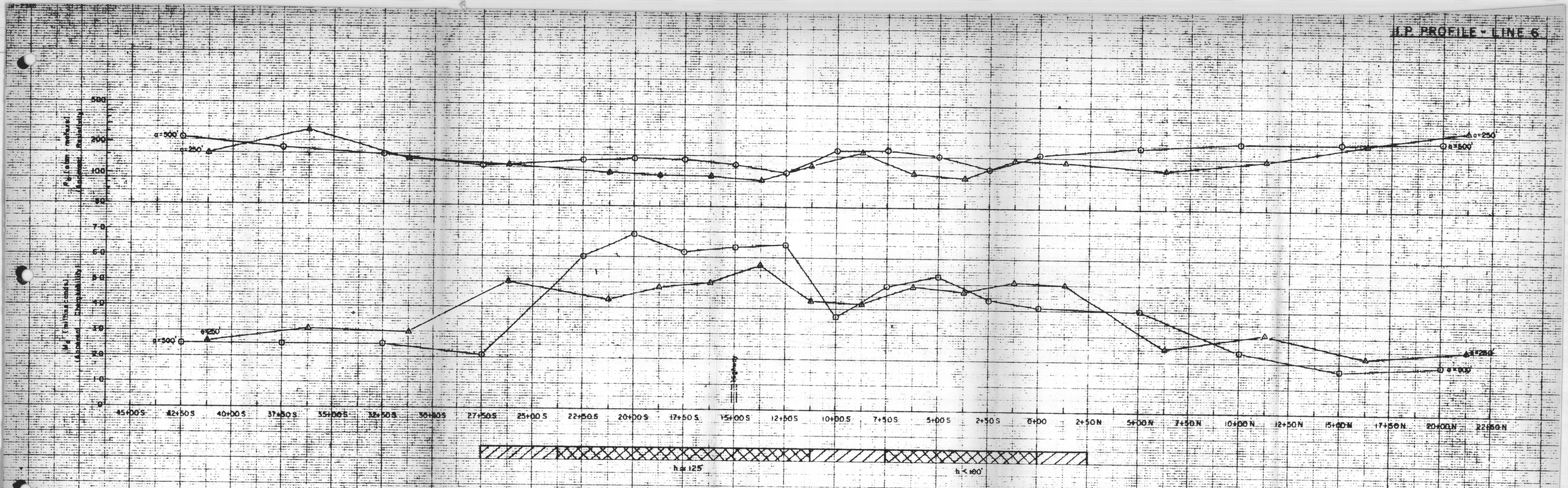
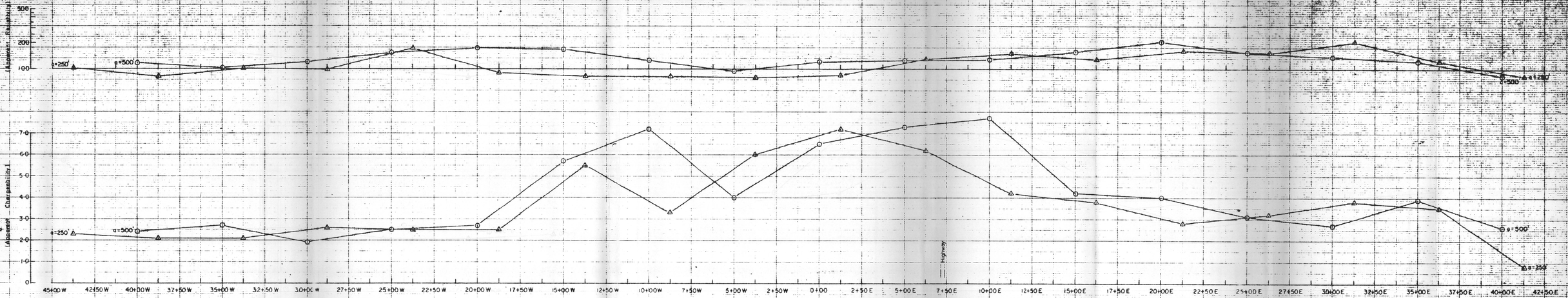

I.P. PROFILE - LINE 6
Pa (ohm - meters)
Apparent Resistivity
Ma (milliamperes)
Apparent Conductivity
500
200
100
50
7.0
5.0
3.0
2.0
1.0
0
a=500'
a=250'
45+00S
42+50S
40+00S
37+50S
35+00S
32+50S
30+00S
27+50S
25+00S
22+50S
20+00S
17+50S
15+00S
12+50S
10+00S
7+50S
5+00S
2+50S
0+00
2+50N
5+00N
7+50N
10+00N
12+50N
15+00N
17+50N
20+00N
22+50N
h ≈ 125'
h < 180'

16

I.P. PROFILE - LINE A

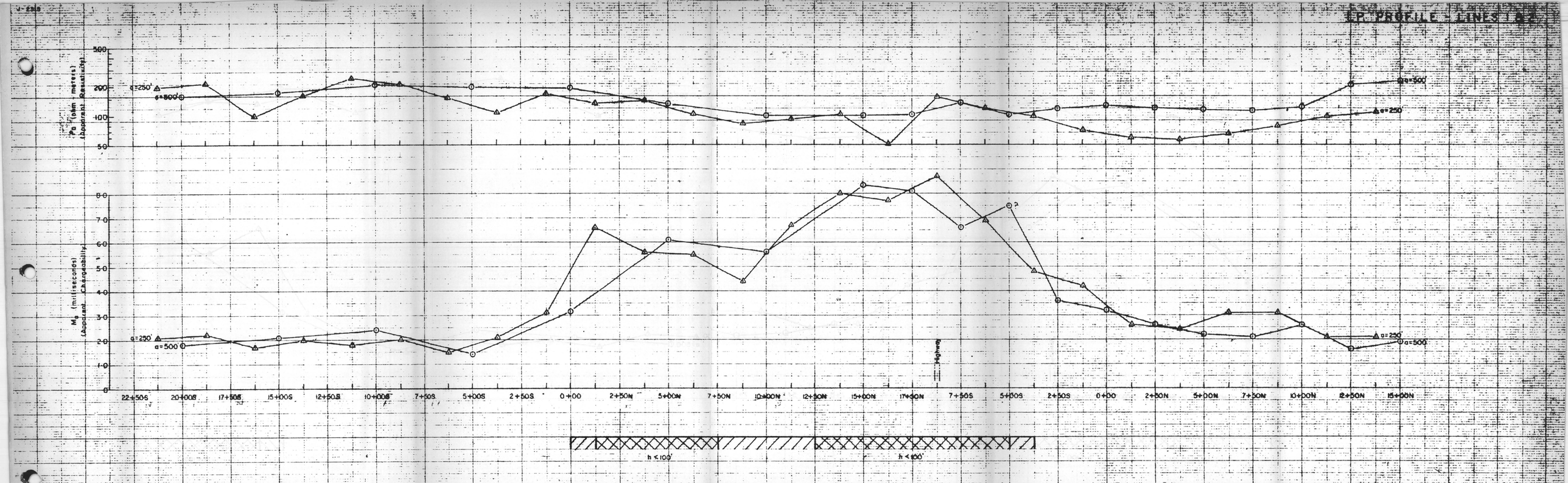


h ≅ 150'

High readings probably due to side effects

17

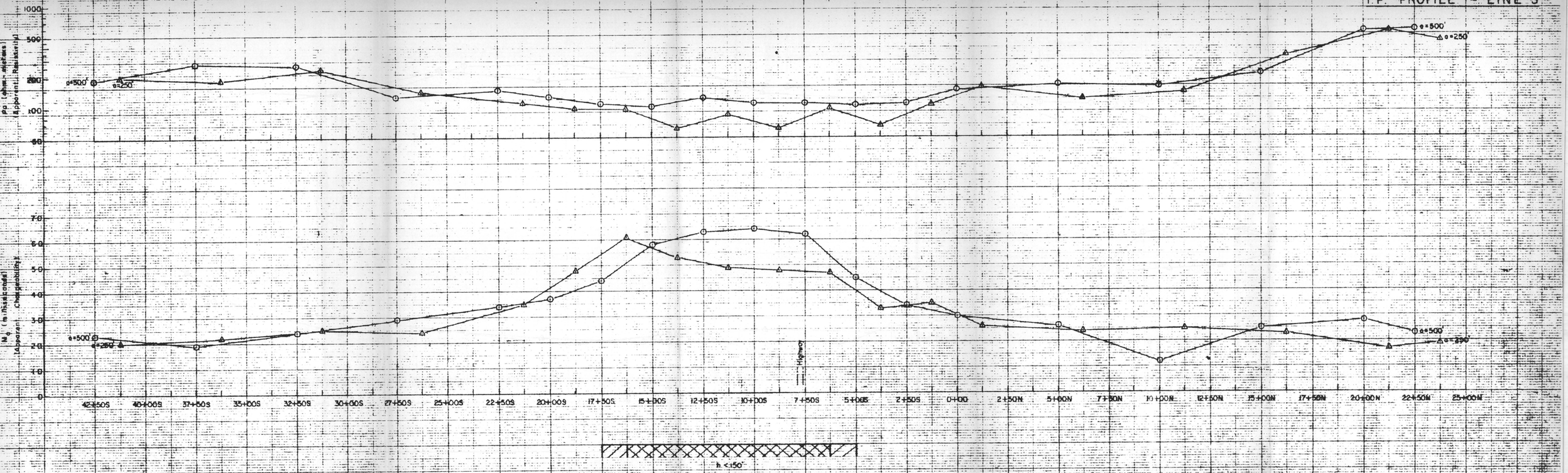
I.P. PROFILE - LINES 1 & 2



18

J-2314

I.P. PROFILE - LINE 3



REPORT OF MINERAL EXPLORATION THROUGHOUT THE PAPAGO INDIAN RESERVATION, ARIZONA FOR THE PAPAGO EXPLORATION COMPANY

September, 1961 - October 1963

by

Stebbins Mineral Surveys, Inc.

J.E. Kinnison

REPORT OF MINERAL EXPLORATION THROUGHOUT THE PAPAGO INDIAN RESERVATION, ARIZONA FOR THE PAPAGO EXPLORATION COMPANY

SEPTEMBER, 1961 - OCTOBER, 1963

BY
STEBBINS MINERAL SURVEYS INCORPORATED
OLD GREENWICH, CONNECTICUT
NOVEMBER, 1963

STEBBINS MINERAL SURVEYS INCORPORATED

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STEBBINS MINERAL SURVEYS INCORPORATED

INTRODUCTION

In this report are summarized the results of a mineral exploration program carried out by Stebbins Mineral Surveys Incorporated for the Papago Exploration Company. The Reservation is located in southern Arizona (see map #2). The project was initiated September 16, 1961 and terminated October 31, 1963, and comprised geologic, geochemical and geophysical studies throughout the Reservation.

It is concluded that, with the exploration techniques currently available, the probability of finding a major mine within the Reservation is very low. In one area, however, the Quijotoa, a high risk drilling program is considered justified, but was not recommended in the face of opposition from the consultant to the Papago Exploration Company.

BACKGROUND

On August 9, 1961 Mineral Prospecting Permit Number 14-20-0450-3736 was authorized by the Secretary of the Interior which granted Hunting Geophysical Services, Inc., as contractors to the Papago Exploration Company, exclusive right to explore the Reservation for minerals other than hydrocarbons for three years. Excluded from the permit were areas where prior rights had been established, namely valid mining claims, the "Garcia Strip," and an area east of the Santa Rosa Wash. Minimum expenditures and a schedule of land relinquished were defined in the permit, along with other terms and conditions.

In the Spring of 1963, Hunting Geophysical Services, Inc. was reorganized and the name changed to Geo-Ventures, Inc. In the Summer of 1963, the company was again reorganized and the name was changed to Stebbins Mineral Surveys Incorporated.

ACKNOWLEDGEMENTS

The field work was supervised by Quentin G. Whishaw, assisted at various times by Keith J. Droste, Donald C. Elkin, Max T. Evans, Morris A. Kaufman, Joseph A. LaRocque, Douglas G. McGoon, Jr., Philip Matter, Rana Modhi, Kenneth Pettigrew, and John J. Reiff. Secretarial work was carried out by Mrs. St. Ives Gray and Mrs. Janet Doidge.

Consultant to the Papago Exploration Company was James A. Noble, Noble and Ruckmick, Pasadena, California.

LOCATION MAP
STATE OF ARIZONA
showing
PAPAGO INDIAN RESERVATION

Scale of Miles

0 25 50 75 100 125 150 175 200

Fig 1

Geochemical analyses were made by Geochemical Prospecting Laboratory, Golden, Colorado.

Assays were made by Hawley and Hawley, Tucson, Arizona.

Consulting geophysicist for the magnetic program was Ross W. Whipple, Salt Lake City, Utah.

Hunting Survey Corporation Limited, Toronto, Ontario was contractor for the seismic survey, provided the Varian airborne magnetometer and operator, and did 23.6 line miles of induced polarization survey.

Heinrichs Geo-Exploration Company, Tucson, Arizona was contractor for 5.8 line miles of induced polarization survey.

Canadian Aero Mineral Surveys Limited, Toronto, Ontario, was contractor for 36 line miles of induced polarization survey.

Pacific Air Industries, Inc., Long Beach, California was contractor for the color and black and white aerial photography.

Arizona Helicopters Incorporated, Chandler, Arizona was contractor for flying the aeromagnetic survey.

Diamond drilling was done by Boyles Brothers Drilling Company, Salt Lake City, Utah.

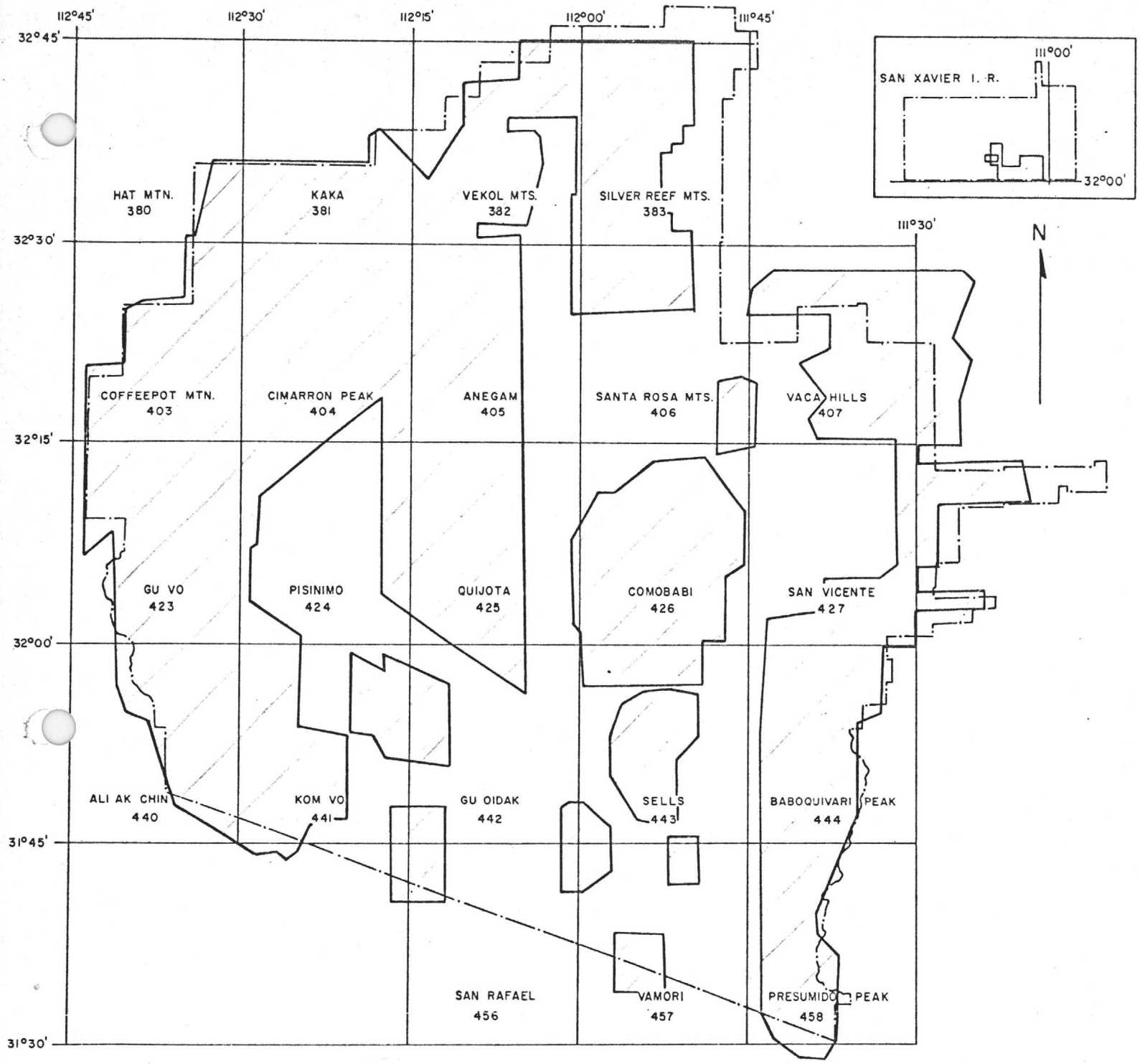
Fifty-seven thin sections were prepared by the University of Arizona and reported on by Charles Rattee, Geology Department.

The drafting was mostly done by Robert T. O'Haire.

The cooperation of the Bureau of Indian affairs and the Papago Tribal Council is gratefully acknowledged.

SUMMARY OF THE EXPLORATION PROGRAM

The Reservation comprises 4,335 square miles (2,774,000 acres). Between September 20 and November 14, 1961 all outcrop was photographed simultaneously in color and black and white as stereo pairs of aerial photography at a scale of 1:10,000 (1 inch equals 833 feet). The outcrop areas approximate 40 per cent of the Reservation (see map #4).



STEBBINS MINERAL SURVEYS INC.
PAPAGO INDIAN RESERVATION PROJECT
ARIZONA

MAP SHOWING U.S. GEOLOGICAL SURVEY
QUADRANGLE NAMES AND NUMBERS
PLUS OUTLINES OF AERIAL PHOTOGRAPHY

SCALE 1 INCH = 12 MILES

From November 20, 1961 to August 9, 1962 a geologic study of the aerial photography combined with field investigations was completed. During this period areas of no economic geologic interest were defined and relinquished, as specified by the permit, and areas warranting additional investigation were selected and assigned priorities. This mapping was compiled as 15-minute quadrangles at a scale of 1 inch equals two miles made from enlargements of the Arizona Bureau of Mines County Geologic Maps published at a scale of 1:375,000 (see map #7).

The remainder of the program (August, 1961 to October, 1963) comprised detailed geologic mapping, geochemical sampling, airborne and ground geophysics, and the drilling of one diamond drill hole. A total of 1499 geochemical samples were collected from which 3095 analyses were reported. Two miles of shallow seismic profiles were obtained, approximately 1,700 line miles of aeromagnetic survey were completed, 37 line miles of ground magnetic survey, and 65.4 line miles of induced polarization survey. The one diamond drill hole was drilled to a depth of 168 feet through 85 feet of alluvium.

Two geologic reports have been submitted to the Department of Interior (August, 1962 and February, 1963), in each case at the time land was relinquished as required by the permit.

PHYSIOGRAPHY

The Papago Indian Reservation lies in the Basin and Range Physiographic Province of Southern Arizona.

Elevations range from 1600 feet above sea level in the southern portion of the Great Plain to 7730 feet, the summit of Baboquivari Peak.

Generally speaking the ranges trend in a northerly direction and they occupy about 40 per cent of the total area. The basins occupy the remaining 60 per cent. They are generally flat gravel plains believed to be occupying structural depressions. The depth of unconsolidated gravel in some areas is greater than 1000 feet. The plain like surfaces were formed through combined deposition and erosion by sheet floods, meandering streams, and wind action.

The area is one of low rainfall (less than 10 inches per annum). Temperatures range from a few degrees below freezing on winter nights to 120 degrees Farenheit in the shade on summer days.

Vegetation is cactus and desert shrubs.

GENERAL GEOLOGY

Rocks from Archean to recent are exposed.

Precambrian rocks, schist, gneiss and intrusives outcrop at the extreme north of the Reservation.

Paleozoic rocks, chiefly represented by sediments are found in the Vekol Mountains in the north of the Reservation. Other small outcrops are found in the north and center. Mesozoic sediments and volcanics are wide spread in the central and eastern parts of the Reservation. Tertiary rocks, mostly andesite and basalt, form the mountains along the west boundary.

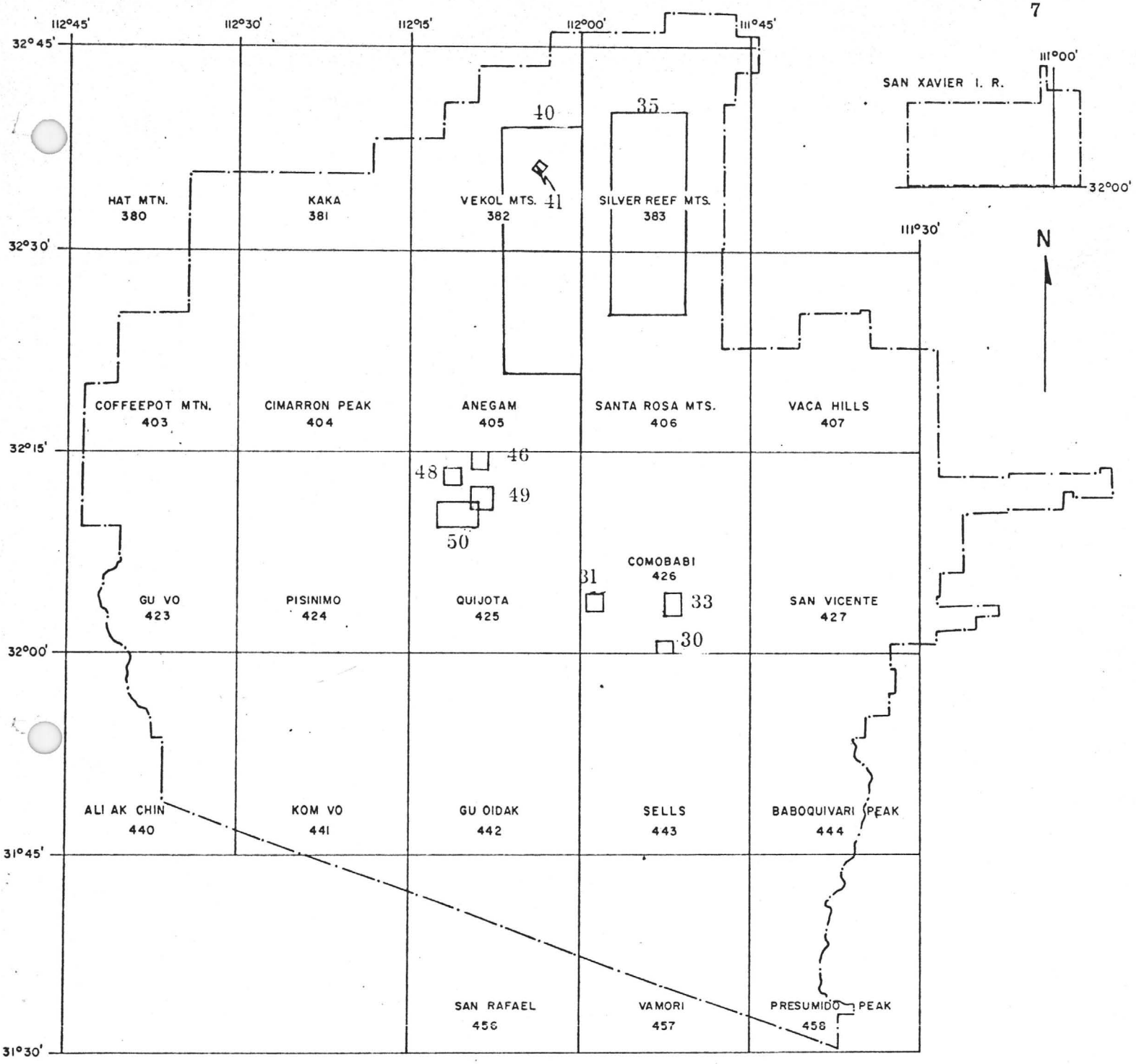
Quaternary volcanics and gravel can be seen in all areas.

All pre-Quaternary rocks are folder and faulted. Intrusives range in age from Precambrian to Tertiary.

RECONNAISSANCE GEOLOGIC MAPPING

The reconnaissance geologic mapping is compiled as 15-minute quadrangles at a scale of 1 inch equals 2 miles (see map #7 and quadrangle maps #9-29, 34, 37, 38, 45) made from enlarging the Arizona Bureau of Mines County Geologic Maps published at a scale of 1:375,000 (1 inch equals 6 miles approximately). Our alterations and modifications of the State Bureau's mapping have been incorporated in the quadrangle maps presented here except in the instances where complete remapping at a larger scale was accomplished. In those cases, the State mapping is simply reproduced on the quadrangle sheet and our mapping appears separately (see maps numbered 29-34, 36, 38-40).

The geology of each quadrangle is summarized below. The legend for all sheets appears as Map #8. The quadrangle name and number of each quadrangle corresponds to the U. S. Geological Survey nomenclature.



STEBBINS MINERAL SURVEYS INC.
PAPAGO INDIAN RESERVATION PROJECT
ARIZONA

INDEX OF GEOLOGICAL MAPS

SCALE 1 INCH = 12 MILES

STEBBINS MINERAL SURVEYS INC.

LEGEND

FOR 15-MINUTE GEOLOGIC QUADRANGLES OF
THE PAPAGO INDIAN RESERVATION

QUATERNARY

- Qs — SILT, SAND, & GRAVEL
- QTs — SAND, GRAVEL, & CONGLOMERATE
- QTb — BASALT

TERTIARY

- Ts — SANDSTONE, SHALE, & CONGLOMERATE
- Tr — RHYOLITE
- Ta — ANDESITE & ANDESITE PORPHYRY
- Tb — BASALT
- Td — DIKES & PLUGS

LARAMIDE

- TKs — SANDSTONE, SHALE, & CONGLOMERATE
- TKv — VOLCANIC FLOWS & PYROCLASTIC ROCKS -- RHYOLITIC TO BASALTIC
- TKd — DIKES & PLUGS
- TKg — GRANITE
- TKsch — SCHIST
- TKgn — GNEISS

CRETACEOUS

- Ks — SHALE, SANDSTONE, CONGLOMERATE, & LIMESTONE, LOCALLY METAMORPHOSED
- Kv — VOLCANIC & SEDIMENTARY ROCKS, UNDIFFERENTIATED
- Ka — ANDESITE

CARBONIFEROUS & DEVONIAN

- CDN — CARBONIFEROUS & DEVONIAN LIMESTONE, SHALE, SANDSTONE, & QUARTZITE
- Pu — LIMESTONE, SHALE, SANDSTONE, & QUARTZITE — PALEOZOIC UNDIVIDED

CAMBRIAN

- Cl — BOLSA & TROY QUARTZITES & ABRIGO & RELATED LIMESTONES

YOUNGER PRE-CAMBRIAN

- YPCu — APACHE GROUP
- YPCd — DIABASE

OLDER PRE-CAMBRIAN

- OPCg — GRANITE & RELATED CRYSTALLINE INTRUSIVE ROCKS
- OPCsch — SCHIST

CONTACT

FAULT, SHOWING DIP. U - UPTHROWN SIDE, D DOWNTHROWN SIDE

STRIKE & DIP OF BEDS

MINE

PROSPECT

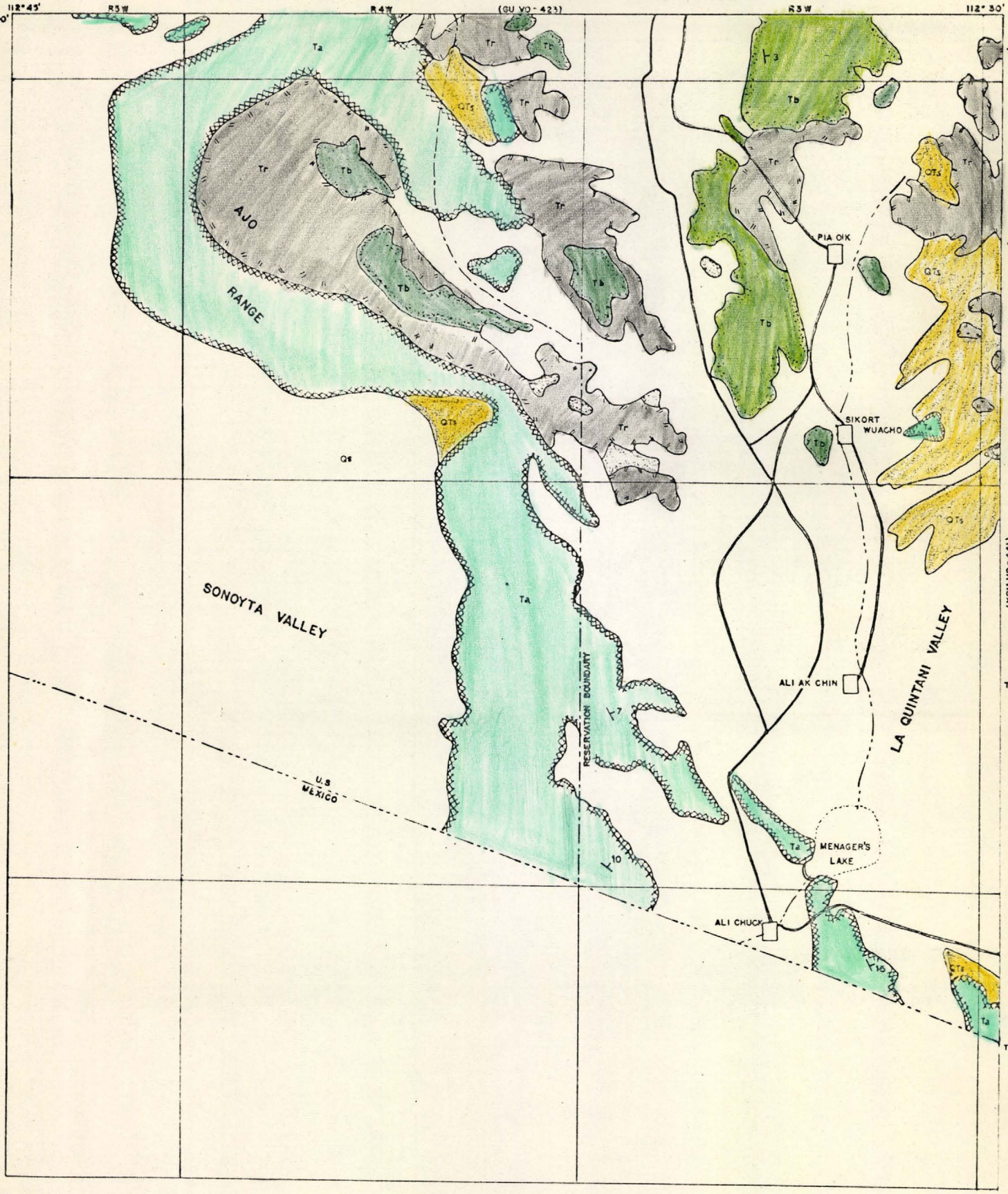
RESERVATION BOUNDARY

SCALE FOR ALL GEOLOGIC QUADRANGLES 1 INCH = 2 MILES

Ali Ak Chin Quadrangle #440

This quadrangle contains the southern end of the Ajo Mountains, the eastern portion of which is in the Reservation. The southern part of the range is composed of Tertiary andesite, gray, green and purple in color. No alteration or mineralization was found in the area.

In the northern half of the quadrangle the rocks are andesite, overlain by rhyolite capped by basalt. Beds of white tuff, up to ten feet thick, occur at the base of the basalt. Wind has carved caves along the outcrop of the tuff. Seams of obsidian occur in the tuff. In many places a brick-red zone up to thirty feet thick occurs at the base of the basalt. No mineralization was observed in this area.



ALI AK CHIN

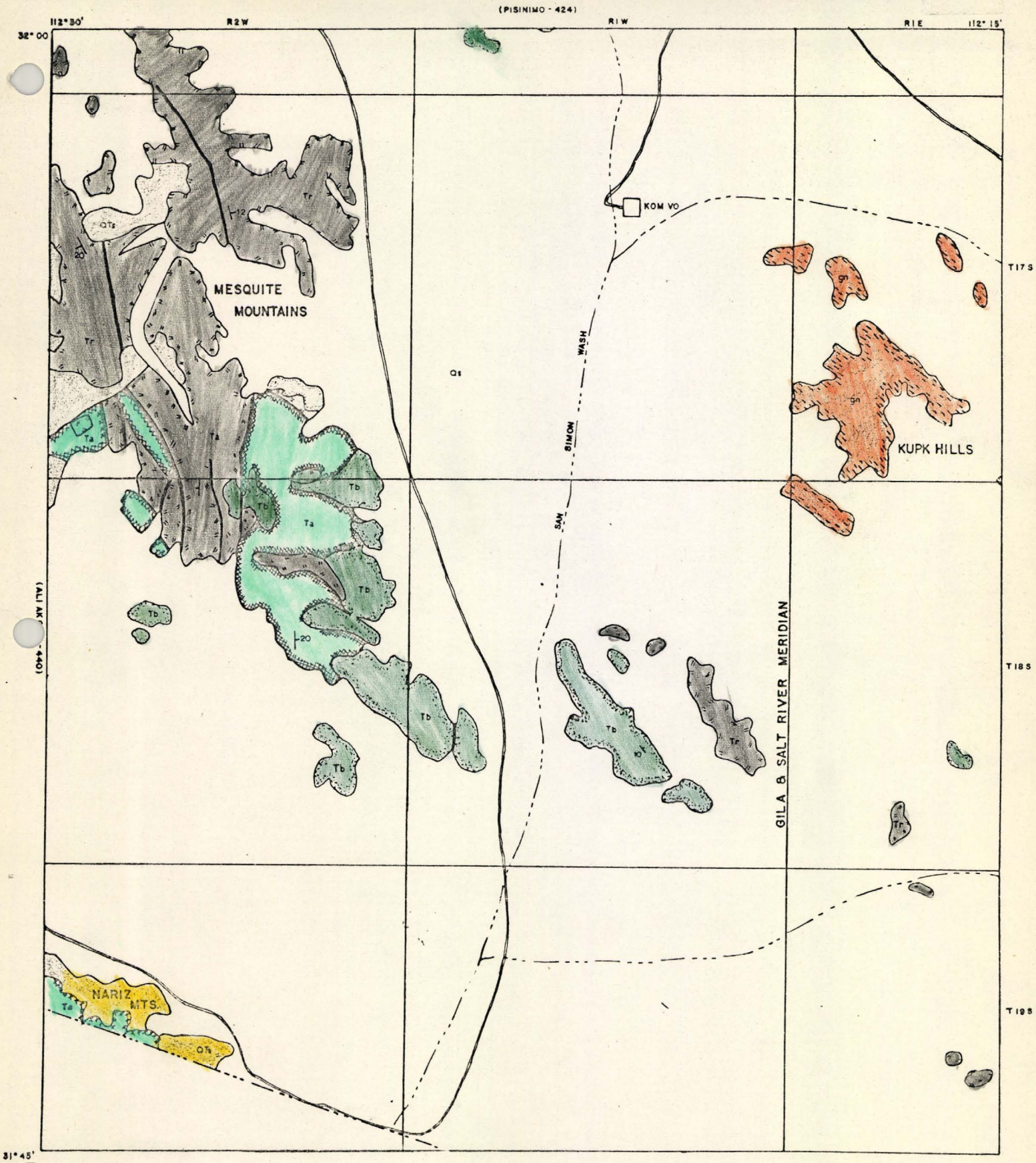
(440)

Kom Vo Quadrangle #441

This quandrangle contains the Mesquite, Mariz and Kupk (Copeka) Mountains. Much of the area is occupied by recent gravel which forms the "Great Plain." The San Simon Wash drains the area.

The Mesquite Mountains are formed of Tertiary volcanics, andesite, rhyolite and basalt. Much of the basalt is highly magnetic due to inclusions of magnetite, which is estimated to comprise in places up to ten per cent of the rock. Minor Tertiary Quaternary sediments border the range. No hydrothermal alteration or commercial mineralization was seen in the area. The Mariz Mountains are a southerly continuation of the Ajo Mountains and lie mostly south of the International Boundary. They consist of Tertiary andesite and Tertiary sediments, conglomerate, quartzite and grit. No hydrothermal alteration or mineralization was noted.

The Kupk Hills are an isolated range of low hills rising from the "Great Plain." They are composed of metamorphics, schist and gneiss. Metamorphism is believed to have taken place during the Laramide Orogeny. No significant alteration or mineralization was encountered and the area was not considered worth further work.

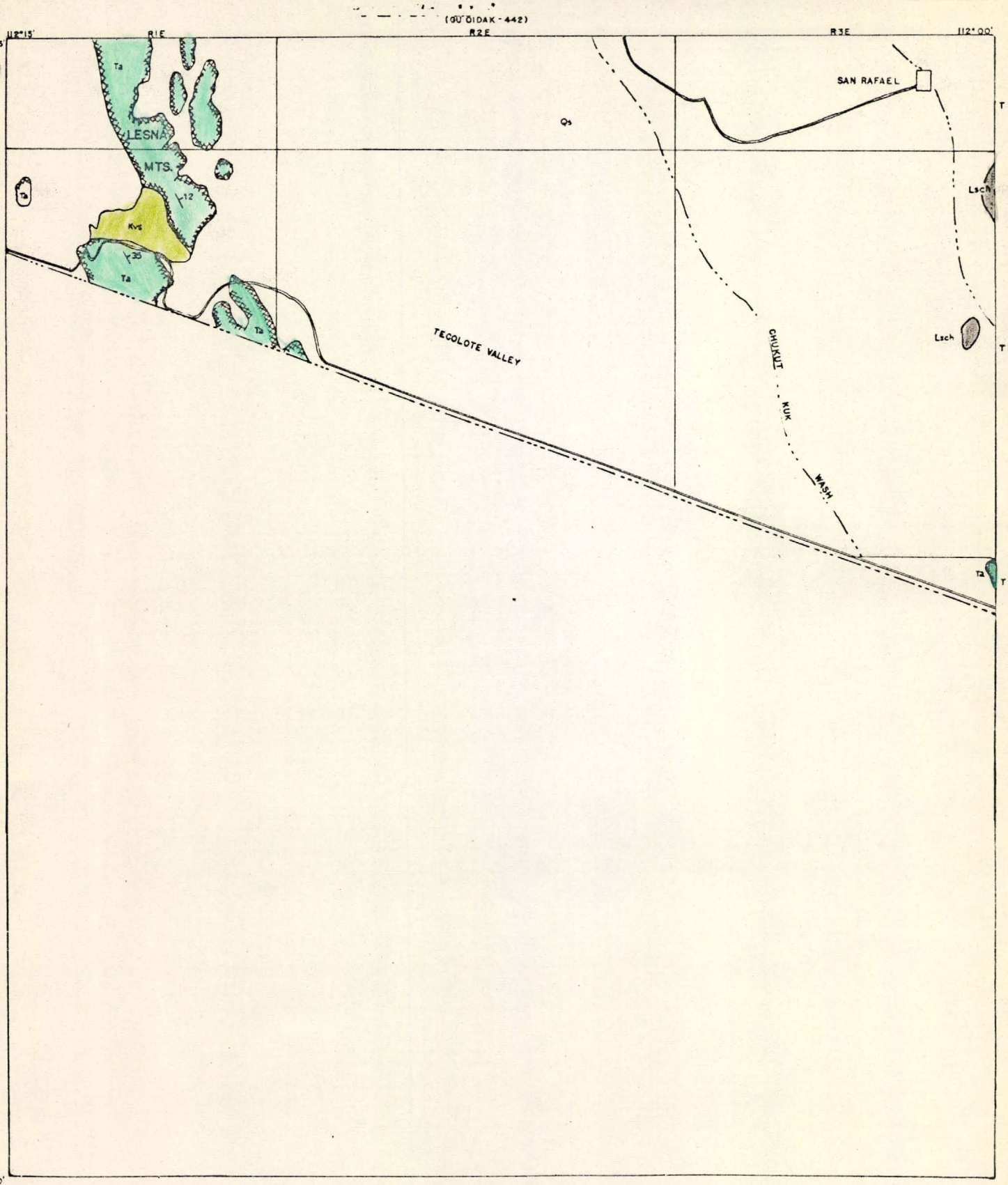

(PISINIMO - 424)
112°30'
R2W
R1W
R1E
112°15'
32°00'
31°45'
(ALI AK - 440)
(GU OIDAK - 442)
T17S
T18S
T19S
KOM VO
MESQUITE MOUNTAINS
KUPK HILLS
SAN SIMON WASH
GILA & SALT RIVER MERIDIAN
NARIZ MTS.
Tr
QTs
Qs
Ta
Tb
gn

KOM VO

(441)

San Rafael Quadrangle #456

Only the northern one third of this quadrangle is in the United States. The Lesna Mountains rise from the Tecolote Valley on the west border of the quadrangle. They are formed of Tertiary volcanics and Cretaceous sediments mostly conglomerate and quartzite. The Tertiary flows are of brown, coarse, porphyritic andesite. At the north end of the range, north striking vertical joints are prominent. This area is devoid of signs of commercial mineralization.

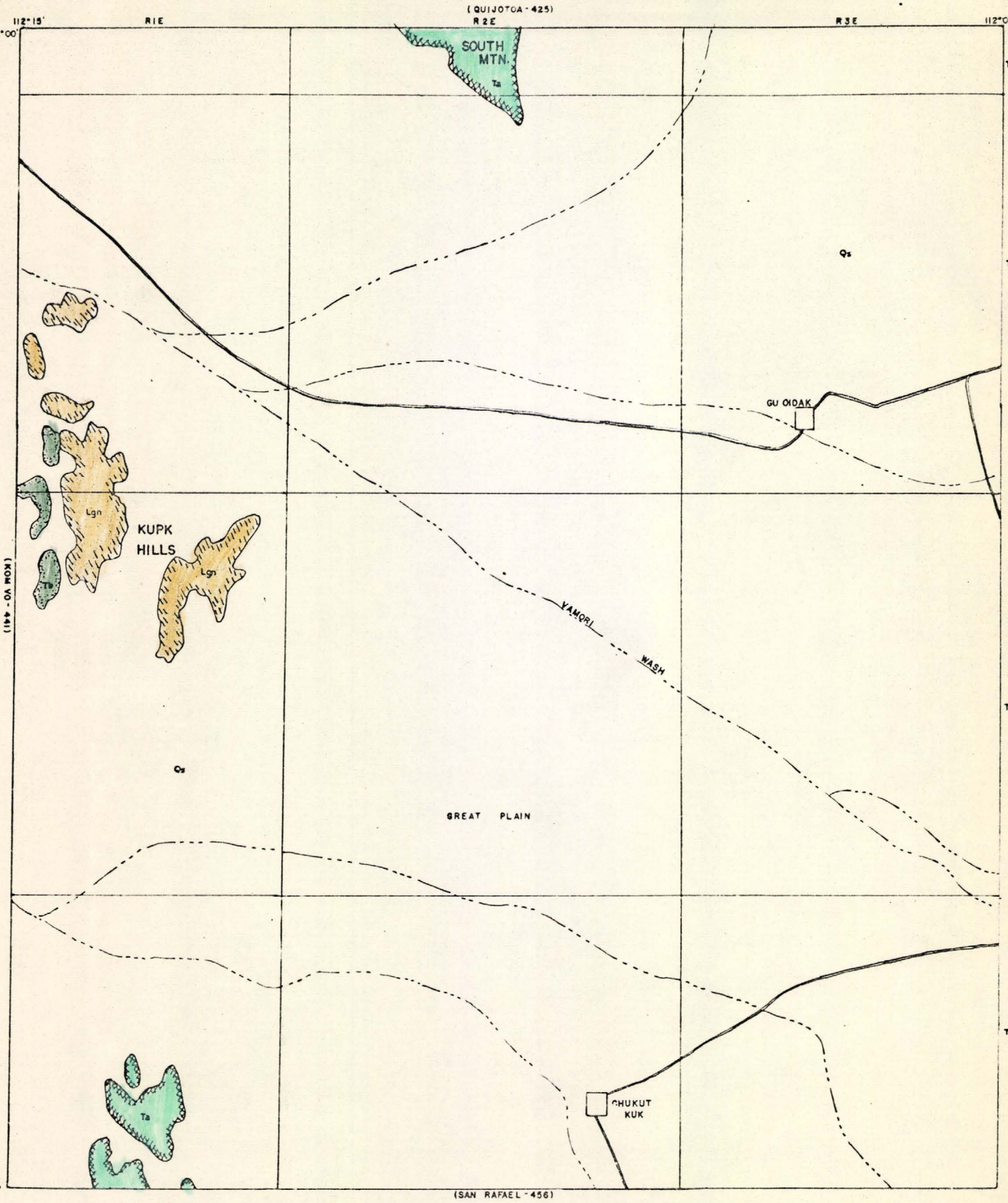


SAN RAFAEL

(456)

Gu Oidak Quadrangle #442

This quadrangle contains the "Great Plain", a gravel filled basin, the east end of the Kupk Hills, which are of unmineralized metamorphics, and the north end of the Lesna Mountains, which are of brown porphyritic andesite.


(QUIJOTOA-425)
112°15'
R1E
R2E
R3E
112°00'
32°00'
SOUTH MTN.
Ta
T16S
T17S
Qs
GU OIDAK
KUPK HILLS
Lgn
Lgn
Ta
(KOM VO-441)
YAMORI WASH
(SELLS-443)
T18S
Qs
GREAT PLAIN
T19S
Ta
CHUKUT KUK
5'
(SAN RAFAEL-456)

GU OIDAK

(442)

Vamori Quadrangle #457

The north half of this quadrangle is in the United States. Most of the area is the Vamori Valley, a typical gravel filled basin. The Alvarez Mountains occur in the northwest corner of the quadrangle and are formed of metasediments of Laramide age. A bleached fracture zone in the west central part of the range, proved to be unmineralized except for slight staining from transported iron oxide. Small diorite dikes occur in parts of the zone.

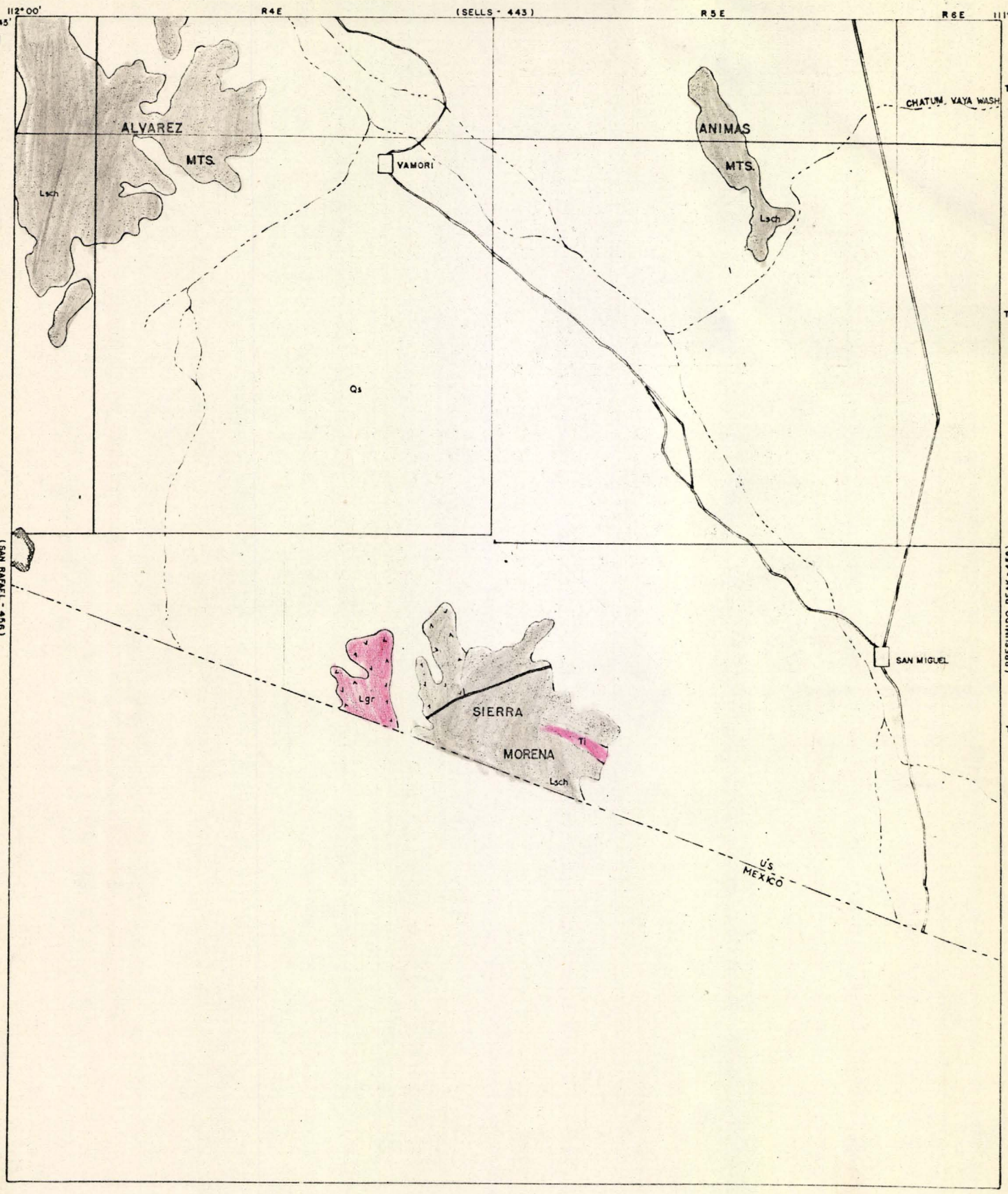
In the northeast part of the range, some prospect pits on a slightly bleached zone in the metasediments showed no sign of introduced mineralization.

The Morena Mountains are in the center of the quadrangle along the International Boundary. The northwest quarter of the range is composed of granite, believed to be of Laramide age, and the east part of the range is metamorphic rocks. Andesite dikes intersect the granite. Parts of the granite stock are stained brown due to the break down of ferro-magnesian minerals. No sign of hydrothermal alteration or mineralization was seen.

A prominent fault that can be traced for three miles trending northeast and dipping vertically, separates the granite from the metamorphics. It is about 50 feet wide and can be divided into three zones. Twenty five feet on the southeast side is brecciated and silicified with very minor sulphide. The central six feet of the zone is dark brown due to inclusions of ankerite, which has been weathered. The northwest side of the shear is twenty five feet thick and scattered "boxworks" indicate that at one time the zone contained sulphide. About 3000 feet north of the International Boundary, on the shear zone, two shafts have been sunk. They are inaccessible, but the rock on the dump contains no mineralization.

Samples from the various parts of the shear zone showed geochemically anomalous amounts of zinc, but nothing of possible economic interest. No further work was done in this area.

The Animas Mountains are in the northeast of the quadrangle. They are composed of Laramide schist. No significant mineralization or alteration was noted. A number of small prospect pits have been sunk on quartz-veins at the south end of the range. None of these was of economic interest.


112°00'
31°45'
R4E
(SELLS - 443)
R5E
R6E
111°45'
T19S
T20S
T21S
ALVAREZ
MTS.
Lsch
VAMORI
Qs
ANIMAS
MTS.
Lsch
CHATUM, VAYA WASH
(SAN RAFAEL - 456)
(PRESUMIDO PEAK - 458)
SAN MIGUEL
Lgr
SIERRA
MORENA
Ti
Lsch
US
MEXICO

VAMORI

(457)

Presumido Peak Quadrangle #458

This quandrangle contains the southern Baboquivari Mountains and the Pozo Verde Mountains. The Papago Indian Reservation boundary runs down the center of this range. Only the west half of the quandrangle is in the Papago Reservation.

The Pozo Verde Mountains and the south half of that portion of the Baboquivari Mountains in the quadrangle are of Laramide granite and allied intrusives. The north half of the Baboquivari Mountains are of granite and metamorphics with some Tertiary sediments and volcanics.

There are a number of prospects in the quandrangle, but no recorded production. Five localities (numbered 1-5 on the quadrangle sheet) where mineralization or alteration occur are described below.

1. The outcrop of Tertiary andesite is a hill of agglomerate which has been intruded by small bodies of andesite and locally contains abundant quartz stringers. Many of these contain limonite believed to be residual from pyrite. They are of no economic interest.

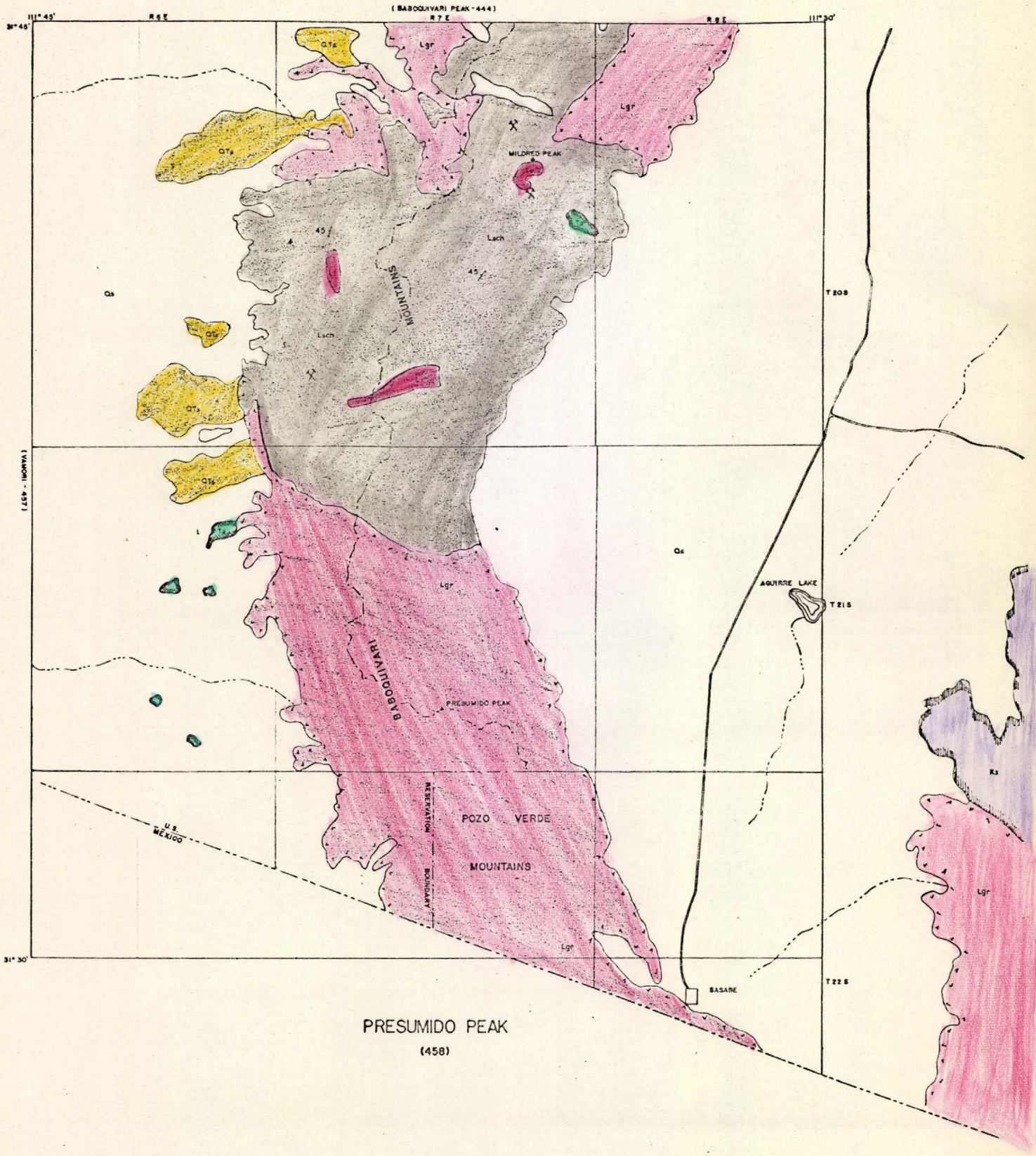
2. In the metamorphics near their contact with the granite occurs a zone containing pyrite and minor malachite and chrysocolla. The metasediments are intruded by both andesitic and granitic dikes. Propylitic alteration occurs in the sediment. There is little sign of economic mineralization in the area.

3. An area of bleached and epidotized metasediments contains a number of quartz veins. These contain scattered copper mineralization, chiefly chrysocolla. One vein contained a few specks of powellite. There is no commercial mineralization in the area.

4. A bleached zone of 300 feet long by 100 feet wide in metasediments contains a few quartz stringers with pyrite and copper stains. The area is of no commercial interest.

5. At this locality there are several prospect pits in a discontinuous vein of glassy quartz. Traces of copper minerals occur in parts of the vein. The occurrence is of no commercial interest.

No other areas of interest were found in the Presumido Peak Quadrangle and no further work was carried out.



PRESUMIDO PEAK

(458)

Baboquivari Peak Quadrangle #44

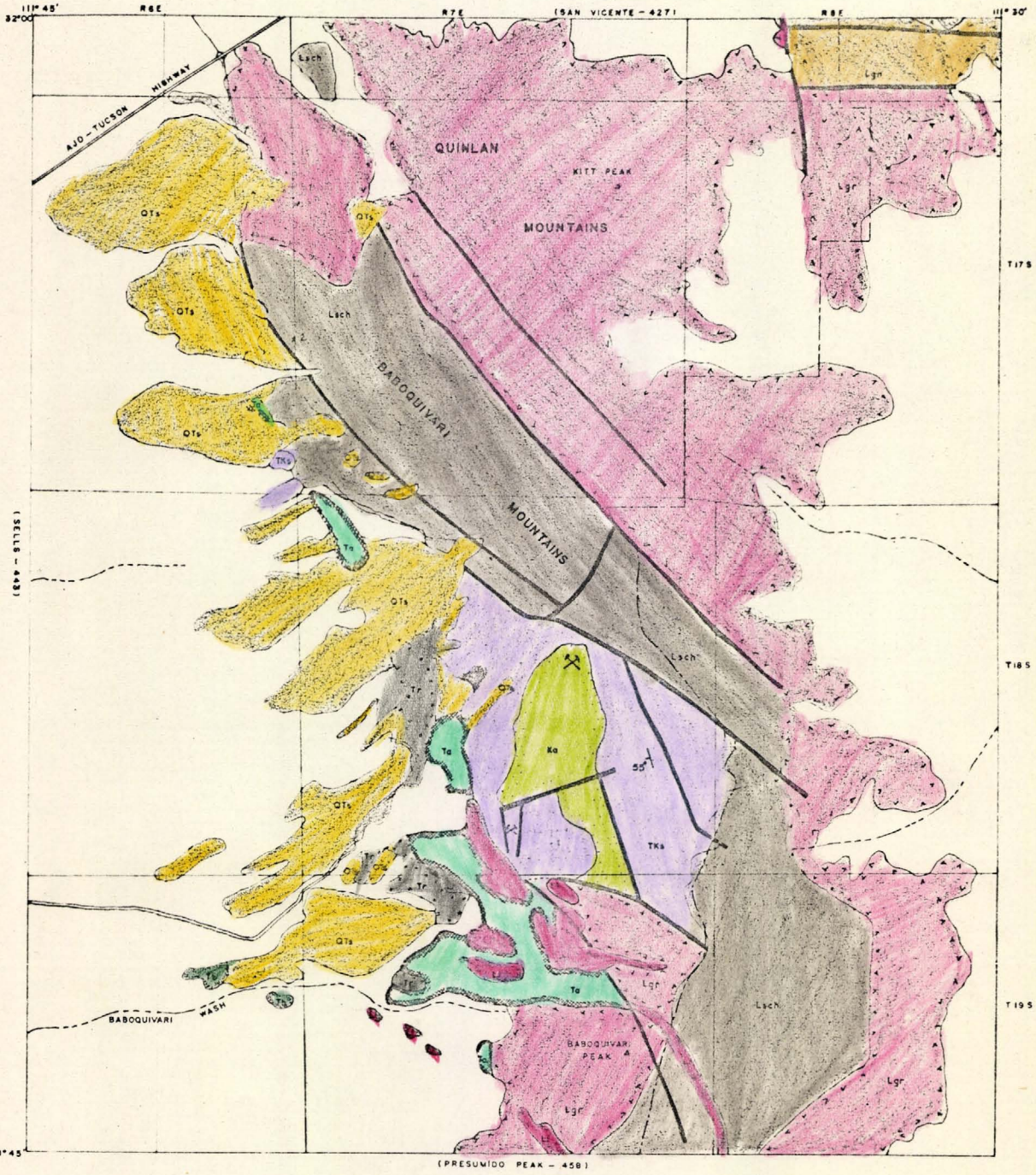
This quadrangle contains the northern part of Baboquivari Mountains. The western two thirds of the range is within the Papago Reservation. There is one mine in the area, the Allison. It is credited with a production of $126,000 of gold from 1895 to 1931. Since that time several thousand tons of ore have been shipped to the Phelps-Dodge smelter at Ajo as silicia flux.

The north and east of the Range is composed of granite of Laramide age. It is a coarse grained, sometimes gneissic, muscovite granite. No traces of mineralization or hydrothermal alteration were found in it. The core of the range is Laramide metamorphics, much of which is a granitic gneiss. The west part of the range is composed of Cretaceous, Tertiary and Quaternary sediments, and Tertiary volcanics.

At the location marked (1) on the map a northwest trending fault zone in metasediments contains fluorite. This is very irregular and well below the commercial grade.

At location (2) some prospect pits have been sunk on a bleached zone in metasediments. Some scattered pyrite occurs in the bleached rock but no copper mineralization.

Neither of the areas is of commercial interest. No other mineralized areas were found and no further work was done.



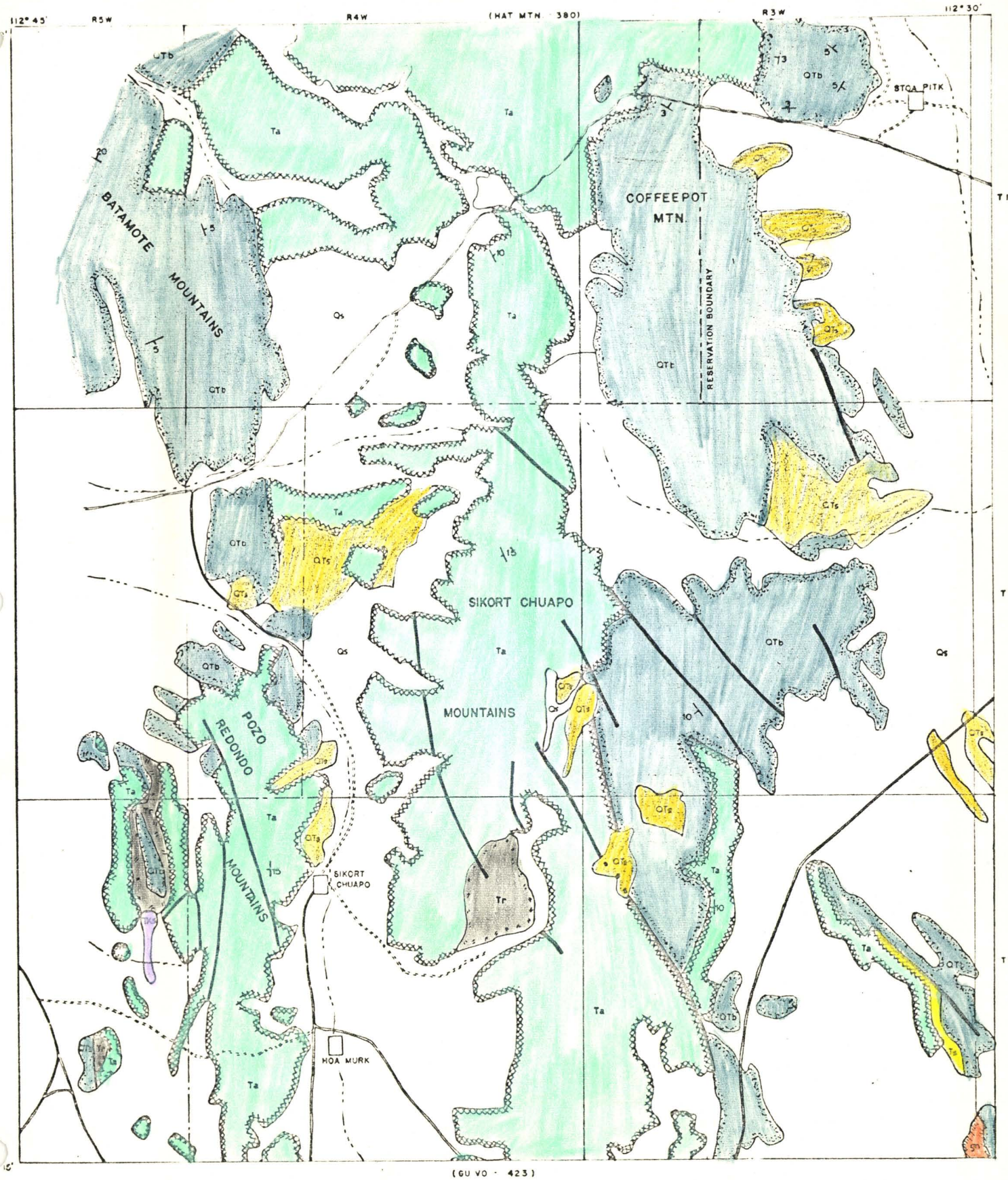
BABOQUIVARI PEAK

(444)

Coffee Pot Mountain Quadrangle #403

The eastern two thirds of this quadrangle is in the Papago Reservation. The outcrop areas consist of the Coffee Pot Mountain, Sikort Chuapo Mountains and Pozo Redondo Mountains.

All are composed of Tertiary and Quaternary volcanics with minor sediments. No alteration of mineralization or any possible economic interest was found in the area.



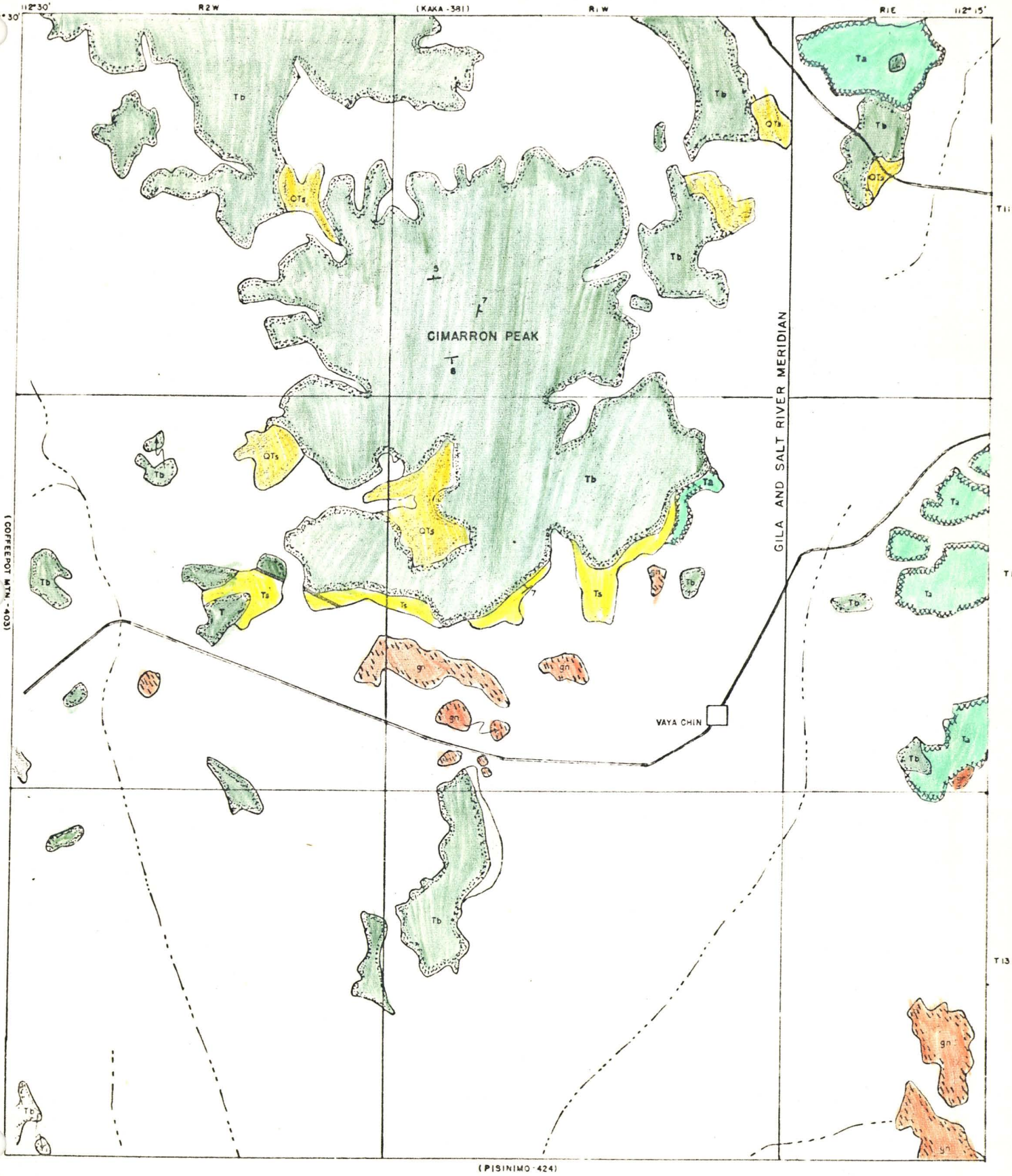
COFFEEPOT MOUNTAIN

(403)

Cimarron Peak Quadrangle #404

The Cimarron Peak Mountain is formed of Tertiary basalt. There are scattered outcrops of Laramide gneiss and Tertiary sediments in the quadrangle.

No alteration or mineralization was found and no further work was undertaken in the area.

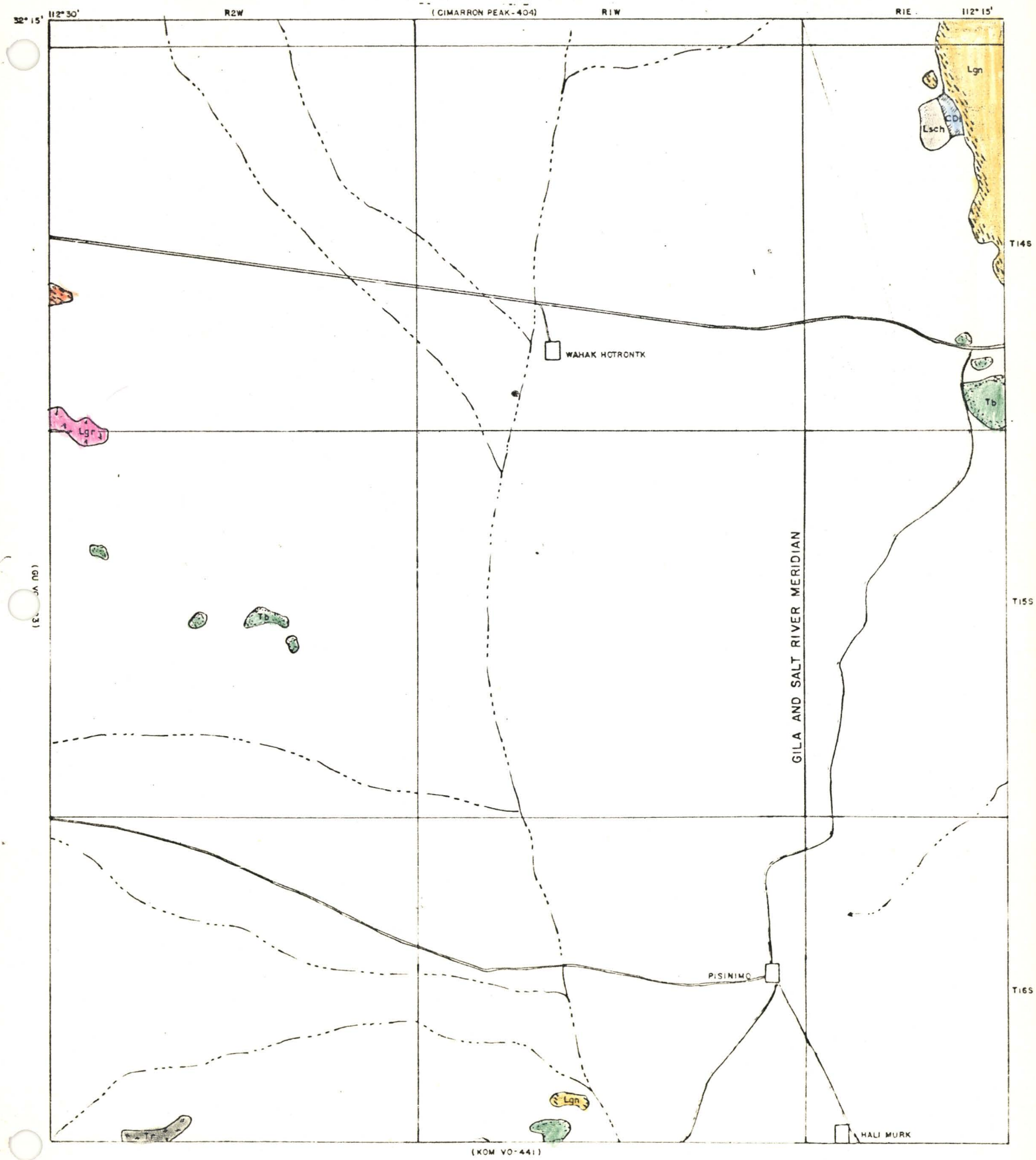


CIMARRON PEAK
(404)

Pisinimo Quadrangle #424

This quadrangle covers the plain of San Simon Wash (a northward extension of the "Great Plain").

The few small outcrops of Laramide Metamorphics and Tertiary volcanics have no alteration or mineralization.



PISINIMO

(424)

Anegam Quadrangle #405

This quadrangle contains the Cimarron Mountains, the Sheridan Hills and the northern foothills of the Brownell Mountains.

The east slope of the Cimarron Mountains is composed of Laramide metamorphics and intrusive. The western slope of the range is of Tertiary volcanics and Quaternary sediments. At the south end of the map sheet Tertiary and Cretaceous sediments overlie two small outcrops of Paleozoic limestone.

There was considerable mining activity in the past and a brief description of some of the more important prospects follows. The numbers refer to those on the Anegam Quadrangle 1 inch - 2 miles geologic map.

1. Small, isolated patches of hematite gossan have been explored by shallow workings. The mineralization, copper-gold, occurs in shears in granitic rock.

2. Similar to (1).

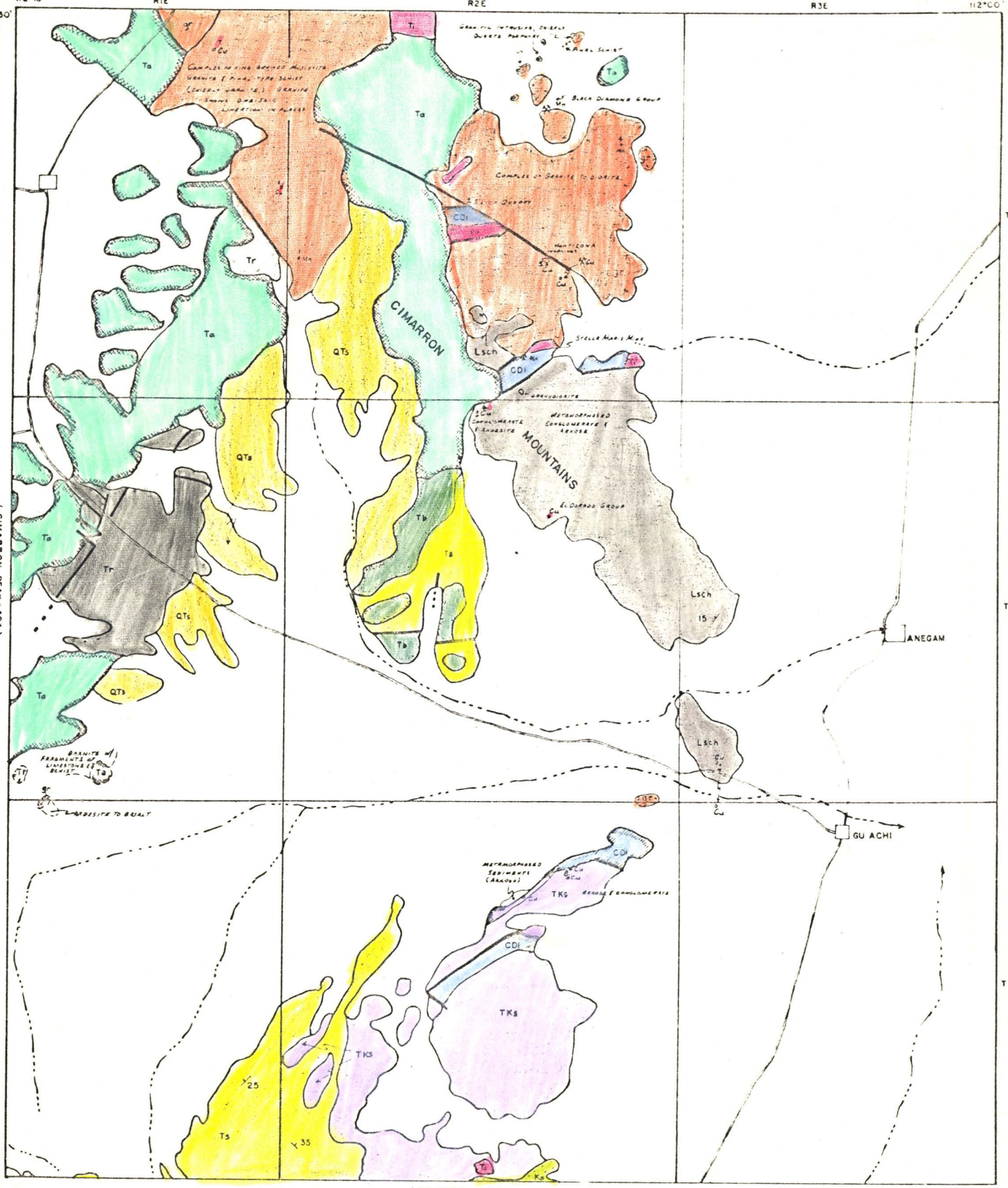
3. Prospect shafts on east-west shear in diorite, containing minor manganese and oxide copper minerals.

4. Prospect pits and a shallow incline have been sunk on quartz-carbonate veins containing manganese. The showing is too small and low grade to be economic.

5. Black Diamond Claim Group A vein striking N. 70 W. can be traced for 200 feet along strike and averages 10 feet in width. It contains uneconomic quantities of manganese oxide with calcite and hematite.

   Montizona Mine Quartz veins associated with aplite dikes cut granitic rock. They contain uneconomic quantities of copper mineralization. The longest vein can be followed for 200 feet on strike and averages 3 feet wide.

6. Stella Maris - Black Jack - Manganese King Mines About 320,000 long ton units of manganese in ore running 27 per cent Mn. has been taken from these mines. The ore irregularly replaces Paleozoic limestone and brecciated quartzite. There is a possibility of more manganese ore in this area, but due to the low grade of the known ore the deposits were not considered to be worth further prospecting.


(VEKOL MTNS. - 362)
112°15'
R1E
R2E
R3E
112°00'
T11S
T12S
T13S
(CIMARRON PEAK - 404)
(SANTA ROSA MTNS. - 406)
(QUIJOTOA - 425)
CIMARRON
MOUNTAINS
ANEGAM
GU ACHI
Ta
Tr
Tb
Ts
QTs
Lsch
CDI
TKs
Ti
Black Diamond Group
El Dorado Group
Stella Maris Mine
Metamorphosed Conglomerate (Arkose)
Metamorphosed Sediments (Arkose)
Arkose & Conglomerate
Granite Fragments of Limestone & Schist
Andesite to Basalt

ANEGAM

(405)

Eldorado Mine Widely scattered shear zones in metamorphosed arkose and conglomerate have been mined by shallow workings for oxide copper. Production has been negligible and the orebodies are too small to warrant further work.

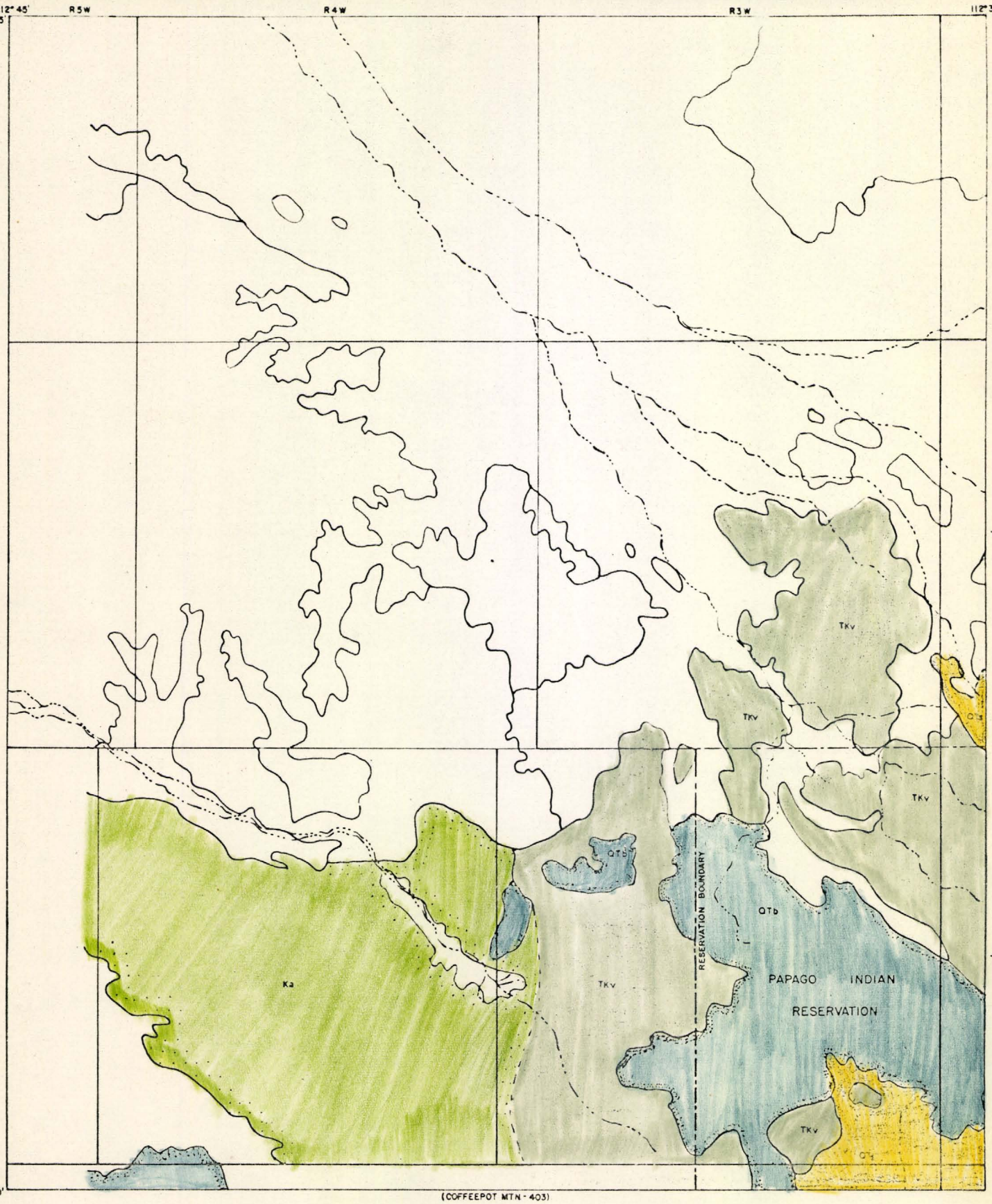
7. Small quartz veins have been explored by shallow workings. They contain minor amounts of oxide copper. They are too small and low grade to warrant further work.

8. Oxide copper minerals occur on the contact between Paleozoic limestone and metamorphosed arkose. The showings are small low grade and there is a lack of hydrothermal alteration. They were not considered to be worth further work.

None of these prospects (and many smaller ones) were considered worth further work.

Hat Mountain Quadrangle #380

Only the southeast corner of this quadrangle is within the Reservation. Rocks outcropping are Cretaceous, Tertiary and Quaternary volcanics, rhyolite, andesite, basalt, glasses, tuffs and agglomerate. No significant alteration or mineralization was noted in the area.

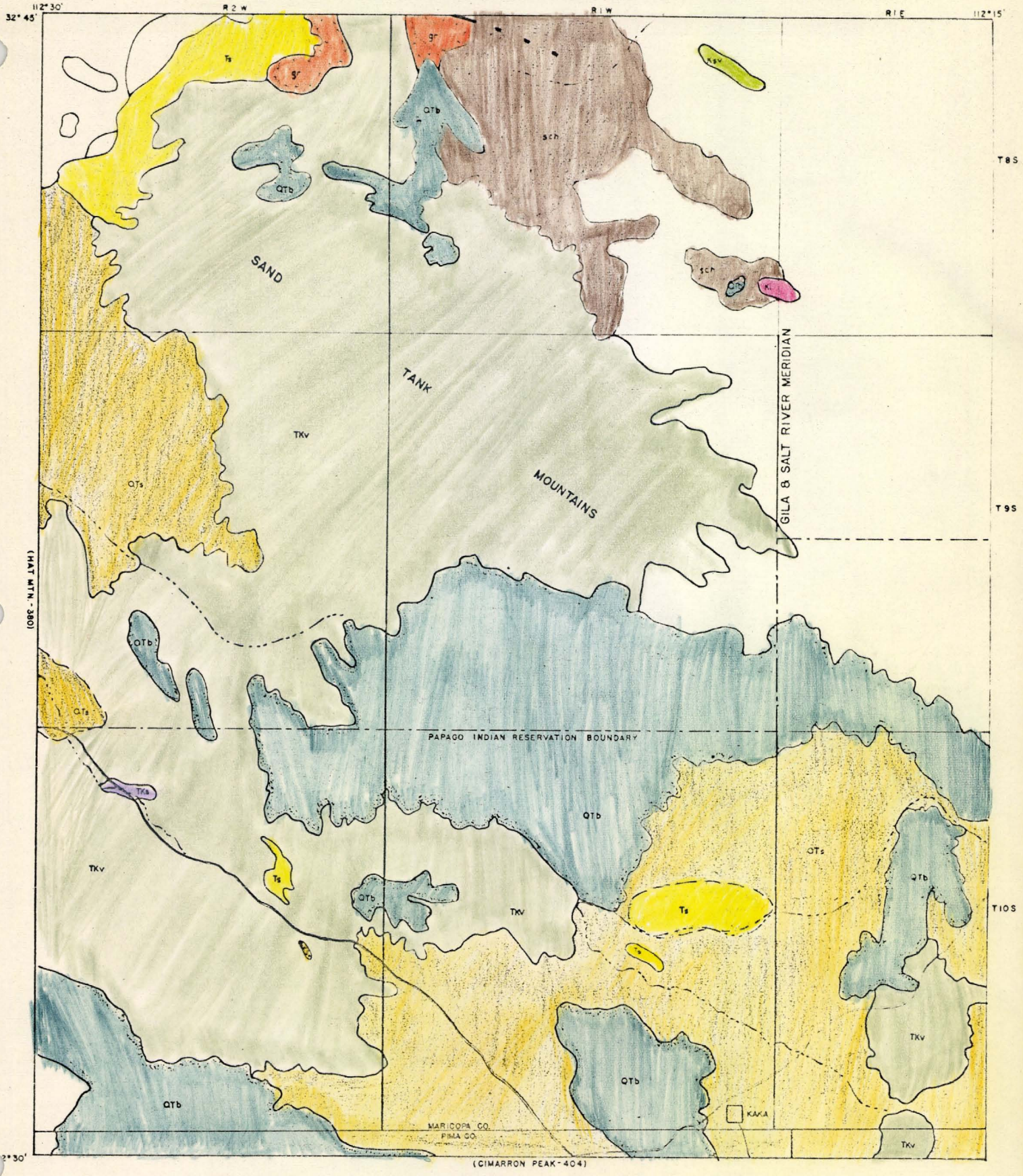


HAT MOUNTAIN

(380)

Kaka Quadrangle #381

The southern one third of this quadrangle is within the Papago Reservation. The area is underlain by Cretaceous, Tertiary and Quaternary volcanics. The higher ranges are capped by flat lying Quaternary basalt flows. Only one area of significant alteration was noted (marked (1) on the geological map). Here a finely banded, welded tuff is stained pink-brown by hematite. The tuff bed strikes southeast and dips 50° southwest and in places is highly contorted. The tuff contains scattered garnets and is cut by a vertical rhyolite dike. The tuff is not geochemically anomalous in copper. The hematite appears to be transported rather than residual and, except for the scattered garnets, there is no sign of hydrothermal alteration.

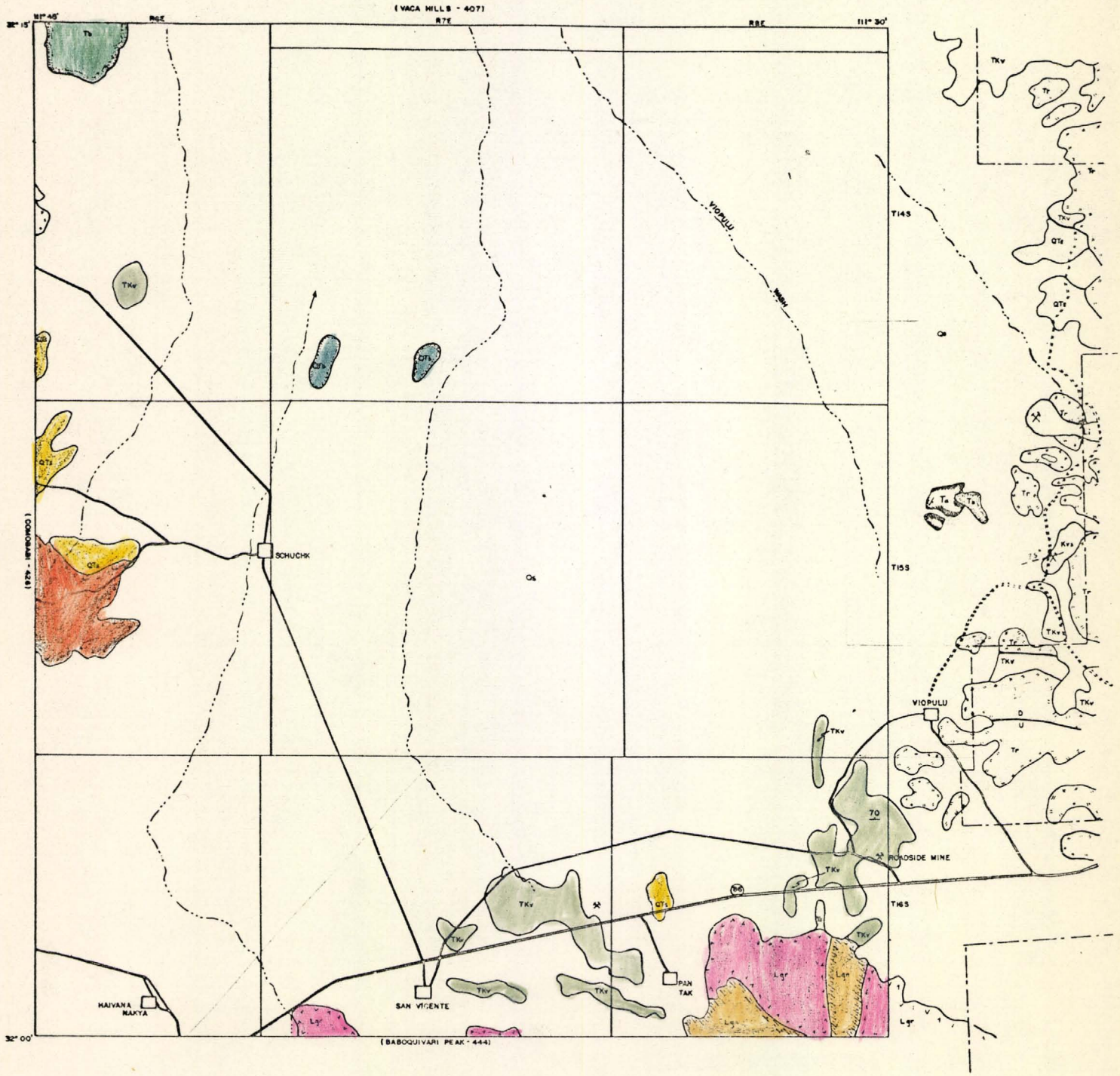

112°30'
R 2 W
R 1 W
R 1 E
112°15'
32°45'
T 8 S
T 9 S
T 10 S
SAND
TANK
MOUNTAINS
GILA & SALT RIVER MERIDIAN
PAPAGO INDIAN RESERVATION BOUNDARY
MARICOPA CO.
PIMA CO.
KAKA
(HAT MTN.-380)
(CIMARRON PEAK-404)
Ts
gr
QTb
sch
TKv
QTs
TKa
Kl

KAKA

(381)

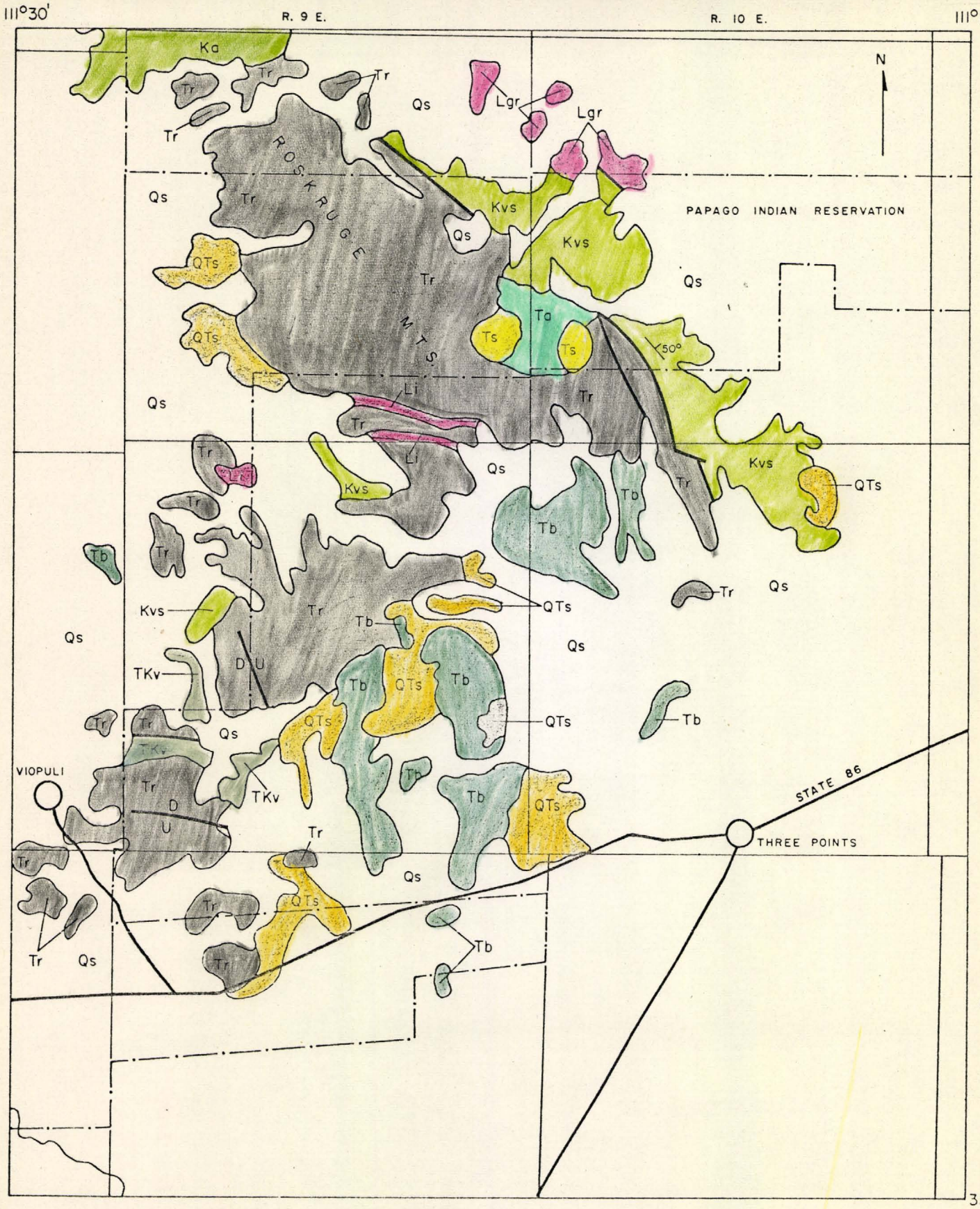
San Vicente Quadrangle #427 (and Cocoraque Butte #428

The Coyote Mountains, composed of granite and gneiss, to the north of which are scattered hills of volcanics, are in the southeast corner of the quadrangle. A portion of the east edge of the Comobabi Hills occurs along the west boundary of the quadrangle. These are composed of quartz monzonite intrusive and Tertiary and Quaternary sediments.



SAN VICENTE

(427)



COCORAQUE BUTTE #428

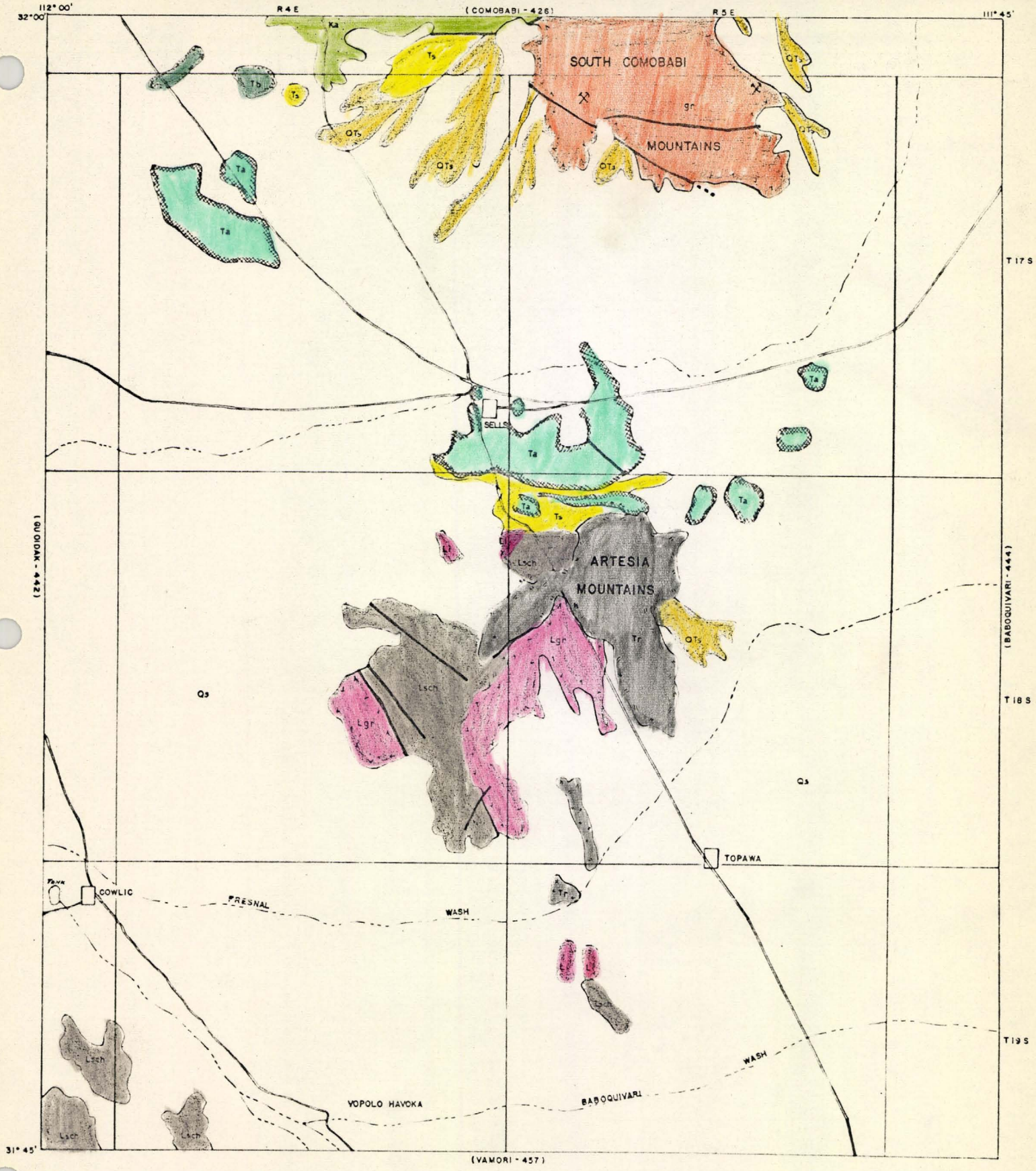
Sells Quadrangle #443

This quadrangle contains the Artesia Mountains which are composed of Tertiary volcanics and sediments and Laramide metasediments and intrusives. No significant alteration or mineralization was found. No mineral production is recorded from the area.

The southern half of the South Comobabi Mountains occupies the northern part of the quadrangle sheet. The eastern portion of this range is of diorite and quartz monzonite of Laramide age. The western part is of Tertiary and Quaternary sediments and volcanics.

A number of small gold mines have been worked intermittently, but production has been small. Production of $20,000 has been recorded from the Jaeger.

Many prospect pits have been sunk on veins and shear zones in the intrusive. All, however, are far too small to be of economic interest. No other alteration or mineralization was found.


112° 00'
32° 00'
R 4 E
(COMOBABI - 426)
R 5 E
111° 45'
SOUTH COMOBABI
MOUNTAINS
gr
Ka
Ts
Tb
QTs
Ta
T 17 S
SELLS
ARTESIA
MOUNTAINS
Lsch
Lgr
Tr
Qs
(QUIJOTOA - 442)
(BABOQUIVARI - 444)
T 18 S
TOPAWA
COWLIC
FRESNAL
WASH
T 19 S
VOPOLO HAVOKA
BABOQUIVARI
WASH
31° 45'
(VAMORI - 457)

SELLS

(443)

Gu Vo Quadrangle #423

The eastern two thirds of this quadrangle is within the Papago Indian Reservation. Outcrop areas are the Gunsight Hills to the north and the northern end of the Ajo Mountains to the south of the map sheet. The Ajo range is composed of Tertiary volcanics and sediments. No alteration, or mineralization of economic interest was noted.

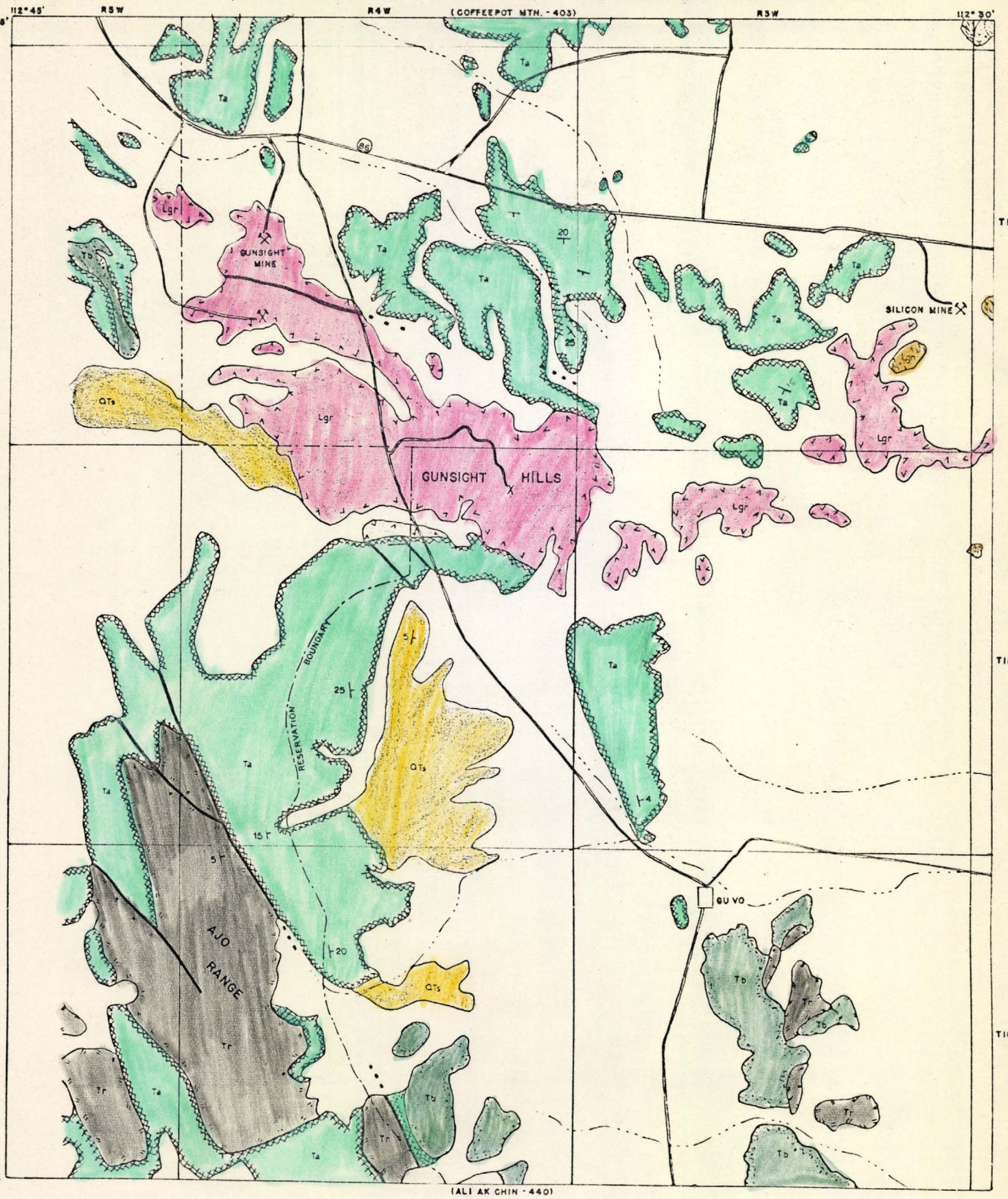
The Gunsight Hills are formed of granitic rocks. The most widespread type is a coarse grained biotite granite cut by numerous aplite dikes. This rock type grades to the east into foliated gneissic granite and then into banded gneiss. East and northeast striking quartz veins have been extensively prospected by pits presumably for gold. None is of economic interest.

The Gunsight Mine occurs in the northwest of the Gunsight Hills. It is credited with a production of lead silver ore valued at $100,000. The ore occurs in quartz carbonate veins which strike northeast. The veins occur in granitic rock which may be later and intrusive into, the biotite granite. This Gunsight Mine granite has a strongly developed northeasterly striking fault pattern. Earthy limonite coats fault planes and fills small pits in the rock. In the vicinity of the Gunsight Mine veins felspars in the granite show signs of weak argillic alteration.

Thirty three rock chip samples from the areas of most intense alteration were assayed for traces of copper and molybdenum. Three samples showed anomalous copper (+ 400 P.P.M.) These were taken from the immediate vicinity of the mine and may be salted. The remainder gave copper values below 30 P.P.M. and molybdenum values less than 10 P.P.M.

Except for possible extensions of the veins in the Gunsight Mine the area is economically uninteresting.

No further work was carried out in the area.


112°45'
R5W
R4W
(COFFEEPOT MTN. - 403)
R3W
112°30'
32°18'
T14S
T15S
T16S
GUNSIGHT MINE
SILICON MINE
GUNSIGHT HILLS
RESERVATION BOUNDARY
AJO RANGE
GU VO
Ta
Lgr
Tb
Tr
QTs
(ALI AK CHIN - 440)

GU VO

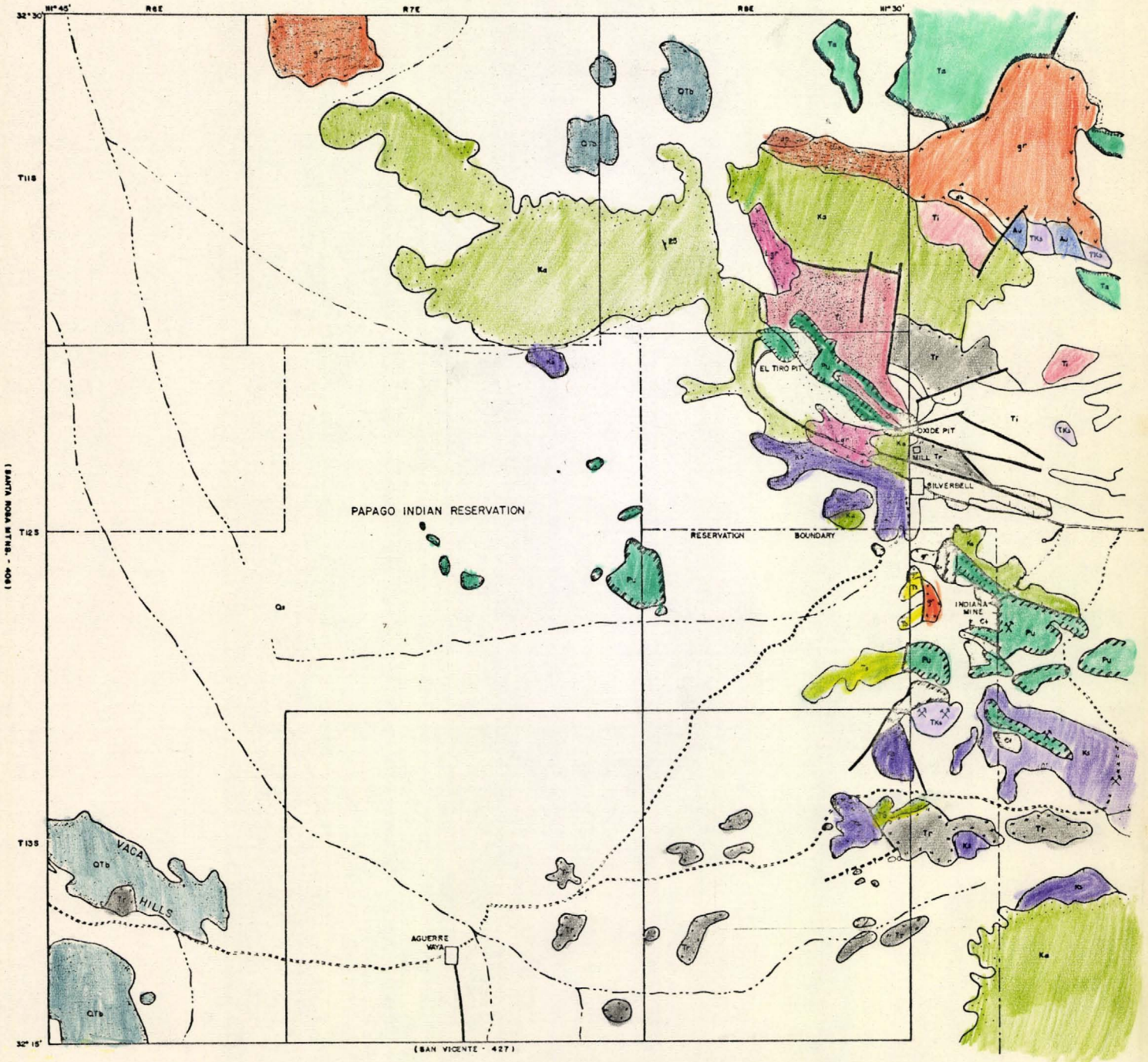
(423)

Vaca Hills Quadrangle #407 (and Silverbell Peak #408)

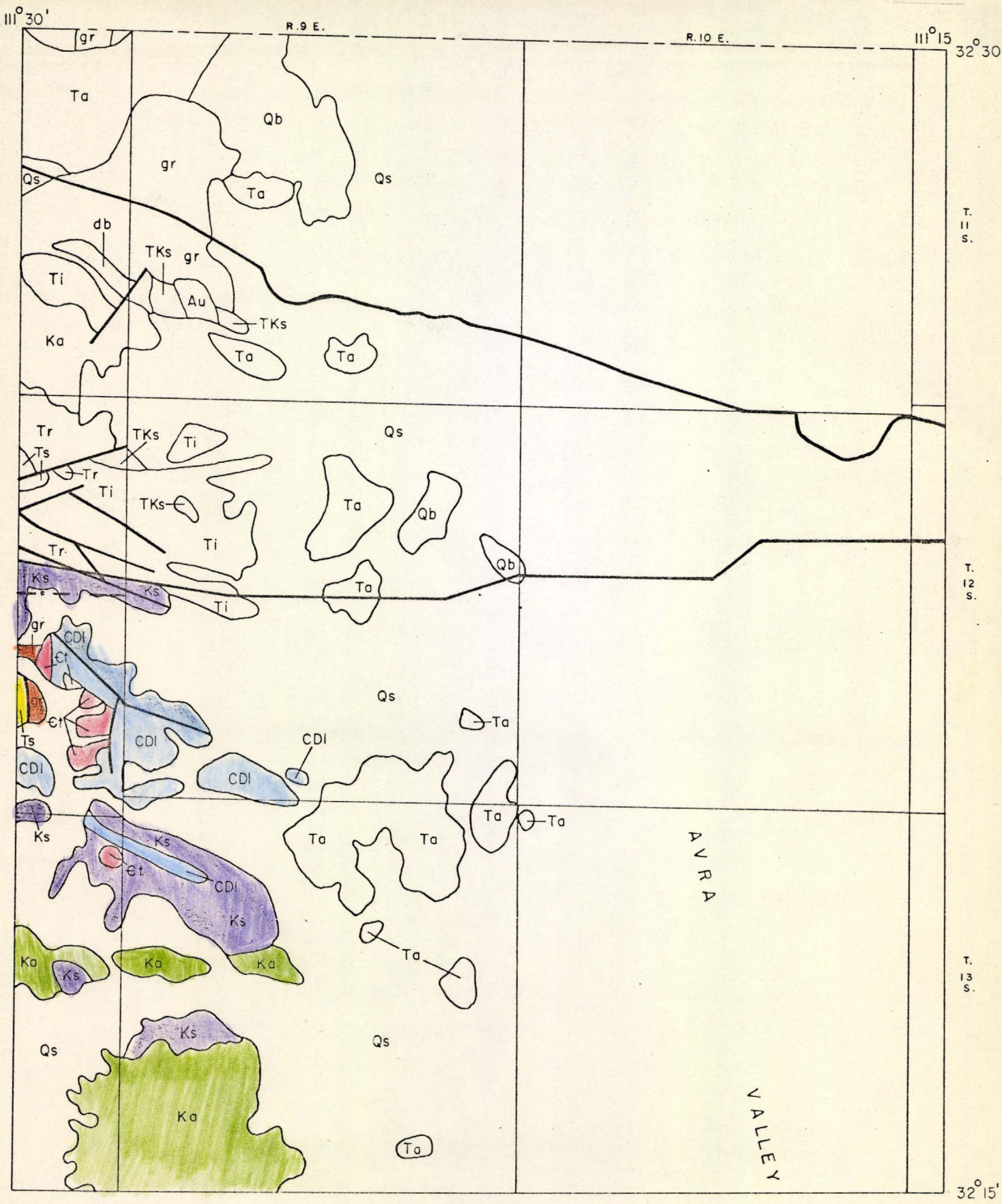
The southwest half of the quadrangle is within the Papago Reservation. This portion is mostly occupied by the northward extension of the gravel plain of the Viopulu (San Vicente Quadrangle).

The Silverbell Mine is two miles north of the northeast corner of the Reservation. It is a typical porphyry-type copper deposit associated with Cretaceous and Tertiary granitic rocks intruded into Paleozoic and Mesozoic sediments. Two miles southwest of the Indiana Mine, which is outside the Reservation boundary, are a number of copper prospects. The most important occurs on the San Carlos claims, located at Sec. 1 & 2, T13S-R8E. Mineralization occurs at the intersection of two faults in porphyritic andesite. One strikes northwest and dips 65° S; the other northeast and 42° S. The mineralized zone is 300 feet long by 15 feet wide. An area near the fault intersection 30 feet long by 15 feet wide averages more than 1 per cent copper. The remainder of the zone shows only traces of oxide copper minerals.

There is no other mineralization of interest in the area within the Reservation.



VACA HILLS
(407)



SILVER BELL PEAK #408

Comobabi Quadrangle #426

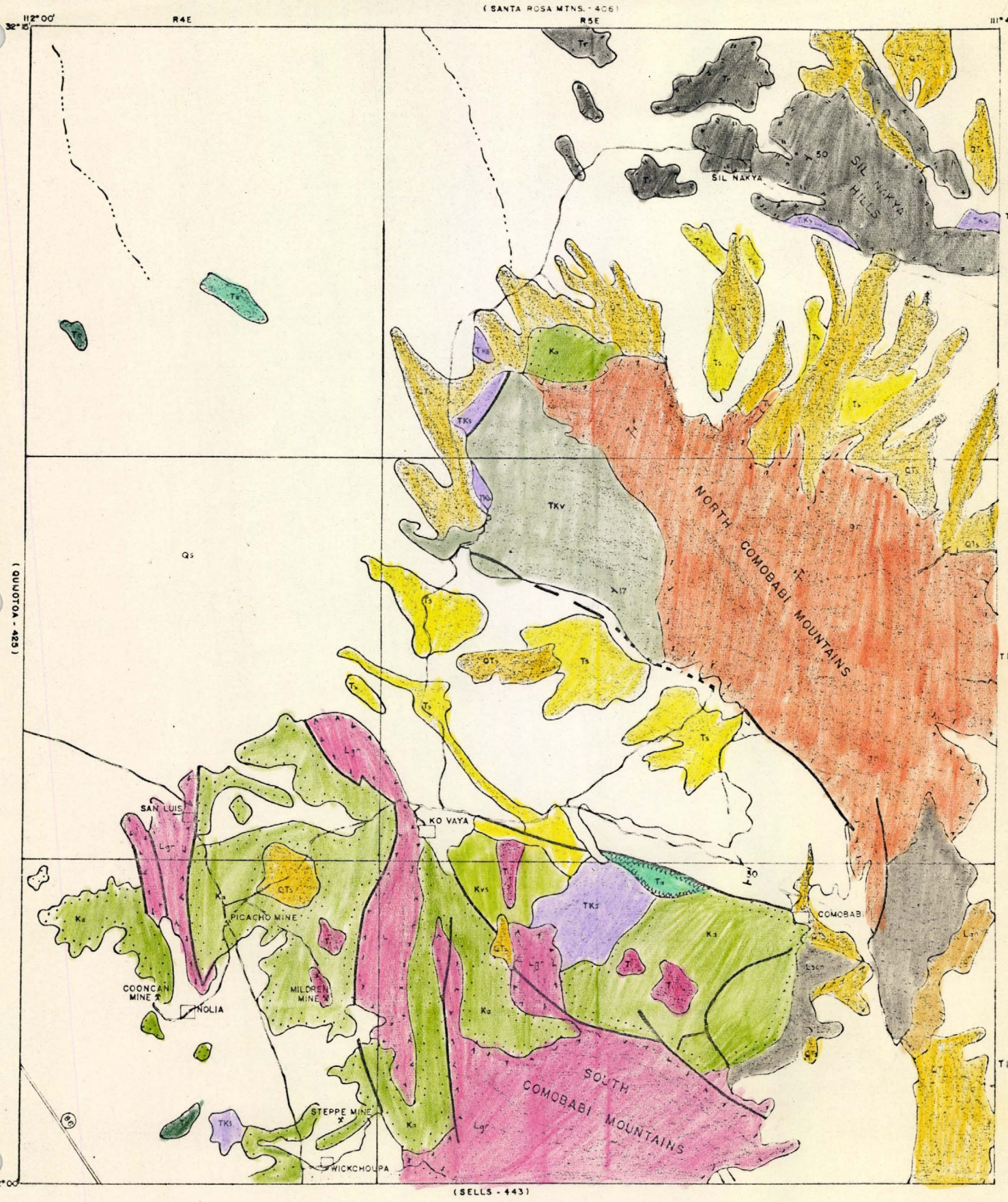
This quadrangle contains the North and South Comobabi Mountains.

The South Comobabi Mountains were mapped on a scale of 2 inches equals 1 mile by Leonid Bryner as part of the requirements of a Phd degree from the University of Arizona.

The ranges consist generally of Cretaceous sediments and volcanics, overlain by Tertiary volcanics and intruded by Laramide diorite, monzonite and granite.

A number of small gold and silver mines, mostly small erratic veins in the volcanics, have been operated in the area but none was successful. Total production has been under $200,000. No mines are operating at the present time.

Two areas were considered worth further work.



COMOBABI
(426)

Green Mine

The mine is just north of the southern boundary of the quadrangle. In the vicinity of the mine, quartz monzonite intrudes diorite and underlies it. The wash running past the mine exposes the contact for several thousand feet. (See map #30). A rock type apparently transitional between the diorite and quartz monzonite outcrops to the north of the mine.

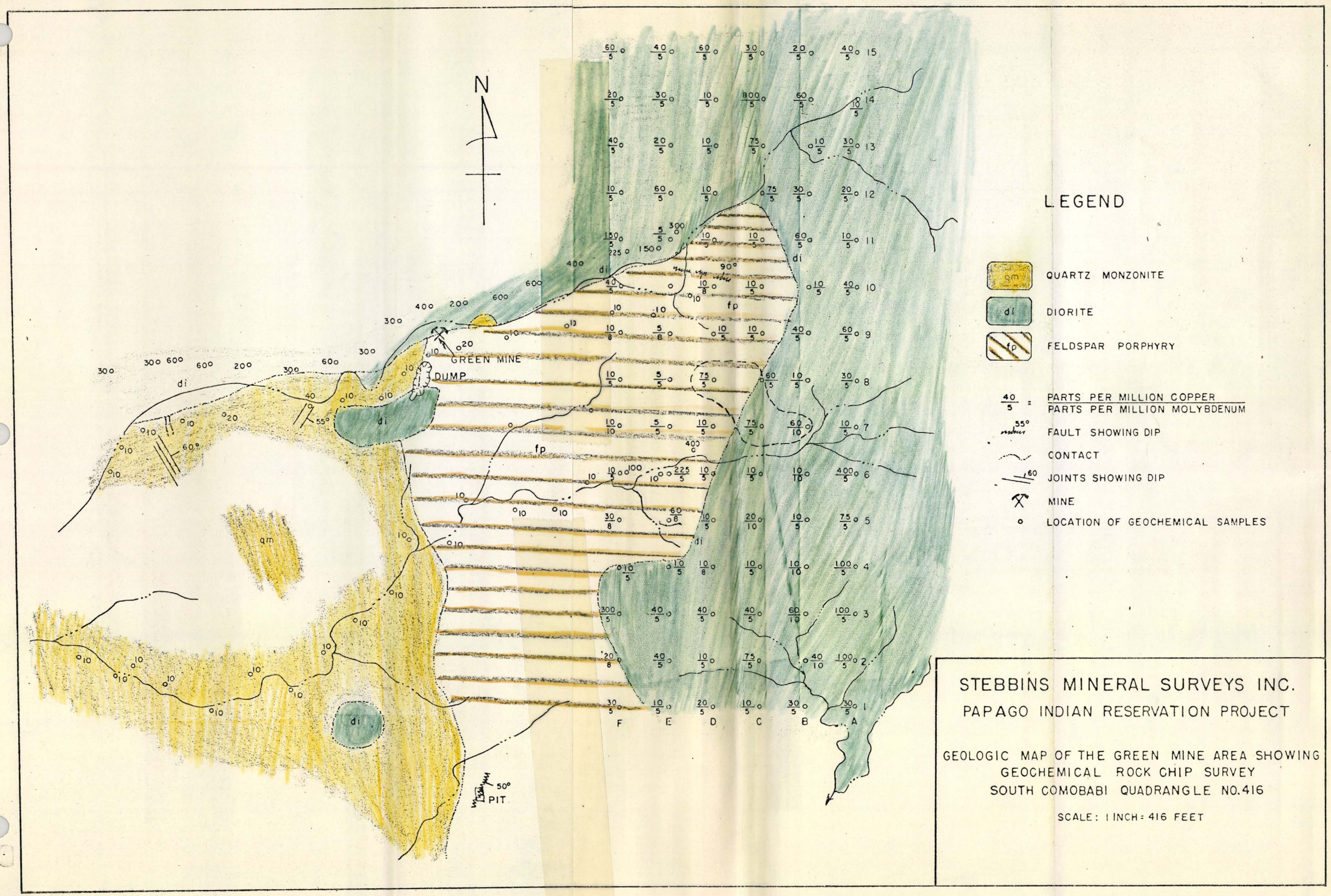
The mine workings are in an intensely altered zone about 1000 feet long by 200 feet wide which is exposed in the wash.

The rock at the mine is believed to be quartz monzonite, but is altered to a white, apparently fine grained rock consisting mostly of clay minerals. Copper stains can be seen on fracture and fault planes. The mine is developed by two shafts and some underground lateral work. A sample from a two inch wide veim assayed 4.07 per cent Cu.

Geochemistry A series of rock chip samples was taken at 200 foot intervals along both sides of the Green Mine Wash (See map #30). They were assayed by the hot extraction method for copper and molybdenum. The diorite has a background copper value of about 60 parts per million in copper. Three samples east of the mine ran 150,225 and 300 P.P.M. copper and two samples of diorite from a wash south of the mine assayed 110 and 400 P.P.M. Background copper value for the quartz monzonite is about 10 P.P.M. There were no anomalous values in this rock type.

Rock chip samples collected on a grid pattern covering the two anomalous areas failed to show any extensive area of anomalous copper values.

The altered area is small and the alteration not typical of disseminated copper deposits and no more work was done in the area.


N
GREEN MINE
DUMP
PIT
50°
55°
60°
90°
di
fp
qm
A
B
C
D
E
F
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
LEGEND
QUARTZ MONZONITE
DIORITE
FELDSPAR PORPHYRY
40/5 = PARTS PER MILLION COPPER / PARTS PER MILLION MOLYBDENUM
FAULT SHOWING DIP
CONTACT
JOINTS SHOWING DIP
MINE
LOCATION OF GEOCHEMICAL SAMPLES
STEBBINS MINERAL SURVEYS INC.
PAPAGO INDIAN RESERVATION PROJECT
GEOLOGIC MAP OF THE GREEN MINE AREA SHOWING
GEOCHEMICAL ROCK CHIP SURVEY
SOUTH COMOBABI QUADRANGLE NO.416
SCALE: 1 INCH = 416 FEET

Ko Vaya Hills (See map #31)

This range lies to the northwest of the main South Comobabi Mountain mass and is separated from it by a narrow valley. The Indian Village of San Luis lies to the north of the area. The Ko Vaya Hills are part of Leonid Bryner's thesis area and they were also mapped on a scale of two inches equals one mile by McCaller in 1957, ("Geology of the Western Part of the Comobabi Mining District") for a M.A. degree at the University of Arizona.

Geology According to Bryner, the oldest rock in the area is quartz monzonite of Jurassic age. This rock is overlain by flows of andesite and latite and intruded by quartz latite and alaskite.

The quartz monzonite, quartz latite and the alaskite are difficult to distinguish in the field and they grade into one another. The quartz monzonite is a pink, medium grained rock containing pink orthoclase, white plagioclase, biotite and minor quartz. The quartz latite is a pink fine grained rock of approximately the same composition as the quartz monzonite. Most of this rock has been finely brecciated, but in places coarse flow brecciation results in fragments up to one inch. This is most apparent on weathered surfaces. The alaskite is a pale gray variety of the quartz latite. There is a possibility that these three rock types are phases of the same intrusive and are therefore of the same age.

The overlying volcanics are mostly purple andesite. In places these are flows but in others andesite occurs within the quartz latite as if it were a more mafic phase of this rock.

Mineralization Twenty three pits and a number of areas stripped by bulldozer were examined. Most had been sunk on small showings of chrysocolla or malachite. No economic mineralization was seen.

Previous work In 1952 the Anaconda Copper Company optioned a group of claims, the "Padres Hester," at the north end of the range. They drilled two diamond drill holes inclined at 45° to the east at the locations marked on the map.

Hole #1 Intersected:

0-60'	quartz latite
60-117'	purple andesite
117-430'	brecciated quartz latite

Map No 31

qal ALLUVIUM

qm QUARTZ MONZONITE

an ANDESITE

dla DARK LATITE

lat LATITE

ap APLITE

FAULT

OUTCROP

CONTACT

DIP AND STRIKE

X PROSPECT WITH COPPER

DD#2 DIAMOND DRILL HOLE

+50 SAMPLE LOCATION AND PARTS PER MILLION COPPER

IP LINE INDUCED POLARIZATION SURVEY LINE

GEOCHEMICAL ANOMOLY

STEBBINS MINERAL SURVEYS INC
PAPAGO INDIAN RESERVATION PROJECT

GEOLOGIC MAP OF KO VAYA HILLS, ARIZONA
SHOWING GEOCHEMICAL SURVEY AND CONTOURS OF ANOMALIES
PLUS THE LINE OF INDUCED POLARIZATION SURVEY

SCALE: 1 INCH = 830 FEET

A composite sample from chip [illegible]

Au(oz.)	Ag(oz.)	Cu(%)	S_1O_2(%)	Al_2C_3(%)	Fe(%)	CaO(%)	S(%)
Trace	0.015	0.06	66.2	10.00	3.8	1.7	0.3

Hole #2 Intersected:

0-155'	andesite
155-326'	quartz latite porphyry
326-418'	andesite
418-710'	quartz latite, some brecciation

134 determinations for copper averaged 0.06 per cent. Thin section study of core specimens showed slight argillic and sericitic alteration.

Geochemistry

One hundred and five rock chip samples, collected from the area where brecciation was most prominent, were assayed by the hot extraction for copper and molybdenum. Two small anomalous areas in the quartz latite were outlined (see map #31).

Induced Polarization

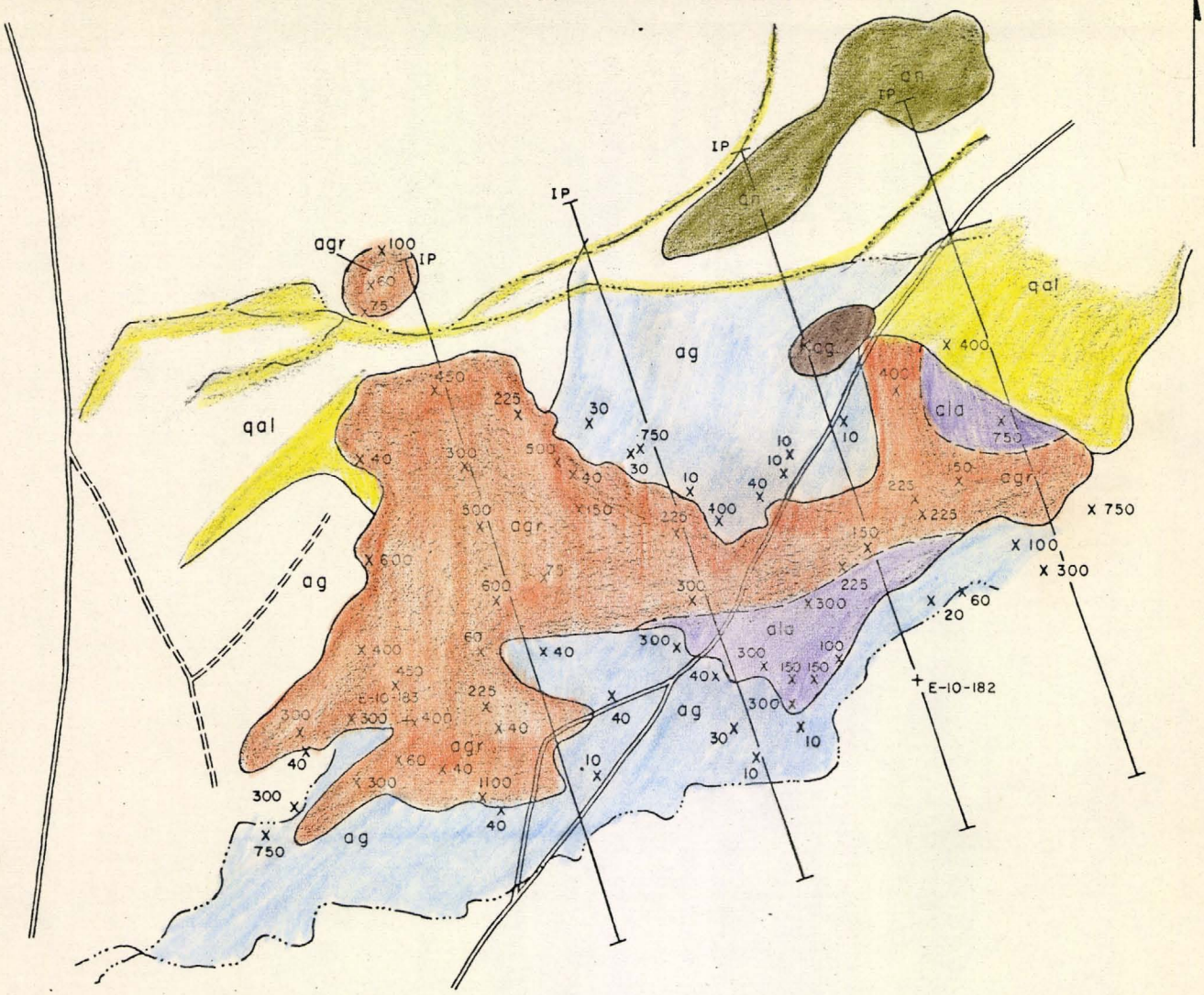
One line of induced polarization survey was run roughly north-south to cover the geochemical anomaly. This work was carried out by Canadian Aero Mineral Surveys using a Siegel Associates, pulse-type, seven kilowatt unit with 500-foot electrode spacing in three electrode array configuration. No anomalous I.P. response was registered.

No further work was done in the area.

Vulture #1 (see map #33)

In this area fine grained granite and porphyritic andesite intrude Cretaceous volcanics and sediments. The intrusive is about 5000 feet long by 1500 feet average width. The entire body is stained pale brown by limonite which occurs on fractures and joint planes and as specks up to 1 mm within the rock. These specks are probably the results of the break down of ferro-magnesian minerals. Typical sulphide box works were not seen. Rock chip samples on a grid of approximately 200 feet centers were assayed by the hot extraction method for traces of copper and molybdenum. Molybdenum values were uniformly less than 15 P. P. M. and have not been plotted. Copper values are shown in parts-per-million. Background values in the volcanics are up to 60 P.P.M. copper. Average value within the area of the intrusive is 375 P.P.M. It was thought possible that this might represent a "leached capping" and that an enriched zone might exist below. Four lines of induced polarization survey were run over the intrusive. No anomaly was found indicating that no detectable quantity of disseminated sulphide exists at depth.

No further work was done in this area.



LEGEND

qal	ALLUVIUM
ag	AGGLOMERATE
an	ANDESITE
ala	ALTERED ANDESITE
Kcg	CRETACEOUS, CONGLOMERATE
gr	GRANITE
agr	ALTERED GRANITE

IP ⊢—⊣ INDUCED POLARIZATION LINE

x150 PARTS PER MILLION COPPER

STEBBINS MINERAL SURVEYS INC.
PAPAGO INDIAN RESERVATION PROJECT
ARIZONA

GEOLOGIC MAP OF VULTURE AREA
COMOBABI QUAD Nº. 426 SHOWING INDUCED
POLARIZATION SURVEY LINES AND
GEOCHEMICAL SURVEY

SCALE 1 INCH = 1000 FEET

Santa Rosa Quadrangle #406

This quadrangle contains the Santa Rosa Mountains, a range eight miles long by about two miles wide, surrounded by gravel filled basins.

The range is composed of Laramide intrusive and schist with scattered outcrops of Paleozoic to Quaternary sediments. There are a number of prospects in the range. Mostly they are shallow pits in small copper bearing veins in the metasediments, and are of no economic importance.

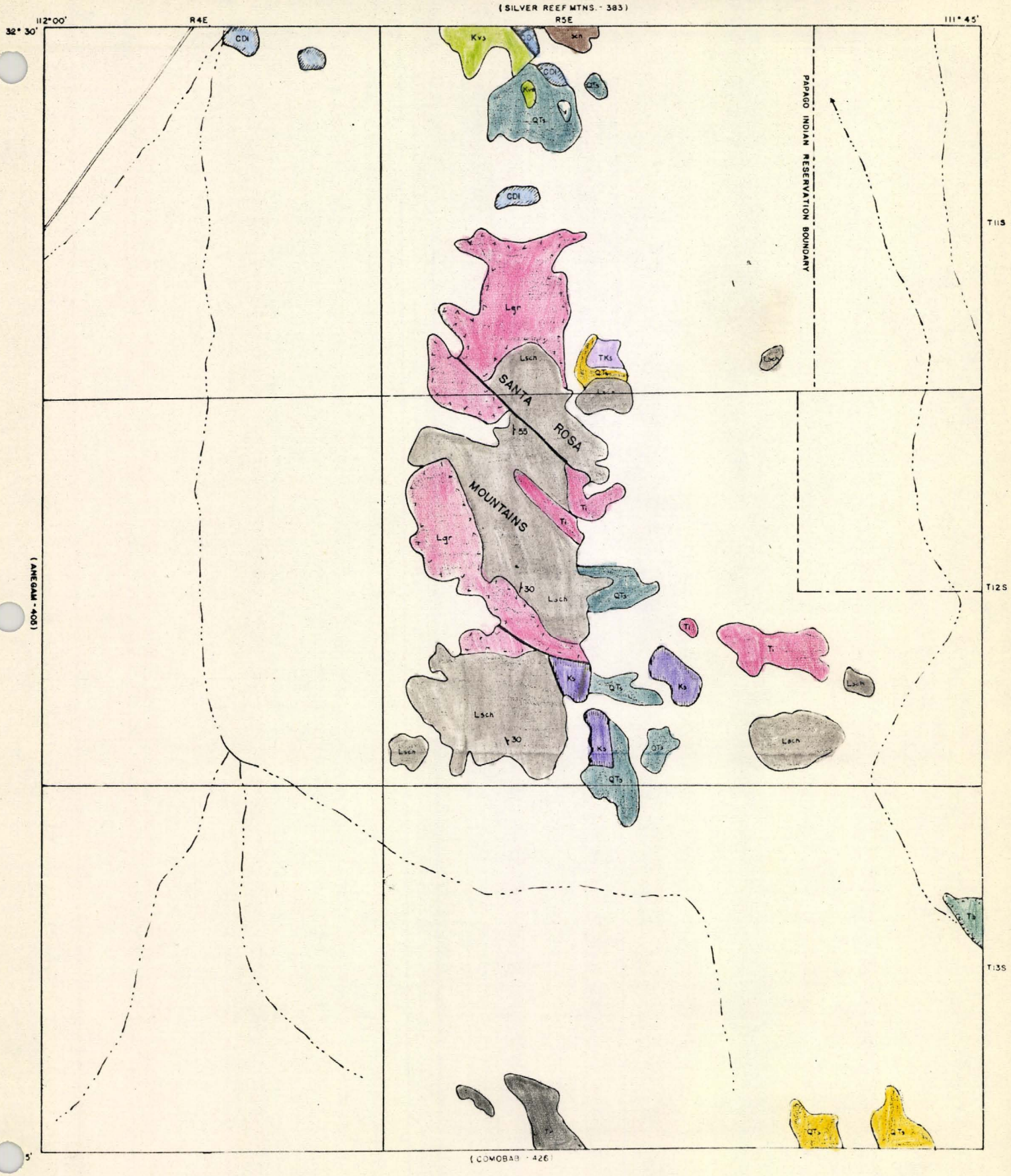
The rocks at the north end of the range where they pass under gravel cover are a medium grained diorite. A number of pits and trenches have been sunk on veins and fractures containing oxide copper minerals. The rock is slightly altered by the introduction of epidote and chlorite. To the north outcropping through the valley gravel are two hills of Paleozoic limestone. One half mile to the east of the above is a small outcrop of limestone altered to tactite. One mile north of the quadrangle boundary is the Lakeshore Mine, estimated to contain 2,000,000 tons of 1.8 per cent copper in oxide copper minerals in a host rock of altered sediment. One quarter mile north of the quadrangle boundary is the Slate Mine which has a small tonnage of copper ore in tactite. In view of the above the gravel area north of the Santa Rosa was explored by an airborne magnetometer survey and by an induced polarization survey (see map #35)

Magnetic Survey

A total intensity magnetic survey was carried out using a Varian nuclear precession magnetometer Model V-4910 mounted on a Bell 47G-3B helicopter flying at constant ground clearance of 150 feet along north-south flight lines spaced 1000 feet apart. The "bird" was suspended 50 feet above the ground. A total magnetic intensity contour interval of 140 gammas is shown as an overlay to map #35.

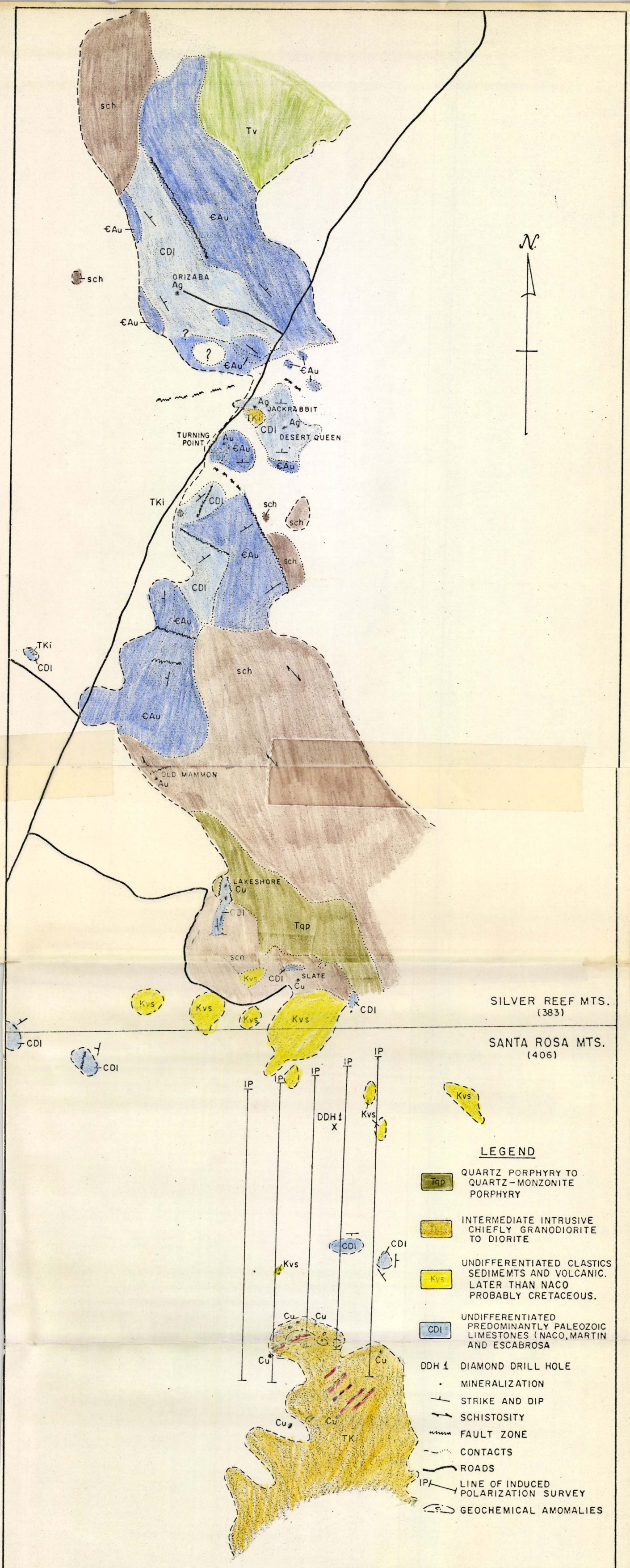
It was thought that the magnetic high marked "A" could be caused by magnetite associated with tactite and that this environment might contain copper or lead and zinc. An induced polarization survey over the same area gave no anomalies. Oxidized copper ore, as at the Lakeshore Mine, gives no I.P. response and it was thought possible that an amount of magnetite sufficient to cause the magnetic high might not be detected by I.P.

A hole was drilled to test the bed rock and it proved to be a brown to purple volcanic agglomerate which is strongly magnetic.



SANTA ROSA MTNS.

(406)



STEBBINS MINERAL SURVEYS INC.
PAPAGO INDIAN RESERVATION PROJECT
ARIZONA

GEOLOGY OF PORTION OF THE SILVER REEF AND THE SANTA ROSA MOUNTAINS

SCALE 1" = 1 MILE

The hole intersected:

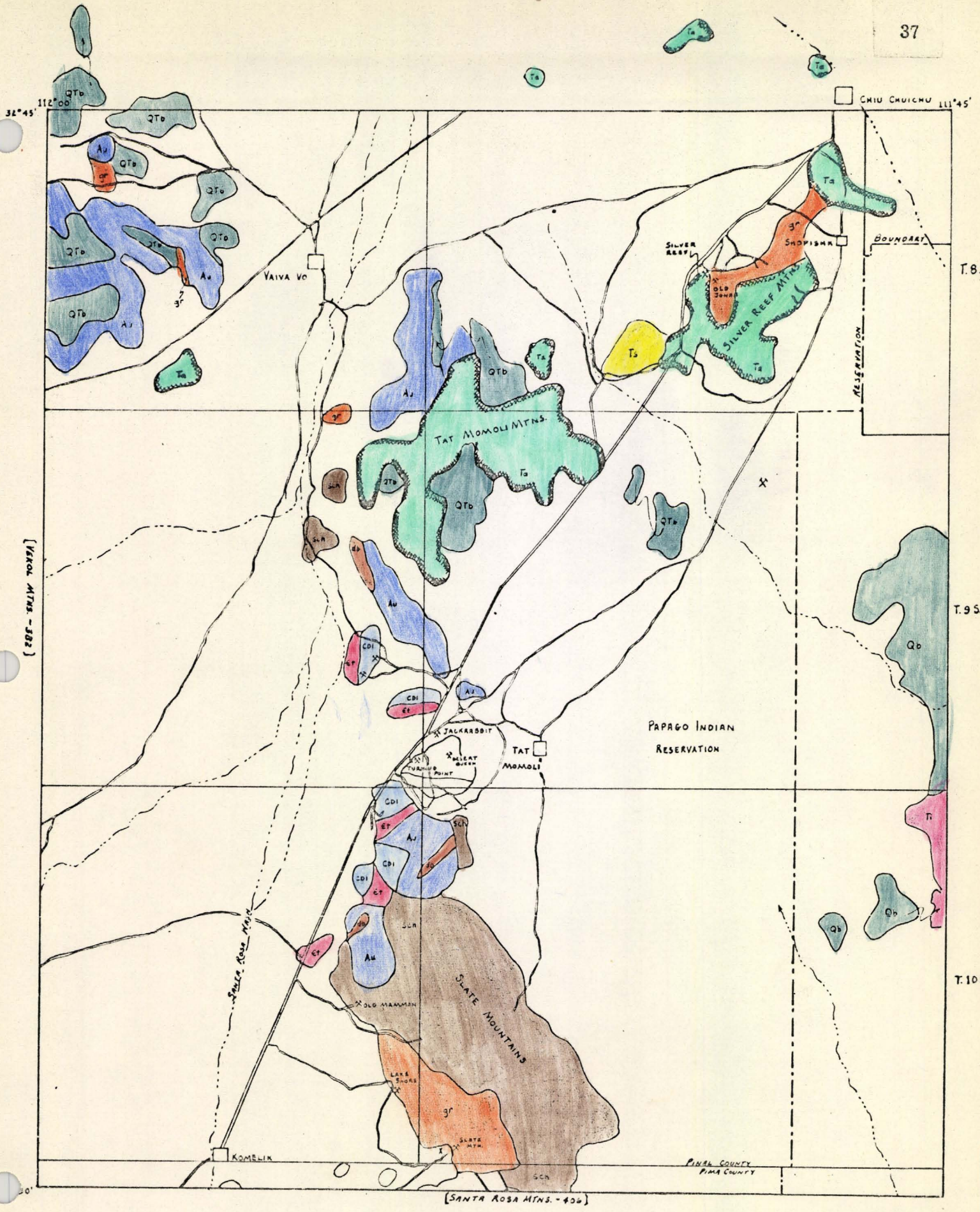
0 - 85'	Unconsolidated Alluvium
85 - 104'	Brown volcanic agglomerate, fragments up to two inches. Highly magnetic.
104 - 134'	Agglomerate. Fragments infrequent up to 1/2 inch.
134 - 168	Same as above but veined with calcite and altered.

There is little doubt that the magnetic anomaly is explained by the magnetic character of the volcanic.

Silver Reef Quadrangle #383

Only the ground west of the Santa Rosa Wash within this quadrangle was included in the prospecting permit as the ground west of the wash had previously been leased by the Papago Tribe to Trans Arizona Resources, owners of the Lakeshore Mine.

In the northwest corner of the quadrangle Precambrian Apache group sediments occur. These are capped by Quaternary volcanics, mostly basalt. To the south is the gravel filled basin drained by the Santa Rosa Wash. Part of this area was covered by the aeromagnetic survey (see map #35 and overlay). No magnetic anomalies were recorded, and no further work was done in the area.



SILVER REEF MTNS.

[383]

Vekol Mountains Quadrangle #382

This quadrangle covers the Vekol Mountains, the southern end of the Table Top Mountains and the adjoining gravel filled basins to the northwest and southeast. The area is one of complex geology and rocks from Archean to Tertiary occur. It is also the area from which the bulk of the mineral production from the Papago Reservation has come. It is estimated that $1,360,000 has been taken from the district, $1,000,000 of this from the Vekol Mine (silver) alone. It is possible that the Vekol is the only mine on the Reservation to have shown a profit.

Intrusive Rocks

There are a number of granite stocks in the area. Where possible these have been dated by their field relations. Where this has not been possible, they have been assigned an age on the basis of lithology. (see map #35 and #40) Generally speaking the field criteria used are the relationship of the intrusive to the Pinal (Archaen) sediments, Apache group (Proterozoic), Paleozoic or Cretaceous sediments, and they can be dated as pre or post one of these categories. No geochemical dating has been undertaken in the area.

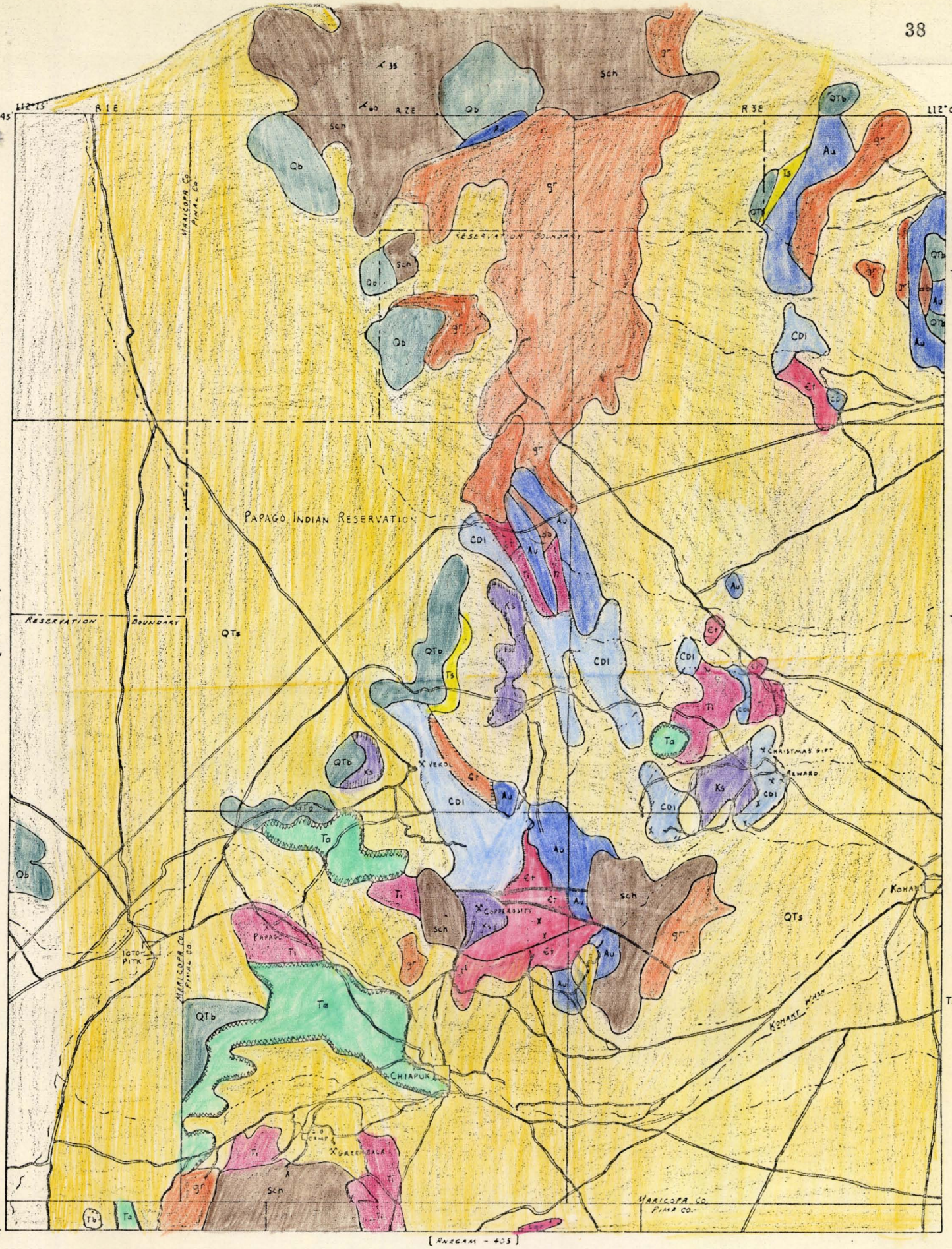
The large area of granite in the north of the map area is believed to be Archean.

Granite bodies in the central Vekols are believed to be post Pinal (Archean) while similar appearing rocks in the Cimarron Mountains are clearly post Paleozoic.

The granite body which forms the hanging wall of the Lakeshore orebody is believed to be Precambrian and in fault contact with the Lakeshore metasediments. The intrusive which forms the northern part of the Santa Rosa Mountains is diorite of Cretaceous - Tertiary (Laramide) age.

Mineralization & Alteration

The most important type of mineralization in the area is replacement deposits in limestone, usually associated with small faults. The Vekol-Great Eastern, Copperosity, Reward-Phanodorce, Jackrabbit, Turning Point, Desert Queen, and Slate deposits are all of this type, and have produced silver, copper, lead and zinc. Veins containing silver have also been worked.

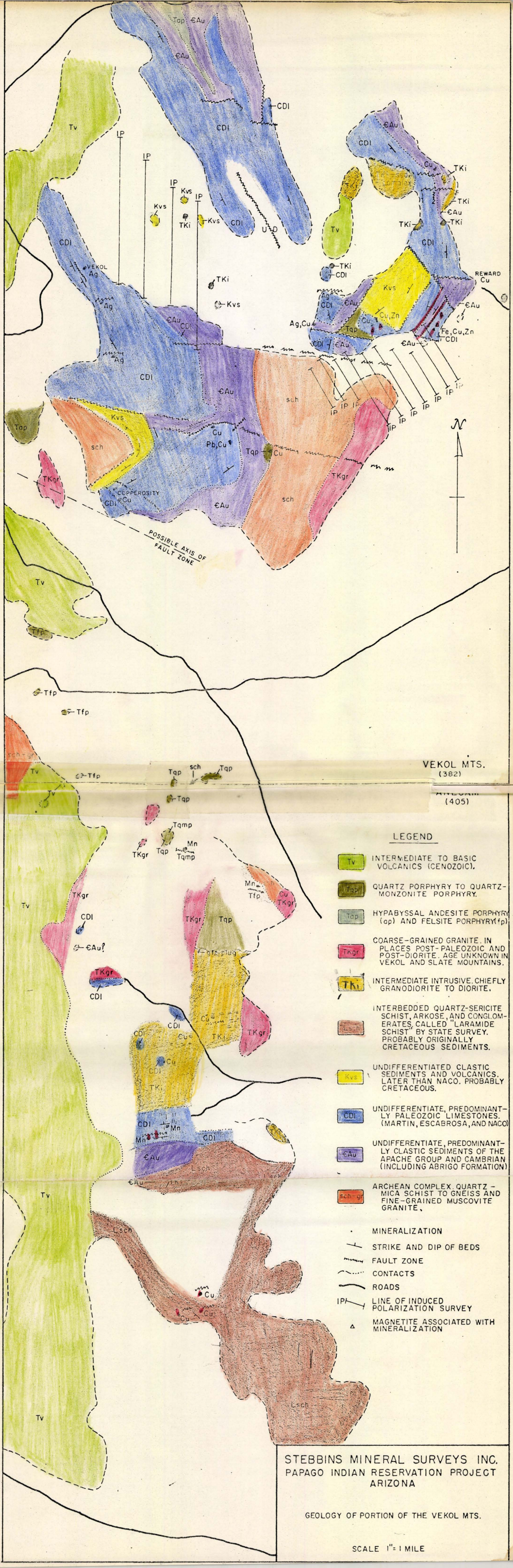


[Maxa - 381]

[Silver Reef Mtns. - 383]

[Anzgam - 405]

VEKOL MTNS.


Tv
Tap
€Au
CDl
IP
Kvs
TKi
U D
VEKOL
Ag
REWARD
Cu
Ag,Cu
Cu,Zn
Fe,Cu,Zn
sch
Pb,Cu
TKgr
COPPEROSITY
Tqp
Tfp
POSSIBLE AXIS OF FAULT ZONE
N
VEKOL MTS.
(382)
(405)
Tqmp
Mn
Lsch
LEGEND
INTERMEDIATE TO BASIC VOLCANICS (CENOZOIC).
QUARTZ PORPHYRY TO QUARTZ-MONZONITE PORPHYRY.
HYPABYSSAL ANDESITE PORPHYRY (ap) AND FELSITE PORPHYRY (fp).
COARSE-GRAINED GRANITE. IN PLACES POST-PALEOZOIC AND POST-DIORITE. AGE UNKNOWN IN VEKOL AND SLATE MOUNTAINS.
INTERMEDIATE INTRUSIVE. CHIEFLY GRANODIORITE TO DIORITE.
INTERBEDDED QUARTZ-SERICITE SCHIST, ARKOSE, AND CONGLOMERATES, CALLED "LARAMIDE SCHIST" BY STATE SURVEY. PROBABLY ORIGINALLY CRETACEOUS SEDIMENTS.
UNDIFFERENTIATED CLASTIC SEDIMENTS AND VOLCANICS. LATER THAN NACO. PROBABLY CRETACEOUS.
UNDIFFERENTIATE, PREDOMINANTLY PALEOZOIC LIMESTONES. (MARTIN, ESCABROSA, AND NACO)
UNDIFFERENTIATE, PREDOMINANTLY CLASTIC SEDIMENTS OF THE APACHE GROUP AND CAMBRIAN (INCLUDING ABRIGO FORMATION)
ARCHEAN COMPLEX. QUARTZ-MICA SCHIST TO GNEISS AND FINE-GRAINED MUSCOVITE GRANITE.
MINERALIZATION
STRIKE AND DIP OF BEDS
FAULT ZONE
CONTACTS
ROADS
LINE OF INDUCED POLARIZATION SURVEY
MAGNETITE ASSOCIATED WITH MINERALIZATION
STEBBINS MINERAL SURVEYS INC.
PAPAGO INDIAN RESERVATION PROJECT
ARIZONA
GEOLOGY OF PORTION OF THE VEKOL MTS.
SCALE 1" = 1 MILE

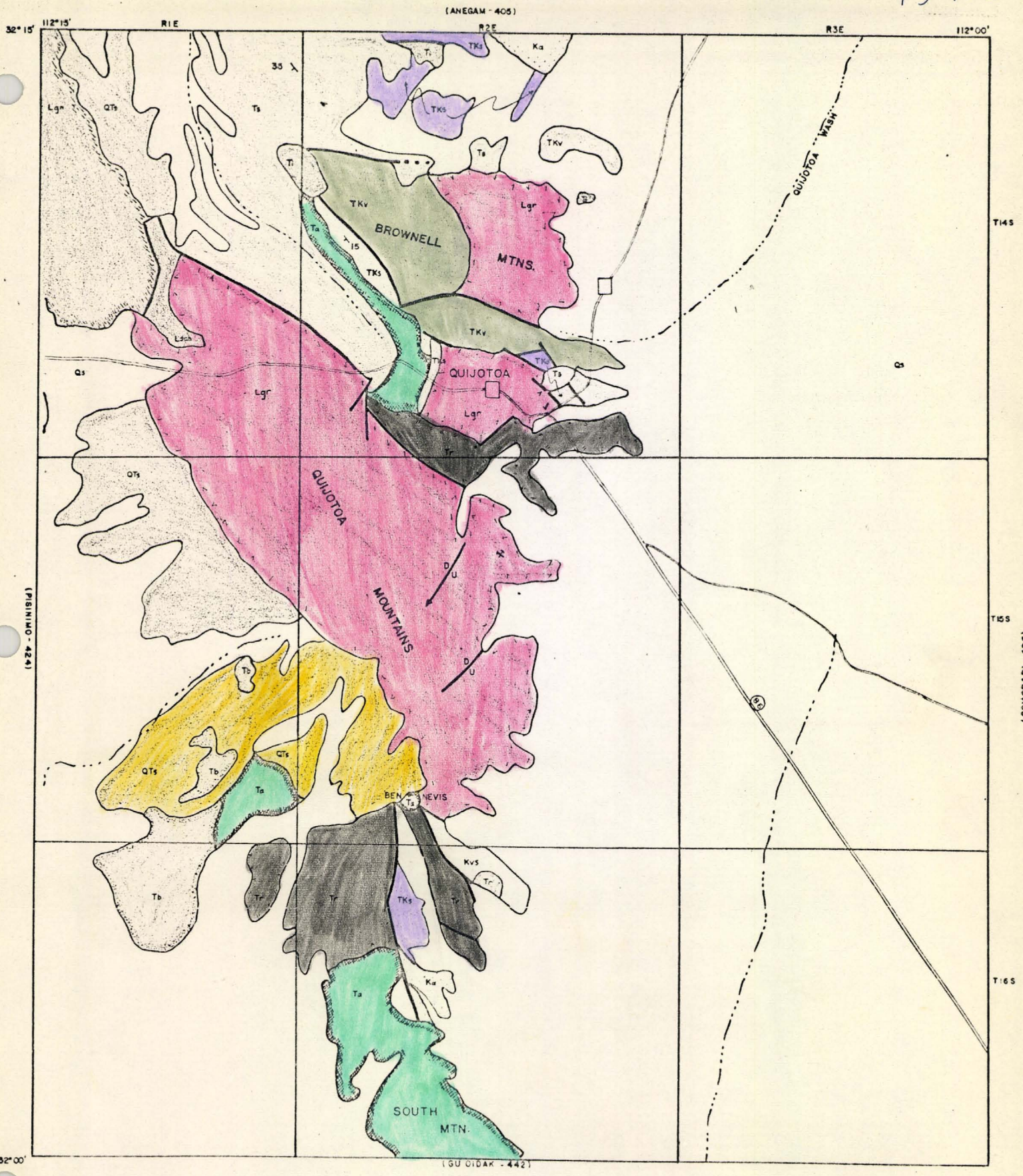
Only minor alteration is observed near silver veins, but extensive tactite zones consisting chiefly of grossularite, with our without magnetite, occur with the copper at the Reward, Copperosity and Lakeshore. The quartz monzonite porphyry intrusive in the Reward area whows weak propylitic alteration.

Evidence exists for two ages of mineralization. Boulders containing sphalerite occur in Cretaceous conglomerate capping the hill in which the Phanodoree deposits occur. Mineralization also occurs in quartz porphyry which intrudes the Cretaceous conglomerate.

Oxidation extends to 500 foot depth at the Lakeshore Mine. This is probably in a fault zone. Pyrite and chalcopyrite have been noted at the surface in the diorite at the north end of the Santa Rosa Mountains.

Map 425

~~45~~
Pg 41a



QUIJOTOA

(425)

Quijotoa Quadrangle #425

This quadrangle covers the Sierra Blanca, Brownell and Quijotoa Mountain Ranges. The east of the sheet covers the gravel filled basin drained by the Santa Rosa Wash.

The Sierra Blanca Mountains

This range is composed of metasediments. The metamorphism is believed to be Laramide. Several small stocks of acid intrusives occur in the area. Paleozoic limestone crops out on the west slope of the range.

A number of mineralized areas were examined but none showed sufficient mineralization or alteration to be considered worth further work.

The Brownell Mountain Area

The Brownell Mountains are taken to include the area extending from the villages of Maish, Vaya, Covered Wells and Quijotoa on Highway 86, north to the Brownell Mine. The south half of the range, composed of granite and a fine grained intrusive and volcanic complex is topographically rugged, with elevations from 2000 to 3500 feet. The north half of the area is made up of low lying hills of clastic sediments. A geological map on a scale of 1 inch equals 1000 feet based on photo interpretation was made of the whole area, of which the maps covering the Quijotoa Breccia area #50, Moud Tel Claim area #49, Poor Boy Mine area #48 and Brownell Mine area #46 are parts.

see 2nd report for this map and description of prospect.

Brownell Mine Area

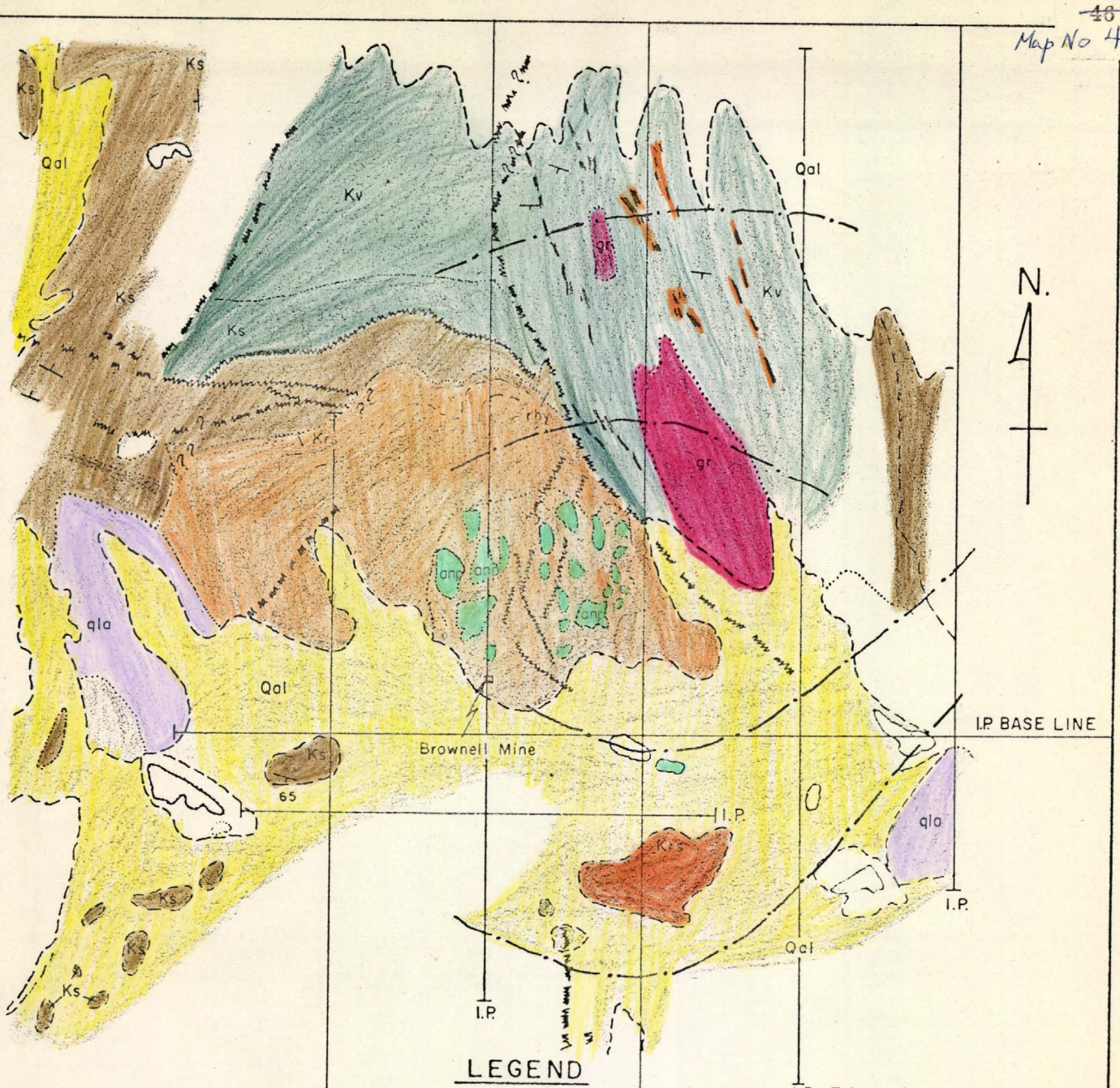
This mine is at the north end of the main range of the Brownell Mountains.

History

Little is known about its history. A shipment of 1000 tons in 1925 assayed 3 per cent copper and 9.36 ounces silver. Possibly some smaller shipments were made earlier but there is no record of them.

Geology

The mine is located on a small hill of flat dipping well stratified volcanics. The volcanics are strongly altered but were originally intermediate to rhyolite.



LEGEND

Line 4A

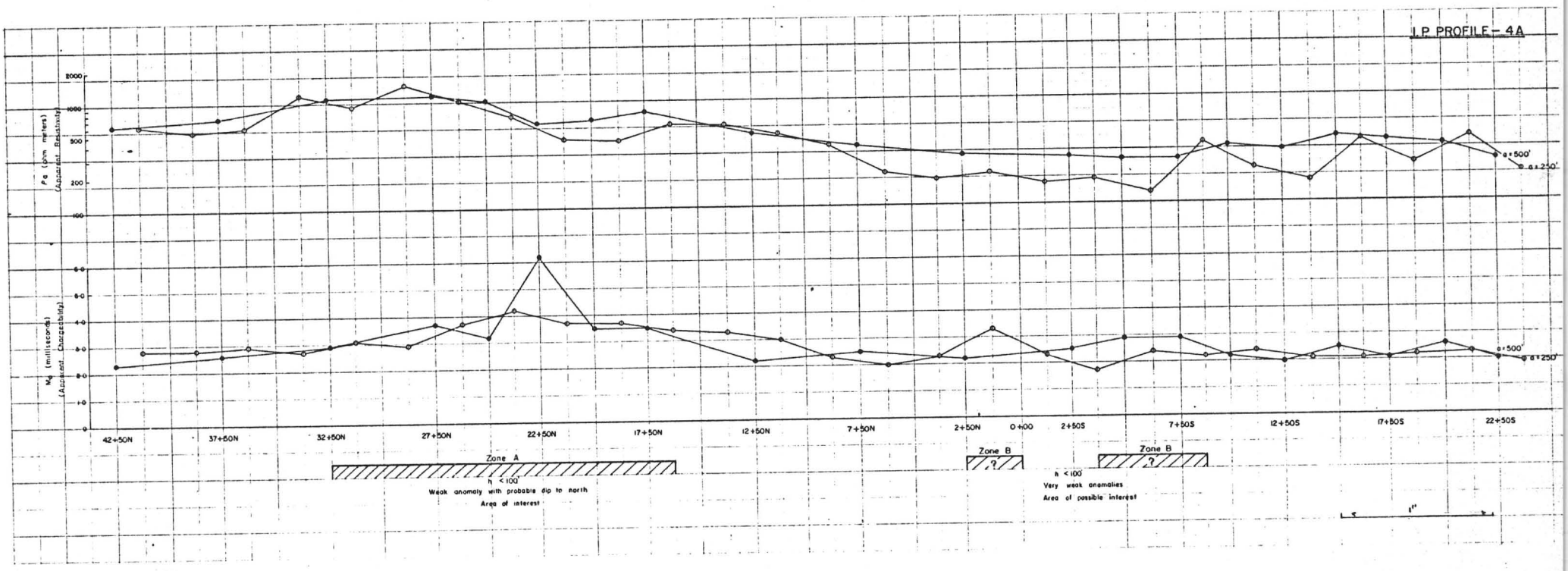
Qal	ALLUVIUM
Ks	CRETACEOUS, RED BEDS, ARKOSE WITH OCCASIONAL THIN LINESTONE
Krs	CRETACEOUS, RHYOLITE TO INTERMEDIATE VOLCANICS OCCAS. INTERBEDDED WITH SEDIMENTS
Ks	CRETACEOUS, THICK CONGLOMERATE
Kv	CRETACEOUS, ACID VOLCANIC AND RELATED FINE GRAINED INTRUSIVES
an	ANDESITE
anp	ANDESITE PORPHYRY
rhy	RHYOLITE AND FELSITE INTRUSIVE
gr	GRANITE
qla	QUARTZ LATITE PORPHYRY

	FAULT
	OUTCROUP
	CONTACT
	STRIKE AND DIP
	POND
	OUTLINE OF I.P. TREND
I.P.	INDUCED POLARIZATION LINE

STEBBINS MINERAL SURVEYS INC.
PAPAGO INDIAN RESERVATION PROJECT
ARIZONA

GEOLOGIC MAP OF BROWNELL MINE AREA
SHOWING OUTLINES OF POSSIBLE TRENDS FROM
INDUCED POLARIZATION SURVEY DATA

SCALE: APROX. 1 INCH = 1000 FEET



STEBBINS MINERAL SURVEYS INCORPORATED
PAPAGO INDIAN RESERVATION PROJECT
BROWNELL MINE AREA

Induced Polarization Profile
Line 4A

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The mine area is flanked on the north and east by sediments dipping toward it and on the south by alluvium. A small granite body cuts the sediments northeast of the mine. A ring of andesite dikes and plugs surrounds the hill and layered rocks within the ring dip gently towards the center. Alteration is intense but very local and erratic.

Oxide copper minerals are visible on the rock dumps near the southern edge of the hill. Alteration and oxide mineralization suggest that the zone might be leached and that an enriched ore body would occur at depth.

Induced Polarization Survey

An induced polarization survey was carried out using a Hunting 2.5 kilowatt unit and three-electrode array at 250 and 500 foot spacing. About 6.5 line miles were surveyed.

Two weakly anomalous zones were found as shown on map #46. The maximum chargeability of 6.0 milliseconds, about 3 times background, was considered too low to indicate an economic orebody and this, coupled with the small extent of the alteration zone, suggested that no more work was worth undertaking in that area. (see profile #47.)

Poor Boy Prospect (map #48)

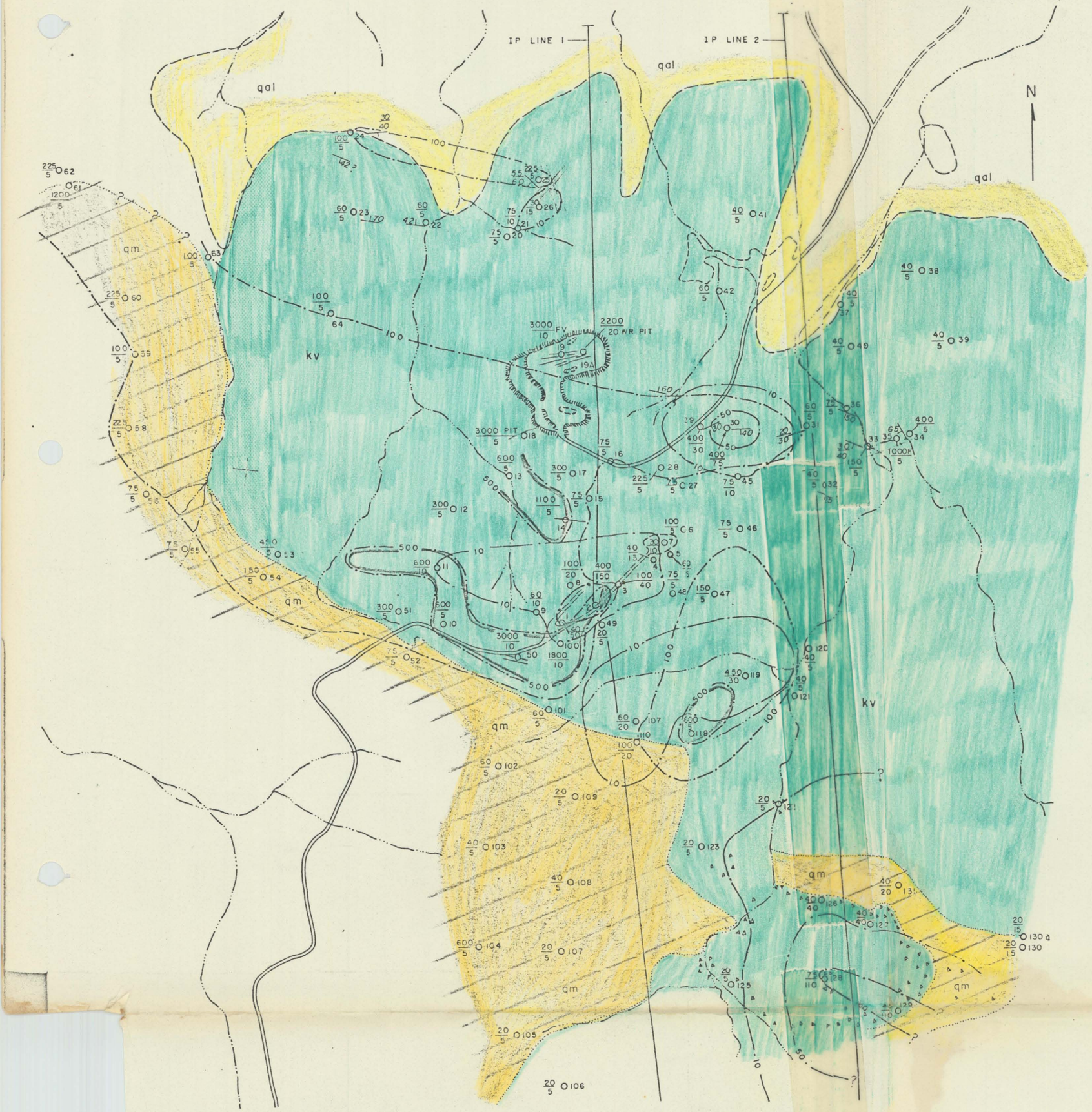
History

A number of prospect pits and trenches were dug on showings of oxide copper around the turn of the century. In 1957 the property was examined by Miami Copper Co. They subsequently drilled one churn drill hole to a depth of 460 feet. No ore was intersected and the property was abandoned.

Geology

A body of quartz monzonite intrudes flow banded siliceous rocks of the intrusive-volcanic comples.

A circular and probably pipe-like body of tourmaline breccia about 400 feet in diameter occurs at the southeastern end of the contact between quartz monzonite and volcanic rocks.



LEGEND

- qal — ALLUVIUM
- qm — QUARTZ MONZONITE
- kv — ACID VOLCANICS AND RELATED FINE GRAINED INTRUSIVES
- OUTCROP
- CONTACT
- 40 — STRIKE AND DIP
- FAULT
- FRACTURES
- MINERALIZED FRACTURES
- IP — INDUCED POLORIZATION SURVEY LINE
- CONTOUR OF COPPER ANOMALY
- CONTOUR OF MOLYBDENUM ANOMALY
- LOCATION OF GEOCHEMICAL SAMPLES
- 75/5 — PARTS PER MILLION COPPER / PARTS PER MILLION MOLYBDENUM
- ROAD
- BRECCIA

STEBBINS MINERAL SURVEYS INC.
PAPAGO INDIAN RESERVATION PROJECT
ARIZONA

GEOLOGY OF POOR BOY PROSPECT AREA, BROWNELL MOUNTAINS SHOWING GEOCHEMICAL COPPER-MOLYBDENUM ANOMALIES AND INDUCED POLORIZATION SURVEY

SCALE: 1 INCH = 830 FEET

The volcanics along the northeast end of the monzonite are stained with limonite, are locally silicified, contain small areas of fresh pyrite and are crossed by narrow (up to 1/2 inch) stringers of specular hematite. Minor amounts of copper oxide minerals are found in some of the prospect pits.

Geochemistry

Hot extract geochemical analyses of rock chip samples indicated an area 1600 feet by 600 feet with anomalous copper values from 200 to more than 500 P.P.M. Background in the surrounding area is about 40 P.P.M. The tourmaline breccia zone has low copper value but molybdenum values up to 110 P.P.M. with background of 5 P.P.M.

Induced Polarization Survey

Two induced polarization survey lines, 500 feet apart, were run using a Hunting 2.5 kilowatt unit with three electrode array and 250 and 500 foot spacing. The lines cross the tourmaline breccia zone and the area of anomalous copper near the quartz monzonite - volcanic contact. No anomaly was detected.

Mond Tel Claims (see map #49)

A group of twelve claims known as the Mond Tel group cover a large area in the central part of the Brownell Mountains.

Geology

The rocks in the area are part of the acid intrusive - volcanic complex. They are well fractured with iron oxide coating fracture surfaces. Specular hematite veins with minor oxide copper are abundant.

Geochemistry

An alluvium sampling program was carried out in which the minus 80 mesh fraction of material from the tributary drainage gullies was analyzed for copper by the cold citrate extraction method. A broad irregular anomaly covering most of the claim group was disclosed. Copper values ranged from 10 to 60 P.P.M. Experiments showed that these values are approximately one tenth of what would have been obtained by the hot extraction method used on other surveys.

Induced Polarization Survey

Two lines of induced polarization survey were run near the south end of the claims using the Hunting 2.5 kilowatt unit and 250 and 500 foot spacing. Neither line showed an anomalous I.P. response.

Crackled Zone

To the southeast of the Mond Tel Claims an area known as the "crackled zone" can easily be outlined on colored air photos as a dark red-brown area.

Geology

The rocks of the acid-intrusive-volcanic sequence are locally brecciated with rotated fragments in a silicious matrix. The rocks in the zone, originally silicious, have been further silicified.

Geochemistry

A rock chip geochemical survey showed anomalous copper (up to 200 P.P.M. by hot extraction) in the crackled zone.

Induced Polarization Survey

Two lines of induced polarization survey using the Hunting 2.5 kilowatt unit, intersecting at right angles on the zone, gave no anomalous response. Scattered copper is widespread in the central Quijotoa area but the negative I.P. results over those areas of most favorable geology suggest that there has been little leaching and no formation of an enriched zone at depth. ↖ conclusion not responsive to facts

Map No 49

LEGEND

Qal	ALLUVIUM
Kb	CRETACEOUS? BASALT WITH SOME INTERBEDDED TUFFS
Kv	CRETACEOUS, ACID VOLCANICS AND RELATED FINE GRAINED INTRUSIVES
Ks	CRETACEOUS, RED BEDS, ARKOSE WITH OCCASIONAL THIN LIMESTONE
an	ANDESITE
gr	GRANITE

FAULT

OUTCROP

CONTACT

OUTLINE OF ALTERED OR DISCOLORED AREA (CRACKLED ZONE)

INDUCED POLARIZATION SURVEY LINE

GEOCHEMICAL ANOMALY, alluvial samples ROCK CHIP HOT EXTRACT METHOD, PARTS PER MILLION COPPER

GEOCHEMICAL ANOMALY, ROCK CHIP COLD CITRATE METHOD, PARTS PER MILLION COPPER

STEBBINS MINERAL SURVEYS INC.
PAPAGO INDIAN RESERVATION PROJECT
ARIZONA

GEOLOGIC MAP OF MOND-TEL CLAIMS
AND CRACKLED ZONE, BROWNELL MOUNTAINS
SHOWING INDUCED POLARIZATION LINE
AND GEOCHEMICAL ANOMALIES

SCALE: APPROX. 1 INCH = 1000 FEET

Map No 49
Mond Tel
and "Crackled zone"

San Xavier Reservation

This part of the Papago Reservation is a separate area of about 109 square miles southwest of the city of Tucson. Eight square miles along the southern boundary had previously been leased to the American Smelting and Refining Company.

Most of this Reservation is gravel covered plain. Granite crops out along the southern boundary and the Black Hills of Tertiary volcanics are in the northeast of the area.

The Reservation was intensively prospected by the American Smelting and Refining Company and the ground where drilling encountered mineralization, is now held under lease. Except for an examination of the granite for hydrothermal alteration, no work was carried out by Stebbins Mineral Surveys in the Reservation.

Gila Bend Indian Reservation

This Reservation is 16 square miles in extent and is situated just north of the town of Gila Bend, Maricopa County.

There is no bed rock outcrop in the area. No exploration work was undertaken by Stebbins Mineral Surveys.

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