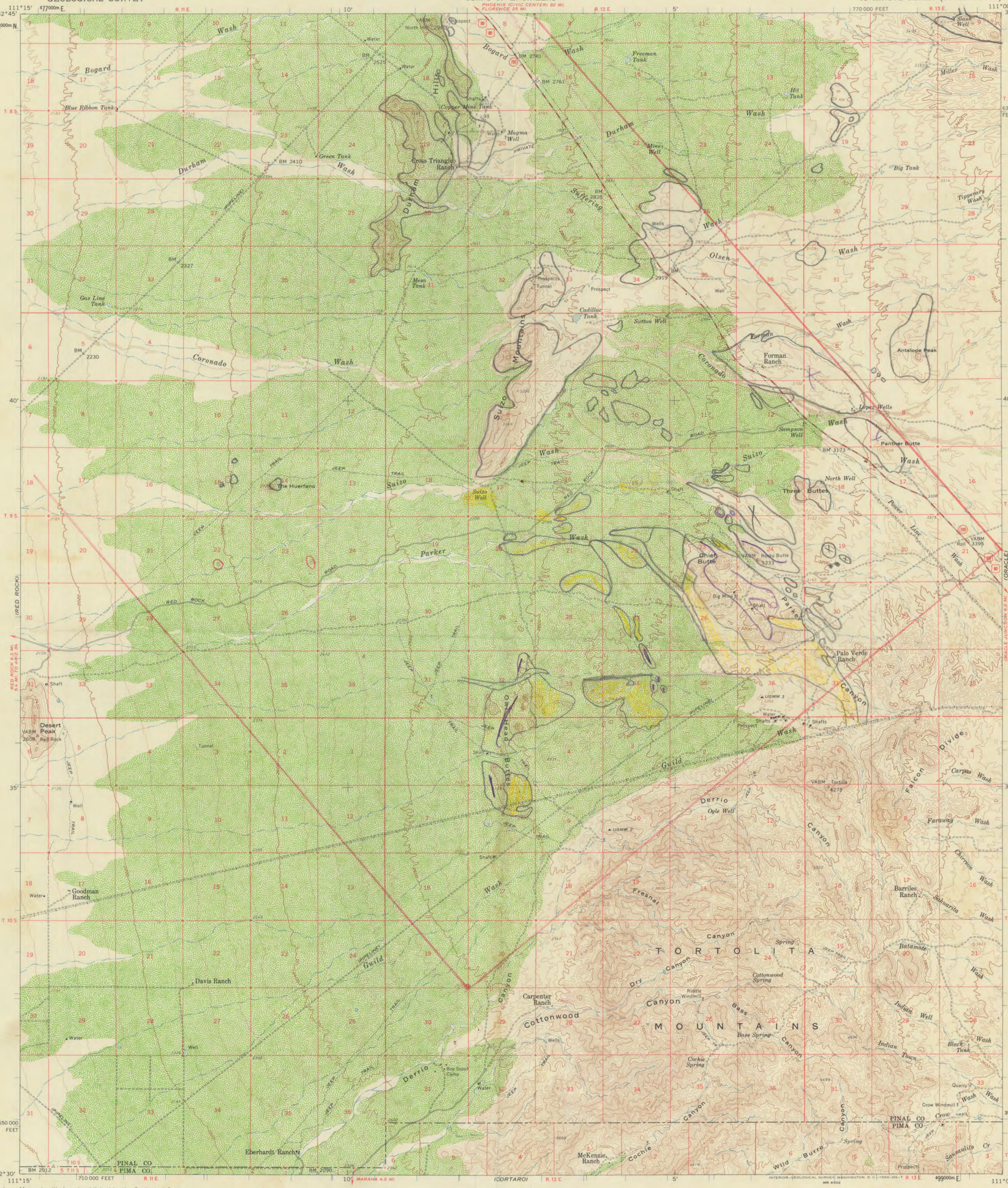
TORTOLITA MTS., ARIZ.
N3230—W11100/15
1959

Geology from Pima county Geology map

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

UNITED STATES
DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS

TORTOLITA MTS. QUADRANGLE
ARIZONA
15 MINUTE SERIES (TOPOGRAPHIC)



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13½°
TRUE NORTH
MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1959

SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 40 FEET
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N3230—W11100/15

1959

5000
10000
2000
1200
10400
TUES

4000

5200
6000
6000
1800
19800
WED

28
3
8400
3000
11400
MON

93762

PLATE III

GEOLOGIC MAP OF THE BIG MINE AREA

BY

CALVERT D. ILES

SCALE 1:1200

0 100 200 300

FEET

1966

EXPLANATION

T_a	TERTIARY VOLCANICS		CHRYSOCOLLA, MALACHITE, AZURITE, AND/OR NATIVE COPPER
PC_p	OLDER PRECAMBRIAN PINAL SCHIST	CC	CHALCOCITE
Cal	MASSIVE CALICHE	CP	CHALCOPYRITE
	DEFINITE CONTACT	B	BARITE
	APPROXIMATE CONTACT	CA	MASSIVE CALCITE
40	FAULT STRIKE AND DIP	GN	GALENA
30	APPROXIMATE STRIKE OF FAULT ZONE, WITH DIP		QUARTZ
30 40	FAULT TREND WITH STRIKE AND DIP		GREEN MINERAL
T_a 20	VEIN STRIKE AND DIP		SHAFT (ONE- AND TWO-COMPARTMENT)
T_a 20	STRIKE OF VEIN ZONE, WITH DIP		PROSPECT PIT
20 20	VEIN TREND WITH STRIKE AND DIP		PROSPECT TRENCH
	MINE ROAD		DUMP
	STOPE		

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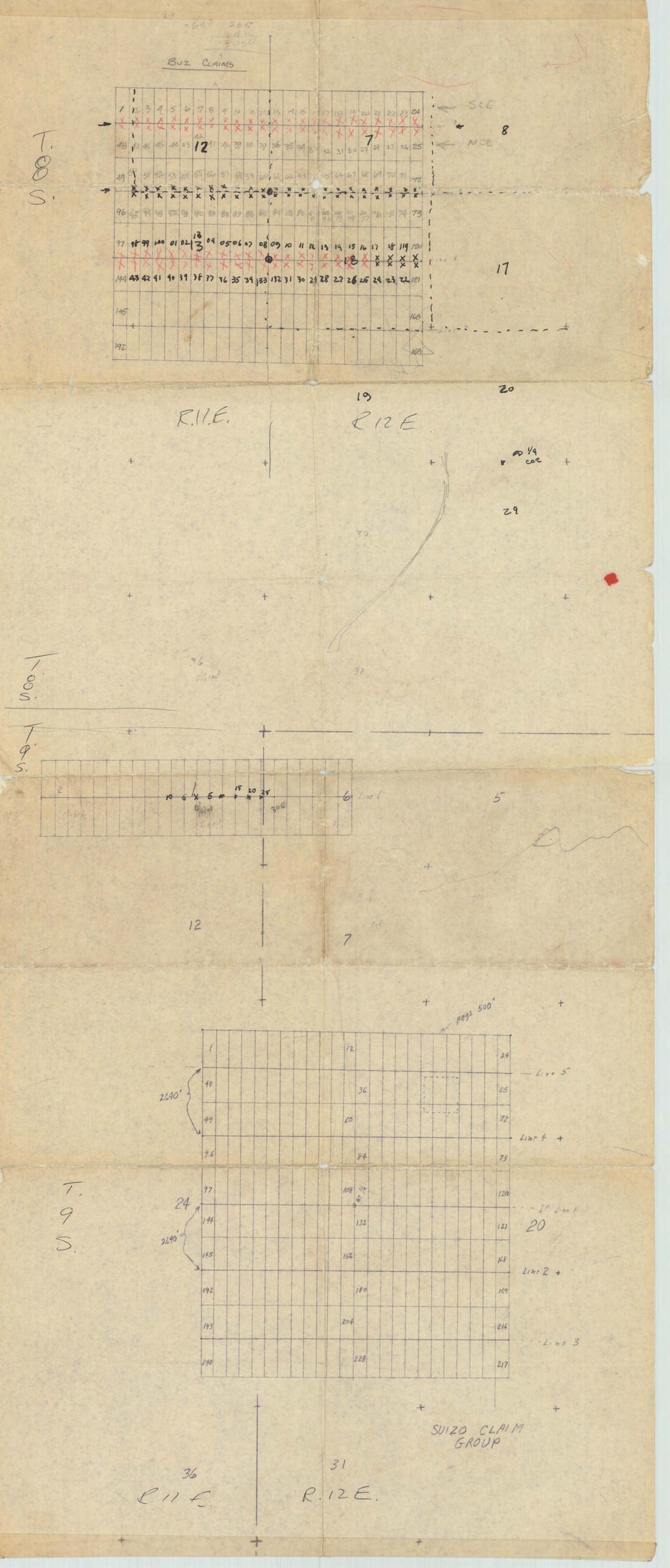


BUZ CLAIMS
SCE
NCE
T. 8 S.
R.11.E.
R12E
T. 8 S.
T. 9 S.
T. 9 S.
pegs 500'
2640'
2640'
Line 5
Line 4
Line 2
Line 3
SUIZO CLAIM GROUP
R11E.
R.12E.

GEOLOGIC MAP OF A PORTION

OF THE

OWL HEAD MINING DISTRICT

BY

CALVERT DILES

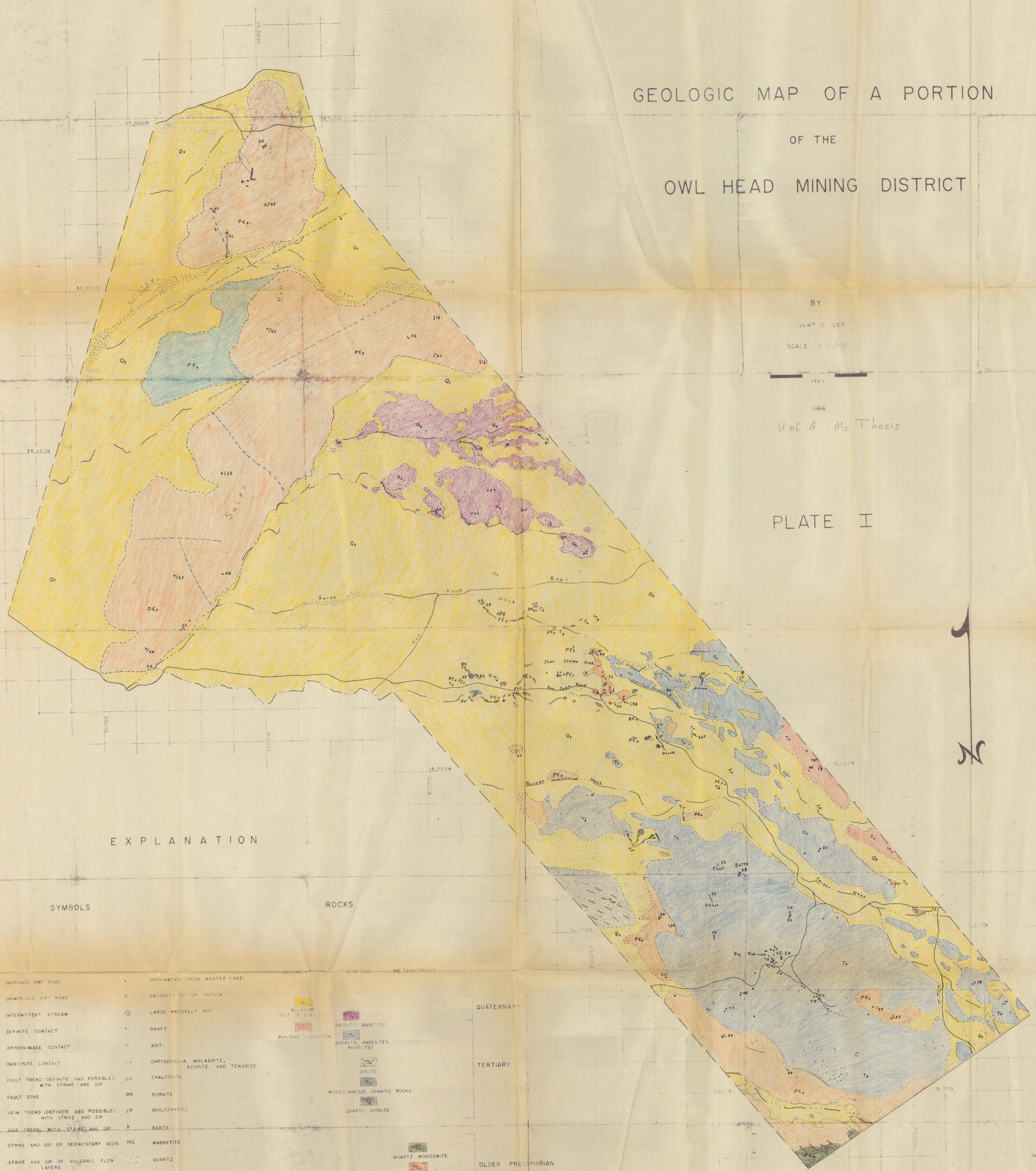
SCALE 1:12,000

FEET

1966

U of A Ms Thesis

PLATE I

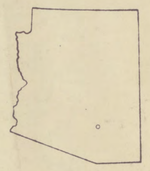


EXPLANATION

SYMBOLS

- IMPROVED DIRT ROAD
- UNIMPROVED DIRT ROAD
- INTERMITTENT STREAM
- DEFINITE CONTACT
- APPROXIMATE CONTACT
- INDEFINITE CONTACT
- FAULT TREND (DEFINITE AND POSSIBLE), WITH STRIKE AND DIP
- FAULT ZONE
- VEIN TREND (DEFINITE AND POSSIBLE), WITH STRIKE AND DIP
- DIKE TREND, WITH STRIKE AND DIP
- STRIKE AND DIP OF SEDIMENTARY BEDS
- STRIKE AND DIP OF VOLCANIC FLOW LAYERS
- STRIKE AND VERTICAL DIP OF VOLCANIC FLOW LAYERS
- STRIKE AND DIP OF FOLIATION
- INFORMATION FROM BARTER (1962)
- PROSPECT PIT OR TRENCH
- LARGE PROSPECT PIT
- SHAFT
- ADIT
- CHRYSOCOLLA, MALACHITE, AZURITE, AND TENORITE — CC
- CHALCOCITE
- BORNITE — BN
- CHALCOPYRITE — CP
- BARITE — B
- MAGNETITE — MG
- QUARTZ
- "GREEN MINERAL"
- PROSPECT PIT, WITH ROCK TYPE AND MINERALIZATION — BN × CP PCp

ROCKS

	SEDIMENTARY	IGNEOUS	METAMORPHIC
QUATERNARY	Qs — ALLUVIUM (SILT TO CLEBLES)	Ts — BASALTS, ANDESITES	
	Tm — PANTANO FORMATION	Tr — BASALTS, ANDESITES, RHYOLITES	
TERTIARY		Ta — APLITE	
		Tg — MISCELLANEOUS GRANITIC ROCKS	
		Tq — QUARTZ DIORITE	
OLDER PRECAMBRIAN		PCq — QUARTZ MONZONITE	
		PCp — PINAL SCHIST	
		PCb — BIOTITE GNEISS	

INDEX MAP OF ARIZONA