The geology of, and known mineral occurrences within, Wilderness Study Area 4-1A Needle's Eye - Mescal Mountains

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This report is preliminary and has not been edited or reviewed for conformity with Arizona Bureau of Geology and Mineral Technology standards.

Brief summary of geological features and known mineral occurrences

Wilderness Study Area 4-1A
Needle's Eye - Mescal Mountains

1) The WSA is underlain by Precambrian metamorphic rocks, Cambrian quartzites, Carboniferous limestones and shales, middle Tertiary volcanics, and late Tertiary-Quaternary alluvium in stream valleys (sands, gravels, etc.). Complex fault fissure systems and tilted fault blocks are characteristic of the Mescal Range and Dripping Springs Mountains, in which the WSA is situated;

2) One known inactive exploration prospect is located within the WSA. Type of mineral deposit and extent of claim development are unknown;

3) Copper, chiefly in the form of sulfides (particularly pyritic sulfides), represents the major ore commodity within this region. Copper mining activities, begun in the early 1860's, have concentrated in four areas surrounding the WSA. These areas include the Ray - Miami Mining District to the west and north, the Dripping Springs valley deposits to the west, the Christmas Mine area and Saddle Mountain - Banner Mining District to the southwest, and the Stanley - Aravaipa Mining District to the southeast. Secondary copper minerals occur in fissure veins cutting late Precambrian-Carboniferous limestones and middle Tertiary volcanics. Gold, silver, and lead ore are associated with these deposits, as well as minor or trace occurrences of mercury, vanadium, molybdenum, antimony, and gypsum.

With the exception of the current mining activities at Ray, Miami, and Christmas, the majority of the copper prospects within these four areas are inactive. According to mine records, the Christmas Mine produced 1,554,500 tons of copper between the years 1905 and 1954. Additional information regarding development and production are enclosed.

Copper deposits also occur to the north of the WSA in

fault fissure zones dissecting Precambrian and Paleozoic rocks. There are no records of production; small claim workings have been inactive since the late 1920's;

4) Gold lode deposits are located to the west, southwest, and southeast of the WSA in the Dripping Springs valley, Christmas Mine area, and Stanley - Aravaipa region. Gold occurs in association with copper, silver, and lead deposits in contact zones and fissure veins. Gold and silver were recovered in substantial amounts prior to 1940. Most gold prospects are now idle; mining of gold and silver at the Christmas Mine has proved to be uneconomical;

5) Gold placer mining concentrated along the Dripping Springs Wash west of the WSA. Operations are presently inactive. Placer gold worth $3000 was reportedly recovered from Dripping Springs deposits in 1927; however, production statistics cannot be verified;

6) Silver, zinc, and lead ores are associated with copper-bearing veins in Precambrian-Carboniferous sedimentary rocks to the west, southwest, and southeast of the WSA. Substantial amounts of these ores were produced in the Stanley-Aravaipa region during the early 1900's. Most operations are currently inactive, although the Christmas Mine continues to produce some lead ore in addition to copper;

7) Vanadium deposits occur to the west of the WSA in the Dripping Springs valley. Minor amounts of ore were shipped from the Vanadium Property during the mid-1900's; no further production has been recorded and operations are presently inactive;

8) Manganese and iron oxides have been mined from an area just north of Stanley Butte, to the east of the WSA. Oxides occur as replacement deposits in Paleozoic limestones. No production was reported;

9) Bituminous coal was stripped from narrow beds of Cretaceous snadstone and shale in the Deer Creek Basin during the early 1900's. According to Peirce et al. (1970), deposits will probably not be further developed because of the thinness of the coal beds and their relative high ash content;

10) Asbestos-serpentine deposits are located to the north of the WSA, on the northern flanks of the Mescal Range. Shallow prospect pits, dug in the early 1920's, are presently inactive. Records of production are unavailable;

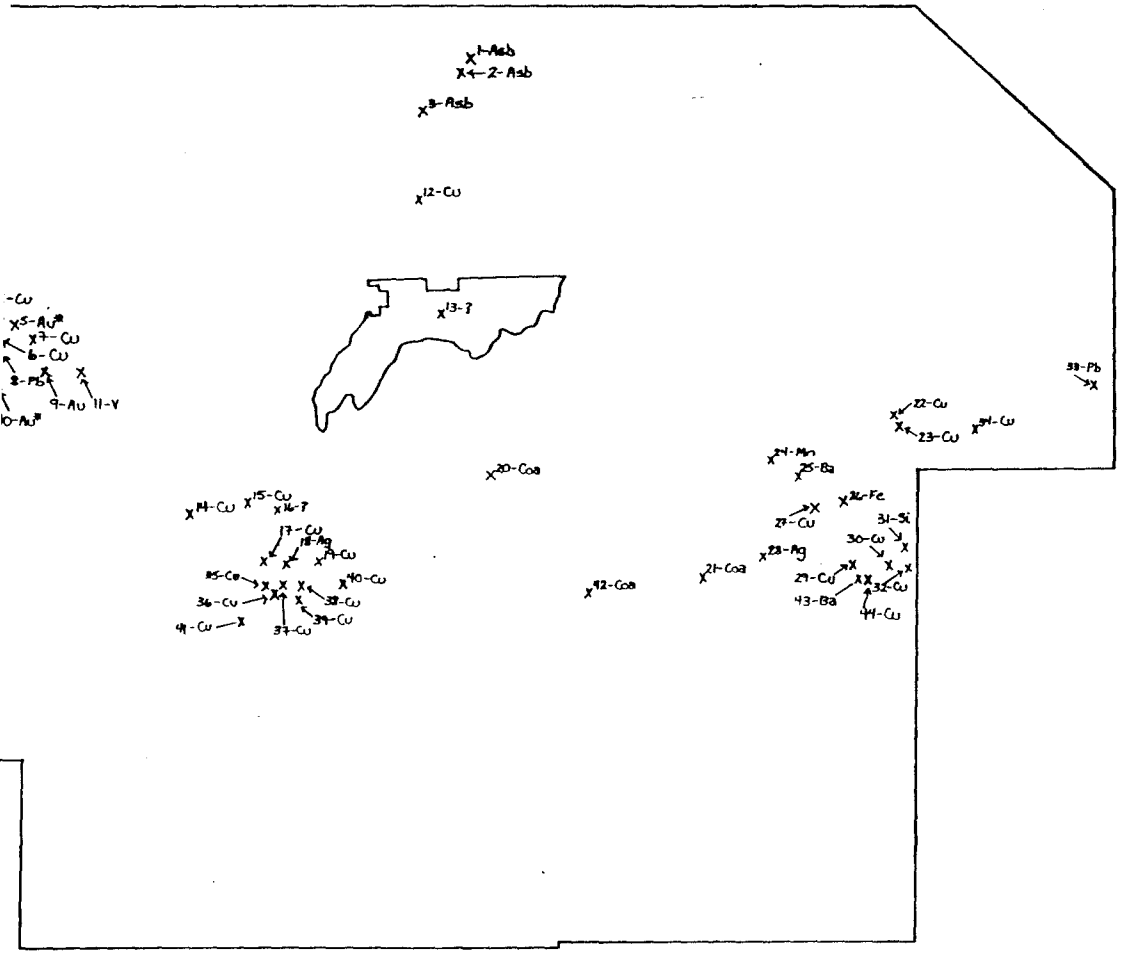
11) Barite-fluorspar veins are located in brecciated Tertiary rocks within the western portion of the Stanley - Aravaipa region, to the southeast of the WSA. Ore deposits are sporadically distributed and pinch out at shallow depths. Extent of development and production are unknown;

12) Andradite garnet, used as an abrasive, has been mined from metamorphosed Paleozoic limestone in the Stanley - Aravaipa region. Production data are unavailable;

13) The Saddle Mountain - Banner Mining District is located to the south of the WSA and the Christmas Mine area. Copper, lead, silver, and zinc deposits are contained in Carboniferous limestones, Cretaceous - Tertiary stratified rocks of volcanic and sedimentary origin, and late Tertiary-Quaternary basin-fill. Prospect work began in the early 1870's; production prior to 1925 was estimated at 550,000 tons of copper ore, 6500 tons of lead-silver ore, and minor amounts of vanadium and zinc ore.

    See Ross (1925) for additional information regarding mineral potential and geology of the region;

14) The Ray - Miami Mining District is located to the west and north of the WSA. Large, irregular bodies of disseminated copper ore are contained in Precambrian schist and granite porphyry. For additional discussion of this area, see Ransome (1919).

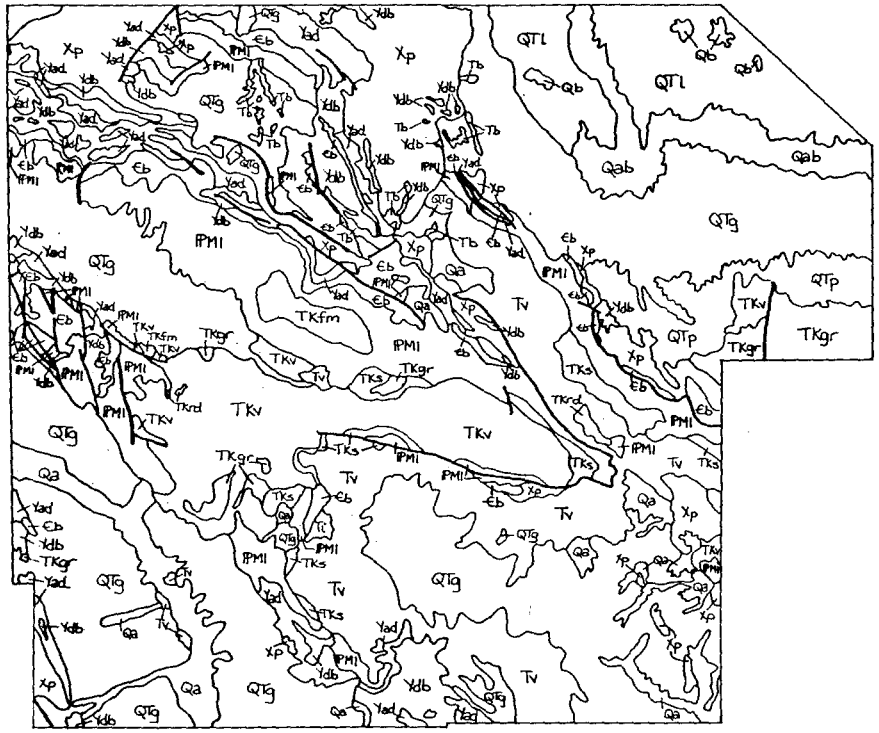


MINERAL OCCURRENCES IN THE MESCAL MOUNTAINS AND VICINITY (4-1A)

EXPLANATION

Known mineral occurrences are located by map number, followed by type of mineral deposit. See accompanying table of mineral occurrences.

- x^{Cu} copper; primarily chalcocite and chalcopyrite; associated gold, silver, zinc, lead, mercury, vanadium, molybdenum, antimony, and gypsum
- x^{Ag} silver
- x^{Au} gold lode; associated copper, silver, lead
- x^{Au*} gold placer
- x^{Pb} lead and zinc; associated silver
- x^{V} vanadium; associated tungsten, mercury, gold, silver, lead
- x^{Mn} manganese oxides
- x^{Fe} iron oxides and sulfides
- x^{Si} silicates; andradite garnet
- x^{Ba} barite; associated fluorspar, manganese, lead, copper, and iron oxides
- x^{Asb} asbestos
- x^{Coa} bituminous coal
- $x^{?}$ unknown mineral types



GEOLOGY OF THE MESCAL MOUNTAINS AND VICINITY (4-1A)

EXPLANATION

QUATERNARY

- **Qa** Younger alluvium; unconsolidated silt, sand, and gravel on active flood plains and in stream channels.
- **Qb** Basalt flows, interbedded with, and overlying, Gila Conglomerate type sedimentary rocks.
- **Qab** Broad, low gradient alluvial fans that are largely inactive and generally dissected by erosion.

QUATERNARY-TERTIARY

- **QTg** Weakly- to well-indurated conglomerate, fanglomerate, and breccia capping low terraces and ridges.
- **QTl** Lake-deposited silt, sand, and limey sediments.
- **QTp** Older alluvium and colluvium; coarse pediment gravel, sand, and silt of older valley fill.

TERTIARY

- **Tv** Rhyolite welded ash flow tuff and coarse-grained porphyritic andesite flows.
- **Tb** Basalt and basaltic andesite flows and pyroclastic deposits.
- **Tc** Intrusive rocks, including granitic plutons and aphanitic to porphyritic dikes and plugs.

TERTIARY - CRETACEOUS

- **TKrd** Dikes and small intrusive bodies of rhyolite and rhyolite porphyry.
- **TKgr** Porphyritic quartz monzonite and granodiorite-diorite, forming great batholith north of Santa Teresa Mountains.
- **TKfm** Feldspar-mica porphyry, forming large laccolith exposed in Granite Basin, and associated dikes, sills, and plugs.
- **TKs** Sedimentary rocks, including sandstone, shale, mudstone, conglomerate, and coalbeds.
- **TKv** Flows, tuffs, breccias, and volcanic conglomerates of andesitic to rhyolitic composition.

CARBONIFEROUS

- **IPMI** Fine-grained fossiliferous limestone and shale; locally includes Naco, Escabrosa, Martin, Horquilla, and Tornado limestone formations.

CAMBRIAN

- **Єb** Fine-grained to pebbly quartzites, interbedded with limestone, conglomerate, and shale; locally includes Abrigo limestone, and Troy and Bolsa quartzite formations.

PRECAMBRIAN

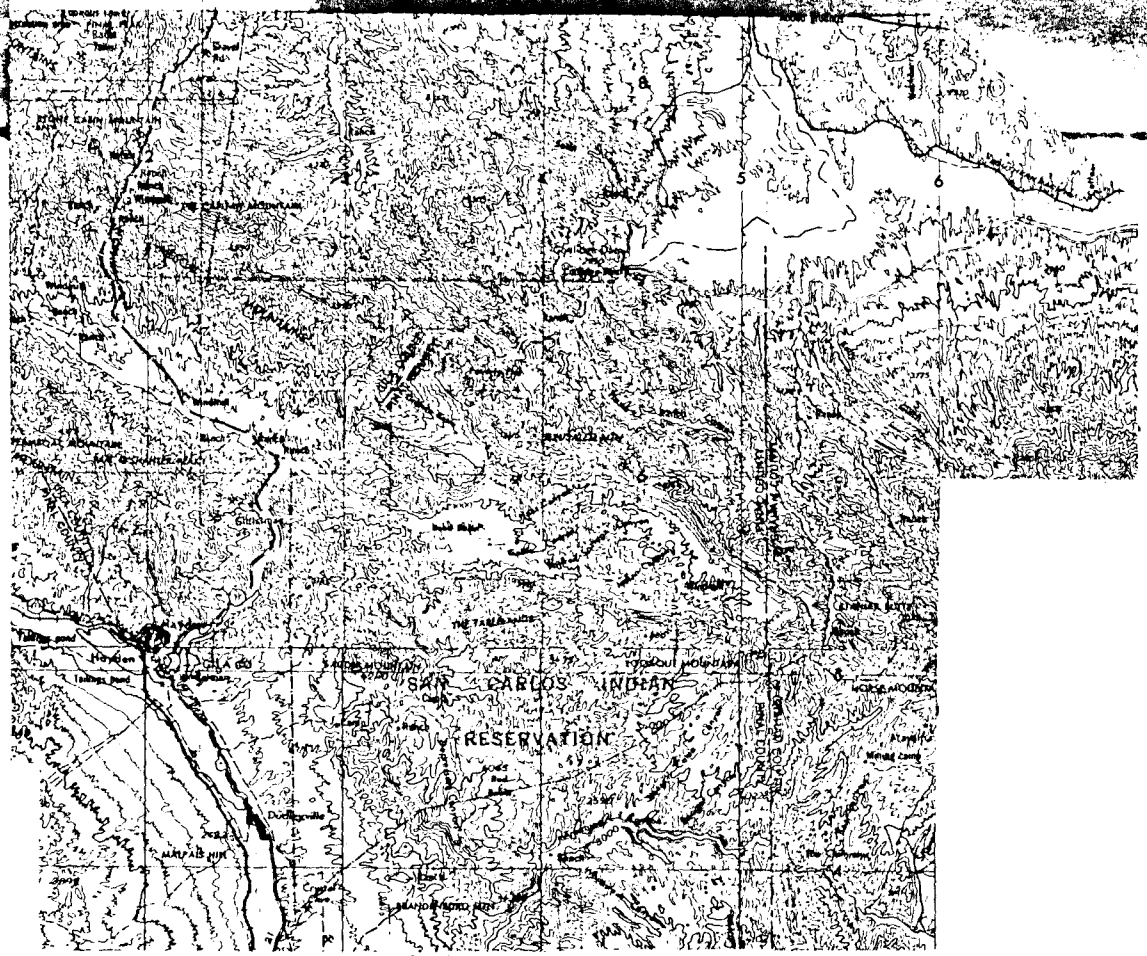
- **Ydb** Diabase and closely related diorite dikes, sills, and tabular bodies that parallel bedding of sedimentary rocks.
- **Yad** Apache Group; includes Mescal limestone, Dripping Spring quartzite, Barnes conglomerate, Pioneer shale, and Scallan conglomerate formations.
- **Xp** Pinal Schist; locally containing units of granitic gneiss, pebbly quartzite, coarse-grained schist and cordierite gneiss.

contact

fault

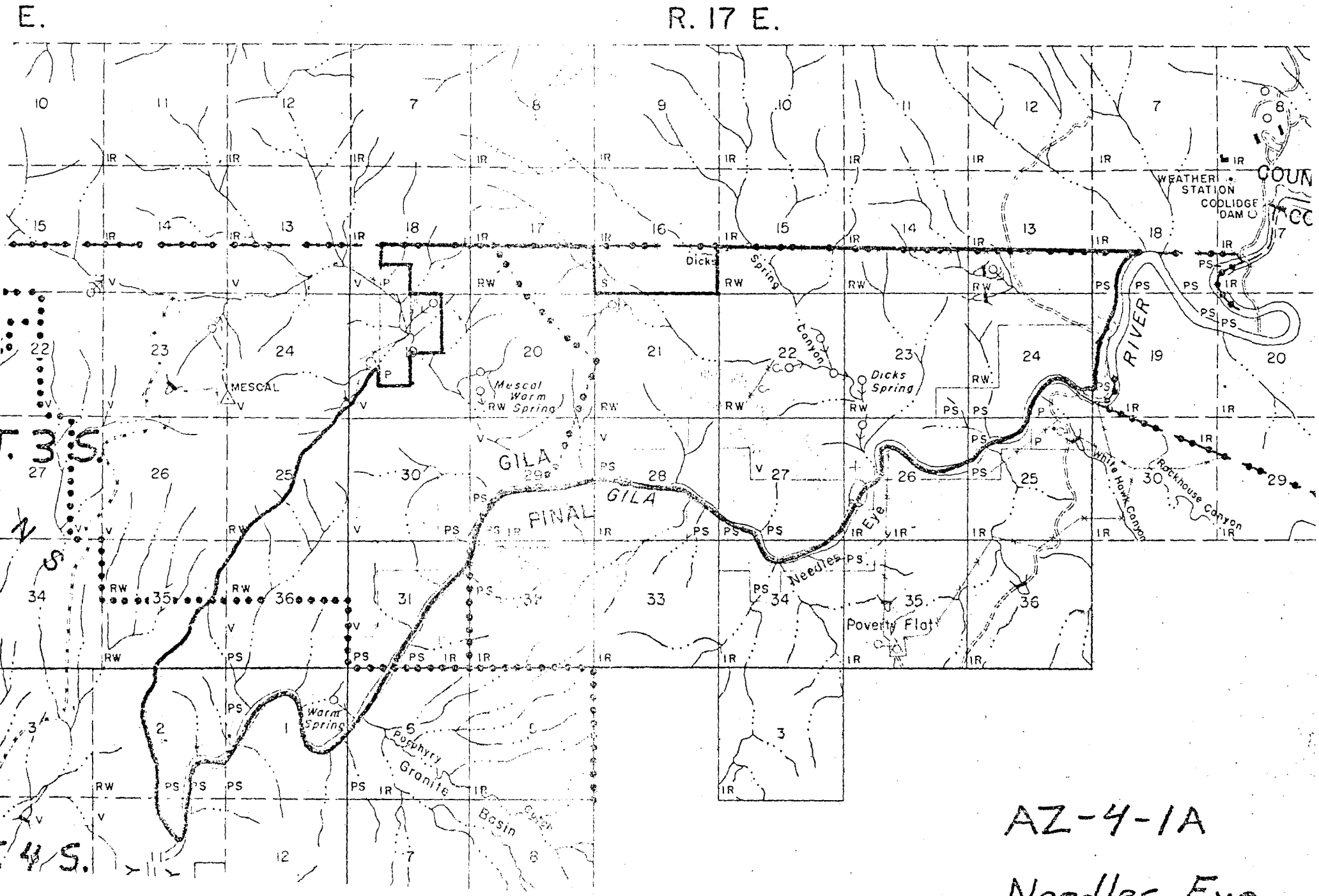
Sources of information include:

Bromfield and Shride, 1956
Ransome, F. 1919
Wilson, E.D., and R.T. Moore, 1958
Wilson, E.D., and R.T. Moore, 1959



CONTOUR INTERVAL 200 FEET

SAN CARLOS INDIAN RESERVATION



AZ-4-1A

Needles Eye

KNOWN MINERAL OCCURRENCES

NEEDLE'S EYE AREA (4-1A)

Copper, Gold, Silver, Lead, Zinc, Barite, Fluorspar, Uranium, Mercury, Tungsten, Manganese, Iron, Coal, Asbestos, and Garnet Deposits

The Needle's Eye area is situated within the belt of northwest-trending mountain ranges that borders the Colorado Plateau along its southwestern edge. The Mescal Range and Dripping Springs Mountains, in which the Needle's Eye WSA is located, are composed of extensively faulted and exposed schists, quartzites, and intrusive granitic rocks (Precambrian); gently folded and metamorphosed sandstones and limestones (late Precambrian-Carboniferous); interbedded stratified rocks of volcanic and sedimentary origin (Cretaceous-Tertiary); and coarse, poorly sorted alluvium in stream valleys (Quaternary). A myriad of small dikes and irregular intrusions of diverse, fine-grained porphyritic rocks dissect Paleozoic-Mesozoic strata.

The Dripping Springs Mountains are characterized by extensive and complex fault fissure systems and tilted fault blocks. Within this mountain range, the Christmas area occupies a broadly oval syncline, formed in Cretaceous strata prior to emplacement of fissure systems.

The Mescal Range forms a single structural unit, termed a homoclinal block, in which strata dip uniformly at an angle of 20° to 25° SW. The range has been extensively intruded by a branching sheet of diabase that has isolated numerous blocks of Precambrian quartzite and Paleozoic limestone.

North of the Mescal Range, the Pinal Range is elaborately dissected by faults and granitic intrusions. Tilted fault blocks, juxtaposing Precambrian metamorphosed sediments with Tertiary volcanics, are highly characteristic of this region.

Copper deposits (map numbers 4,6,12,14,15,17,19,22,23,24,26-30,32-41,44) occur in fissure veins cutting limestone (late Precambrian-Carboniferous) and Tertiary volcanics, and in contact zones between sedimentary rocks and granite intrusives. In the Mescal Mountains region, secondary copper minerals are contained in irregular deposits along the Mescal Limestone-intrusive rhyolite/diabase contact. Predominant ore minerals include chalcopyrite, chalcocite, and pyritic sulfides.

Gold lode deposits (map numbers 4,6,7,12,18,19,26,27,29,35-39) occur in association with copper, silver, and lead deposits in fissure veins and contact zones. Irregular lense-like masses have also been encountered between bedding planes of Precambrian-Cambrian quartzites and Paleozoic limestones.

Gold placer mining has recovered fine flakes and small round nuggets of gold from 20-to-80-ft. thick gravels resting on Gila Conglomerate (map numbers 5,10,41). Gold is probably derived from erosion of small gold-bearing quartz veins in the Dripping Springs Mountains and Mescal Range.

Silver, zinc, and lead ores are associated with sulfide-bearing veins along shear zones in late Precambrian-Cambrian age quartzites, and with replacement deposits in Devonian-Carboniferous limestones (map numbers 7,8,9,17,18,23,24, 33,36,38,39,40).

Barite sulfate is contained in irregular replacement-type bodies (disseminations, stringers, sporadic rosettes) in narrow quartz zones within Paleozoic limestone beds, usually in association with fluorspar and with manganese, lead, copper, and iron oxides (map numbers 24,25,27,28,43). Fine-grained barite-fluorspar veins are located in brecciated Tertiary trachytes within the western portion of the Stanley-Aravaipa Mining District.

Minor amounts of fluorspar (map numbers 25,27,34) are contained, in association with barite and magnetite, in contact zones between limestone (Paleozoic) and rhyolitic rocks (Tertiary).

Vanadium, tungsten, and mercury are found with gold, silver, and lead ores in contact deposits in Cretaceous-Tertiary intrusives and Devonian-Carboniferous limestones (map numbers 9,11).

Uranium radioactivity has been reported from a contact deposit containing fluorspar and magnetite (map number 34).

Manganese and iron oxides occur in irregular replacement-type bodies within Paleozoic limestone beds (map numbers 24,27). Iron oxides and sulfides have also been recovered from contact deposits in granite intrusives (Cretaceous-Tertiary) and limestones, and from Tertiary lava flows.

Bituminous coal was actively mined in the early 1900's from narrow beds of Cretaceous sandstone and shale in the Deer Creek Basin (map numbers 20,21,42).

Asbestos-serpentine zones parallel bedding in the late Precambrian-Cambrian Mescal Limestone Formation on the northern flanks of the Mescal Range (map numbers 1-3).

Andradite garnet (map number 31), used as an abrasive, has been mined from metamorphosed Paleozoic limestone.

Other minor and trace mineral occurrences include antimony (map number 23), gypsum (map numbers 38,40), and molybdenum (map number 14).

Mining operations in this area began during the late 1860's. By the mid-1900's, most of the smaller operations were idle. Most activity is now confined to the Christmas, Ray, and Miami copper mines.

Map No.: 4-1A-1

Mine: Chiricahua Group

Location:	T. 02S	Sec. 09	Lat. 33-15-50N
	R. 17E	Cen.	Long. 110-37-50W
Geology:			Elev. 4500 Ft.

4 asbestos-serpentine zones parallel bedding of Mescal Limestone (late Precambrian), which strikes N10W and dips 20°-25° SW. Are exposed almost continuously for 400 Ft. along an outcrop that roughly parallels strike of formation. Asbestos is soft in upper zone and harsh in lower 3 zones.

Mineral Products: Asbestos

Development and Production: Exploration prospect, one shallow prospect pit dug in the early 1920's. Property comprises 5 claims. No record of production.

References:

USBM Files, Chiricahua Group
USGS Cutter Quad (1:24000)
Bromfield and Shride, 1956, p. 676
Stewart, L.A., 1955, p. 104
Elevatorski, E.A., 1978, p. 28

Map No.: 4-1A-2

Mine: Mystery Prospect (Mystery Group)

Location:	T. 02S	Sec. 09	Lat. 33-15-25N
	R. 17E	SW	Long. 110-38-40W
Geology:			Elev. 5400 Ft.

2 asbestos deposits enclosed in lower member of the Mescal Limestone (late Precambrian; upper formation of the Apache Group). Mescal Limestone is only host rock in east-central Arizona in which asbestos deposits are found. Asbestos-serpentine zones are exposed continuously for 300-350 Ft., lying roughly parallel to strike of enclosing limestones (N10-20W, 25°-30° SW). Asbestos veins range from 1/4 - 1 3/4 inches in thickness, in serpentine zones that average 1-6 inches thick.

Mineral Products: Asbestos - short fiber, long fiber

Development and Production: Exploration prospect; developments included surface quarrying, 135 Ft. long adit, and exploratory surface cuts. No record of production. Property comprises 6 claims.

References:

USBM Files, Mystery Prospect
USGS Cutter Quad (1:24000)
Bromfield and Shride, 1956, p. 677-679
Stewart, L.A., 1955, p. 104
Elevatorski, E.A., 1978, p. 28

Map No.: 4-1A-3

Mine: Prospect North of Red Whiskers Spring

Location:	T. 02S	Sec. 20	Lat. 33-14-48N
	R. 17E	NW	Long. 110-38-30W
Geology:			Elev. 4600 Ft.

Asbestos fibers contained in algal limestone of the Mescal Limestone Formation (late Precambrian), near contact with massive diabase intrusion. Minor amounts of short fiber asbestos in interbedded, narrow cherty limestone and siliceous beds striking NW and dipping 25° SW. Fiber averages 1/4 - 1/2 inches in length; asbestos zones are from a few inches to 3 Ft. from contact.

Mineral Products: Asbestos:Short Fiber

Development and Production: Exploration prospect, extent of development and production unknown.

References:

USBM Files, Prospect North of Red Whiskers Spring
USGS Mescal Warm Spring Quad (1:24000)
Bromfield and Shride, 1956, p. 679
Elevatorski, E. A., 1978, p. 28

Map No.: 4-1A-4

Mine: Dripping Springs Claims (Columbia Property, Gold Queen)

Location: T. 03S Sec. 30 Lat. 33-08-51N
R. 15E NW Long. 110-51-37W
Elev. 2920 Ft.

Geology:

Five mineralized fissures, 3-8 Ft. wide in contact zone between Mescal Limestone (Precambrian-Cambrian) and intrusive diabase (Cretaceous-Tertiary). Fissure veins generally strike E to NW-SE and dip 70°-80° S. Area is locally divided into small fault blocks of Precambrian and Paleozoic sedimentary rocks with intrusions of diabase, quartz-diorite porphyry, and granodiorite. Associated with garnet, magnetite, and vesuvianite.

Mineral Products: Copper: Cuprite, Pyritic Sulfides, Chalcopyrite
Gold
Silver

Development and Production: Underground operations; presently inactive. Developments included 550 Ft. long main adit, 950 Ft. of drifts to the south and 350 Ft. to the north, and several branch drifts, cross-cuts, and stopes. Part of the original claims located in 1901; property comprises (as of 1963) 31 claims. Less than 100 tons of ore produced. Gold reportedly discovered about 1938.

References:

USBM Files, Columbia Property
USGS Hayden Quad (1:24000)
ADMR Columbia Mine File
Ross, 1925 (B), p.67
USGS El Capitán Mtn. Quad (1:24000)
USBM Files, Dripping Springs Mining Co. Property
ADMR Troy Claims File

Map No.: 4-1A-5

Mine: Dripping Springs Placers

Location: T. 03S Sec. 30 Lat. 33-08-35N
R. 15E NE Long. 110-50-55W
Elev. 3200 Ft.

Geology:

20 to 80 Ft. thick gold-bearing gravels resting on hard Gila Conglomerate (Pliocene-Pleistocene). Gravels are weakly cemented with red clay. Richest gold deposits lie at base of these gravels in southern part of placer area, and are erratically distributed in northern part. Probably derived from erosion of small gold-bearing quartz veins in Dripping Springs Mountains. Occurs as fine flakes and small, well-rounded nuggets.

Mineral Products: Placer gold

Development and Production: Placer mining; presently inactive. Gravel containing free gold was mined from shafts, tunnels, and underground stopes. Production records cannot be verified; placer gold worth $3,000 reportedly recovered from Dripping Springs deposits in 1927.

References:

USBM Files, Dripping Springs Placers
USGS El Capitán Mtn. Quad (1:24000)
Wilson, 1961, p. 62-63
Johnson, M.G. 1972, p. 13-14
Ransome, 1919, pl.II

Map No.: 4-1A-6

Mine: Troy Claims (Gold Nugget Property, Round Top Property, Rattler Property)

Location:	T. 03S	Sec. 30	Lat. 33-08-22N
	R. 15E	SW	Long. 110-51-20W
Geology:			Elev. 3400 Ft.

Secondary copper minerals in fissure veins cutting Mescal Limestone (Precambrian-Cambrian) and in contact zones between limestone and rhyolite porphyry (Cretaceous-Tertiary). Gold and copper also form irregular lense-like masses between bedding planes of limestone, and Dripping Springs Quartzite and Troy Quartzite (Cambrian).

Mineral Products: Copper: Pyritic Sulfides, Chalcocite, Bornite, Malachite, Chalcopyrite
Silver
Gold

Development and Production: Underground operations; past producer. Includes old mines of Columbia, Cave, Gold Nugget, Gold Queen, and Roundtop. Property comprises 54 claims, extending into sec. 25 and 26, Cen. (T. 035, R. 14E). Developed by numerous adits, surface cuts, tunnels, shafts, and stopes (including 2500 Ft. long tunnel, 450 Ft. deep shaft. In 1947, $25,000,000 worth of gold and silver mined. Oil exploration conducted on property in 1980's by Exxon and Amax Corporations.

References:

USBM Files, Troy Claims, Gila County
USGS El Capitán Mtn. Quad (1:24000)
USGM Files, Rattler Property
ADMR Troy Claims File
BLM Mining Claims File 55960, 55972, July 1980

Map No.: 4-1A-7

Mine: Hope (Banner) Group

Location:	T. 03S	Sec. 30	Lat. 33-08-10N
	R. 15E	SE	Long. 110-50-45W
Geology:			Elev. 3400 Ft.

Secondary copper minerals, with low values of associated gold and silver, in vein deposits, lenses, and contact zones in Dripping Springs Quartzite (Cambrian). Occasional small outcroppings, capped by gossans, contain weak copper mineralization (carbonates and some cuprite; maximum surface outcropping reported as 75 Ft. along vein strike.

Mineral Products: Copper Carbonates; Cuprite
Silver
Gold
Zinc Sulfide

Development and Production: Exploration prospect; developments included one main tunnel opening on a 16-inch-wide vein, an adit, drifting from the tunnel, prospect shaft 50 Ft. deep, surface cuts on gossanized formations. Property comprises 12 claims, extending into sec. 29, 31, and 32 (T. 03S, R. 15E).

References:

USBM Files, Hope (Banner) Group
USGS El Capitán Mtn. Quad (1:24000)
ADMR Hope (Banner) File
USBM Files, Hope Group One
Ransome, 1919, pl. II

Map No.: 4-1A-8

Mine: Plomosa Property (Falcon Mining Co. Property)

Location:	T. 03S	Sec. 31	Lat. 33-07-56N
	R. 15E	NW	Long. 110-51-25W
Geology:			Elev. 3900 Ft.

Ore minerals in fissure veins cutting Troy Quartzite (Cambrian). Local geologic information unavailable.

Mineral Products: Lead
Zinc
Silver

Development and Production: Underground operations; presently inactive. Extent of development and production unknown.

References:

USBM Files, Plomosa Property
USGS El Capitán Mtn. Quad (1:24000)
ADMR Plomosa Mine File
Ransome, 1919, pl. II

Map No.: 4-1A-9

Mine: Cowboy Mine

Location:	T. 03S	Sec. 31	Lat. 33-07-52N
	R. 15E	NE	Long. 110-50-46W
Geology:			Elev. 3400 Ft.

Gold, silver, and lead ore form contact deposits in quartz monzonite porphyry (Cretaceous-Tertiary) and limestone (Devonian-Carboniferous). Quartzite countryrock is cut by quartz-diorite porphyry, and diabase dikes and sills. Two well-defined fissures, trending E-W, extend nearly 3000 Ft. with numerous cross veins connecting the fissures.

Mineral Products:
- Gold
- Silver
- Copper
- Mercury: Cinnabar
- Lead
- Zinc
- Vanadium

Development and Production: Underground operations; presently inactive. Developed by 150 Ft. shaft and 250 Ft. tunnel. Property comprises (as of 1940) 6 claims totalling 115 acres. 15 tons of 31 percent lead ore produced in 1917. Gold values were $1,705 in 1915, and $2,940 in 1916. About 500 total feet of development work has been done.

References:

USBM Files, Cowboy Mine
USGS El Capitán Mtn. Quad (1:24000)
ADMR Cowboy Mines File
Mines Handbook, 1918, p. 520
USBM, 1965, p. 70
Ransome, 1919, pl. II

Map No.: 4-1A-10

Mine: Barbarossa Placers

Location:			
	T. 03S	Sec. 31	Lat. 33-07-18N
	R. 15E	SW of SW	Long. 110-51-30W
Geology:			Elev. 3700 Ft.

Placer gold in soil and loose detritus deposits resting on Troy Quartzite (Precambrian).

Mineral Products: Gold placer

Development and Production: Placer mining; presently inactive. Claims located in 1907. Few thousand dollars of free gold produced between 1907 and 1923. Developments after 1923 are unknown.

References:

USBM Files, Barbarossa Placers
USGS Hayden Quad (1:24000)
Ross, 1925 (b), pl. X
Wilson, 1961, p. 62-63
Willden, 1964, map
Johnson, M.G., 1972, p. 13-14
Ransome, 1919, pl. II

Map No.: 4-1A-11

Mine: Vanadium Property (C and B Property, Cutler and Bywater)

Location:	T. 03S	Sec. 32	Lat. 33-07-58N
	R. 15E	N 1/2	Long. 110-49-56W
Geology:			Elev. 2920 Ft.

Oxidized minerals in vein deposits along contact between limestone (Paleozoic) and diabase (Cretaceous-Tertiary). Vein strikes N60E and dips SE; branch of vein strikes N35W and dips NE. Vanadinite and wulfenite occur in soft vein filling and also form coatings on brecciated diabase for width of a few ft.

Mineral Products: Vanadium: Vanadinite
Tungsten (WO_3)
Lead: Wulfenite, Galena

Development and Production: Underground operations; presently inactive. Developed by 20-Ft. shaft, 2 tunnels 30 and 60 Ft. long respectively, and 10-Ft. winze below shorter tunnel. Property comprises 5 claims owned (in 1925) by Cutler and Bywater. Minor amounts of ore shipped from property.

References:

USBM Files, Vanadium Property
USGS El Capitán Mtn. Quad (1:24000)
Ross, 1925 (B), p. 69
Allen and Butler, 1921

Map No.: 4-1A-12

Mine: Wylomene Claims M.S. 4042 (Elk Hill 1-6, Copper King M.S. 3716)

Location:	T. 03S	Sec. 09	Lat. 33-11-25N
	R. 17E	NW	Long. 110-36-53W
Geology:			Elev. 4480 Ft.

Secondary copper minerals in fault fissure zones cutting Precambrian and Paleozoic rocks. Apache Group and Troy Quartzite (late Precambrian), both intruded by diabase, are overlain with apparent conformity by Martin and Escabrosa limestones (Devonian-Mississippian). Copper minerals in 2 NE-striking fissures cutting diabase, with maximum widths of 8 inches. Diabase is stained by iron oxides a few Ft. on either side of the stringer deposite.

Mineral Products: Copper: Azurite, Malachite, Chalcocite
Gold
Silver
Specular Hematite

Development and Production: Exploration prospect; workings include a pit, 60-Ft. adit, 20-Ft. shaft, 2 additional shallow adits and shafts. No recorded production. First located in 1919; relocated in 1927 as part of the Wylomene Group. No records of activity since late 1920's.

References:

USGS Coolidge Dam Quad (1:24000)
USBM Files, Wylomene Claims
BLM Mining District Sheet 730
Bromfield and Shride, 1956, p. 631
Willden, 1964, pl. 1

Map No.: 4-1A-13

Mine: Coolidge Dam One

Location:	T. 03S	Sec. 28	Lat. 33-08-53N
	R. 17E	Cen N 1/2	Long. 110-36-51W
Geology:			Elev. 3040 Ft.

Claim located at or near contact between Troy Quartzite (late Precambrian) to south and Dripping Spring Quartzite (middle Precambrian) to north.

Mineral Products: Unknown

Development and Production: Exploration prospect; extent of development unknown.

References:

USBM Files, Coolidge Dam One
USGS Coolidge Dam Quad (1:24000)
Willden, 1964, pl. 1

Map No.: 4-1A-14

Mine: Christmas Mine

Location: T. 04S R. 16E Sec. 19 Lat. 33-03-32N Long. 110-44-30W Elev. 3050 Ft.

Geology:

Copper ore bodies occur as replacements in metamorphosed limestones of the Naco, Escabrosa, and Martin formations (Devonian-Carboniferous). Contact-metamorphic mineral deposits formed at high temperatures, associated with intrusive diorite (Cretaceous) and fault fissure systems of the Christmas fault. Fissure system generally trends N.70W- N70E. Most extensive of replacement ore bodies found in lower part of Devonian limestones.

Mineral Products: Copper Sulfide: Chalcopyrite, Bornite, Chalcocite, Native Copper
Silver
Magnetite
Pyrite
Sphalerite
Pyrrhotite
Galena
Specular Hematite
Molybdenite
Gold

Development and Production: Surface and undergound oprations; active producer. Principal working shaft of mine is McDonald shaft (constructed, 1961); mine developec from 5 shafts, deepest of which is about 1450 Ft. deep (No. 3 shaft). 16,800 Ft. of drifts and raises, 73,060 Ft. of diamond-drill holes. Began operations in 1905; original claims located in 1880 as gold and silver claims.

References:

USBM Files, Christmas Mine
USGS Christmas Quad (1:62500)
Willden, 1964, p. 50-56; pl. 1
Ross, 1925 (B), p. 52-60
Peterson and Swanson, 1956
Eastlick, 1958, p. 1-6

Map No.: 4-1A-15

Mine: Faull Group

Location:	T. 04S	Sec. 21	Lat. 33-04-03N
	R. 16E	N-1/2SW	Long. 110-43-16W
			Elev. 2200 Ft.

Geology:

Copper claims located in Cretaceous andesite a short distance south of 2 quartz-mica diorite porphyry dikes. Tunnel workings exposed streaks of alterred andesite containing pyrite crystals (1925 information).

Mineral Products: Copper

Development and Production: Underground exploration tunnel; extent of development and production unknown. Located by James Faull in early 1900's.

References:

USBM Files, Faull Group
USGS Christmas Quad (1:62500)
Ross, 1925(B), p.52
Willden, 1964, pl.1

Map No.: 4-1A-16

Mine: Pinal Claim

Location:	T. 04S	Sec. 27	Lat. 33-03-38N
	R. 16E	NW of NW	Long 110-42-17W
Geology:			Elev. 2330 Ft.

Claim located on massive black basalt bedrock (Cretaceous-Tertiary). Other claims in vicinity contain vein deposits of secondary copper minerals; copper associated with quartz, barite, calcite, galena, sphalerite, and pyrite.

Mineral Products: Unknown

Development and Production: Underground operations; extent of development and production unknown.

References:

USBM Files, Pinal Claim
USGS Christmas Quad (1:24000)
BLM Unpatented Mining Claim Lead File 48310, July 1980
Willden, 1964, pl. 1

Map No.: 4-1A-17

Mine: Spaz Maugh Mining Co. Property (O'Carroll Property, London - Gila Group, London - Arizona Group)

Location:	T. 04S	Sec. 33	Lat. 33-02-16N
	R. 16E	SE	Long. 110-43-27W
Geology:			Elev. 2200 Ft.

Contact mineralization of ore types along both margins of long and narrow dikes cutting series of limestones (Devonian-Carboniferous) underlain by shales, sandstone, and quartzite. Limestones are highly alterred surrounding contacts; garnet is an important alterration product. Irregular ore bodies extend varying distances into countryrock. Gangue consists of impure quartz, limonite, and hematite.

Mineral Products: Copper Oxides and Carbonates: Chalcocite
Lead: Cerussite, Anglesite, Galena
Zinc Oxides
Gold
Silver

Development and Production: Underground workings include 1 vertical shaft 300 Ft. deep, 50-Ft deep winze, 35-Ft deep winze, and over 1500 Ft. of drifts, tunnels, and crosscuts. Property comprises 36 unpatented claims (as of 1941). Several surface pits and cuts. No recorded production. Claims located in 1880 by Dan O'Carroll. Workings also in Sec. 05, E 1/2 (T. 05S, R. 16E, Zachery Claim).

References:

USBM Files, Spaz Maugh Mining Co. Property
USGS Christmas Quad (1:24000)
ADMR London - Gila Group File
ADMR London - Arizona Group File
Ross, 1925 (B), p. 61-62

Map No.: 4-1A-18

Mine: Adjust Group (Hope Metals, Blue Bird Vein, Silver Cross Claims, Gold Gulch, Laurence, Big Treasure, Odell)

Location:	T. 4S	Sec. 34	Lat. 33-01-50N
	R. 16E	S 1/2	Long. 110-41-36W
Geology:			Elev. 2600 Ft.

Vein deposits of gold, silver, and minor amounts of copper in andesitic countryrock (Cretaceous-Tertiary). Principal deposits in Blue Bird vein; vein has well-defined and fairly continuous slickensided walls from 3-7 Ft. wide. Gangue consists of quartz, barite, and calcite. Andesite in veins is thoroughly alterred and largely replaced by vein minerals. Small dikes of quartz-mica diorite (?) porphyry in area.

Mineral Products: Silver Oxide
Lead: Galena
Copper: Chalcopyrite, Bornite
Gold Lode
Zinc: Sphalerite
Pyrite

Development and Production: Underground operations; presently inactive. Principal developments on Blue Bird Vein; workings total 1500 Ft. Property comprises 13 claims located by Adjust Mining Co. in early 1920's. Claims extend into Sec. 35 and 35 (T. 4S, R. 16E) and 1-4, 9 (T. 5S, R. 16E).

References:

USBM Files, Adjust Group
ADMR Adjust Group File
USGS Christmas Quad (1:24000)
BLM Mining District Sheet 701
ADMR Little Treasure File
Ross, 1925 (B), p. 41-43
Willden, 1964, pl. 1

Map No.: 4-1A-19

Mine: Lees Property

Location:	T. 04S	Sec. 35	Lat. 33-02-18N
	R. 16E	SW of NW of SE	Long. 110-40-46W
Geology:			Elev. 2280 Ft.

Vein deposits of secondary copper minerals in massive black basalt bedrock (Cretaceous-Tertiary). Veins are well-defined. Copper associated with quartz, barite, calcite, galena, sphalerite, and pyrite. Pyrite is disseminated in small crystals in wall rock. Veins genetically related to fissure system deposits on Saddle Mountain.

Mineral Products: Copper: Chalcopyrite
Silver
Gold

Development and Production: Underground operations; presently inactive. Developed by several tunnels and other unspecified workings.

References:

USBM Files, Lees Property
USGS Christmas Quad (1:24000)
Ross, 1925 (B), p. 47
USAEC, 1953
Willden, 1964, pl. 1

Map No.: 4-1A-20

Mine: Lower Coalfield (Crowe Chaft, Reed Shaft)

Location:	T. 04S	Sec. 22	Lat. 33-04-20N
	R. 17E	NE of SE of NE	Long. 110-35-11W

Geology:

Coal out crops in lower, narrow beds of Cretaceous sandstone and shale on the north and south sides of Deer Creek Basin. Cretaceous strata contains 2 impure coalbeds, each 24-30 inches thick, and several additional thin beds of no commercial importance.

Mineral Products: Bituminous Coal

Development and Production: Underground operations; presently inactive. Developments included 160-Ft deep inclined shaft, 150-Ft. long slope, 110 Ft. deep shaft to S of other workings, several other shallow shafts and slopes. In 1907, all development was abandoned.

References:

USBM Files, Lower Coalfield
USGS Jerusalem Mtn. Quad (1:24000)
ADMR Deer Creek Coal Field File
Ross, 1925, p. 114-117
Campbell, 1904, p. 248-251
Peirce and Wilt, 1970 p. 35-36
Willden, 1964, pl. 1

Map No.: 4-1A-21

Mine: Deer Creek Coalfield (Upper Coalfield, Anderson Field, Copper Chief Patented Claims M.S. 4385)

Location:	T. 04S	Sec. 36	Lat. 33-02-22N
	R. 18E	W 1/2	Long. 110-27-50W
Geology:			Elev. 4320

Coal lies in lower, narrow beds of Cretaceous sandstone and shale. Maximum thickness measured at 10 inches. Lower sedimentary formation is primarily of non-marine orgin, but locally contains thin beds of marine rock (early Late Cretaceous). Cut by many andesite dikes. Coal has high ash content; no current commercial value. Will probably not be developed because of thinness of beds, high ash content, and relative inaccessibility of area (Peirce et. al, 1970, p. 36).

Mineral Products: Bituminous Coal

Development and Production: Underground operations; presently inactive. Developments included 110-Ft. long tunnel, shafts 200 and 150 Ft. deep, and a number of other slopes, pits, and shafts. Abandoned prior to 1925. Discovered in 1881 by David and Robert Anderson, and other prospectors. Claims extend into sec. 6, NW (T. 05S, R. 19E).

References:

USBM Files, Deer Creek Coalfield
USGS San Carlos Reservior Quad (1:62500)
ADMR Deer Creek Coalfield File
Ross, 1925, p. 114-117
USBM Files, Upper Coal Field
BLM Mining District Sheet 746
Peirce and Wilt, 1970, p. 35-36
Campbell, 194, p. 248-251

Map No.: 4-1A-22

Mine: Parks Brothers Prospect

Location:	T. 04S	Sec. 11	Lat. 33-06-03N
	R. 19E	Cen, N 1/2	Long. 110-22-23W
Geology:			Elev. 3760 Ft.

Secondary copper minerals in fractured, tilted, and locally overturned beds of Tornado Limestone (Carboniferous). Tunnel on property cuts a somewhat chloritized felsite containing minor amounts of pyrite. Copper associated with chlorite, epidote, calcite, limonite, and a little residual galena.

Mineral Products: Copper Sulfide: Chrysocolla, malachite, azurite
Lead Sulfide: Galena, Anglesite, Cerussite
Pyrite

Development and Production: Underground exploration prospect; one tunnel of unknown dimensions. Extent of development and production unknown.

References:

USBM Files, Parks Brothers Prospect
USGS San Carlos Reservoir Quad (1:62500)
Ross, 1925, p. 114

Map No.: 4-1A-23

Mine: Starlight (Patented Claims M.S. 2372, Tribullion M. and S. Co., Wright Claims, Arizona Claims, Will Ryan Group)

Location:	T. 04S	Sec. 11	Lat. 33-05-32N
	R. 19E	SE	Long. 110-21-49W
Geology:			Elev. 4000 Ft.

Secondary copper minerals form irregular deposits in fractured, tilted, and locally overturned beds of Tornado Limestone (Carboniferous). Limestone strata generally strikes N25W and dips 60°E. Small irregular bodies of ore locally replace limestone. Copper associated with chlorite, epidote, calcite, limonite, and a little residual galena.

Mineral Products: Copper Sulfide: Chrysocolla, Malachite, Azurite
Silver
Zinc
Lead Sulfide: Galena, Anglesite, Cerussite
Gold
Antimony

Development and Production: Underground operations; presently inactive. Developments included 1900 Ft. long tunnel, several open cuts and shorter tunnels, 2 150-Ft. deep shafts. Worked in mid-1800's. Property comprises 12 overlapping patented claims totalling 180 acres. Operators included Pan Am Mining Co., Starlight Mining Co., Tribullion Smelting and Development Co. 835 short tons of ore mined between 1905 and 1969.

References:

USBM Files, Starlight
USGS San Carlos Reservoir Quad (1:62500)
Ross, 1925, p. 113-114
ADMR Starlight File
BLM Mining District Sheet 745
ABGMT-USBM File Data

Map No.: 4-1A-24

Mine: Black Rock Group
(Davis)

Location: T. 04S Sec. 18 Lat. 33-05-04N
R. 19E Long. 110-26-34W
Elev. 4200 Ft.

Geology:

Manganese and iron oxides occur in irregular replacement-type bodies in beds of Paleozoic limestone with strike of NIOW and dip of 20°-25°W. Deposit ranges from 4-8 Ft. thickness; maximum length 250 ft. along strike. Manganiferous float continues about 150 Ft. N of northernmost open cut.

Mineral Products: Manganese: Pyrolusite
Iron: Hematite, Siderite
Copper: Malachite
Lead: Galena
Barite
Silver

Development and Production: Surface and underground operations; developments included 60 Ft. long open cut, 140 Ft. inclined shaft, several shallow open cuts, surface stripping. Property comprises 6 unpatented claims located by L. K. Davis in 1939. Iron reported to be too intimately associated with manganese to be economical. Produced 20 short tons in 1951 (2300 lbs. lead, 20 oz. silver).

References:

USBM Files, Black Rock
USGS Crib Data, 1979
USGS San Carlos Reservoir Quad (1:62500)
Farnham et.al, 1961, p. 90
ABGMT-USBM File Data

Map No.: 4-1A-25

Mine: Barium King 1-4 (Barite King, Ireland Barite, Mitchell Barite Prospect)

Location:	T. 04S	Sec. 19, 20, 13	Lat. 33-04-50N
	R. 19E	NW of SE of SE (13)	Long. 110-20-57W
Geology:			Elev. 4120 Ft.

Brecciated barite and rock fragments in Tertiary trachyte; cemented with iron-stained, fine-grained barite. Barite exposed 60 vertical Ft. on hillside. West Side of mineralized zone against a S-striking fault that dips 55°E. Barite zone at least 50 Ft. wide. Fine-grained barite-fluorspar veins in brecciated trachyte average 18 Ft. side. Trachyte is rhyolitic in composition. Barite float occurs continuously NW from exposure to a distance of 2400 Ft.

Mineral Products: Fluorspar: Fluorine
Barite Sulfate

Development and Production: Surface and underground workings including 10-Ft. shaft, several shallow surface cuts. Property comprises 4 unpatented lode claims.

References:

USBM Files, Barium King 1-4
USGS San Carlos Reservoir Quad (1:62500)
Ross, 1925, p. 114
Elevatorski, E. A., 1971, p. 20
Elevatorski, E. A., 1978, p. 32-33
USGS Crib Data, 1979
Stewart and Pfister, 1960, p. 25-28
ADMR MAS, Barium King
USBM Files, Mitchell Barite Prospect

Map No.: 4-1A-26

Mine: Captain Jack (Black Strap, Last Dollar, Calumet, Gold Crack, Squaw Springs, Red Iron, Dinner Belle)

Location:	T. 04S	Sec. 26	Lat. 33-03-22N
	R. 19E	NW	Long. 110-22-18W
Geology:			Elev. 4800 Ft.

Magnetite and specularite bodies in limestone (Paleocene) along a diabase intrusive contact (Cretaceous-Tertiary). Largest body is 10-30 Ft. thick and about 200 Ft. long. Contact trends N, dipping 70°E.

Mineral Products: Gold
Copper Oxide
Silver
Iron: Magnetite, Specularite

Development and Production: Surface and underground exploration prospect. Developments included 2 shallow shafts, a 50-ft. adit, and numerous small cuts and pits. Property comprises 5 claims (as of 1946); has been located several times for gold and silver prospecting. No production from property.

References:

USBM Files, Captain Jack
USGS San Carlos Reservoir Quad (1:62500)
Harrer, 1964, p. 58
ADMR Black Strap Group File
USGS CRIB Data, 1979

Map No.: 4-1A-27

Mine: Copper Reef (Copper Reef Consolidated, Coronado Claims, North Star Shaft)

Location:			
	T. 04S	Sec. 28, 29	Lat. 33-03-21N
	R. 19E	Cen, W-1/2	Long. 110-24-55W
Geology:			Elev. 4000 Ft.

Irregular bodies several ft. wide containing oxidized copper ore along mineralized zone in Tornado Limestone (Carboniferous); limestone beds strike N50W and dip 25°-35°SW. Mineralized zone makes small angle with direction of bedding in limestone, and dips steeply, NE. Barite occurs as disseminations, stringers, and sporadic rosettes in narrow quartz zones stained with iron, manganese, and copper oxides. Barite contains small amounts of fluorspar. Ore deposits pinch out at shallow depths.

Mineral Products:
- Lead
- Barite Sulfate
- Gold
- Copper: Chrysocolla, Malachite, Chalcocite, Bornite, Azurite, Chalcopyrite
- Fluorspar: Fluorine
- Silver
- Manganese

Development and Production: Underground operations; presently inactive. Developments included 1400 Ft. long California tunnel, 2500 Ft. of drifts, 735 Ft. deep North Star Shaft, and several shallower shafts and other workings. Property comprises 125 claims; Copper Reef Consolidated Mine Incorporated in 1910. Coronado Group of claims located in vicinity of North Star shaft in 1954 by Coronado Development Co.

References:

USBM Files, Copper Reef
USGS San Carlos Reservoir Quad (1:62500)
Ross, 1925, p. 111
Elevatorski, E. A., 1978, p. 32
Stewart and Pfister, 1960, p. 30
USGS CRIB Data, 1979
ADMR MAS, Coronado
Elevatorski, E. A., 1971, p. 20
USBM Files, Coronado Group

Map No.: 4-1A-28

Mine: Rawhide Mtn. Prospects

Location:	T. 04S	Sec. 31	Lat. 33-02-44N
	R. 19E	NE	Long. 110-26-08W
Geology:			Elev. 4200 Ft.

Claims located on slips in Tertiary lava (includes andesite, rhyolite, and latite, with minor amounts of tuff sandstone, and conglomerate of fluviatile origin).

Mineral Products: Silver
Barite Sulfate
Copper
Iron

Development and Production: Surface and underground operations; exploration prospect. Extent of development and production unknown.

References:

USBM Files, Rawhide Mtn. Prospects
USGS San Carlos Reservoir Quad (1:62500)
Ross, 1925, p. 112

Map No.: 4-1A-29

Mine: Friend Mine (McIntosh and Stevens, Blake and Warren, Copper Range Group)

Location:	T. 04S	Sec. 34	Lat. 33-02-13N
	R. 19E	Cen. S1/2	Long. 110-23-19W
Geology:			Elev. 4040 Ft.

Copper minerals in veins cutting Cretaceous shales and sandstones, and Cretaceous-Tertiary andesitic rocks. Principal ore body at intersection of 2 veins that dip stteply and strike N20W and N20E, respectively. Associated with calcite gangue. Ore contains 20-30% copper (1925 report). Several veins on property , including those on Stanley Butte; biotite latite on Little Stanley Butte is cut by 2 Ft. wide vein of coarse calcite darkened with manganese.

Mineral Products: Copper: Native Copper, Azurite, Malachite, Cuprite, Bornite, Chalcocite, Chalcopyrite
Silver
Gold
Hematite

Development and Production: 2000 Ft. of underground workings, 1400 Ft. long tunnel, several short tunnels and shafts. Deposits discovered in early 1880's. Owned by McIntosh and Stevens in 1880's, Blake and Warren in 1890's. Also operated by Stanley Peak Mining Co. Only one carload (18 tons) of ore reported to have been shipped out.

References:

USBM Files, Friend Mine
USGS San Carlos Reservoir Quad (1:62500)
Ross, 1925, p. 110
USGS CRIB Data, 1979

Map No.: 4-1A-30

Mine: Copper Belle (Yellow Metal Group, Willamette Group, Davis Group)

Location:	T. 04S	Sec. 35	Lat. 33-05-16N
	R. 19E	SE	Long. 110-22-06W
Geology:			Elev. 4800 Ft.

Secondary copper minerals in irregular seams cutting highly faulted Tornado Limestone (Carboniferous). Mineralized rock contains specularite, calcite and pyrite.

Mineral Products: Copper: Chalcopyrite
Silver

Development and Production: Underground operations; presently inactive. Developed by several shallow shaft. First located in 1883. No production data; 2 partial carloads of ore shipped in early 1900's. Workings also in Sec. 32, Cen. and E 1/2 (T. 04S, R. 19E).

References:

USBM Files, Copper Belle
USGS San Carlos Reservoir Quad (1:62500)
Ross, 1925, p. 109
ADMR Williamette Group File
ADMR C. R. Roberts and Davis Properties
ADMR Houston Bowman File
ADMR Copper Basin Group File
USBM Files, Davis Claims

Map No.: 4-1A-31

Mine: Quartzite Mtn. Garnets

Location:	T. 04S	Sec. 36	Lat. 33-02-58N
	R. 19E	NW	Long. 110-21-26W
Geology:			Elev. 5600 Ft.

Andradite garnet in metamorphosed Paleozoic limestone. Garnet is an alterration product of limestone.

Mineral Products: Abrasive Garnet

Development and Production: Surface workings; extent of development unknown.

References:

USBM Files, Quartzite Mtn. Garnets
USGS San Carlos Reservoir Quad (1:62500)
Elevatorski, E. A., 1978, p. 33

Map No.: 4-1A-32

Mine: Soldier's Prospect

Location:	T. 04S	Sec. 36	Lat. 33-02-23N
	R. 19E	SE	Long. 110-20-51W
			Elev. 5600 Ft.

Geology:

Copper stain and some specularite in irregular deposits along fault zone in Tornado limestone (Carboniferous). Limestone beds cut by quartz porphyry dikes (Tertiary); replaced by garnet in some areas. Limestone beds also contain actinolite and free quartz.

Mineral Products: Copper
Iron: Specularite

Development and Production: Underground exploration prospect; development included inclined shaft, tunnel more than 1000 Ft. long.

References:

USBM Files, Soldier Prospect
USGS San Carlos Reservoir Quad (1:62500)
Ross, 1925, p. 108
USGS CRIB Data, 1979

Map No.: 4-1A-33

Mine: Hinton Mine
(Black Iron, Mineral Survey 3818, Iron Reef)

Location:	T. 04S	Sec. 02	Lat. 33-06-31N
	R. 20E	SW of SW	Long. 110-16-13W
Geology:			Elev. 4800 Ft.

Lead, zinc, and copper minerals form replacement and vein deposits in metamorphosed limestone, quartzite, and sandstone (Paleozoic). Maximum vein width 50 Ft. Vein shows small value of copper ore on surface. Sedimentary countryrock extensively intruded by rhyolite dikes (Cretaceous-Tertiary). Limestone alterred to garnet and actinolite.

Mineral Products: Iron
Lead
Copper
Silver

Development and Production: Underground operations; presently inactive. Developments included 90 Ft. inclined shaft; 4 tunnels with lengths of 350 Ft., 250 Ft., 300 Ft., and 150 Ft.; and numerous small open cuts and drifts. Property comprises 13 unpatented claims (as of 1954). No production recorded.

References:

USBM Files, Hinton Mine
USGS San Carlso Reservior Quad (1:62500)
ADMR Black Iron File
BLM Mining District Sheet 761

Map No.: 4-1A-34

Mine: Bitter Spring Prospect (Bitter Springs Claim)

Location:	T. 04S	Sec. 17	Lat. 33-05-23N
	R. 20E	NE	Long. 110-18-41W
			Elev. 4650 Ft.

Geology:

Replacements of magnetite along contact between limestone (Paleozoic) and rhyolitic rock (middle Tertiary). Mineralization is less than 10 Ft. in length; magnetite associated with malachite stains and minor amounts of pyrite. Mineralization also occurs along 5-10 Ft. wide quartz-pyrite-magnetite zone; magnetite float occurs along projected strike of zone for 100-150 Ft.

Mineral Products: Copper Sulfide: Malachite
Fluorspar: Fluorine
Iron: Magnetite, Pyrite
Uranium (U_3O_8)
Copper

Development and Production: Surface and underground exploration prospect. Developments included adit of unknown length and shallow shaft. Claims located in 1920 by F. C. Crockett. No production is recorded.

References:

USBM Files, Bitter Spring Prospect
USGS San Carlos Reservoir Quad (1:62500)
Harrer, 1964, p. 57-58
USAEC, 1954
ADMR San Carlos File
Bromfield and Shride, 1956, p. 634-635
USGS Crib Data, 1979

Map No.: 4-1A-35

Mine: Hoosier Group

Location:	T. 05S	Sec. 04	Lat. 33-01-32N
	R. 16E	W 1/2	Long. 110-43-22W
Geology:			Elev. 2200 Ft.

Ore minerals in fault zone between Cretaceous andesite, including light-colored hornblende porphyry, and a small block of Tornado Limestone (Carboniferous), downthrow to SW. NW of block, fault is marked by mineralized zone about 20 Ft. wide of fault breccia composed of hornblende porphyry, dark andesite, and limestone. Limestone almost completely replaced by quartz, chlorite, magnetite, specularite, and pyrite.

Mineral Products: Gold
Copper
Silver
Pyrite

Development and Production: Underground operations; presently inactive. Workings included 4-5 shallow shafts and 2 short tunnels. Property comprises 8 unpatented claims. Production data unavailable.

References:

USBM Files, Hoosier Group
USGS Christmas Quad (1:24000)
ADMR Hoosier Group File
Ross, 1925 (B), p. 50-51

Map No.: 4-1A-36

Mine: Carmichael Group

Location:	T. 05S	Sec. 04	Lat. 33-01-20N
	R. 16E	SE	Long. 110-42-30W
Geology:			Elev. 2750 Ft.

Ore sulfides in quartz stringers within poorly defined shear zones in Cretaceous andesite and gray hornblende porphyry. Dikes of quartz-mica diorite cut andesite. Associated with limonite, pyrite, specularite, and magnetite. On SE end of group, andesite is dissected by numerous stringers of almost pure gypsum mixed with small amounts of calcite.

Mineral Products: Copper Sulfide
Lead Sulfide
Gold
Silver

Development and Production: Underground operations; presently inactive. Claims contain a number of shafts and other workings; located by J. N. Carmichael in early 1900's. Property comprises 20 unpatented claims and extends into sec. 2, 3, 9, and 10 (T. 05S, R 16E).

References:

USBM Files, Carmichael Group
USGS Christmas Quad (1:24000)
Ross, 1925 (B), p. 48
USAEC, 1953

Map No.: 4-1A-37

Mine: Hilltop Property (Ash Creek Gold Mining and Milling Co., Poole Claims, Lee Property, Pools Property)

Location:	T. 05S	Sec. 04; 03	Lat. 33-01-35N
	R. 16E	Cen E 1/2;	Long. 110-42-39W
Geology:		SE of NW	Elev. 2700 Ft.

Secondary copper minerals in shear zone cutting dark andesitic rocks (Cretaceous-Tertiary). Narrow stringers of quartz contain a little pyrite. Additional deposit located on contact between andesite and Cretaceous slate. Shaft located in zone of sheeted and brecciated alterred andesite about 4 Ft. wide, with chlorite, calcite, quartz stringers and pyrite; zone strikes N55E and dips steeply to SE.

Mineral Products: Copper: Chalcopyrite
Silver
Gold
Pyrite
Lead Sulfide

Development and Production: Underground; 600 Ft. of workings on property include several inclined shafts and shallow cuts. 10 unpatented claims operated (1925) by Ash Creek Gold Mining and Milling Co.

References:

USBM Files, Hilltop Property
USGS Christmas Quad (1:24000)
Ross, 1925 (B), p. 49-50
ADMR Hilltop Mine File
USBM Files, Pools Property

Map No.: 4-1A-38

Mine: Saddle Mountain Group (Lola Claims, Dye Vein, Gila Copper Sulfide Co. Property)

Location:	T. 05S	Sec. 03	Lat. 33-01-50N
	R. 16E	NE	Long. 110-41-35W
Geology:			Elev. 2800 Ft.

Ore minerals contained in vein running parallel to long quartz-mica diorite dike (on NW side) through Cretaceous andesite and andesite breccia. Average strike is N50E and dip is variable but steep. Dike itself is mineralized in saddle of Saddle Mountain. Vein averages 2.5-5 Ft. wide; wall rock is mineralized a few Ft. beyond width of vein. Big Rock Vein to E is of similar type; are well-defined, and unoxidized portions contain quartz, barite, calcite, galena, sphalerite, copper minerals, and alterred andesite.

Mineral Products: Lead: Galena
Silver
Iron: Limonite, Anglesite, Cerussite
Gold
Gypsum
Zinc: Sphalerite
Copper: Chalcopyrite, Chrysocolla
Pyrite

Development and Production: Underground operations; presently inactive. Workings totalling 3450 Ft. included a number of short tunnels, shafts, and pits. Property comprises 15 patented claims and one unpatented claim located in 1900 by Saddle Mountain Mining Co. 3 carloads of ore shipped in early 1900's. Claims extend in Sec. 34 (T. 04S, R. 16E).

References:

USGS Christmas Quad (1:24000)
USBM Files, Saddle Mountain Group
ADMR Saddle Mountain Group File
Ross, 1925 (B), p. 43-47

Map No.: 4-1A-39

Mine: Two Queens Property
(Bromide No. 1 Claim)

Location:	T. 05S	Sec. 03	Lat. 33-01-32N
	R. 16E	N 1/2 of N 1/2	Long. 110-41-38W
Geology:		of SE	Elev. 2570 Ft.

4 nearly parallel veins and one cross-vein containing copper minerals at depth and surface deposits of gold, cutting sedimentary and volcaniclastic Cretaceous strata. Sediments composed of sandstone, in part calcareous, conglomerate, and carbonaceous shale. Volcanic strata consists of andesitic lava, flow breccia, and tuff. Quartz-mica diorite dikes in vicinity; dikes contain fine disseminations of pyrite, calcite, and chlorite. Metasomatic replacement of country-rock by ore minerals.

Mineral Products: Gold
Silver
Copper
Lead Sulfide

Development and Production: Underground operations; presently inactive. Workings included a shaft 260 Ft. deep with 2 100-Ft. crosscuts off it, tunnel 400 Ft. long with 90 Ft. winze off it, and several shallower pits. Property comprises 9 patented claims; operated from 1906-1908 by Central Mining and Development Co. No records of further development. 3 small lots of ore shipped in early 1900's. Area 175 acres.

References:

USBM Files, Two Queens Property
USGS Christmas Quad (1:24000)
Ross, 1925 (B), p. 48
ADMR Two Queens Mine File
USAEC, 1953
Copper Handbook, 1908, p. 504
Copper Handbook, 1912-13, p. 223

Map No.: 4-1A-40

Mine: Ash Creek Claims (Monitor Group, Southwest Copper Co. Property)

Location:	T. 05S	Sec. 01	Lat. 33-02-00N
	R. 16E	NW	Long. 110-40-22W
			Elev. 2370 Ft.

Geology:

Secondary copper and silver minerals in E-W trending fissure veins cutting Martin and Tornado limestone formations (Devonian-Carboniferous). Also occur in contact zones between limestone and diabase porphyry (Cretaceous). Vein walls coated with heavy talc selvage. Considerable amounts of placer gold reportedly mined from gulches adjacent to Ash Creek.

Mineral Products:

Gypsum
Copper: Chalcocite
Gold
Silver: Sulfide, Chloride, Bromide
Lead
Iron
Zinc

Development and Production: Surface and underground exploration prospects. Monitor Group (Ash Creek Group) includes mines of Monitor, Richmond, Dewey, Tucson, Mountain View, Cumberland and Merrimac. 16 mining claims patented and located by Southwest Copper Co. about 2500 Ft. of underground work conducted on properties, including tunnels, shafts, drifts, winzes, and discovery pits. Production data unavailable.

References:

USGS Christmas Quad (1:24000)
USBM Files, Ash Creek Claims
ADMR Ash Creek Claims File
ADMR Monitor Group File
Elevatorski, E. A., 1978, p. 54

Map No.: 4-1A-41

Mine: Reider and Bailey Group

Location:	T. 05S	Sec. 09	Lat. 33-01-07N
	R. 16E	NW	Long. 110-43-10W
Geology:			Elev. 2200 Ft.

Oxidized minerals contained in quartz stringers within poorly defined shear zones in Cretaceous andesite and gray hornblende porphyry. Dikes of quartz-mica diorite cut chloritized andesite; diorite is alterred and contains numerous pyrite crystals and quartz stringers with chrysocolla mineralization. Outcrops of shear zones contain limonite, chrysocolla, and small amounts of unoxidized pyrite, specularite, and magnetite in quartz stringers.

Mineral Products: Gold Placer
Copper: Chrysocolla
Iron Sulfide

Development and Production: Underground workings; development included 2 tunnels. Extent of development and production unknown. Group comprises several unpatented claims; other Reider claims located in Sec. 5, W 1/2 (T. 05S, R. 16E).

References:

USBM Files, Reider and Bailey Group
USGS Christmas Quad (1:24000)
Ross, 1925, (B), p. 51-52

Map No.: 4-1A-42

Mine: Middle Coalfield

Location:	T. 05S	Sec. 05	Lat. 33-01-34N
	R. 18E	W 1/2	Long. 110-32-05W
Geology:			Elev. 3200 Ft.

Coal lies in lower, narrow beds of Cretaceous sandstone and shale. Might be continuation of coal beds in Upper Coalfield. Deer Creek Coalfield occupies an irregular synclinal basin between the Mescal Range on the north and an unnamed ridge on the south, which separates the basins of Deer and Ash Creeks; 10-12 miles long E-W, 3-4 miles wide.

Mineral Products: Bituminous Coal

Development and Production: Surface operations; presently inactive. Number of surface openings made prior to 1925, but development apparently less than in either upper or lower field. No information regarding Middle Coalfield is available.

References:

USBM Files, Middle Coalfield
USGS Jerusalem Mtn. Quad (1:24000)
Ross, 1925, p. 114-117
Peirce and Wilt, 1970, p. 35-36
Campbell, 1904, p. 248-251

Map No.: 4-1A-43

Mine: Stanley (Little Mule Group)

Location:	T. 05S	Sec. 02	Lat. 33-01-55N
	R. 19E	NW of NW	Long. 110-22-43W
			Elev. 4640 Ft.

Geology:

Barite veins occur along fractures in Cretaceous-Tertiary diorite porphyry. Veins average 6-18 inches wide; 6 known. Veins on property. Virtually pure, massive barite exposed in surface cuts. Barite occurs in segregations, stringers, and rosettes with many inclusions of rock fragments. Associated with copper-oxide staining. No report of fluorite from this area.

Mineral Products: Lead
Silver
Barite Sulfate

Development and Production: Underground exploration prospect. Development included a 1200 Ft. long tunnel, inclined shaft bearing S20E and reaching depths of 100 Ft., 30 Ft. cut on vein, 170 Ft. adit, numerous additional surface cuts of 10-20 Ft. length. Claims originally located by Bob Knowles about 1907. Barite samples average 74% $BaSO_4$ and 14 oz. silver per ton (1960 information).

References:

USBM Files, Stanley
USGS San Carlos Reservoir Quad (1:62500)
Ross, 1925, p. 109
ADMR Stanley Region File
Stewart and Pfister, 1960, p. 28-30

Map No.: 4-1A-44

Mine: Wolf

Location:	T. 05S	Sec. 02	Lat. 33-01-31N
	R. 19E	Cen	Long. 110-22-16W
Geology:			Elev. 6000 Ft.

Secondary copper minerals along contact metamorphic zone next to a sill that has brecciated Tornado limestone courntryrock (Carboniferous). Strong epidote-garnet zones adjoin the sill.

Mineral Products: Copper Oxide; Bornite, Chalcopyrite

Development and Production: Underground operations; presently inactive. Extent of development and production unknown.

References:

USBM Files, Wolf
USGS San Carlos Reservoir Quad (1:62500)
ADMR Wolf Property File

Uranium Occurrences in the
Mescal Range - Pinal Mountains
Area (see enclosed material for
individual prospect descriptions)

American Mine (Pinal Co.)
Betty #1 (Pinal Co.)
Castle Dome Copper Mine (Gila Co.)
Christmas Mine (Gila Co.)
Copper Cities Copper Mine (Gila Co.)
Dale 1-5 (Gila Co.)
Desert Queen (Gila Co.)
Four Bagger (Gila Co.)
Greystone, Doctor, Frisco et. al (Gila Co.)
Grubstake, Iron Hills, and Oversight Claims (Gila Co.)
Highway and Highgrade Group (Gila Co.)
Honey Bee and Shortie Group (Pinal Co.)
Interstate Group (Sky, Fran, Zora, Peanuts, Desert Queen) (Gila Co.)
Katie #3 (Pinal Co.)
King 1-3 (Gila Co.)
Kullman - McCool (Gila Co.)
L & V Prospect (Gila Co.)
Lucky Boy (Gila Co.)
Lucky King (Gila Co.)
Lulu Belle #7 (Gila Co.)
Ramon (Gila Co.)
Star 1-3 (Gila Co.)
Waterfall (Pinal Co.)
Wooley #1 (Pinal Co.)

FROM: U.S. Bureau of Mines Minerals Availability System Files

Mescal Range - Pinal Mountains Area
(uranium, copper, lead, gold, silver, tungsten, molybdenum, zinc, and stone deposits)

Location, commodity, and development statistics for mines and prospects in the following township and range locations:

T.1S, R. 14E

American (Fondern and Gibson Property, Virginia-Arizona Copper Co. Property)
Arlene Group
Copper King
Copper Springs Mining Claims
Crenshaw Property (Virginia - Arizona Mining Co. Claims, Omega Claim, Jack Pot Claim, Ella Claim, Butte Claim)
Ellis Vein
Franks Claims
Gibson Property (Bellevue - Old Site, Kuno Property, Claims M.S. 2219, Summit Property, Reynolds Goup, Pasqual Group)
Gin Claims
King Copper Group (Harry Hawser Property)
Lonesome Pine and Esther Groups
Lorraine (Fuhrman Group)
Madera Claims
Snyder (Frank Snyder Mining Calims, Hughes Group)
Tucson - Globe Group (Globe Weston, Old Westbrook Property)
Yan Property (Central Shaft, Fred Beck Property)

T.1S, R.15E

Azurite Property (Blue Ball)
Falcon Tungsten
King 1,2,3
Lulu Belle #7
Rising Sun and Enterprise Claims
Westlake Tungsten Property (Merged Mines Property, Del Ray Silver)

T.2S, R.14E

Bobtail Group (Mariana Property, Bobaway Property, Doak Group, Wisner-Glassburn Property, Twentieth Century Claims)
Doak Vein (Miami Mining and Milling Co.)
Sulphide Copper of Arizona Claims

T.2S, R.15E

Clark Property
Lucky Boy (Pinal Property, Phelps Dodge Corp. Lease)
Pinal Minerals Leach and Icon Plant
Pioneer (White Metal Mining Co. Claims, Devine Property, Great Republic Patent M.S. 370, Pioneer South Patent M.S. 374, Howard Shaft)
Oversight Group (Big Skookum Claim, Grubstake)
Sky Deposit (Fran, Zora, Peanuts)
Swan Property
Silver Creek (Old McGraw, Manifest Mining Co. Claims, Hanna Property)
Vindicator Group

T.3S, R.15E

El Capitan (Gold Dust Claim)
Mescal Mountain Deposit
Grubstake (Silver Dime, Jim Whitaker Claims)
Silver Dime (V-9 Group, Oversight Extension Claim)

T4S., R.14E

ABC Group
Deen Claims - Area 1
Deen Claims - Area 2 (Lucey Claim, Junc, Claim, Hidden Treasure Claim)
Gravel Pit
Grayback 15
Grayback 19
Honey Bee Claims (Shortie Claims)
Kate No. 3 Claim
Kearny 14
Kennecott Property - Area 2 (Belgravia Claim)
Keri Claim
Lucky Strike Claim - Area 1
Lucky Strike Claim - Area 2
Lucky Strike Claim - Area 3
Lucky Traid (Rare Metals Claims, Hidden Treasure Claims, Gray Copper Claims File, Tipperary Group, Reinstated Claims, Johnson Property)
Shorty Nos. 1,2 and 4
Wooley Property
Nancy Extension M.S. 1261

T.5S, R.14E

Civil Rights Group
Copper Basin Group (SilverKing, Babbit Claims, Winkelman Silica Property)

T.5S, R.15E

John Glenn Mining Claims
Waterfall Claims
White Beauty Claims

T.7S, R.14E

Betty Jane No. 1 M.S. 4258

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