and Cleator Fm. (informal name) in an area of lower metamorphic grade. # 10

Stop 6: low grade pelitic rocks just south of the Aqua Fria River.
Stop 7: felsic volcanics of the eastern volcanic belt
Stop 8: fault at edge of Shylock fault zone
Stop 9: f1 folds # 3, 10

Return to Prescott

April 16: drive to Mayer then north to Pipeline Rd. # 2, 3, 4, 10
Morning: Iron King Volcanics - structure and stratigraphy

Stop 1: isoclinal folding (f1) as per J. Evenson
Stop 2: calcareous rocks - discussion of protolith problems
Stop 3: metamorphic reactions producing amphibole.
Return to Mayer then southwest on Goodwin Rd. to Mule Creek.

Afternoon: Brady Butte - Mule Canyon Area # 3
Stop 4: traverse across an area where layering and S1 are folded by f2 folds; observe Texas Gulch unconformity; return upsection through Texas Gulch Fm,; return to road along Mule Creek and observe f1 folds now folded by f2 event.
Drive to eastern limb of Texas Gulch Fm. and stop at the end of road by corral. Along the road observe f1a folds.
Stop 5: hike up Turkey Creek and observe f1a folds as well as major fault zone. Traverse south one creek, then up creek and observe foliation relative to f2 folds. Traverse back down creek to Turkey Creek and observe Iron King Volcanic stratigraphy as well as Texas Gulch contact.
Return to Prescott

April 17: Drive to Humboldt and enter Iron King Mine. # 19
Stop 1: on road leading south of mine, traverse east to old workings passing through sericite-pyrite alteration. At the chert outcrop we will discuss the geology of the mine and spacial relationships of ore to alteration and the geochemical nature of the deposit. Hike down to the creek and return to vehicles.
continue on road to Copper shaft
Stop 2: observe alteration
continue on road to small road to east
Stop 3: observe chloritic alteration (?)
return to mine site and take mine road south to Power Line Rd.
Stop 4: Texas Gulch Fm.
Stop 5: Railroad cut felsic volcanics
return to Rt. 69. (LUNCH !)

Afternoon: Binghampton - Copper Queen Mines; drive to Mayer then turn north to Agua Fria River

Stop 6: hike west along river to see f2 folds and 12 lineations. Return to vehicles.

Stop 7: traverse along creek to look at various breccias.

Stop 8: alteration associated with the Cu. Queen mine

Stop 9: alteration associated with the Binghampton mine. # 10, 20

Return to Prescott

April 18: drive to Jerome and meet Paul Handverger at the museum at 9 a.m. # 11

April 19: drive to Mayer and south along Blue Bell Rd.

Morning: Geology of the Blue Bell Mine area # 17

Afternoon: Geology of the DeSoto Mine area # 18

Return to Prescott.

Kaaterskill Exploration *Geochemistry • Petrology • Structural Analysis*

691 ROBINSON DRIVE • PRESCOTT, ARIZONA 86301 • 602/778-5321

Arizona Precambrian Field Trip to the Prescott-Jerome Area

for: NICOR MINERAL VENTURES INC. by: Pat O'Hara
April, 1985

April 15:

Morning: Room 171, Yavapai College
1) introduction to stratigraphy and age relations between Precambrian rocks throughout central, Arizona
2) structural models proposed by various workers.
3) metamorphism and the role of fluids during regional and contact metamorphism
4) summary of stratigraphic and structural models
5) ore deposits associated with Precambrian rocks
6) geochemistry of stratabound systems
7) a geochemical ore genesis model

Afternoon: Drive to Mayer and on to Cordes
Stop 1: overlook south of Cordes-discussion of the following:
1) pretectonic intrusive complexes
2) eastern metavolcanic belt
3) Cleator Fm. (informal name)
4) Brady Butte granodiorite
5) Iron King Volcanics
6) Crazy Basin quartz monzonite
7) ductile deformation
8) Shylock fault zone #'s 1-9

Transect of eastern volcanic belt
Stop 2: felsic volcanic rocks within the Shylock fault zone.
Stop 3: isoclinal folding of feruginous chert in the felsic volcanics
Stop 4: at site of the old railroad station of Middleton - folding of layering and various schistosity into broad f3 fold.
Stop 5: high grade regional metamorphic assemblages including staurolite and andalusite.

Return to Mayer and transect the eastern volcanic belt

and Cleator Fm. (informal name) in an area of lower metamorphic grade. # 10

Stop 6: low grade pelitic rocks just south of the Aqua Fria River.
Stop 7: felsic volcanics of the eastern volcanic belt
Stop 8: fault at edge of Shylock fault zone
Stop 9: f1 folds # 3, 10

Return to Prescott

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Afternoon: Geology of the DeSoto Mine area # 18

Return to Prescott.

NICOR MINERAL VENTURES

Prospect and Submittal Report

Date: June 16, 1985

Property Name: Silver Mountain

Township: 9 N

County, State: Yavapai Co., AZ

Range: 1,2 W

Date Examined: In office By: G.A.Parkison

Section: Several

Reply and Date:

Quadrangle Name: Crown King, Copperopolis 7½

AMS Sheet: Prescott

Summary, Conclusions, Actions Recommended This property may be of interest for small company with underground experience. Veins probably somewhat syngenetic with local remobilization. Gold values generally less than 0.04 opt. Probably narrow vein widths. Will pass on this.

Location and Accessibility About 6 mi. south of Crown King, AZ. Access by USFS dirt roads.

Owners and Intermediaries, Address, Phone, Zip Unknown - submittal report on file prepared by Robert Winegar, Geoplan, Inc., 1001 N. Russell, Missoula, MT 59802; (406) 543-5850 who is acting as agent (?) for owners who are AZ limited partnership KOOZ.

Property Description, Status 28 patented, 66 unpatented claims -- agent(?) for owners is Geoplan

Terms 6 mos. free with $10,000 work; $20,000 payment + $50,000 work for next year; years 2 through 5: $20,000 or 5% NSR and $100,000 work each yr.; 5% NSR toward $15,000,000 purchase or $50,000 payment for thereafter.

Previous Exploration and Production Unknown. Probably quite small production. Several shafts, tunnels. Five reverse circ. holes drilled -- only some data known.

General Geology Within Precambrian Yavapai Schist bordering Precambrian granite cut by younger Precambrian dikes, intrusives.

Geology of Prospect* Granitic bodies and latite dikes cut the schist, often parallel to foliation. Veins appear to also parallel foliation and often in contact with latite dikes. Veins predate regional amphibolite facies metamorphism.

Mineralization* (Primary and Secondary) Mineralization could be syngenetic, is certainly Precambrian. Past production from veins for Cu-Ag-Pb-Au. Two enechelon veins can be traced for 5.3 mi. strike. Local Gossans. Assume mine width of vein is 6 ft. w/grades of 2.2% Cu, 4.5 opt Ag, .04 Au for speculative reserves.

Geochem Results Available from geoplan

Exploration Recommended None - veins probably quite erratic in grade and width. All underground mining.

Attachments

References

* Attach geologic map, sketch or otherwise, including examiner's observations with emphasis on mineralization and alteration and their relationships to other geological features. Other desirable attachments: Location map, property map, sample results, etc.

SUMMARY REPORT:

SILVER MOUNTAIN PROPERTY

by

Robert C. Winegar
Geoplan, Inc.

May 6, 1985

Robert C. Winegar

Robert C. Winegar, President
Geoplan, Inc.
1001 North Russell
Missoula, Montana 59802
(406) 543-5850

Robert C. Winegar

Summary Report: Silver Mountain Property

Location

The property consists of 28 patented and 66 unpatented claims in T9N, R1W and T9N, R2W Yavapai County, Arizona (Fig. 1). Access is by gravel and paved roads, a total of 55 miles from downtown Phoenix.

Figure 2 is a modified reproduction of a portion of Lindgren's Bradshaw Mountains Quadrangle. The Yavapai Schist forms an antiform structure around a core of Precambrian granite and the Crooks Complex (Plate 1). Younger granitic bodies and

Plate 1. Bradshaw Mountains viewed from the southwest. The Yavapai Schist is trending from the lower right-hand corner of the picture through the Pacific Mine and toward the upper left-hand corner. Crooks Complex is the lineated rock in the foreground of the Bradshaw Mountains. Bradshaw Granite is the light colored rock occurring in the pine covered higher elevations.

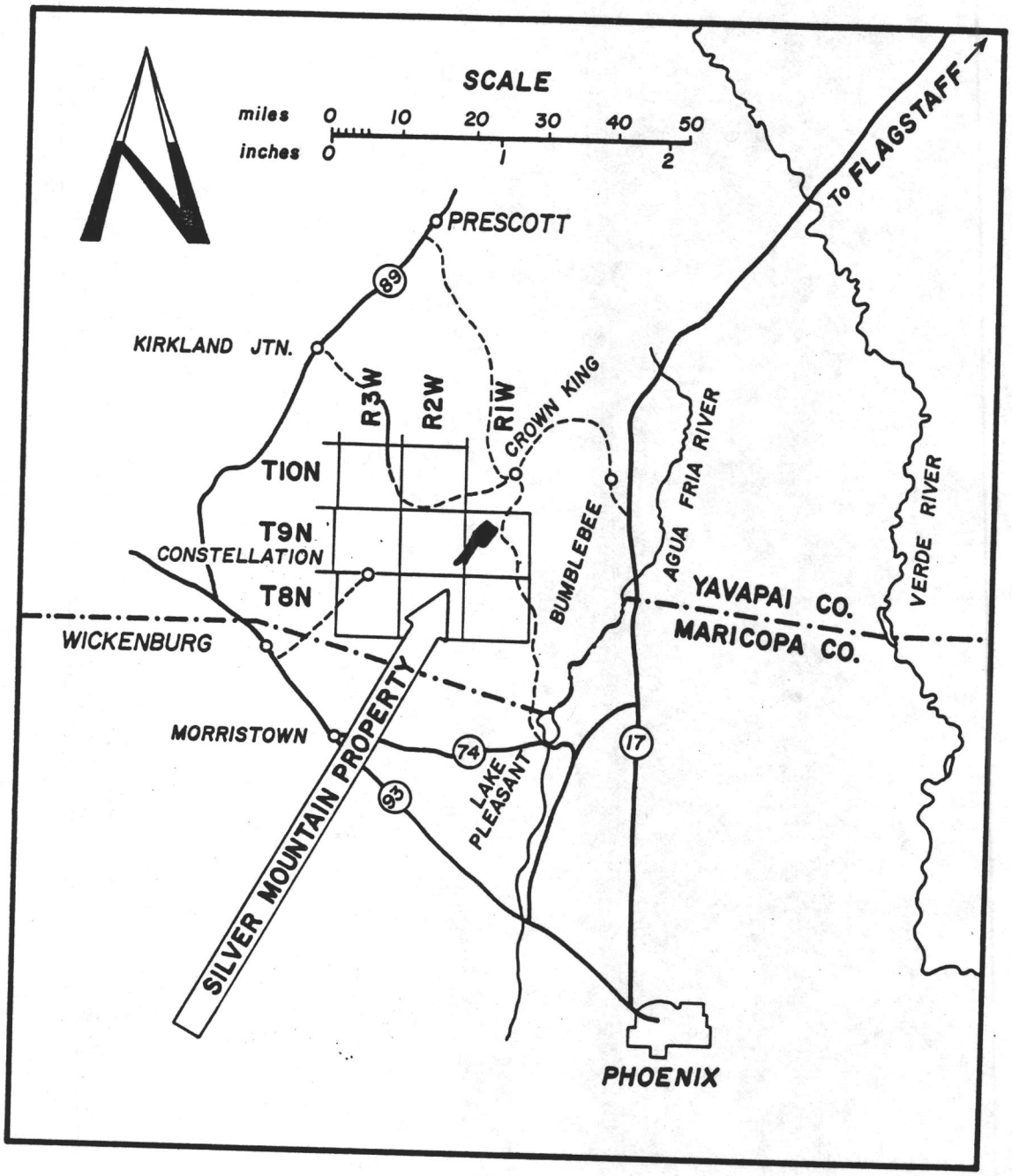


FIGURE 1

INDEX MAP

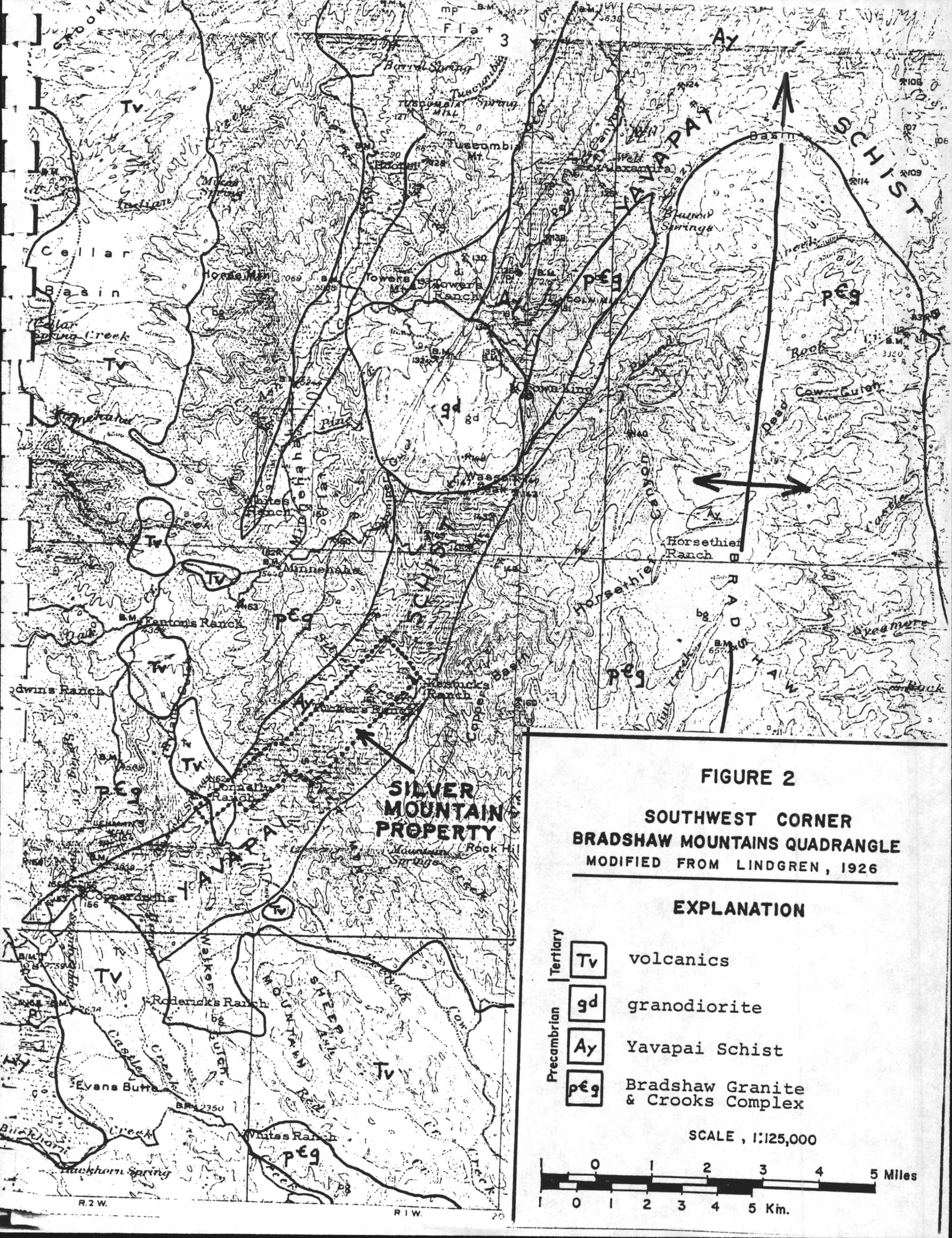


FIGURE 2

SOUTHWEST CORNER BRADSHAW MOUNTAINS QUADRANGLE

MODIFIED FROM LINDGREN, 1926

EXPLANATION

Tertiary	Tv	volcanics
Precambrian	gd	granodiorite
	Ay	Yavapai Schist
	p€g	Bradshaw Granite & Crooks Complex

SCALE, 1:125,000

0 1 2 3 4 5 Miles

1 0 1 2 3 4 5 Km.

latite dikes cut the schist. The younger latite dikes are often concordant with the foliation of the Yavapai Schist. The vein structures occur within the Yavapai Schist, often in association with the latite dike bodies. The accompanying North Half and South Half geology maps show the surface mapping accomplished in 1977-1978.

The deposit is a copper-silver volcanogenic massive sulfide. Metamorphism is in the amphibolite facies and some remobilization of the ore has occurred. Two veins occur for a total strike length of 5.3 mi. on the property. Leaching has been fairly complete at the surface (Plate 2) but several samples, surface and underground, show good amounts of copper, silver and gold (Table 1).

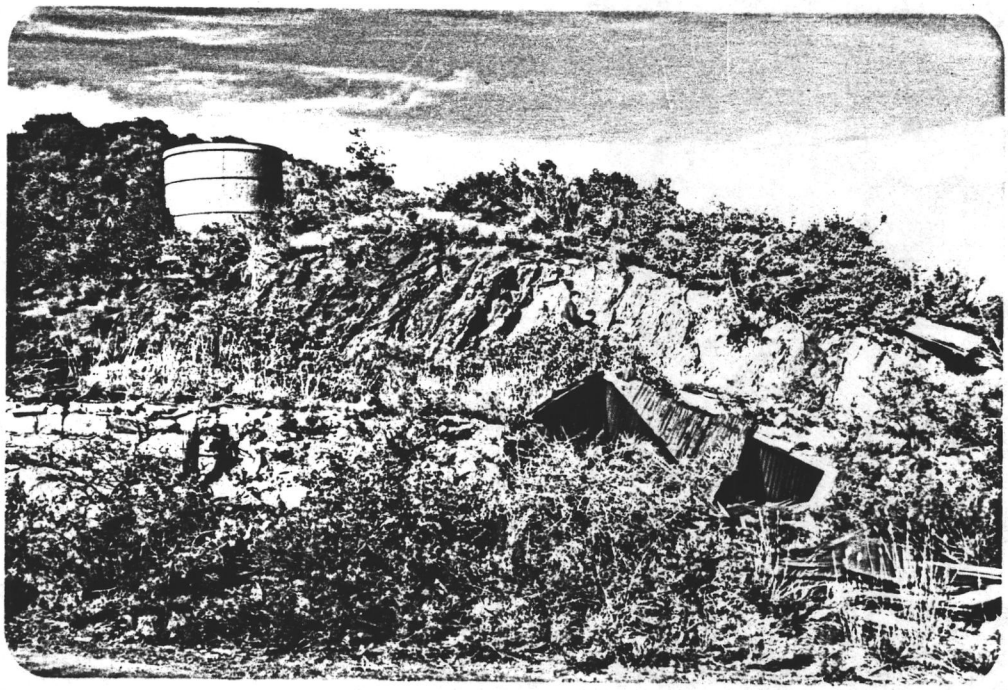


Plate 2. Exposure of footwall gossan behind the old hoist platform at the Pacific Mine. Oxidation extends to 60 ft.[1]

---

[1]Jones, N. O., 1970, Report on the Pacific Mine Area: Unpublished report.

Table 1

Partial List of Sampling

Location	Sample type	Au oz/ton	Ag oz/ton	Pb %	Zn %	Cu %
Pacific Mine						
Dump	Grab	.047	.76	.04	.31	.60
Copper Ash Tunnel						
Sta. 85	Grab	.010	1.24	nil	0.2	1.97
Sta. 148	18" Chip	.035	22.48	0.20	7.9	12.67
Sta. 125	Grab	.035	18.76	0.10	0.5	8.38
Comet Tunnel						
Pit Dump	Grab	.061	1.37	.01	.03	3.3
Adit	4' Chip	.003	.09	.02	.01	.10
Sta. 75	Grab	.040	2.82	nil	0.4	3.26
No. Ten Tunnel						
Dump	Grab	.070	1.20	nil	0.5	3.05
Dump	Grab	.084	2.41	.01	.03	.65
Adit	5' Chip	.006	.09	Tr	.01	.12
Little Joe						
Trench	Grab	.055	15.38	26.6	0.2	.26
Wellington						
Sta. 15	Grab	.030	.70	nil	0.4	nil

Five reverse circulation drill holes were completed on the property but only part of the data is in Geoplan's possession.

Reserves

The work thus far has defined a good exploration target but enables only speculation on reserves and grade. A potential model would be 6 ft. mining width x 6000 ft. strike x 700 ft. depth yielding 2+ million tons @ 2.2% Cu, 4.5 oz/ton Ag and .039 Au.

These are arithmetic averages of the above analyses with the high and low thrown out. Value per ton = $75.10; using Cu @ $.60/lb, Ag @ $6/oz and Au @ $300/oz. Pb and Zn may also give some credits.

These figures are to be used only as a perspective on the size and kind of property Silver Mountain presents. A substantial amount of initial exploration work has been done with the surface and underground mapping but much remains to be completed for definition of grade, reserves and mine feasibility.

Geoplan, Inc. has an agreement with KOOZ (a Arizona Partnership) for consulting on the property. Our involvement is to be paid from monies due the owner (KOOZ). Finder's fees or other payment from the buyer or leasee is not expected. All materials are available for examination in our office.

General Terms

1. First six months free time with an exploration commitment of $10,000.

2. First year after the first six months:

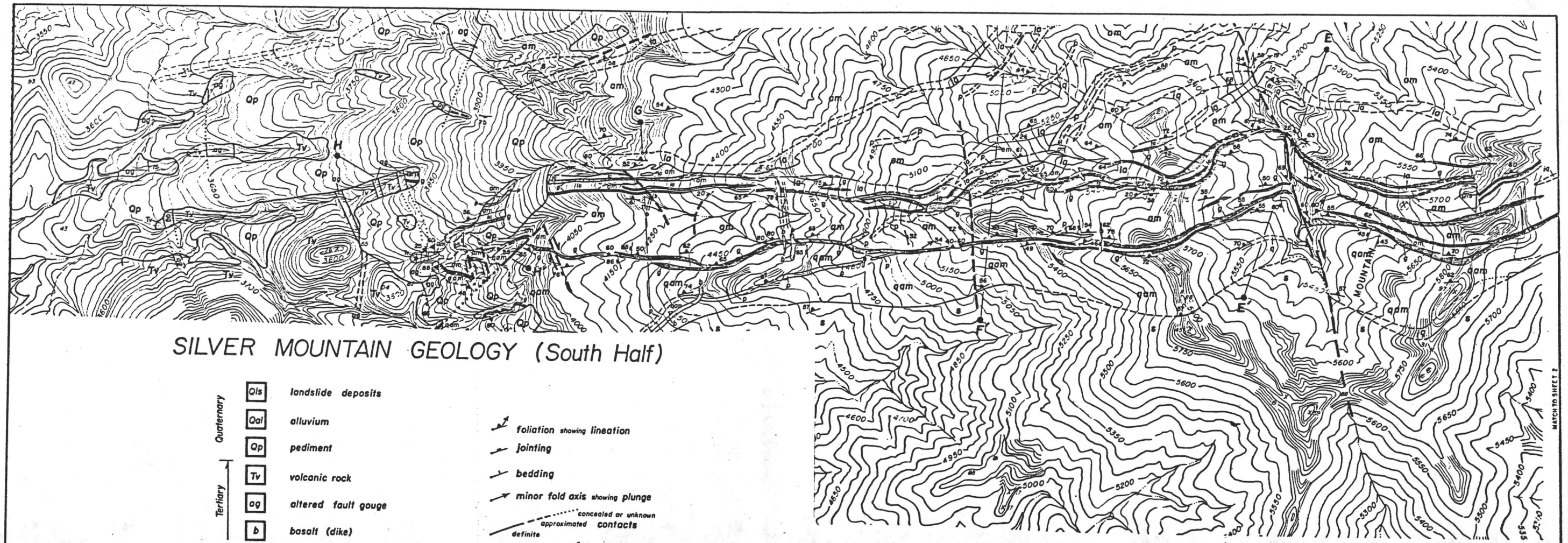
   5% royalty on NSR or a minimum royalty of $20,000, whichever is greater, and an exploration commitment of $50,000.

3. Second year and continuing yearly through fifth year:

   5% royalty on NSR or a minimum royalty of $20,000, whichever is greater, and an exploration commitment of $100,000.

4. Sixth year and continuing yearly until a purchase price is reached of $15,000,000:

   5% royalty on NSR or a minimum royalty of $50,000 without an exploration commitment.



SILVER MOUNTAIN GEOLOGY (South Half)

Quaternary	Qls	landslide deposits
	Qal	alluvium
	Qp	pediment
Tertiary	Tv	volcanic rock
	ag	altered fault gouge
	b	basalt (dike)
	g	gossan or mineralized vein
Pre-Cambrian	la	latite dike or sill
	p	pegmatite
	s	muscovite schist
	am	amphibolite
	qam	quartz amphibolite
	iq	iron quartzite

foliation showing lineation

jointing

bedding

minor fold axis showing plunge

concealed or unknown / approximated / definite contacts

faults showing relative movement

fold axis showing plunge

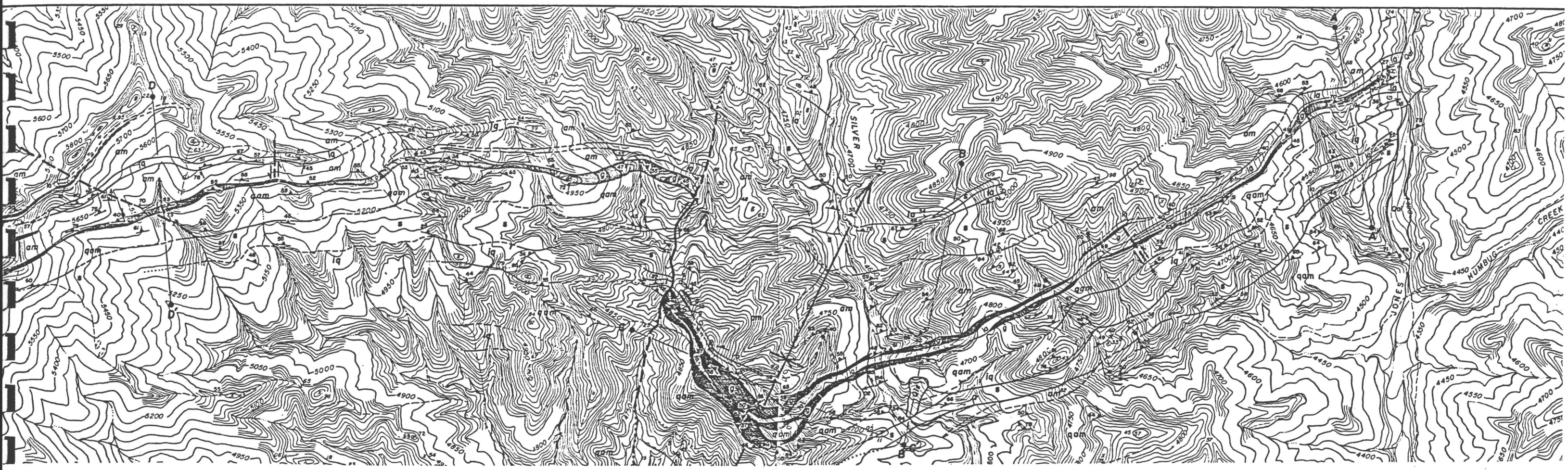
X X′ x-section

Field Mapped by
Robert C. Winegar, Bruce E. Cox
GEOPLAN INC
Mark Pfau and Clarence Zink
D.W. Litchfield and Assoc. Inc.
1977-1978

SCALE 1" = 800'

CONTOUR INTERVAL 10'
PHOTOGRAPHY DATE OCT 15, 1977

SHEET NO. 1



SILVER MOUNTAIN GEOLOGY (North Half)

CONTROL NOTE
MAP ACCURACY BASED ON HORIZONTAL & VERTICAL CONTROL DETERMINED FROM USGS 1:24000 QUADRANGLES OPPENHOPOLIS AND COLLINS ARIZ.

Quaternary

- Qls — landslide deposits
- Qal — alluvium
- Qp — pediment

Tertiary

- Tv — volcanic rock
- ag — altered fault gouge
- b — basalt (dike)
- g — mineralized zone

PreCambrian

- la — latite dike or sill
- p — pegmatite
- s — muscovite schist
- am — amphibolite
- qam — quartz amphibolite
- iq — iron quartzite

foliation showing lineation
jointing
bedding
minor fold axis showing plunge
concealed or unknown
approximated contacts
definite
faults showing relative movement
fold axis showing plunge

Geology by
Robert C. Winegar, Bruce E. Cox
GEOPLAN INC.
Mark Pfau and Clarence Zink
D.W. Litchfield and Assoc. Inc.

APPROX. 0.2°

SCALE 1"=800'
400 0 400 800 1200
CONTOUR INTERVAL 10'
PHOTOGRAPHY DATE OCT. 15, 1977

AERIAL SURVEYS INC - SALT LAKE CITY UTAH - 7131

SHEET NO 2

GSA

Cordill

Rept by Geoexplorers for BLM
in AZ Bur. Mines Lib

Yavapai Cty

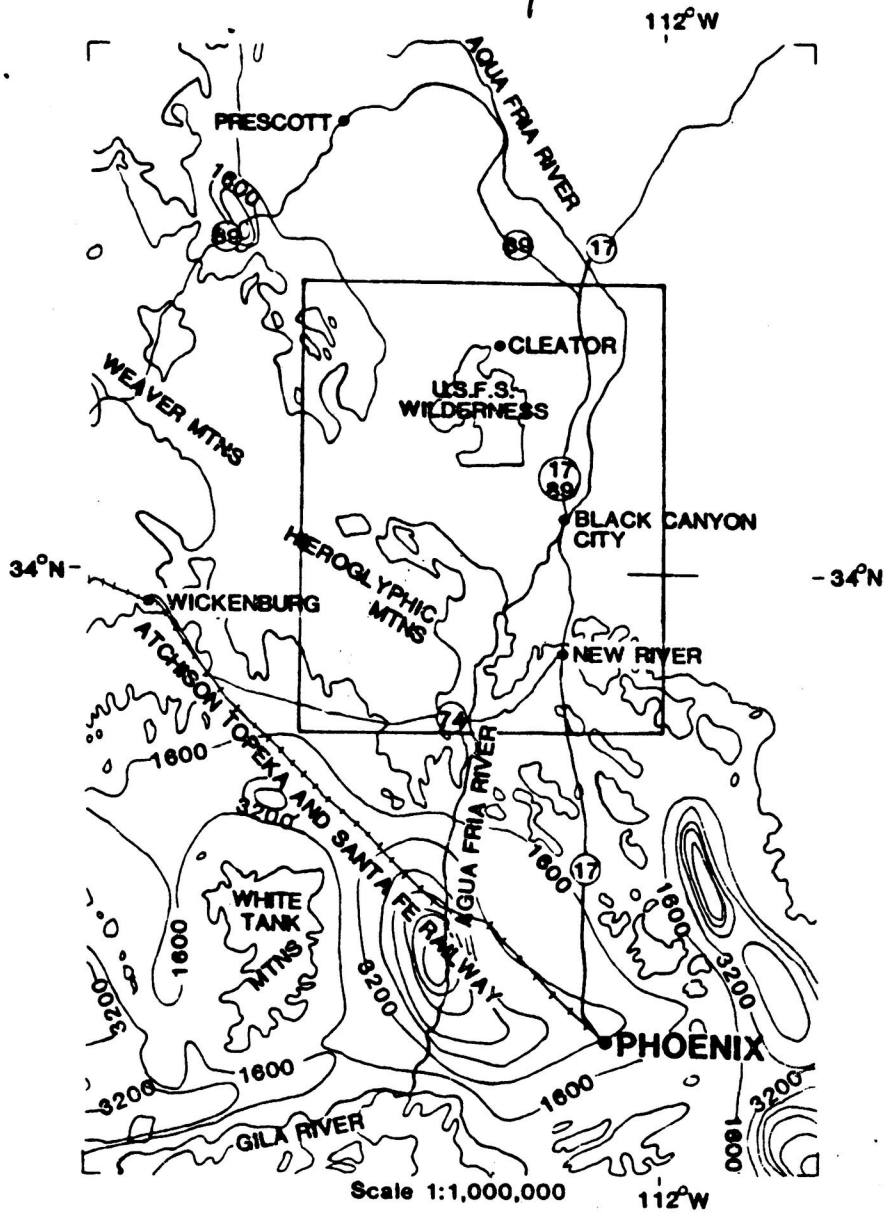


Figure 1. **LOCATION OF THE HOT SPRINGS GRA. Surface physiography and depth to basement contours (1600 feet interval), after Oppenheimer and Sumner (1981).**

Rept by Geoexplorers for BLM
in AZ Bur. Mines Lib

Yavapai Cty

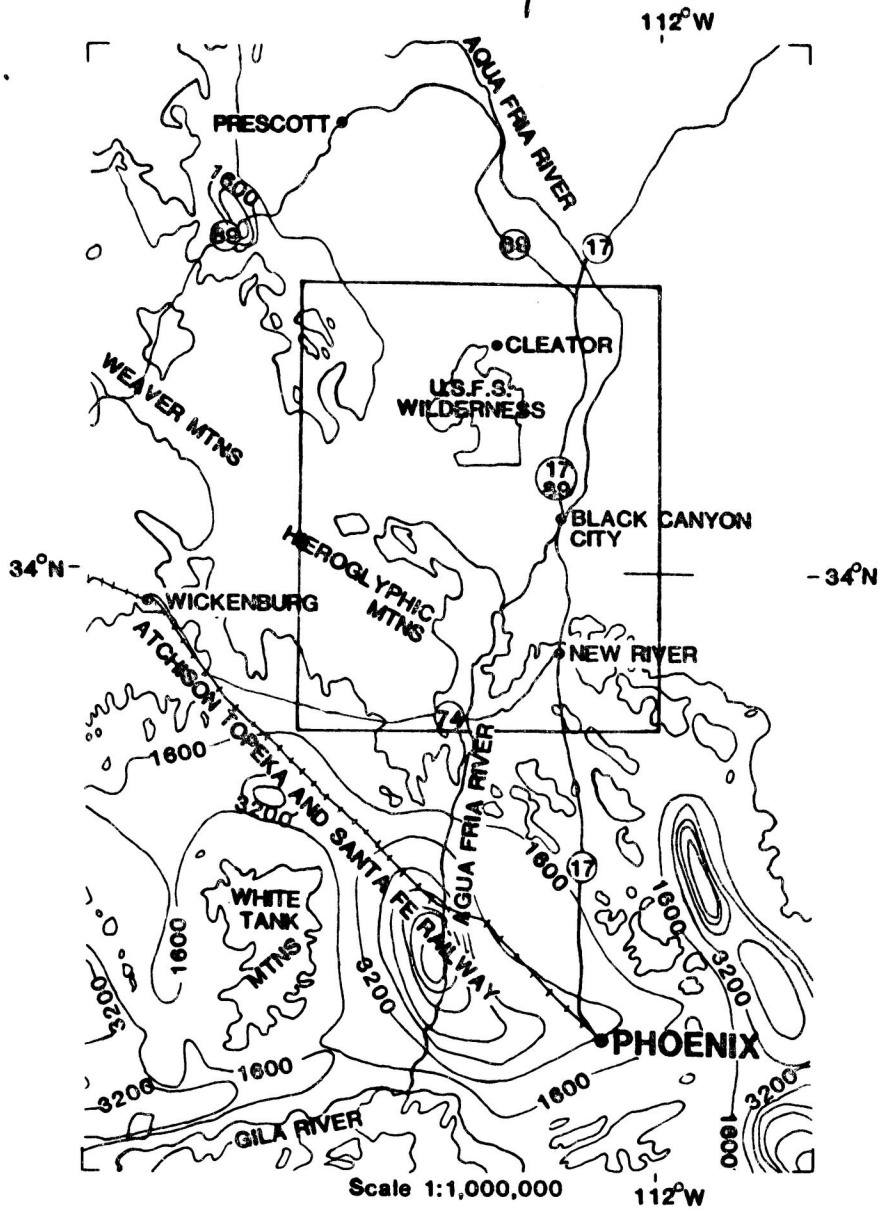


Figure 1. LOCATION OF THE HOT SPRINGS GRA. Surface physiography and depth to basement contours (1600 feet interval), after Oppenheimer and Sumner (1981).

NICOR MINERAL VENTURES

One of the NICOR basic energy companies

MEMORANDUM

To: Staff

From: Mike Dennis

Date: October 24, 1985

Subject: Notes - Workshop on Early Proterozoic Geology of Arizona

The workshop, convened by Clay Conway, Karl Karlstrom and Lee Silver, was held on October 5 & 6, 1985 in Flagstaff. The following are notes taken from the talks. No abstracts are available.

Lee Silver - Overview and Selected Prospectives

Describes systematic age difference from north to south.

1) North - includes Yavapai Series
   a) Supracrustal rocks 1700 my
   b) Granite (syn- and post kinematic) 1680-1750 my
   c) Anorogenic granite 1400-1460 my

2) South - includes Mazatzal, Haigler and Alder Groups
   a) Supracrustal 1660-1710 my
   b) Granite (syn- and post tectonic) 1610-1650 my
   c) Anorogenic granite 1400-1460 my

Defines 2 distinct Proterozoic provinces

1) SW-NE trending extending from w-central Arizona to Great Lakes

2) Western boundary defined as plate margin - parallel left - lateral trancurrent faults
   a) San Gabriel terrane is example of offset provinces

3) Northern province dominated by hornblende-rich primitive island arc systems with inter-arc basins
   a) Age ranges from 1700-1800 my
   b) Would include Yavapai series rocks

4) At transition between provinces, high SiO2 rhyolites and transgressive sedimentary rocks dominate
   a) Boundary hard to identify but most put it in the area of the New River Mtns (Orizaba Mine area)

5) Southern province dominated by deep water fore-arc basin type sediments
   a) Extensive turbidite sequences
   b) Age ranges from 1650-1700 my
   c) Mazatzal Group and Pinal Schist

Clay Conway - Geologic history of the younger Early Proterozoic rocks in central Arizona

Stratigraphy - Tonto Basin Area

1) Mazatzal Group - youngest
   a) Quart arenites with slates at base
   b) Upper part has abundant interbedded felsic volcanic rocks and quartz-rich sandstones

2) Haigler Group
   a) Almost all rhyolite ash flow tuff with minor interbedded clastic rocks

3) Alder Group
   a) General trend of mafic to felsic volcanics up section with interculated sandstone, conglomerate and shale
   b) Oldest

Stratigraphy - Mazatzal Mtn Section

1) Very similar to Tonto Basin section

2) Red Rock rhyolite is ash-flow tuff
   a) Can map cooling units

3) At least 2 major widespread quartzite units are interbedded with silicic ash flow tuffs
   a) Indicate continental environment
   b) Tuff is alkali rhyolite similar to alkali rhyolites in western USA
      1) PЄ rhyolites may represent calderas

Unconformities

1) Major unconformity at base of Deadman quartzite
   a) Represents major tectonic events?
      1) Doesn't think so; probably related to local tectonics associated with calderas

Is Tonto Basin/Mazatzal section correlative to Pinal Schist?

1) Ages range from 1680-1700 my in both areas
   a) Form continuous basin? Conway says yes

Proposes name of Pinal Super Group to include Pinal Schist, Mazatzal Group, Haisler Group and Alder Group.

East Verde R. Sequence i.e., City Creek area

1) 1000's feet of greywackes (turbidites)
   a) May be correlative to Yavapai Series?
   b) Unlike anything in Alder Group rocks
   c) Lots of uncertainty about where turbidites fit into sequence

2) Paleocurrent data indicates NW to SE flow
   a) Fluvial facies to NW, marine facies to SE

Gibson Creek Sequence

1) Mafic plutonic rocks - diorite

2) Chemically distinct from alkaline silicic rocks
   a) Calc-alkaline

3) May represent basement upon which Pinal-Tonto-Mazatzal rocks were deposited
   a) Diorite may be correlative to Yavapai Series rocks

Structure - Tonto Basin Area

1) Thrust faults, reverse faults, fold axis and left-lateral transcurrent faults
   a) Generally trend NE-SW

2) Older than Apache Group

Structure-Mazatal Area

1) Similar to Tonto Basin in time and orientation

Defines Mazatzal Orogeny as foreland folding and thrusting

Metamorphic grade - lowe to upper greenschist

<u>Kent Condie</u> - General comments

Major problems

1) Time-space relationships of supracrustal rocks

2) Significance of bi-modal volcanism

3) Tectonic settings

Defines 3 rock-type associations

1) Volcanic - submarine bimodal
   1760-1790 my in AZ, CO, NM
   1730-1740 my in CO
   1720 my in NM

2) Volcanic - Sedimentary (submarine and terrestial, bimodal)
   1680-1700 my in NM, AZ
   1650 my in NM

3) Sedimentary - submarine and terrestial
   1650(?)-1700+ my in AZ, NM, CO

Can define volcano-tectonic setting with time

1) 1730-1740 my dominated by basalt and rhyolite with very little andesite

2) 1680-1700 my - bimodal volcanism with abundant andesite

3) 1650 my - bimodal with mostly rhyolite with abundant quartzite and pelite

<u>Karl Karlstrom</u> - Structural Styles and Kinematics

Mazatzal and Haigler Groups

1) Classic foreland thrusting and folding

Alder Group

1) Pronounced vertical cleavage
   a) Overprints older thrusts

2) 10-20 km displacement on thrusts
   a) Translated to NW

Yavapai Series
   Texas Gulch Fm

1) Ductily deformed
   a) Middle to upper amphibolite grad(?)

2) Early recumbent folds f_1
   a) Up to 1/2 mile amplitude

3) Followed by F_2 shortening, resulting in steeply dipping f_1 fold axis

4) Recumbent folds related to regional thrusting

5) Entire Texas Gulch records intense transposition

Shylock fault

1) Major early thrust fault
   a) S_2 cleavage crosscuts it

Thrusting is NW directed

Lithology, structural style (brittle vs ductile), age metamorphic grade is different in Yavapai Series rocks vs Tonto Basin/Mazatzal Rocks

1) Implies different terranes

<u>Phil Anderson</u>

Northwest AZ (north of Kingman)

1) 1900-2100 my old

2) Polyphase deformation contrasting with single phase to SE

Calc-alkaline mafic belts in New River, Cave Creek and Mazatzal areas

Bimodal tholetic to calc-alkaline suite in Prescott-Jerome area

Structure - defined by fe-formations (ala Ed DeWitt)

   a) Steeply dipping isoclinal folds
   b) Can define regional stratigraphy based on fe-formations
   c) Much controversy over Phil's ideas

Yavapai Series redefined as Yavapai Super Group

1) Typical island-arc

<u>Pat O'Hara</u> - Structure and Metamorphism in Bradshaw Mtns

Structure - 2 episodes of deformation

1) Isoclinal folds (f^1), steeply dipping axis
   a) May be thrust related

2) Shallow dipping open folds

May be allocthonous rock packages

1) South to north stacking of Big Bug Group
   a) Napping and thrusting

2) Followed by E-W compression
   a) Steeply dipping S_2 foliation
   b) Rotates shallow-dipping f_1 isoclinal folds into steeply dipping folds

Metamorphism

1) Low temp assemblage in north Bradshaws

2) High temp assemblage in southern Bradshaws

Defines zones of high H_2O and CO_2 in metamorphic fluids

1) Controlled by bulk chemistry of rocks, i.e., carbonates - high CO_2

Alteration

1) Most rhyolites altered to qtz-sericite schists
   a) Alkali leaching - exchange of K-Na for Si
   b) Ti and Zr may also be mobile
   c) At higher metamorphic grade may get kyamite, sillimanite or staurolite

Paul
~~Jerome~~ Lindberg - Jerome

1) UVX is a separate body from UV
   a) On opposite limb of major anticline

2) Reverse motion on Verde fault in Laramide, normal motion in Tertiary

3) Supergene enrichment of UVX in Tertiary

4) Steeply dipping NNW trending tight folds control geometry of massive sulfide

5) Deposition along submarine scarp

   a) Scarp is ring fracture of submarine caldera?

6) Cleopatra rhyolite is one catastrophic accumulation
   a) Has fractures bordered by intense chloritic alteration
      1) Implies hydrothermal system already in place followed by caldera collapse

Gordon Swann - Shylock Fault zone and other shear zones in Arizona

1) Mesa Butte fault correlative with aeromag and gravity lineation

2) Skylock is a zone of widely distributed shear

Bruce Bryant - USGS, Denver - Geology of Poachie Range

1) Located on the south margin of the Colorado Plateau transition zone

2) Plutonic rocks dominate
   a) Metamorphic rocks occur as septa and inclusions in plutonic rocks
   b) Several plutonic types - granite to granodiorite
      1) Age from 1416 to 1700 my
      2) Locally foliated

Age vs deformation

1) 1700 my - deformed

2) 1680 my - undeformed

3) 1416 ± 2 my - undeformed

Nancy Johnson - UofA grad student

1) Exhalite at Jerome contains abundant cobalt
   a) May be used as pathfinder element - work in progress

Clay Conway - Old Dick-Bruce - Bagdad

Stratigraphy

1) Homoclinal sequence

2) Locally steep folding

3) Strongly bimodal volcanism

4) From bottom to top
   a) Bridle volcanics, mafic flows
   b) Rhyolite, massive, extrusive, interbedded with felsic clastic rocks and minor andesite
   c) Mafic to felsic volcanic cycle

Intrusives

1) Leucocratic granite and granophyre west of mine
   a) Subvolcanic equivalent of rhyolite?
   b) Responsible for hydrothermal alteration

Geochem and Alteration

1) Chlorite pipe west of mine

2) Several other areas of chlorite alteration in basalt and Dick rhyolite

Enrichment Studies

1) Cu - 3 ppm median in basalt
   a) Normal - 50 to 100 ppm
   b) Zn not leached from basalt, why?
      1) Previous hydrothermal event
      2) Leaching of Cu and Zn are independent of each other

Alteration

1) Mg/Na ratio studies
   a) Mg enrichment, Na depletion
   b) Adjacent to Old Dick-Bruce get very high ratios decreasing away

<u>Phil Anderson</u> - New River - Cave Creek Area

1) Mafic rocks at base of section are younger than Yavapai Series

2) Section dominantly felsic rocks
   a) Can trace Verde granite through an extrusive phase
      1) Overlain by slates and greywackes

3) Can correlate stratigraphic units (with facies changes of course) as far as the Dos Cabezas

Steve Maynard - UNM - New River Mtns

Three groups of Precambrian rocks

1) Moose Gulch metasediments, and ferruginous chert (Orizaba Mine)
   a) May be Yavapai(?) in age

2) Intruded by quartz chlorite on west side of New River Mtns

3) New River group, in fault contact with subaerial rhyolite to the east
   a) May be Haigler equivalent
   b) Minor interbedded clastic component with tops facing east

Structure - 2 terranes

1) Moose Gulch terrane
   a) Penetrative deformation
      1) Lineations, isoclinal folding, transposition

2) New River terrane
   a) Tilting
   b) Foliation developed near Moose Gulch fault

Origin of Moore Gulch fault

Possibilities - not sure which it is

1) Unconformity

2) Strike-slip fault

3) Normal fault

4) Thrust fault

Conclusions

1) New River group is part of the Southern Province (Lee Silver)

2) Moose Gulch fault is a province boundary

Larry Middleton - NAU - Mazatzal Quartzite in the Del Rio area

1) Dominantly quartzites and conglomerate
   a) Overlies rhyolite

2) Systematic upsection change
   a) Dominantly sand at base with bull qtz clasts in lower part

   b) Conglomerates increase in thickness and clast size
   c) Rhyolite, chert, greywacke, and fe-formation clasts increase upsection

3) Environment of deposition
   a) Gravel bar on alluvial fan and fluvail
      1) N to S transport

4) Conclusions
   a) Upward coarsening and thickening and change in clast type to older rock types suggests tectonic movement on large fault causing prograding alluvial fans moving south

<u>Dave Pols</u> - NAU - Thrusting in N. Mazatzals

1) Stairstep geometries, i.e, foreland thrust with folding in upper plate

2) NW verging

3) Folding in upper plate caused by thrusting

<u>Julie Roller</u> - NAU - Alter Group-Mazatzal Mtns

1) More complex than simple syncline (as suggested by others)
   a) Presence of refolded folds
      1) Gentle folding (f_2 of isoclinal (f_1) folds
   b) Mega quartzite boudins on scale of 1000's of feet
   c) Sheared fold limbs
   d) Rootless folds, quartzite floating in slates

<u>Rob Reed</u> - UNM - Geochemistry of Alder Group

2 populations of sediments

1) Arc derived

2) Collision orogen or foreland uplift

Igneous Rocks

1) Shows fractionation patterns

2) Continental arc (calc-alkaline) affinities with respect to trace elements suites

Winnie Kortemeir - ASU - Topaz & Beryllium mineralization, Alder Group, Tonto Basin

Breadpan formation - lower unit

1) Interbedded slates and greywackes

2) Beryl in veinlets

Flying W formation - upper unit

1) Rhyolite tuff, basalt and volcanoclastics

2) 1715 ±15 my

3) Topaz in heavy mineral separates from rhyolite tuff

Mineralization

1) Flourite in quartz veins

2) Beryl in K altered shale

3) Tourmaline common

Pete Copeland - NM Tech - Geochem of Pinal Schist

1) Basic igneous rocks similar to back-arc basin basalts
   a) Based on trace element suite

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GEOLOGICAL AND CHEMICAL CONTROL OF STRATABOUND PROTEROZOIC PRECIOUS METAL MINERALIZATION IN CENTRAL ARIZONA

P. F. O'Hara

Kaaterskill Exploration
Prescott, Arizona

For presentation at the SME Annual Meeting
Phoenix, Arizona - January 25-28, 1988

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Abstract

Stratabound Proterozoic precious metal mineralization in central Arizona is associated with felsic and adnesitic to mafic volcanic rocks and sediments derived from these rocks. Hydrothermal fluids associated with felsic volcanism form gold mineralization within hotspring vent complexes or within asymetric basins, which flank the vent complexes and are filled with tuffaceous sediments. Massive to semi-massive sulfide copper-zinc systems associated with felsic volcanism may locally contain small gold occurances either laterally or vertically zoned from the ore.

In andesitic to mafic rocks, zinc-lead-gold-silver-copper bearing mineralization and gold mineralization are both associated with feruginous sulfide bearing cherts.

The partitioning of gold into these specific geologic environments may be related to variations in temperature and composition of the hydrothermal fluid and the depth of the seawater-sediment interface below sea level during the mineralization event.

Introduction

Gilmour and Still (1968) first proposed a strataform origin for mineralization at the Iron King Mine. This pioneering paper was followed by Anderson and Nash (1972), who proposed a stratabound origin for concordant lenses of mineralization at Jerome. Since these papers were published many deposits and mineralized systems within central Arizona have been identified as stratabound deposits. (Figure 1)

The purpose of this paper is to summarize geological and geochemical data which has been generated in the past twenty years within industry and academia and to suggest that these deposits have a more complex origin than was previously recognized.

Proterozoic Stratigraphy

Yavapai Series

Metavolcanic and metasedimentary rocks of the Yavapai Series (Anderson and Creasey, 1958) crop out within the area described in this study. These rocks were originally subdivided into the Ash Creek Group and Alder Group (Anderson and Blacet, 1972c). istopic data led Anderson and others (1971) to rename the Alder Group the Big Bug Group, which includes all the rocks of the Yavapai Series exposed in the area described in this study.

Big Bug Group. The Big Bug Group is divided into three formations. From oldest to youngest they are: (1) Green Gulch Volcanics, (2) Spud Mountains Volcanics, and (3) Iron King Volcanics (Anderson and Silver, 1976). The Green Gulch Volcanics do not host any of the deposits included in this study, therefore, they will not be discussed. The thickness of the Big Bug Group cannot be measured with confidence because of the probability that unrecognized small folds on the flanks of major folds duplicated the section and because of probable thinning and thickening of units during deformation (Anderson and Blacet, 1972c).

The following description of the Spud Mountain and Iron King Volcanics is taken from the report by Anderson and Silver (1976, p. 17). for more detailed information the reader is referred to the many articles coauthored by C.A. Anderson listed in the references.

The lower part of the Spud Mountain Volcanics is characterized by andesitic-rhyolitic breccia containing interbeds of crystal tuff, tuffaceous sandstone, and siltstone. Clasts in the breccia range from 3 to 50 cm in diameter, and individual breccia beds range from 3 to 10 meters in thickness. The dominant rock type forming clasts is porphyritic andesite containing phenocrysts 4 to 8 mm long; clasts of rhyolite may be absent in many beds and abundant in others. The breccia beds form the core of an overturned anticline in the northeastern corner of the Mount Union quadrangle (Figure 1). In the southern part of the Mount Union quadrangle, the breccia beds are thin and appear as interbeds in thickly bedded and massive crystal tuff containing stubby crystals and clasts of quartz and albite.

The upper part of the Spud Mountain Volcanics is dominated by andesitic tuffaceous rocks, locally containing rhyolitic flows and tuffs. Zircons from one of these flows exposed north of the Big Bug Mesa gave an isotopic age of 1775 - 10 m.y. (L. T. Silver, cited in Anderson and others, 1971) This date suggests that a large part of the Big Bug Group is younger than the Ash Creek Group.

In the northwest corner of the Mayer quadrangle, the andesitic tuffaceous rocks in the Spud Mountain Volcanics contain ferruginous cherts that intertongue with the Iron King Volcanics. Southward in this quadrangle and west of the Shylock fault zone, light-colored, sandy and silty tuffaceous rocks become dominant.

The Iron King Volcanics is a thick sequence of pillow and amygdaloidal andesitic and basaltic flows, locally containing thin interbeds of rhyolitic tuffs and flows. The youngest unit is a mixed andesitic-rhyolitic tuffaceous rock that crops out in the trough of the overturned syncline.

Isoclinial folding obscures the original stratigraphy (Anderson and Blacet, 1972; DeWitt, 1976, 1979; Anderson, 1978; O'Hara and others, 1978); therefore, the only way to develop a stratigraphy is to fit the lithologic units into a fold model. Lack of marker horizons of adequate lateral extent hinders structural and stratigraphic analysis in the region.

In the vicinity of the deposits, there is an extremely varied package of volcanic and sedimentary rocks. (Figure 1) Metavolcanic units are complexly interlayered and indicate that rapid facies changes were characteristic of the protoliths, that potential growth structures existed to obscure the stratigraphic relations, and (or) that structural repetition has taken place.

NICOR MINERAL VENTURES

Prospect and Submittal Report

Date: _____

Property Name: TRAILS END MINE

Township: T11N R2W SEC 1,2,11+12

County, State: YAVAIPAI Co, AZ

Range: _____

Date Examined: 6/7/88 By: MM GUSTIN

Section: _____

Reply and Date: _____

Quadrangle Name: Mt. Union 15'

AMS Sheet: _____

Summary, Conclusions, Actions Recommended: No further work

Location and Accessibility: ~30 miles dirt rd from Hwy 89 south of Wilhoit

Owners and Intermediaries, Address, Phone, Zip: Bill Moss

Property Description, Status: _____

Terms: _____

Previous Exploration and Production: _____

General Geology: _____

Geology of Prospect*: Discontinuous, faulted + thin (usually <5' wide) qz veins ± py, cpy
Long strike length of vein system, but v. limited, hi-grade potential at best.

Mineralization* (Primary and Secondary): _____

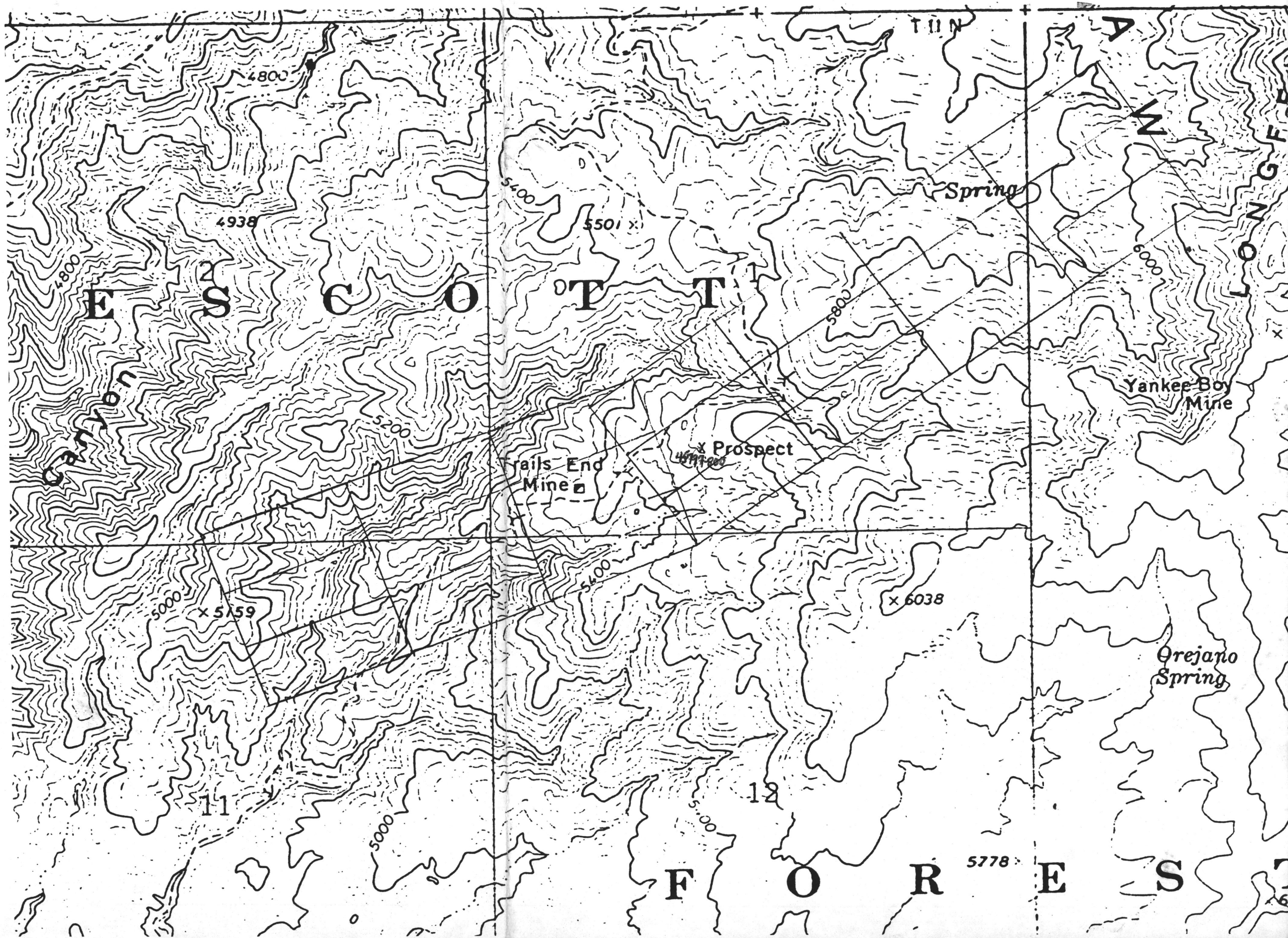
Geochem Results: _____

Exploration Recommended: None

Attachments: _____

References: _____

* Attach geologic map, sketch or otherwise, including examiner's observations with emphasis on mineralization and alteration and their relationships to other geological features. Other desirable attachments: Location map, property map, sample results, etc.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Tucson, Arizona 85703
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REPORT OF ANALYSIS

JOB NO. UGH 175
June 21, 1988
45797 TO 45882

WESTMONT MINING, INC.
Attn: Mr. Michael M. Gustin
2341 S. Friebus, Suite 12
Tucson, Arizona 85713

Analysis of 37 Rock Chip Samples

	ITEM	SAMPLE NO.	Au (ppm)	Ag (ppm)	
TRAILS END MINE	1	45797	.40	.4	
	2	45798	.99	.4	
	3	45799	.04	1.8	
	4	45800	<.02	.4	
	5	45850	1.70	4.0	2.5' QZ VEIN IN
granite	6	45851	.24	1.4	3' of hanging wall of # 850
ORO GRANDE DISTRICT - ATWATER CLAY PROSPECT	7	45852	<.02	.4	
	8	45853	<.02	.8	
	9	45854	<.02	.8	
	10	45855	<.02	.4	
	11	45856	<.02	1.6	
	12	45857	<.02	1.6	
Tr. vrk.	13	45858	<.02	<.2	
	14	45859	<.02	.4	
	15	45860	<.02	.4	
	16	45861	<.02	<.2	
	17	45862	<.02	.4	
	18	45863	<.02	<.2	
	19	45864	<.02	.6	
	20	45865	<.02	.4	
SHADOW MTS (N. of Victorville)	21	45866	<.02	1.4	
	22	45867	<.02	3.6	
	23	45868	.12	23.0	
	24	45869	<.02	3.2	
	25	45870	<.02	.2	

Charles E. Thompson
Arizona Registered Assayer No. 9427

William L. Lehmbeck
Arizona Registered Assayer No. 9425

James A. Martin
Arizona Registered Assayer No. 11122

UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Records of Massive Sulfide Occurrences in Arizona

By

Michael E. Donnelly[1], Clay M. Conway[2], and Robert L. Earhart[3]

Open-File Report 87-0406

1987

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

[1]Noranda Exploration Incorporated

[2]U.S. Geological Survey
Flagstaff, Arizona

[3]U.S. Geological Survey
Denver, Colorado

DEKALB Mining, Inc.

MEMO TO: J. B. Imswiler

DATE: December 4, 1981

FROM: K. M. Emanuel

SUBJECT: Reconnaissance of the Bradshaw Mountains, Yavapai County, Central Arizona

Districts Included:
Groom Creek, Hassayampa, Walker, Big Bug, Bradshaw, Turkey Creek, Peck, Minnchaha, Pine Grove, Tiger, Black Canyon, White Picacho,and Black Rock.

Types of Deposits Included:
Primarally mesothermal quartz veins within precambrian granites and schist. Vein matter with contains few % pyrite and baremetal sulfides with 0.1 -> 1.0 oz/ton gold and minor silver values.

Maps and References:
Listed with each area.

General Geology:
The Bradshaw Mountains consist of a northeast trending series of structural blocks in which open folded pre-cambrian granite and metavolcanic rocks are exposed.

The areas have been extensively studied by Anderson and others 1958, USGS Prof. Paper 308; 1972 (USGS Bulletin 1336). The mineralization of the area has received little attention since Lindgren's (1926) study, (USGS Bulletin 782). The ore deposits towards the north are generally within fissures radiating from granodiorite bodies of laramide ore. Deposits in the southern part of the Bradshaws do not display an obvious association with intrusive rocks, but are generally similar to those that are. A number of quartz - Au veins that carry tourmalene were considered by Lindgren (USGS Bulletin 782) to be pre cambrian, and are distinct in their low pyrite content and glossy fractured quartz. The veins of this type sampled in this investigation include the Boay mine (Minnchaha district), the Black Rock mine (Black Rock district), the Buster mines (Bradshaw district), and the Snowdrift mine (Walker district). Veins of this type are most common in the pre cambrian exposures of the Southern Bradshaws.

Recommendations:
Most of the northern Bradshaws are tied up in subdivisions of old patents. The best possibilities from the standpoint of land acquisition are to the south of the Crown King area. Further investigations in the Black Canyon, Black Rock and White Picacho districs would appear justified in areas of the assay result received. Mapping and sampling of the Golden Slipper (White Picacho), the Red Bluff (Black Rock), and the Silver Cord (Black Canyon), areas should be done, as well as further reconnaissance in their general vicinity.

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District	Mine	Location	Reference	Samples	Au	Ag	Cu	Pb	Zn	Comments
Groom Creek	Unnamed Prospect	NE¼ SW¼ SE¼ Sec 25 T13N R2W Groom Creek 7.5' Yavapai Cnty Map A	Wilson et al, 1934, Ariz Bur Mines Bull 37 pp 32-33.	X 281 Select grab sample Comb QT_3 w/ Abund Pyrite & lesser Cpy & gn.	7.6	46	0.23%	1.15%	0.33%	~ Small NW trending vertical QT_3 vein (0.3 m thick) Area is currently tied up in housing subdivisions. Older workings are all on patents that have been parcelled - There is little point in pursuing this district further.
Hassayampa	Unnamed Mine	C SE¼ SE¼ NE¼ Sec 35 Groom Creek 7.5 Map B	no Refer.	X 280 Rep Grab sample Comb QT_3 w/ apy & Py	0.84	12.2	850	0.2%	0.24%	a few thousand tons of material on dumps. & remnants of 5 stamp mill at portal of unsafe crosscut
	Sundance Mine	SW¼ SW¼ NW¼ SW¼ Sec 36 T 12.5 N R2W Groom Creek 7.5 Map C Yavapai Cnty	no Refer.	X 290 Rep Grab sample Comb QT_3 w/ py & minor gn	20.7	32	166	0.69%	0.25%	This mine should be looked at more closely. the vein trends NE for over 1 km and appears to be ≈ 1 m wide It has been worked extensively in upper levels. The workings could not be entered however & surface exposures are poor. The mine is currently held in Trust by Continental Service Corp. P.O Box 500 Phoenix Ariz 85001
	MT Union Mine	NW¼ NE¼ NE¼ NE¼ Sec 12 T12N R2W Groom Creek 7.5' Map C	A.B.M. Bull 37 pp 48-50	X 295 Rep Grab sample. Comb QT_3 w/ pyrite & galena	4.73	14.9	750	1.24%	0.66%	NE trending QT_3 vein Patent on which this property lies has been parcelled for summer homes.

District	Mine	Location	Reference	Sample	Au	Ag	Cu	Pb	Zn	Comments
Hassayampa	Davis – Dunkirk Mine	NE 1/4 Sec 3 T12N R2W Groom Creek 7.5 Map D Yavapai Cnty	Bull 37 pp 44-45	X291 Select Grab sample Comb Qtz w/ minor Cpy gal. polybasite & proustite	3.73	350	724	0.13%	0.36%	This vein system shows good potential for a workable operation (>75,000t). The property is currently held by R.C. Land Co. 260N Miller, Mesa Ariz 85203, who have plans to open up the mine. Bill Wilkey reportedly has a hand in this venture.
	Bodie Mine	SE 1/4 SW 1/4 SW 1/4 Sec 25 T12N R2W Battleship Butte 7.5 Sheet I SE 1/4 SE 1/4 NE 1/4 Sec 26 T12N R2W Battleship Butte 7.5	Lindgren, W. US.GS Bull 782. p 126	X292 Rep Grab from main dumps. - Milky white Qtz + carbonate w/ abundant galena & pyrite w/ minor Cpy.	1.43	45	0.34%	3.75%	77	This mine reportedly (Lindgren) produced rich Pb & Ag ore. A Considerable tonnage probably remains, but the assay results are not encouraging
				X293 20" chip across limonitic gouge w/ Qtz stringers - NW end of Bodie vein	0.72	13.3	0.40%	0.25%	0.11%	
	Mastiadon Mine	SE 1/4 SW 1/4 NW 1/4 Sec 17 T12N R1W Groom Creek 7.5 Map F	no Refer.	X294 25" chip across limonite & MnOx rich shear; some Py & silicif. noted	<0.1	38	0.47%	1.28%	500	small pods of Qtz occur in this shear, but are very irreg. in distribution

District	Mine	Location	Reference	Sample	Au	Ag	Cu	Pb	Zn	Comments
Hassayampa	Unnamed Adit Unnamed Adit	SW 1/4 Sec 32 T13N R2W Groom Creek 7.5 Map B Yavapai Cnty	no Refer.	X296 36" chip – limonitic shear w/ Qtz stringers; minor py	<0.1	12.4	39	560	325	Workings from area near Oro Flame Mine
				X297 32" chip – pyritized granite & pyritiferous Qtz stringers	<0.1	2.6	10	331	29	Oro Flame workings could not be accessed or sampled (Dogs!).
	Jersey Lilly Mine	NE 1/4 SW 1/4 Sec 5 T12N R2W Groom Creek 7.5 Map E Yavapai Cnty	A.B.M Bull. 37 p 44	X298 Select grab of Qtz bearing material on dumps – glassy Qtz w/ abund pyrite	22.4	6.3	113	321	0.24%	Exposures are poor, but vein is reputedly an average of 3 m wide. Workings are inaccessable, but owners should be contacted about further information D.K. McLennon 292 Arboleda, Santa Barbara Calif. 93110
				X299 20" chip across glassy Qtz vein in pit near main shaft ~2% py	2.01	3.5	88	86	350	
	Tilly – Starbuck Mine	SW 1/4 SW 1/4 Sec 2 T12N R2W Groom Creek 7.5 Map D Yavapai Cnty	ABM Bull 37 p45	X300 Select grab from small ore pile Qtz cemented granite; calcite and qtz fragments containing disseminated galena and sphalerite w/ minor pyrite.	4.3	1170 ↓ 34.1 oz/Ton	167	0.99%	0.70%	Recent Drilling and sampling done by Stan West Corp. Workings were not entered because of posted bad air warnings. The vein is covered by numerous patents & continues several thousand feet to southwest. average width at northeast end is reputedly 2 feet. → present owner – M. B. Whitlock 2167 Canyon Dr. Los Angeles Calif. 90049

These properties are among the few in the district which have not been sold and parcelled as homesite lots. Purchase of patented acreage in this area requires an investement of $5000→$8000 an acre, because of development pressures, according to owner of part of the Savage patent (NE extension of Tilly Starbuck vein)

District	Mine	Location	References	Samples	Au	Ag	Cu	Pb	Zn	Comments
Walker	Snowdrift Mine.	C NW 1/4 Sec 32 T12.5N R1W Poland Jnct. 7.5 Yavapai Cnty Map C	no Refer.	X282 Select Grab of Qtz bearing dump material Glassy Qtz with accessory siderite, Tourmaline, apy py, and cpy. Trace galena	4.85	12.6	0.13%	0.15%	0.45%	~ N-S bearing vein dips 60° E 1→2 m wide follows basic dike along footwall. The vein cannot be traced readily on surface, but two lode claims, the Moneymetal - Snowdrift I & II, were located in 1977 and assessed regularly thereafter. The ore grade appears to be marginal at best.
As near as could be discerned, all of the patented workings in the Walker district have been parcelled for summerhomes. As such, the district shows little promise for future minerals activity.										
Big Bug	Red Rock Mine	NE 1/4 NE 1/4 Sec 25 T12.5N R1W Poland Jnct 7.5 Yavapai Cnty Sheet G	No Refer.	X283 Select grab of dump material Comb quartz with abund py & apy w/ minor cpy & gn	5.86	13.1	0.21%	113	242	N35E bearing zone of Qtz stringers and pods less than 1m in width. The grade indicated by assays appears to be marginal considering the poddy nature of the vein in outcrop

District	Mine	Location	References	Samples	Au	Ag	Cu	Pb	Zn	Comments
Big Bug	McCabe-Gladstone vein	Secs 20,21 28,29,30 31 T13N R1E Sheet H Yavapai Cnty	ABM Bull 37 p 36-37.	X284 Select grab sample - Comb quartz with abundant pyrite (—?) and minor cpy & gn.	29.2	300	714	0.5%	0.74%	The McCabe-Gladstone is a near vertical shear (0.3→1m wide) with sporadic Qtz stringers the vein trends N54E and can be followed for well over (3Km (>2mi). Much of the system is covered by a block of 98 lode claims (held by Stan West Corp.) and is currently being drilled

The Big-Bug (Henrietta) mine is currently active and is owned by The Big Bug Granite and Material Co & the Gosnick Cattle Co. The Hill group of claims (Gosnick Cattle Co) covers the area south of the Henrietta A.B.M. Bull 37 p. 39

District	Mine	Location	References	Samples	Au	Ag	Cu	Pb	Zn	Comments
Broadshaw	Buster Mine	C N 1/2 Sec 33 T12N R1W Battle Flat 7.5 Map Q	A.B.M. Bull 37 p 55	X 1251 Rep Dump sample - glassy white Qtz w/ ~1-2% py. & Trace gry.	1.0	2.5	154	47	56	Thick (1-3 m) near vertical Qtz vein trends N18W and can be follow for ~1km on surface
				X 1252 40" chip on glassy Qtz vein exposed above main dump. Py content 0.1%	1.58	1.3	42	33	26	The samples taken show the vein to be subeconomic, though high grade shoots may be present, & were undoubtably exploited in the past (Lindgren)

The Tuscumbia mine is the only other mine of consequence within the Broadshaw district. This mine is currently active, and has had a considerable silver output (ABM Bull 37 pp 55 (Lindgren). The mine is currently held by an unknown party.

Turkey Creek	Cumberland Mine	SE 1/4 SE 1/4 NW 1/4 T12N R1W Sec 22 Battle Flat 7.5' Map R	A.B.M. Bull 137 pp. 50-51	X 274 Select dump sample Oxidized Qtz - Py ore	<.1	1.9	113	142	104	N20E bearing zone of intrusive breccia containing veins and breccia fragments of pyriferous qtz - - no follow up recomended -
				X275 Intrusive (?) breccia w/ f.g. quartz bearing intrusive matrix Fragments & matrix contain Py, apy	<.1	1.1	55	77	161	

District	Mine	Location	Reference	Samples	Au	Ag	Cu	Pb	Zn	Comments
Peck District	Peck Mine	NE1/4 Sec25 SE1/4 Sec24 T11N R1W Battle Flat 7.5 Map S	USGS Bull 782 pp160-161	X876 32" Chip; f.g. limonite and qtz w/ minor carbonate	<.1	204	281	0.39%	0.13%	3 N25E bearing quartz lenses in schist (Dip 75°W) Main shoots in upper levels mined out; intervening material sampled is dead. Ore may exist in shoots at depth, but owners seemed satisfied with current plans to mine themselves
				X279 40" Chip: f.g. Quartz-hematite aggregate with veinlets and coatings of stibnite	<.1	25	90	515	677	

Virginia Humphry (part owner) / c/o Peck Mine Cleator Ariz 86333

The Swastika mine follows 3 generally north trending [illegible] vein of ankerite and quartz with silver sulfides and native silver. The property is currently being drilled by the Jerome Mining Co. (Stan West Corp?)

District	Mine	Location	Reference	Samples	Au	Ag	Cu	Pb	Zn	Comments
Minnehaha District	Boaz Mine	C NE1/4 Sec 1 T9N R2W Minnehaha 7.5 Map J	ABM Bull 137 pp 59-60	X288 3 foot chip on qtz vein at shaft on main adit level - glassy qtz w/ ~1% py	1.67	3.1	182	883	144	a Roughly E-W trending vein that dips 38°N Vein is ~1m thick & can be followed for >300 m on the surface Vein matter is glassy white qtz w/ pyrite and specularite. The ore grade appears marginal
				X289 Rep dump sample of white glassy qtz with ~2% py and abund specularite	385	6.7	685	0.59%	0.21%	

District	Mine	Location	References	Samples	Au	Au	Cu	Pb	Zn	Comments
Minnehaha District	The Button mine (1.7 km NE of the Boay) is similar in Type and form to the Boay Mine. The property is covered by the Paydirt group of claims. These are held by Guy Cravens, who resides on the property. A small operation is currently underway at the mine, with a new < 25 Tpd mill.									
Pine Grove District (Crown King)	War Eagle - Philladelphia Vein	CSE 1/4 NW 1/4 Sec 11 T10N R1W Crown King 7.5 (unsurv)	ABM Bull 137 pp. 57-58	X286 Rep Grab from War Eagle dump. Comb quartz with 2-10% pyrite	15	20.3	207	0.16%	0.34%	0.3 - 1m thick quartz pyrite vein that trends slightly east of north for over 2 km (>1 mi) Since sampling, the group was discovered to have been picked up by Noranda on a 5 year base from Present owners. (?) The properties include the Gladiator mine at the NE end of the System
		sheet K		X287 Rep Grab sample from War Eagle dump; non-quartzose pyrite wall rocks (granite)	3.35	7.7	574	274	0.41%	
		" "								
		SE 1/4 SW 1/4 SW 1/4 Sec 11 (unsurv) T10N R1W Crown King 7.5		X332 Select Siderite-Qtz-pyrite material from dump at Philladelphia tunnel portal.	<.1	1.1	95	19	147	
		Yavapai Cnty								

Other possibilities in the Crown King area are limited by extensive subdivision of nearly all the patented ground in the area. Summer cabins were found on every property visited (most had multiple units.) The dumps at the old Crown King are currently being Reprocessed by the Crown King Mining Co. of Crown King, Ariz.

District	Mine	location	References	Samples	Au	Ag	Cu	Pb	Zn	Comments
Tiger District	Tiger-Vein	NW1/4 NW1/4 Sec 27 T10N R1W Crown King 7.5 unsurv.	U.S.E.S. Bull 782 p. pp 172-173	X 1253 Rep grab sample main dump at Tiger shaft. Comb quartz with approx 5% pyrite	<.1	16	495	480	0.14%	Anastomosing group of N 10E bearing Qtz veinlets and pods. The vein can be traced for nearly 1 km on the surface to the Tunnel mine to the south. The grade of the vein material on the dumps suggests that the high grade ore has been largely mined out - no further investigation seems warranted
		" "		X 1254 Rep Grab sample of oxidized pyritic quartz ore from main Tiger dump.	1.0	27	431	0.17%	0.13%	
		C SW1/4 NW1/4 Sec 27 T10N R1W Crown King 7.5 unsurv. Sheet L		X 1255 Rep Grab from small dump at Tunnel mine adit (caved) - Comb Qtz with abund pyrite and minor galena	38	48	795	0.53%	0.41%	
	Oro-Belle	NE1/4 NE1/4 Sec 34 T10N R1W Crown King 7.5 unsurv. Sheet L	A.B.M. Bull 137 p. 59	X 285 V. select sample of Comb quartz with 1-10% pyrite from main dump	8.4	55	0.66%	70	135	Vein is narrow and poorly exposed, but trends almost due north. The dumps are composed of 95% + waste. In view of the high waste to ore ratio suggested, the deposit does not appear to be workable on a large scale.

The New Jersey, Savoy, New Savoy and Rapid Transit Mines are currently held by the MCO company, and signs of recent developmental work were seen at the New Savoy Mine

District	Mine	location	References	Samples	Au	Ag	Cu	Pb	Zn	Comments
Black Canyon	Silver Cord	SE1/4 Sec12 T10N R2E (unsurv) Cleator 7.5	US. Bur Mines Inf Circ. 6905	X277 18" Chip across limonitic QTZ in small stope South of main adit	10.7	572	0.11%	1.0%	0.41%	a roughly northeast trending vein that dips at 20→30° SE. Vein is 0.3→1 m thick and can be traced on surface for over 1 km: This deposit should be sampled further
				X278 Comb QTZ containing abundant pyrite, cpy and galena from small dumps near main adit.	8.87	574	0.12%	2.97%	0.69%	
	Sheet M									
	French Lilly	SW1/4 SW1/4 NW1/4 Sec11 (unsurv) T10N R2E Cleator 7.5	US Bur Mines Inf. Circ 6905	X333 18" Chip across portal sheared & brecciated musc schist w/ yellow limonitic matrix; a few CuOx's	2.81	5.2	0.28%	13	0.60%	– 0.3→1.3 m thick vein that strikes N45W and dips 45° NE – very similar to Silver Cord. This deposit should be sampled further, but workings are not in good condition
				X334 Select dump sample from main shaft area Comb & glossy white QTZ with about 3% py	10.3	8.4	0.33%	86	0.49%	
		Sheet M								

Most of the veins in the Black Canyon area dip at gentle angles and may be amenable to an open pit operation. The Gold Belt, Golden Turkey and Gray Goose mines are currently being operated by Sedona Resources, who operate a small mill on the Golden Belt property. Numerous unnamed workings occur in the area and should be investigated.

District	Mine	Location	Reference	Samples	Au	Ag	Cu	Pb	Zn	Comments
White Picacho	Golden Slipper	NE¼ NE¼ Sec18 T17N R2W Red Picacho 7.5	A.B.M. Bull 137 p 65	X301 5.5' chip across main incline collar – purple silicified rhyolite, with specular & earthy hematite and abundant Copper staining	140	10.7	0.69%	63	331	Ore zone is 1–3 m zone of fracturing and brecciation in porphyritic rhyolite. The zone can be followed for 500 meters or more. It dips 40° NE Further sampling is recommended.
		Sheet N		X302 Rep Grab – southern most incline. Purple rhyolite and rhyolite breccia with earth hematitic matrix and abundant malachite & chysocolla	<.1	2.1	3.29%	53	70	
Black Rock	Black Rock Mine	NE¼ SW¼ SW¼ Sec33 T9N R3W Morgan Butte 7.5 sheet O	no Refer.	X303 Rep Grab sample on main dumps Glassy white to Comb structured with very minor Pyrite (<1%)	6.56	1.5	124	86	21	Vein strike N40W and dips to NE. Where observed the vein was only 0.3 m thick and ~1 km long. Further investigation is not recommended
	Red Bluff Mines (Groom)	SE¼ NE¼ NE¼ Sec2 T8N R3W Morgan Butte 7.5	A.B.M. Bull 137 p.64	X304 4' chip from adit at head of Amazon Gulch – red earthy Quartz-hematite rock with ~1% CuOx's	281	1.9	0.89%	19	35	at least three veins (0.3–2) m thick can be followed for 2→3 km over a 60–200 meter wide hematitic zone in granite. Small veinlets of Qtz_3-hematite are locally present in the intervening granite. This area should be sampled further, with ↙ (continued)
				X305 Somewhat select grab of trench spoils 150 m N20W of X304 Qtz_3-hematite aggregate with 2% malachite and Chrysocolla	6.56	2.1	1.65%	14	40	

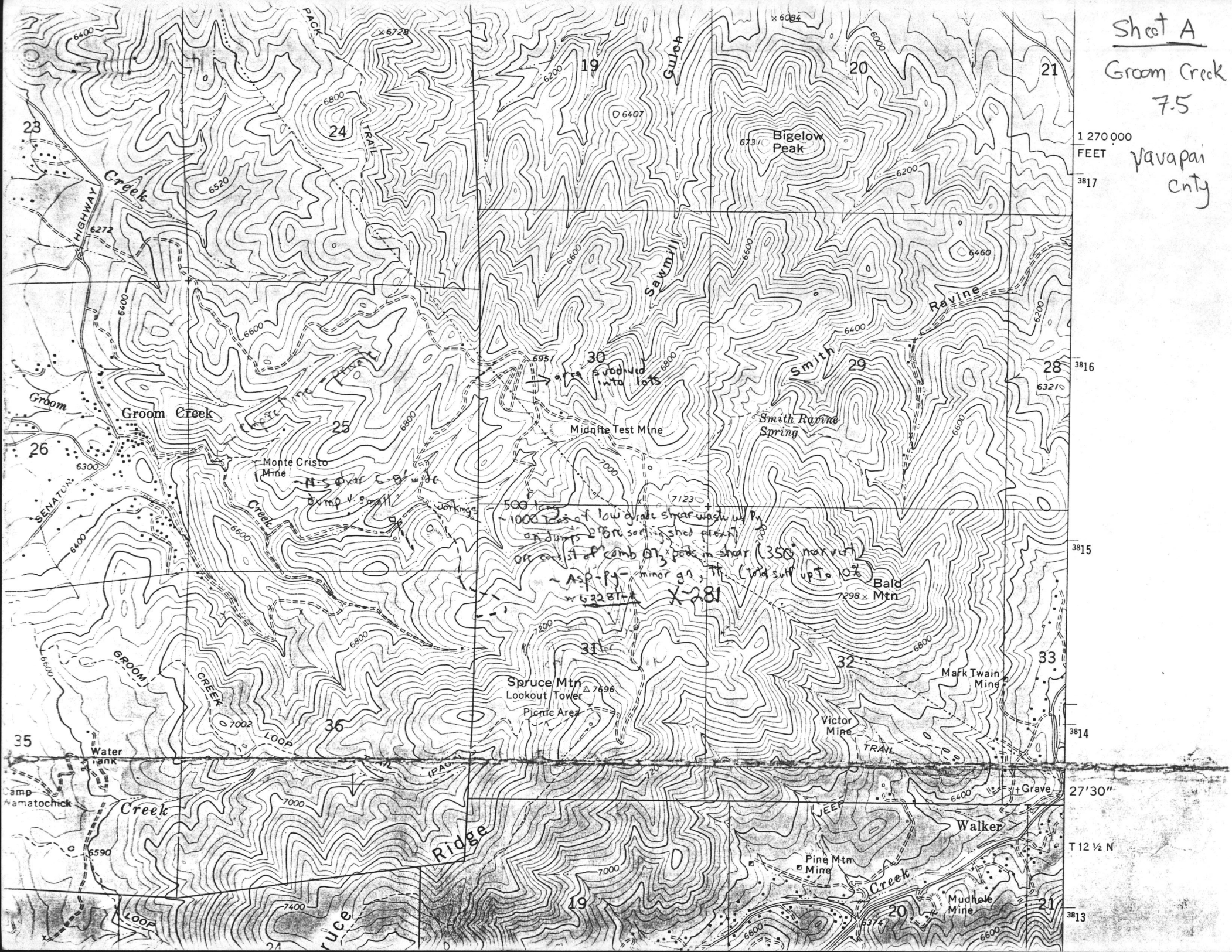
District	Mine	Location	Reference	Samples	Au	Ag	Cu	Pb	Zn	Comments
Black Rock	Red Bluff Mines (cont)									an eye for determining whether the intervein areas carry gold values. A small open pit operation near the northwest end of the property has recently been conducted by Red Bluff Mines Inc. P.O. Box 33934 Phoenix Ariz 85067 but is currently inactive
	Monte Carlo Mine	SW1/4 SW1/4 NW1/4 Sec4 Sec4 T8N R3W Morgan Hill 7.5 Sheet O	no Refer.	X306 - Select dump sample - glassy white qtz with a few percent pyrite and arsenopyrite.	<.1	<.1	87	38	251	Thousands of tons of waste occur on the dumps but very little ore. The mine appears to follow several lean NW trending qtz bearing shears - no further consideration recommended
	Mistake Mine	C N1/2 SE1/4 Sec12 T8N R5W Sam Powell Peak 7.5 Sheet P	no Refer.	X331 2' chip across portal of caved incline - limonitic and hematitic zone within brecciated basalt & andesite.	<.1	1.1	284	239	288	A thin limonitic zone follows the contact between basalt & andesitic agglomerate. Workings are small & probably followed small high grade pockets - no further work recommended

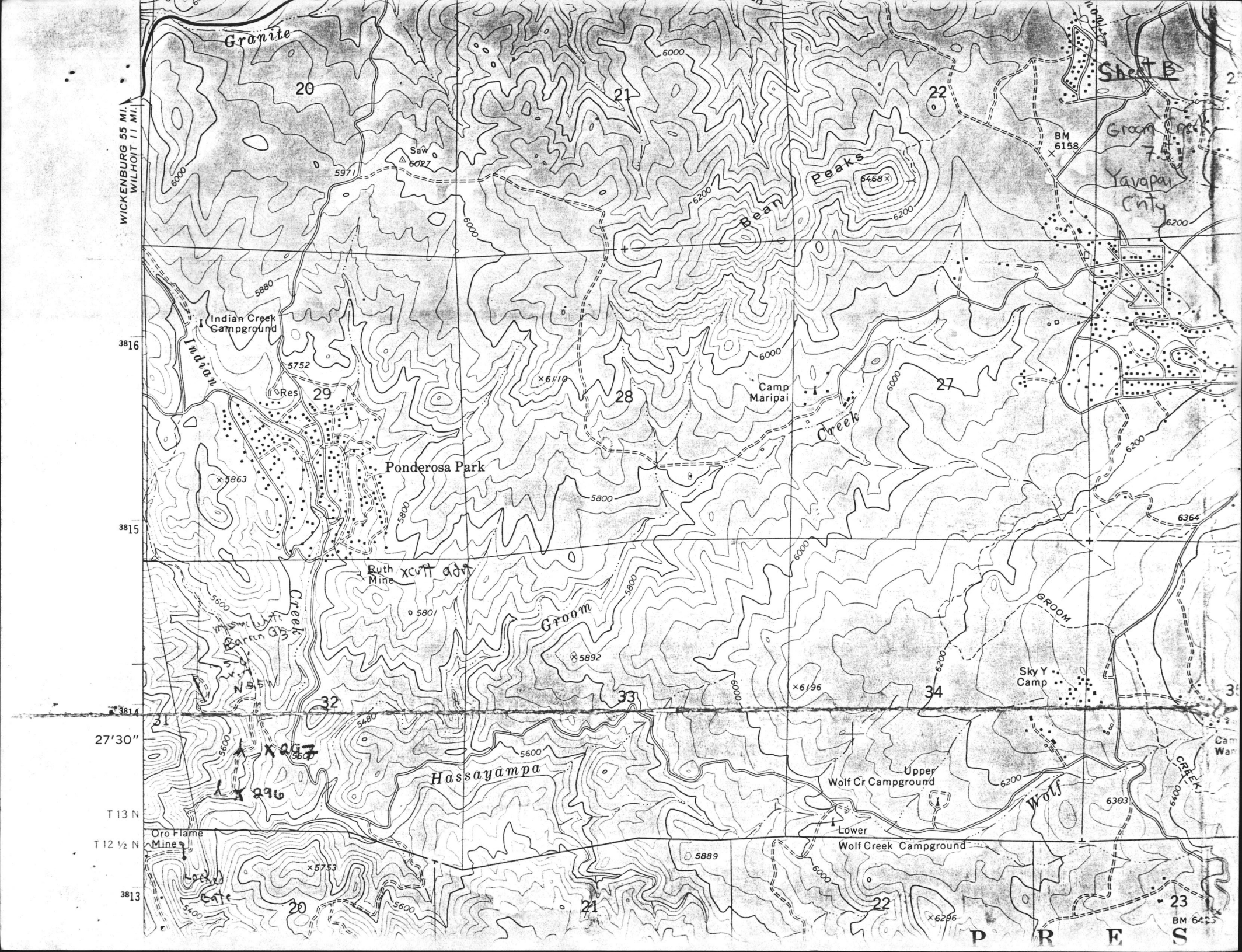
The Oro Grande mine currently has a new 80,000 + Dowie built on the dumps. The Golden Bar Mine is currently being promoted by Stan West Corp. of Connecticut, and is not recommended as a possible acquisition.

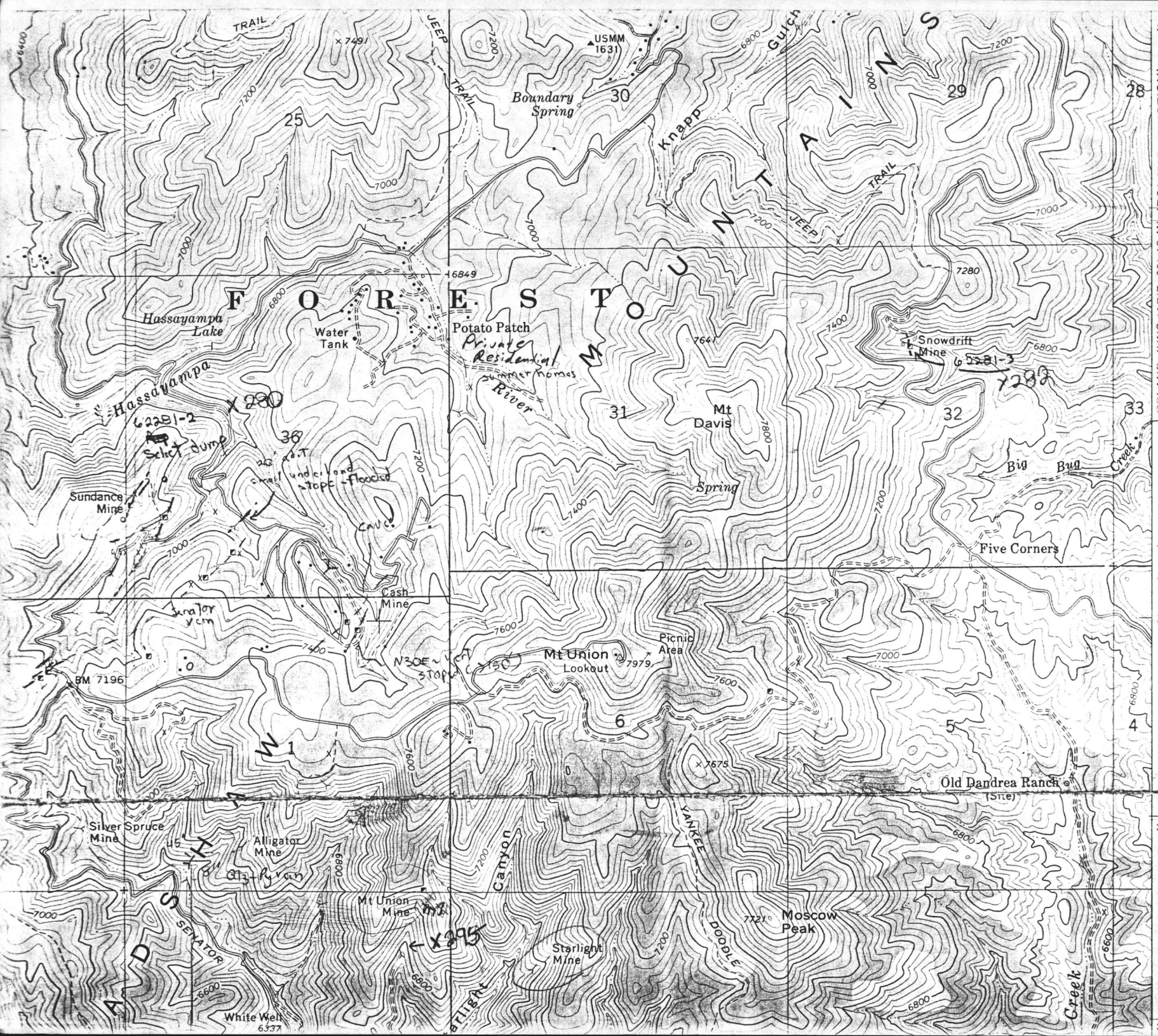
Sheet A

Groom Creek 7.5

Yavapai Cnty

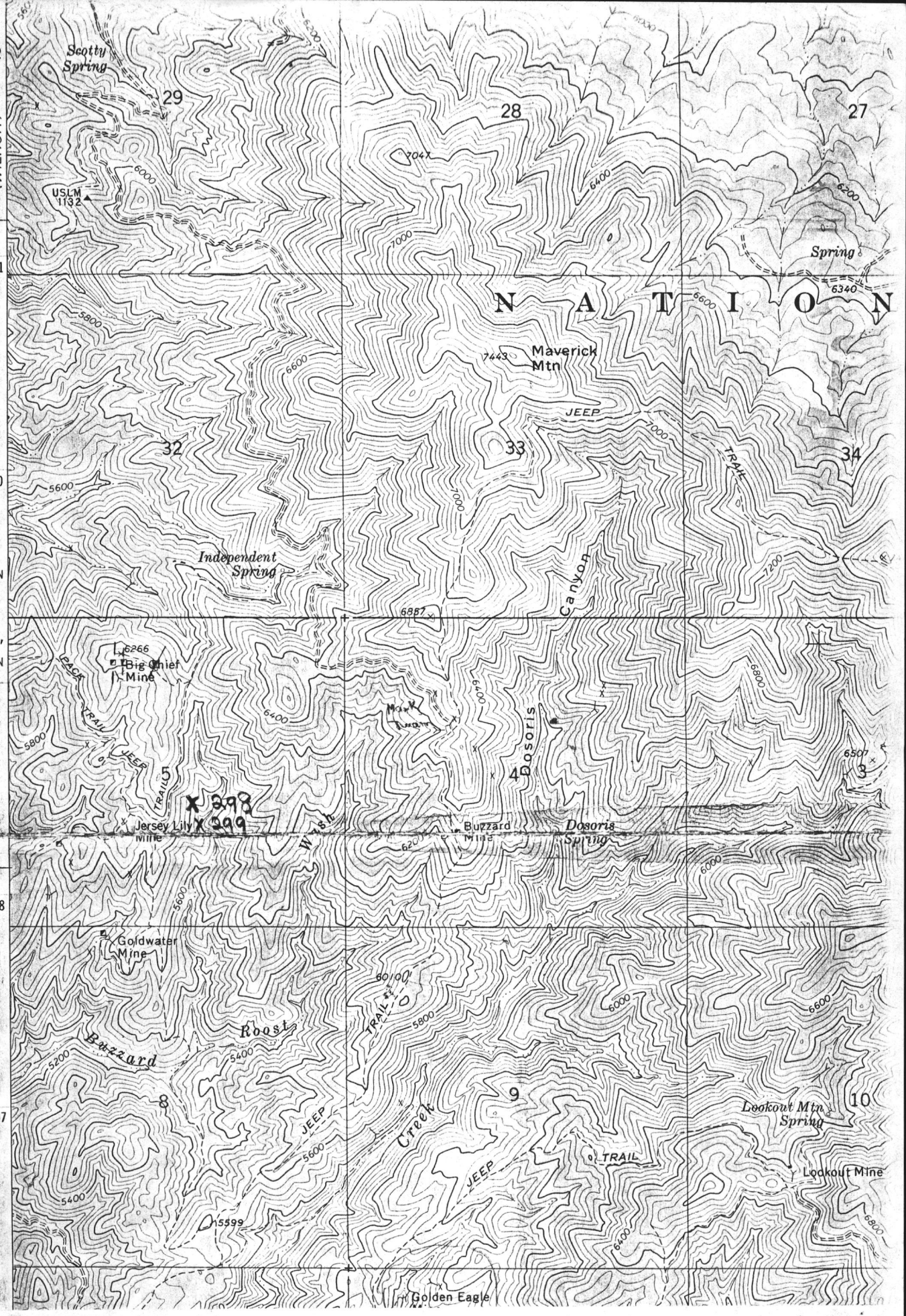


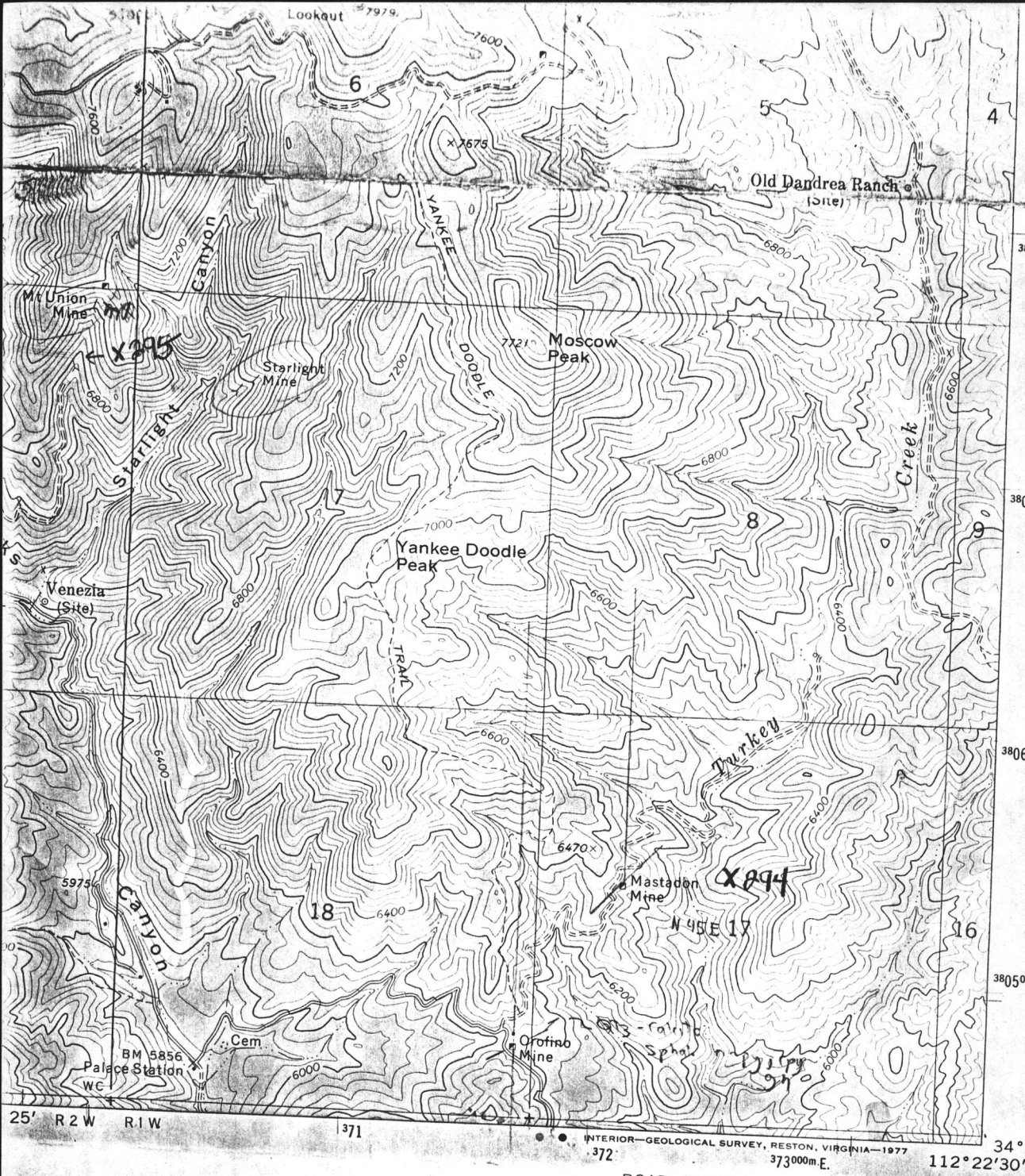

Granite
20
21
22
Sheet B
Groom Creek
7
Yavapai Cnty
BM 6158
Saw 6027
5971
6000
6200
6468
Bean Peaks
WICKENBURG 55 MI.
WILHOIT 11 MI.
Indian Creek Campground
Indian
5880
5752
Res
29
28
27
Camp Maripai
Creek
Ponderosa Park
5863
5800
6364
Ruth Mine
5801
Groom
5892
GROOM
Sky Y Camp
6196
34
33
32
31
5480
5600
Barren Gs Creek
Hassayampa
Upper Wolf Cr Campground
Wolf
6303
6400
CREEK
Lower Wolf Creek Campground
5889
Oro Flame Mine
Locked Gate
5753
5400
6296
BM 6433
3816
3815
3814
3813
27'30"
T 13 N
T 12 ½ N
P R E S


Sheet C
Groom Creek 7.5
Yavapai City
SW 1/4
SW 1/4
NW 1/4
SW 1/4
Sec 36
T 12 1/2 N
R 2W
C
SE 1/4
SE 1/4
NE 1/4
FORESTOUNTAINS
SMITH
ADS
TRAIL
JEEP TRAIL
USMM 1631
Boundary Spring
Knapp Gulch
Hassayampa Lake
Hassayampa River
Water Tank
Potato Patch
Private Residential summer homes
Mt Davis
Spring
Snowdrift Mine
Big Bug Creek
Five Corners
Sundance Mine
Select dump
small undercut stope - flooded
Cave
Cash Mine
Senator vein
Picnic Area
Mt Union Lookout
N30E vein stope
BM 7196
Silver Spruce Mine
Alligator Mine
Alg-Ryan
Mt Union Mine
Starlight Canyon
Starlight Mine
Moscow Peak
Old Dandrea Ranch (Site)
YANKEE DOODLE
SENATOR
White Well
Creek
POLAND JUNC. (ARIZ. 69) 10 MI. (POLAND JUNCTION) 3552 IV NE
T 12 1/2 N
T 12 N
25'
3812
3808
3807

TRAIL
JEEP
TRAIL
Boundary Spring
USMM 1631
27
26
25
30
N A L
F O R E S T
Hassayampa Lake
Water Tank
Potato Patch
Private Residential summer homes
River
USLM 1481
St Theresa Mine
Hassayampa
34
35
36
31
Sundance Mine
Cash Mine
Mt Tritle
Davis Dunkirk Mine
BM 7196
Mt Union Lookout
USLM 1691
Silver Spruce Mine
Alligator Mine
Tilly Starbuck Mine
Lookout Mtn
Mt Union Mine
Starlight Mine
Starlight Canyon
White Well
Crooks
HIGHWAY
Venezia (Site)
B R A D S H A W
SENATOR
Ash Creek
JEEP
10
11
12
7
3
2
1
6

Sheet E
Groom Creek 7.5
Yavapai Cnty





C
SE 1/4
SE 1/4
NE 1/4

SE 1/4
SW 1/4
NW 1/4
17

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1977

ROAD CLASSIFICATION

Primary highway, hard surface

Light-duty road, hard or improved surface

Secondary highway, hard surface

Unimproved road

Interstate Route

U. S. Route

State Route

QUADRANGLE LOCATION

GROOM CREEK, ARIZ.

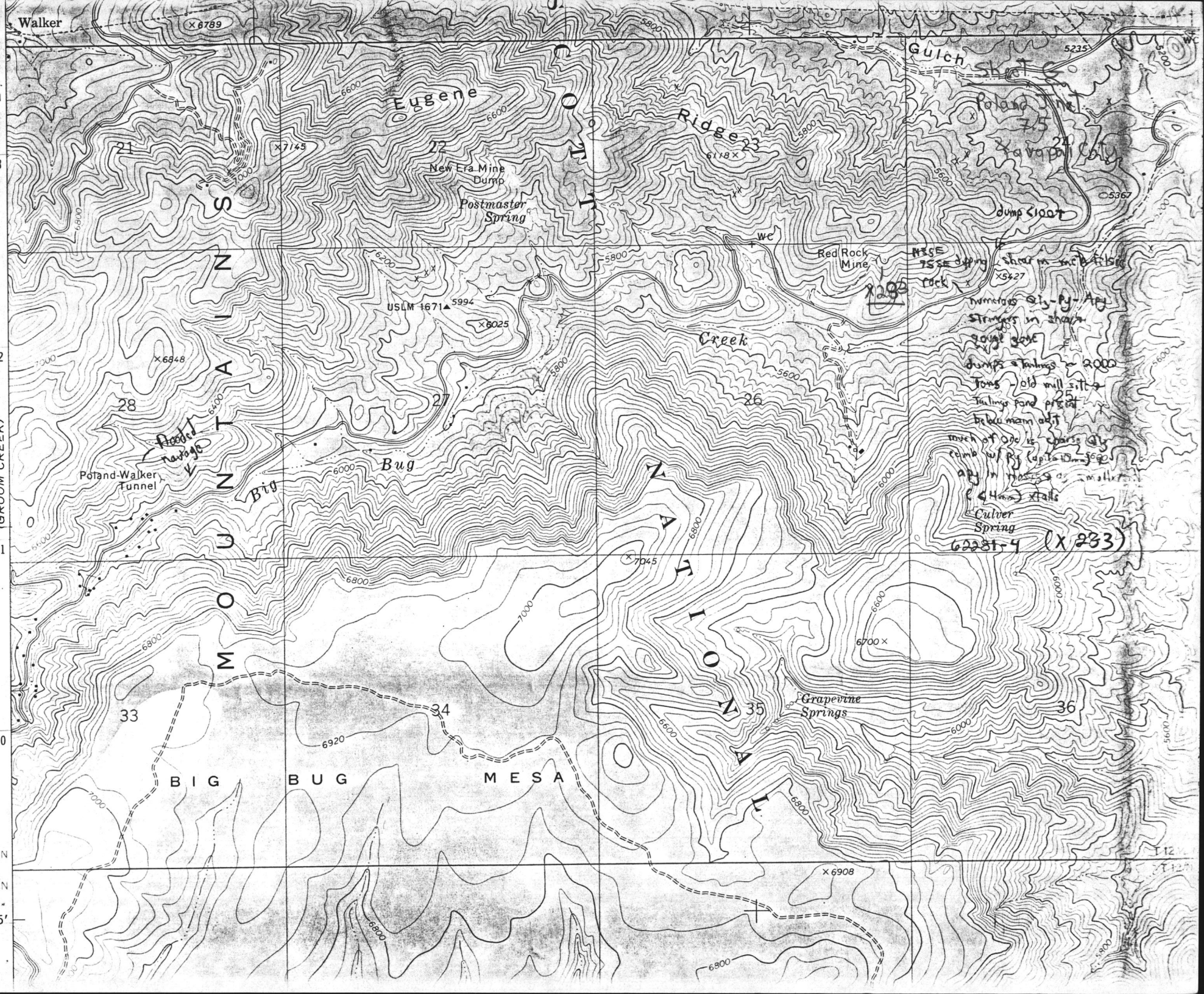
NW/4 MT. UNION 15' QUADRANGLE

N3422.5—W11222.5/7.5

1974

AMS 3552 IV NW—SERIES V898

Sheet F
Groom Creek 7.5
Yavapai Cnty


Walker
27'30"
T 12½ N
3813
3812
3811
3810
T 12½ N
T 12 N
25'
3552 IV NW
(GROOM CREEK)
Eugene
Ridge
Gulch
Poland Jct.
Yavapai City
New Era Mine
Dump
Postmaster
Spring
Red Rock
Mine
USLM 1671
Creek
Big
Bug
Poland-Walker
Tunnel
Culver
Spring
Grapevine
Springs
BIG BUG MESA
MOUNTAIN
ZAVALLA
21
22
23
24
25
26
27
28
33
34
35
36
6789
7145
6118
5994
6025
6848
7045
6700
6908
5427
5367
5235
6600
6800
7000
6200
6000
5800
5600
6920

Sheet H

Poland Jnct.

7.5

Yavapai Cnty

POLAND JUNCTION QUADRANGLE

ARIZONA—YAVAPAI CO.

7.5 MINUTE SERIES (TOPOGRAPHIC)

NE/4 MT. UNION 15' QUADRANGLE

3553 II SW (HUMBOLDT)

112°15'

34°30'

381 17'30" 382 390 000 FEET 383 384 385

Spud Mountain

Tailings

DEWEY (ARIZ. 169) 2.9 MI.

1 270 000 FEET

JEEP TRAIL

PIPELINE

GRADE

RAILROAD

OLD

Prospect

Current activity

Cem

Lookout

T.48

Spring

WC

Gulch

30 Gulch

Galena

Dredge Tailings

California Mine

Grave

BM 4533

BM 4748

N54E

~Vertical 85° SE

flooded 26' below collar

Total sulf ~ 2%

minor gn

in 1-3' zone of

sheared chlorite schist (inclusions)

Notice of Relocation Lode claim location

Ben Goldman

Jewell Filer

130 So. Rush

Apt A.

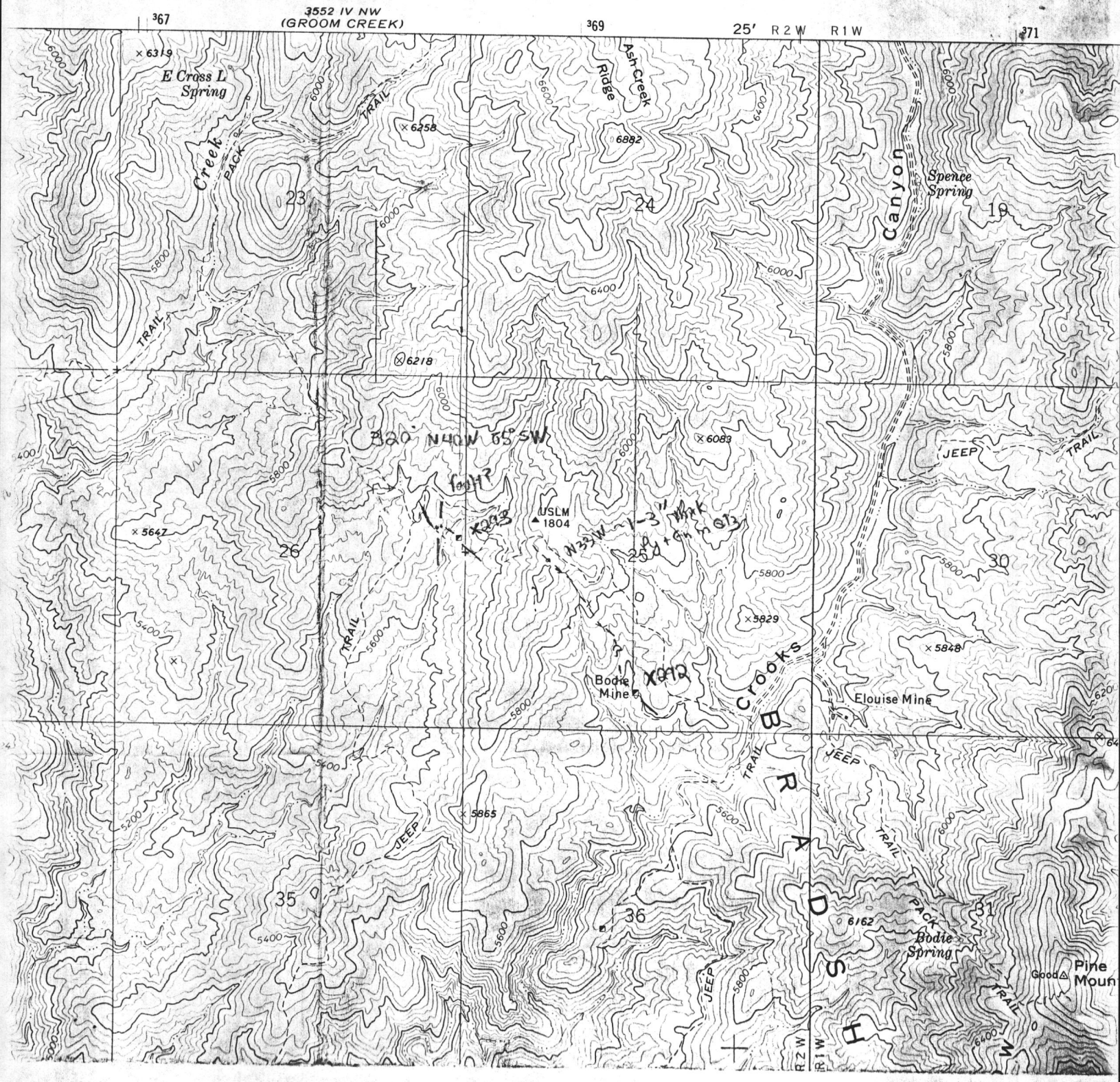
Prescott

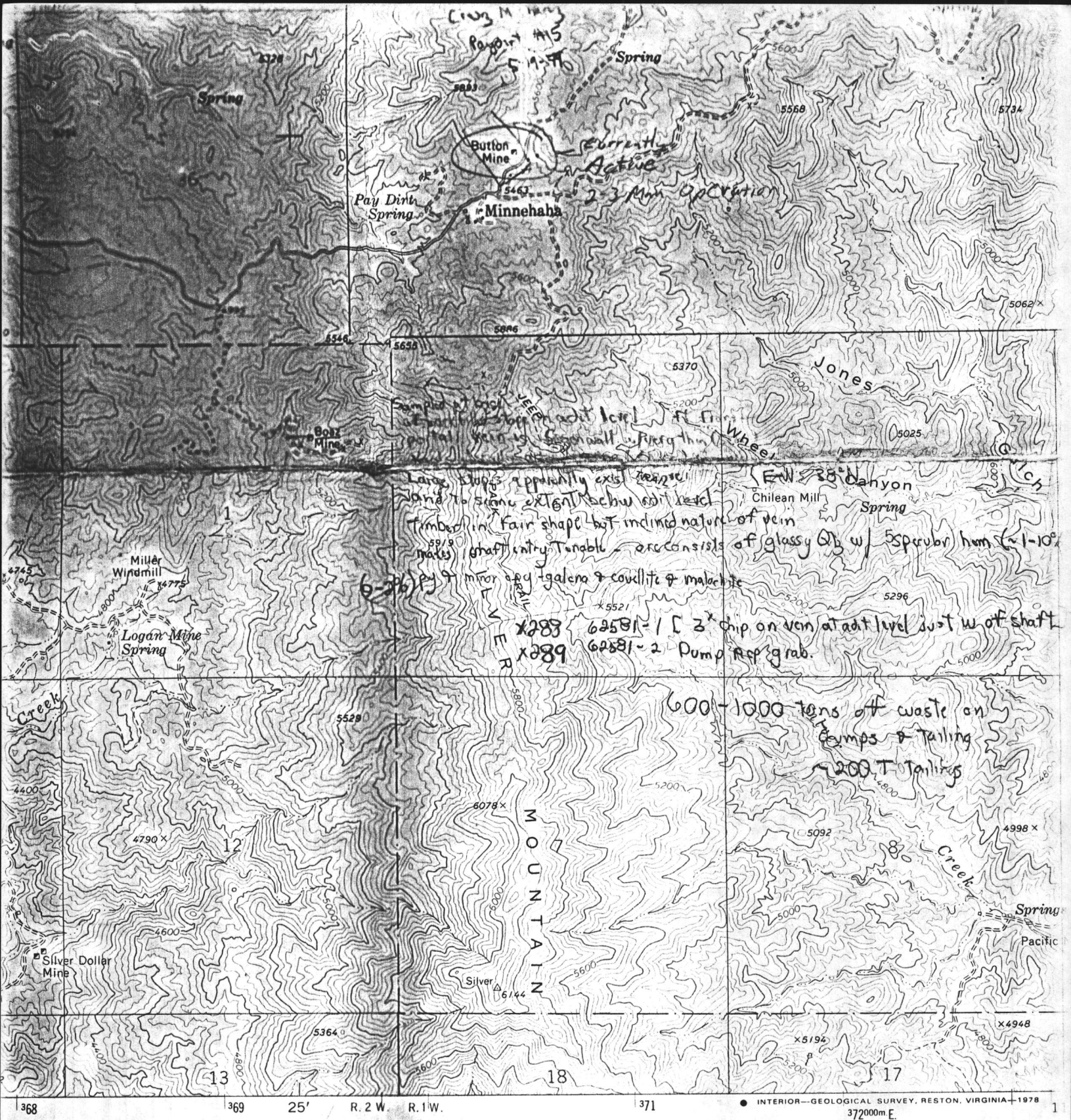
86301

~~May 3 1971~~

2-2-81

Sheet I
Battleship Butte
7.5
Yavapai Cnty





1 MILE

5000 6000 7000 FEET

1 KILOMETER

ET
OF 1929

ROAD CLASSIFICATION

Primary highway, hard surface

Light-duty road, hard or improved surface

Secondary highway, hard surface

Unimproved road

Interstate Route

U. S. Route

State Rou

ARIZONA

QUADRANGLE LOCATION

Sheet 9

MINNEHAHA, AR

N3407.5—W11222.5/7

1969

URACY STANDARDS
80225, OR RESTON, VIRGINIA 22092

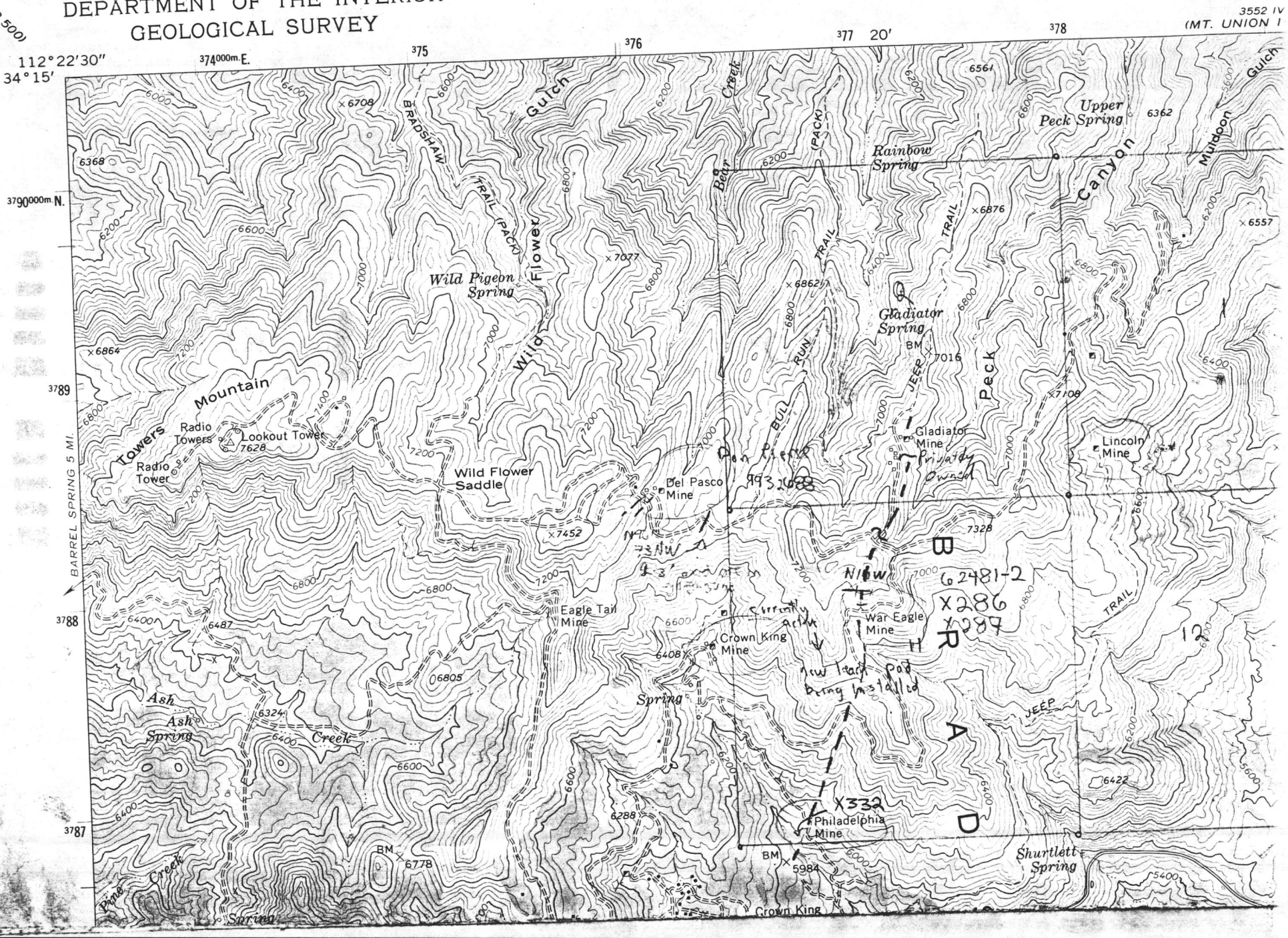
Gladiator – war Eagle Group
Takinover by Noranda, Feb 18, 1981

Sheet K

Crown King 7.5

3552 IV (MT. UNION 1:62 500)

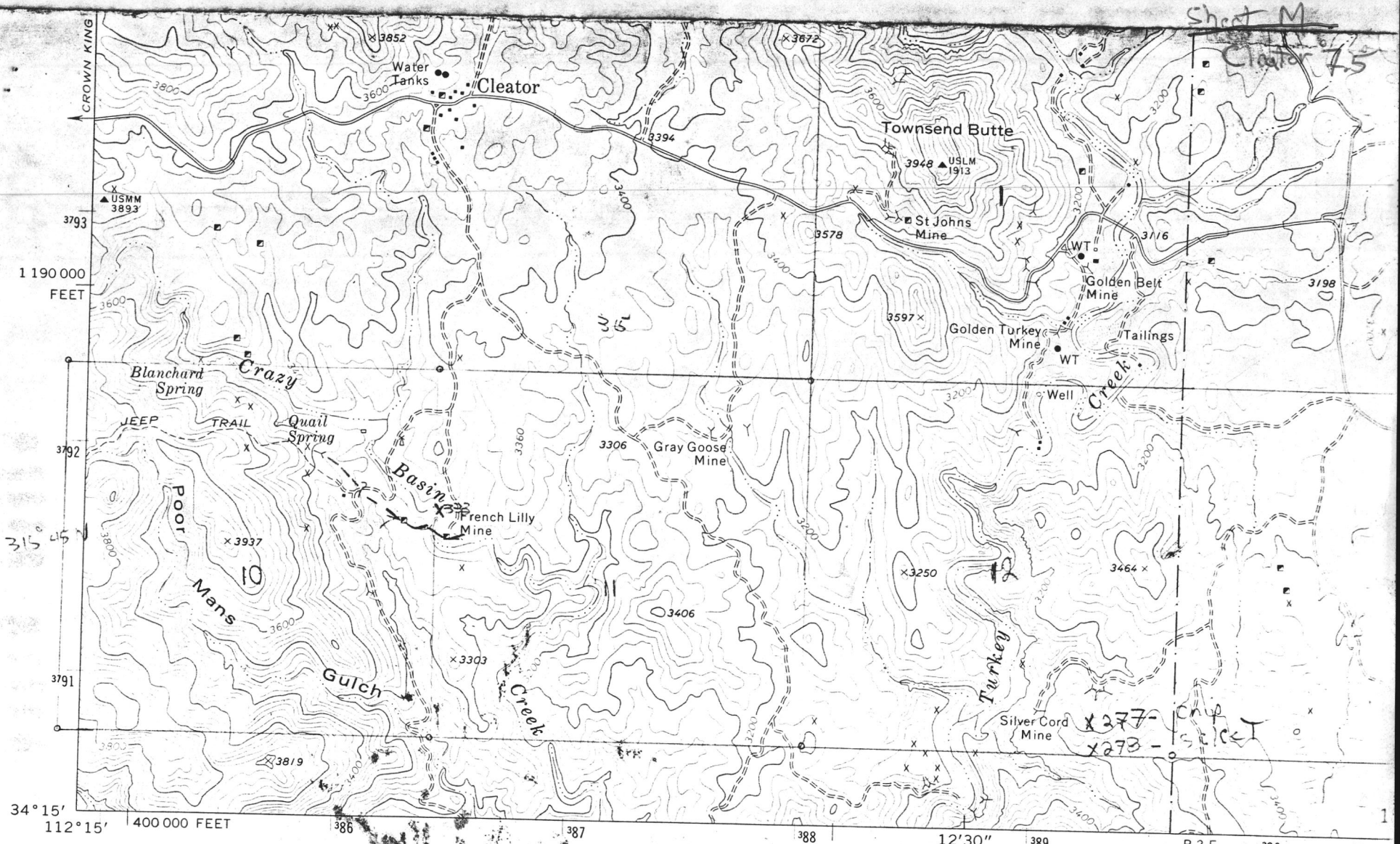
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



Sheet L

Crown King 7.5

Sheet M
Cleator 7.5



(CROWN KING) 3552 III NE

Mapped, edited, and published by the Geological Survey

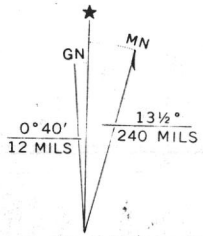
Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1973. Field checked 1974

Projection and 10,000-foot grid ticks: Arizona coordinate system, central zone (transverse Mercator)
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue. 1927 North American datum

Fine red dashed lines indicate selected fence lines

Where omitted, land lines have not been established

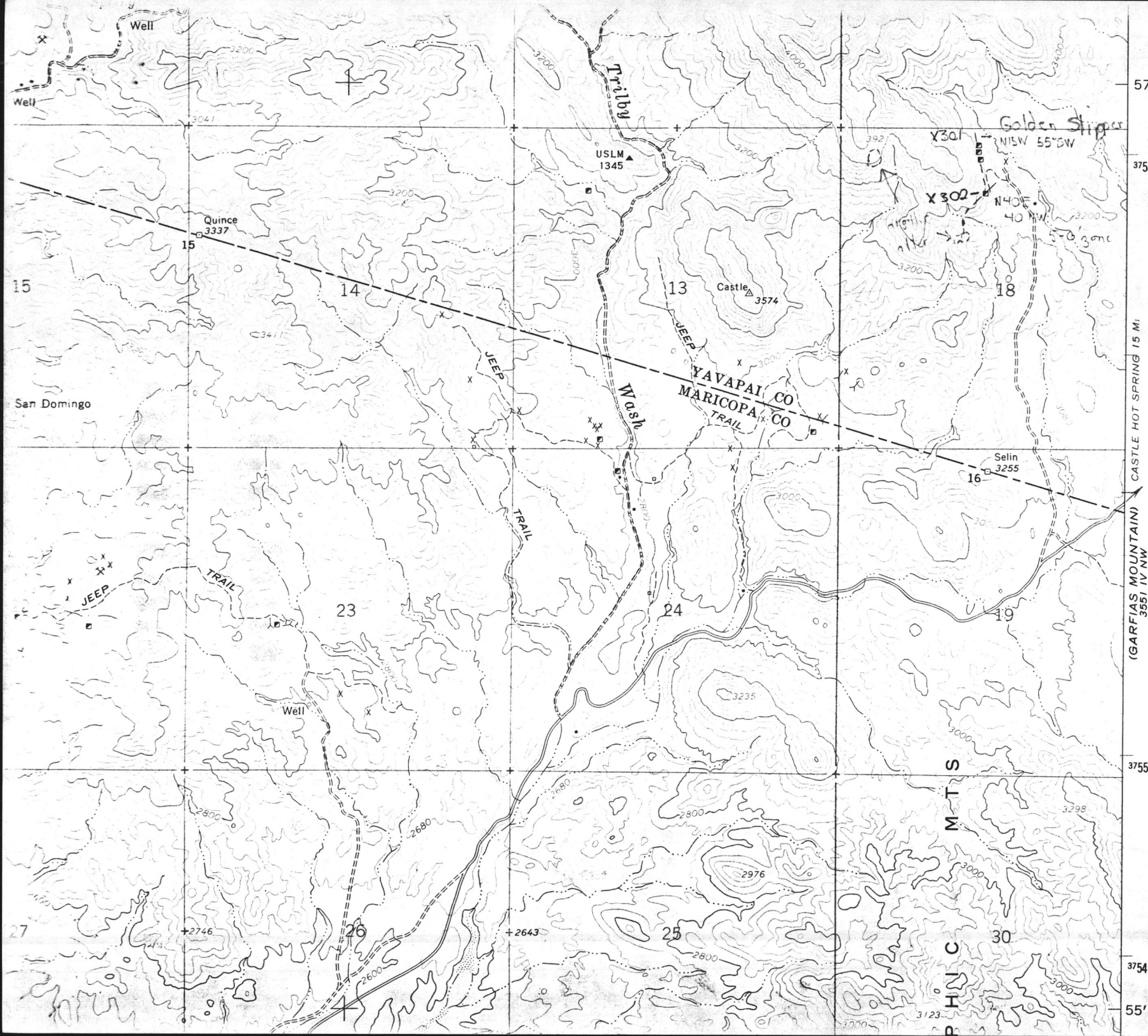


UTM GRID AND 1974 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE

CONTOUR IN
NATIONAL GEODETIC

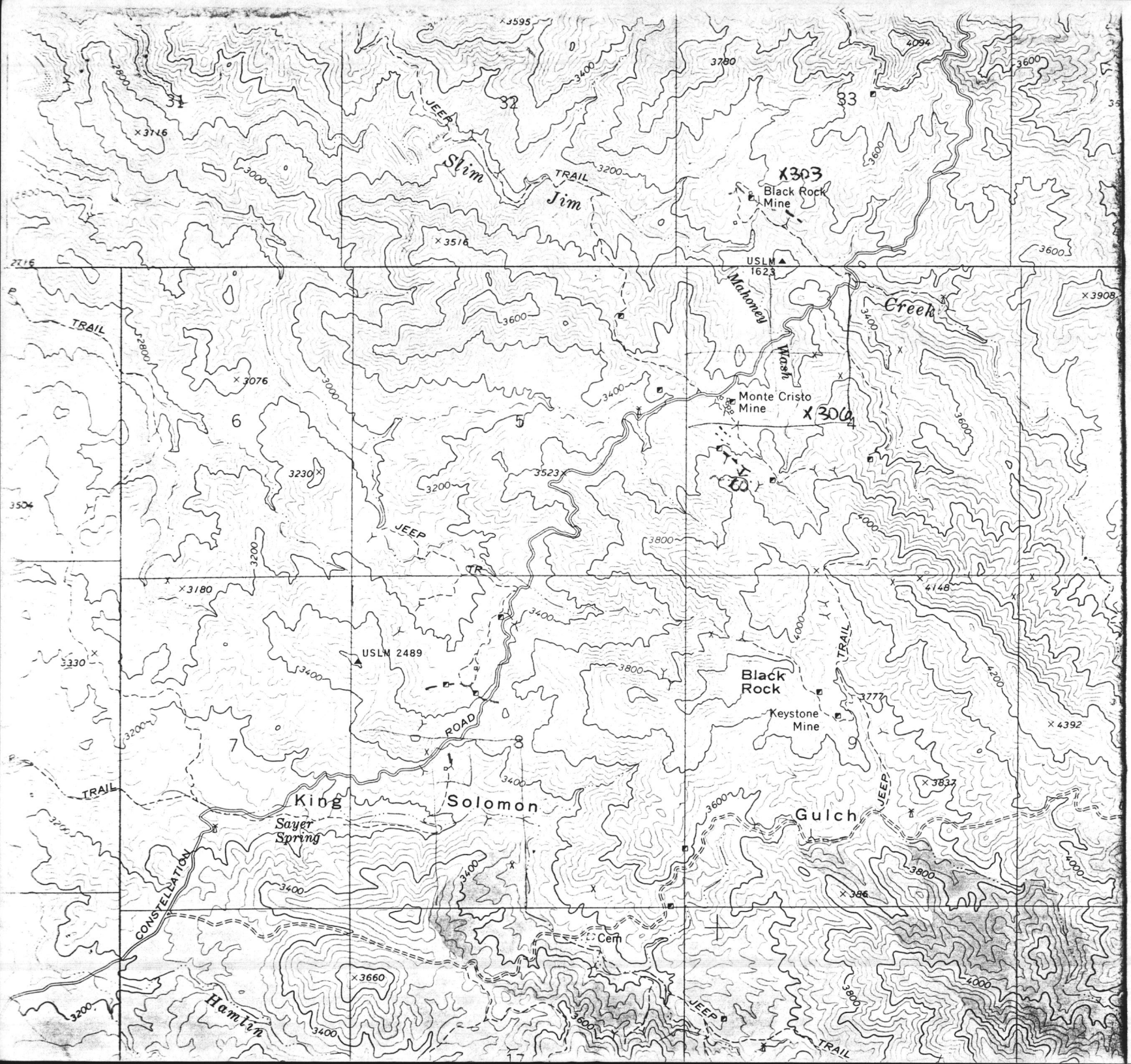
THIS MAP COMPLIES WITH NAT
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENV
A FOLDER DESCRIBING TOPOGRAPHIC MA

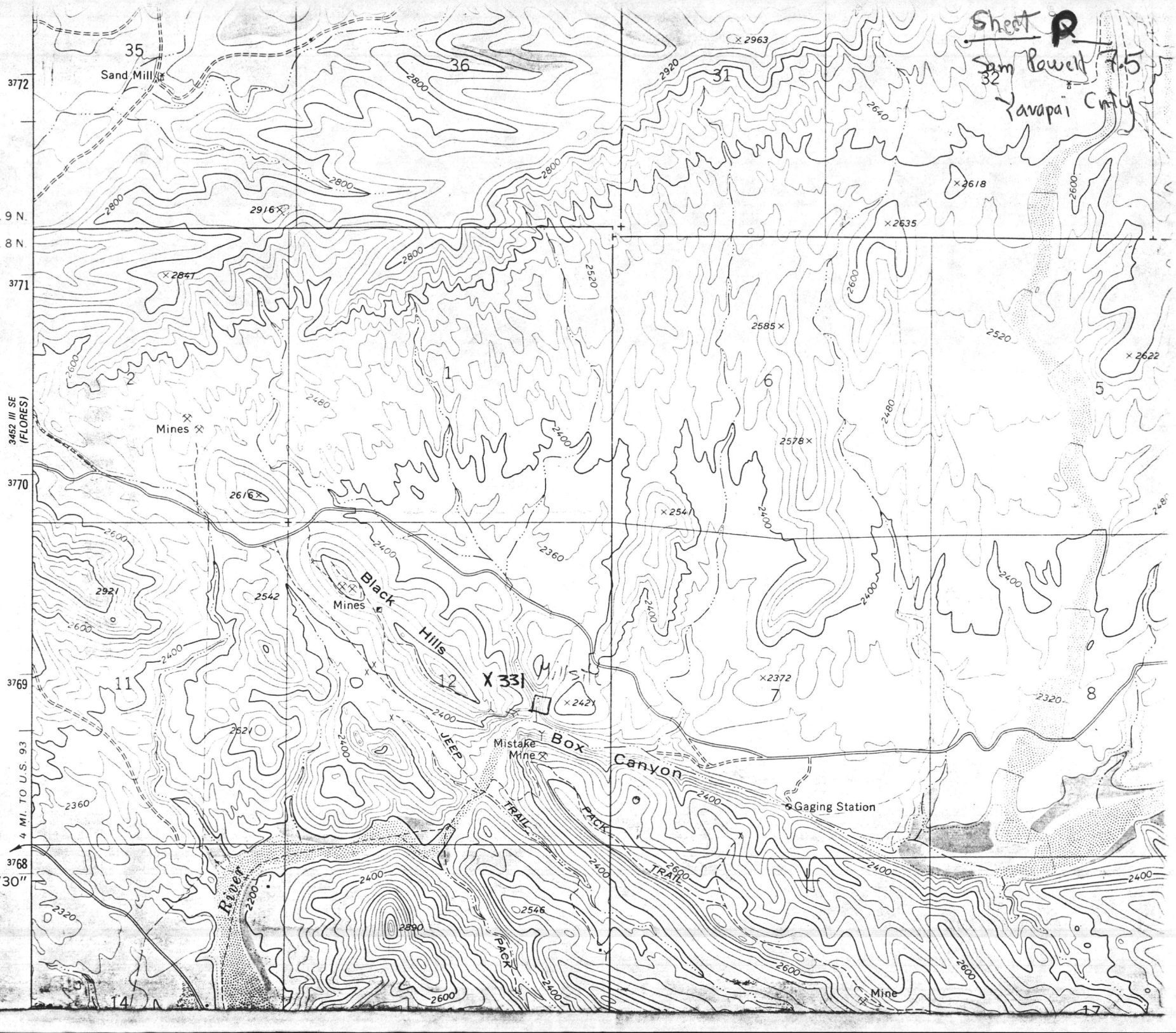

sheet N
Red Picacho
7.5
Well
Well
Triby
Wash
USLM
1345
Quince
3337
15
14
13
Castle
3574
18
Golden Stripe
X301
N15W 55°SW
X302
N40E
40 NW
5-0 gone
JEEP
TRAIL
YAVAPAI CO
MARICOPA CO
San Domingo
Selin
3255
16
CASTLE HOT SPRING 15 MI.
(GARFIAS MOUNTAIN)
3551 IV NW
23
24
19
Well
3235
2976
2746
2643
26
25
30
27
2680
2600
2800
3000
3200
3400
4000
3041
3392
3298
3123
57'30"
3758
3755
3754
55'

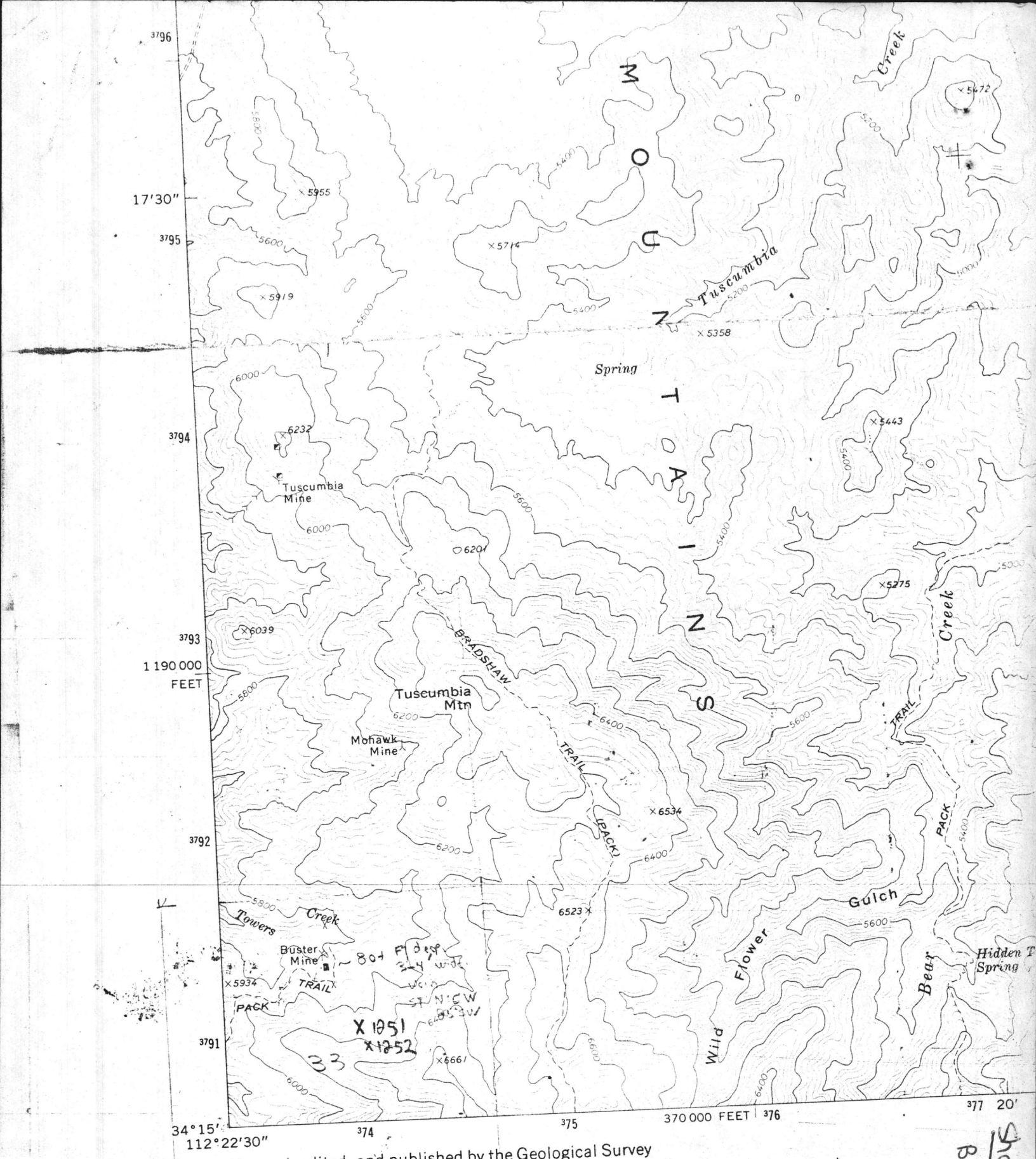
Sheet O

Morgan Butte

7.5




Sheet P
Sam Powell 7.5
Yavapai Cnty
Sand Mill
Mines
Mines
Black Hills
X 331
Mistake Mine
Box Canyon
Gaging Station
JEEP TRAIL
PACK TRAIL
PACK TRAIL
Mine
River
T. 9 N.
T. 8 N.
3452 III SE (FLORES)
4 MI. TO U.S. 93
2'30"
3772
3771
3770
3769
3768
35
36
31
32
2
1
6
5
11
12
7
8
14
17
2963
2920
2800
2916
2618
2635
2841
2520
2585
2622
2600
2480
2578
2616
2541
2400
2360
2921
2542
2372
2320
2421
2521
2546
2890
2200



Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1973. Field checked 1974

Projection and 10,000-foot grid ticks: Arizona coordinate system, central zone (transverse Mercator)

1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue. 1927 North American datum

Where omitted, land lines have not been established

(MINNEHAHA) 3552 IV NW

GN MN 0°44' 13 MILS 13½° 240 MILS

UTM GRID AND 1974 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

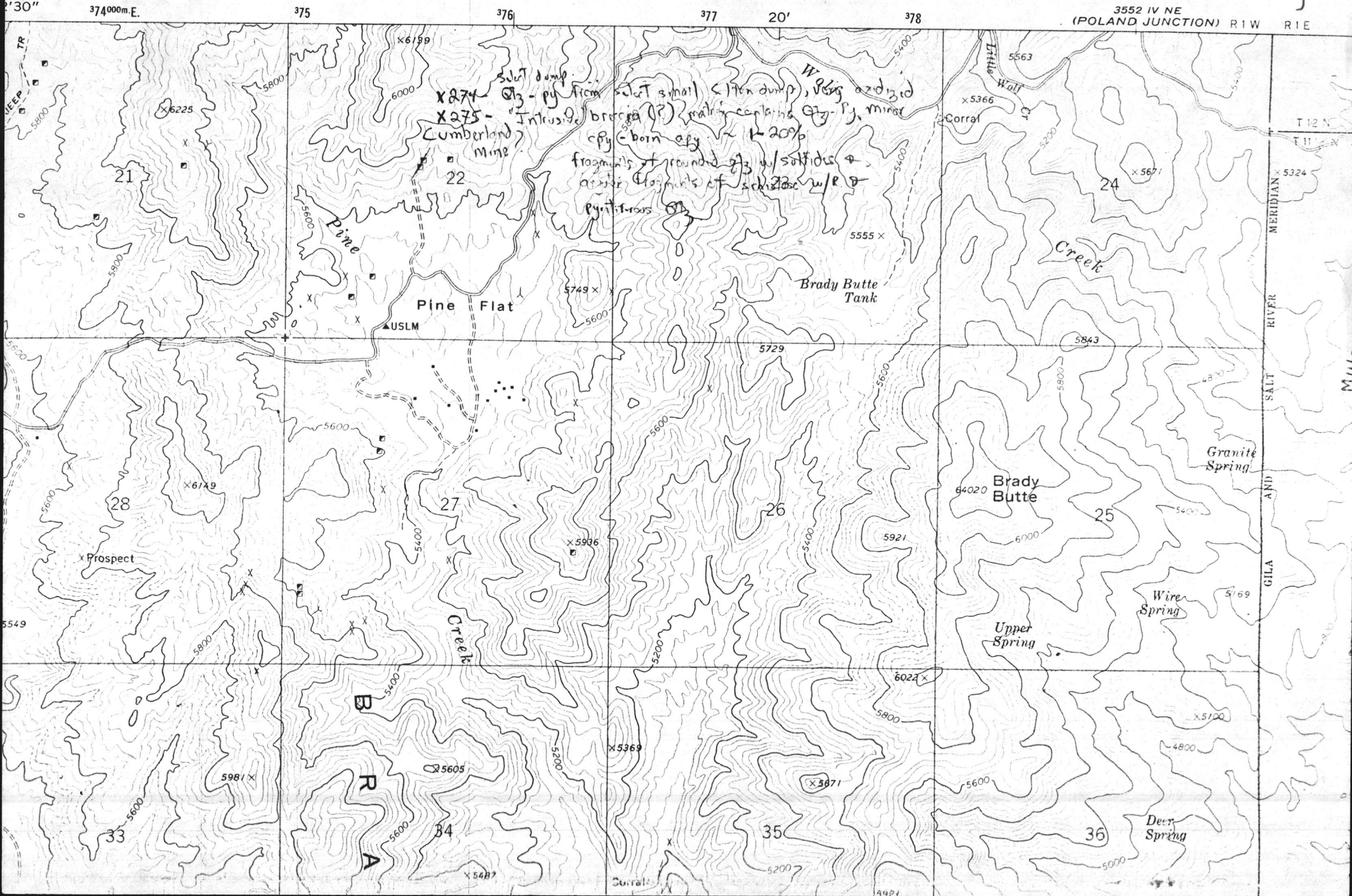
Sheet 2 Battle Flat 7.5 Yavapai Cnty

Sheet R

Battle Flat 7.5

Yavapai Cnty

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY



Select dump

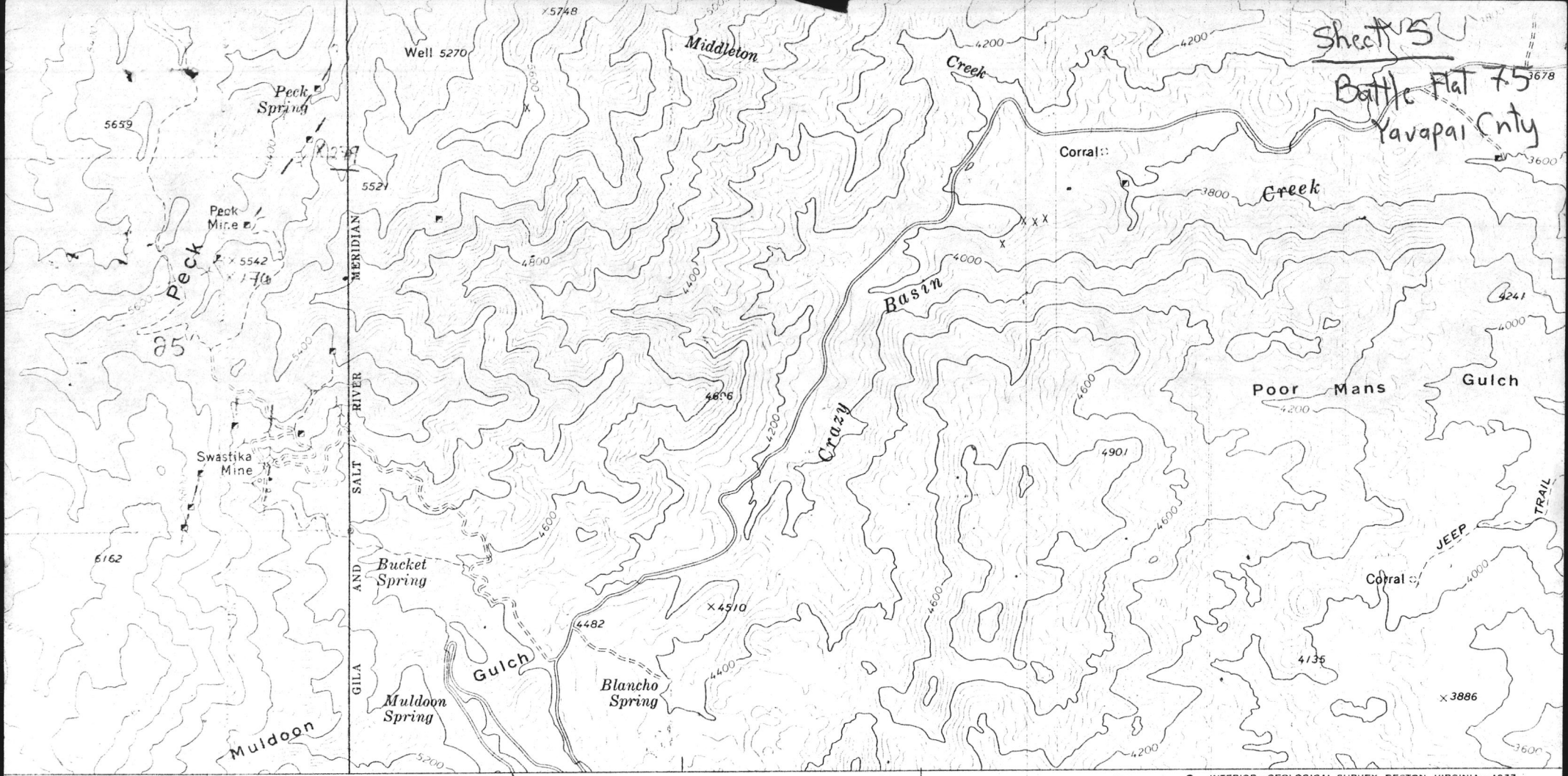
X274 - Qz3 - py from select small (often dump), very oxidized

X275 - Intrusive breccia (?) matrix contains Qz - Py, minor cpy - born cpy ~ 1-20%

fragments of rounded Qz3 w/ sulfides & darker fragments of schistose w/ P

Pyritiferous Qz3

Sheet 5
Battle Flat 7.5
Yavapai Cnty



SCALE 1:24 000

½ 0 1 MILE

0 1000 2000 3000 4000 5000 6000 7000 FEET

.5 0 1 KILOMETER

CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

ARIZONA
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

S MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
GEOLOGICAL SURVEY, DENVER, COLORADO 80225, OR RESTON, VIRGINIA 22092
DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

BATTLE FLAT, ARI

SE/4 MT. UNION 15' QUADRANGLE
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