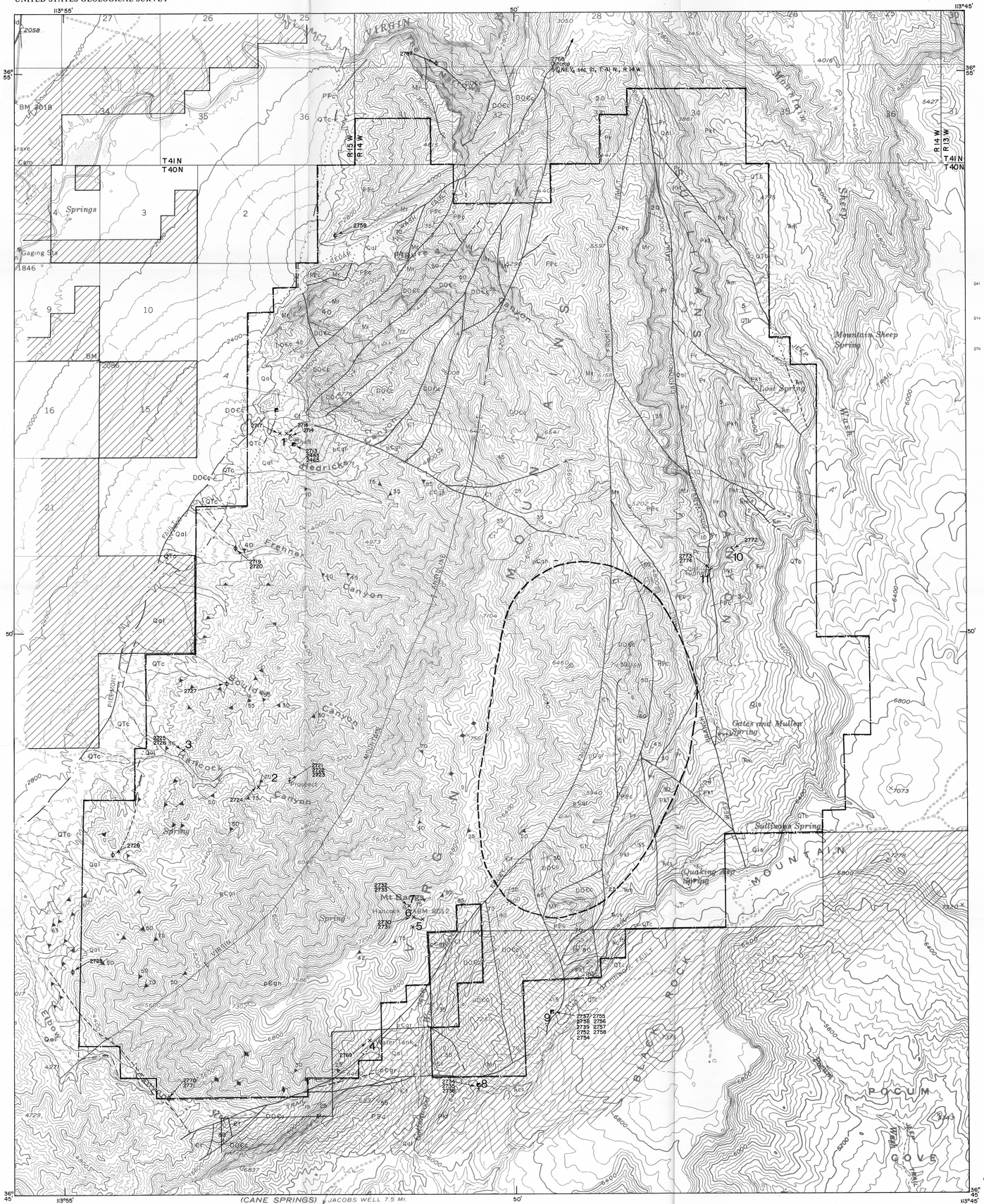


CORRELATION OF MAP UNITS

Qal	QUATERNARY
Qls	QUATERNARY(?)
UNCONFORMITY	
QTb, QTc	QUATERNARY(?) AND TERTIARY
UNCONFORMITY	
Ꞧc, Ꞧss	TRIASSIC
UNCONFORMITY	
Ꞧm	
UNCONFORMITY	
Pkt, Pf	PERMIAN
PMPc	PERMIAN AND PENNSYLVANIAN
Mr	MISSISSIPPIAN
DOCc	DEVONIAN ORDOVICIAN(?) AND CAMBRIAN
Ꞓt	CAMBRIAN
UNCONFORMITY	
pCqn, pCgr	PRECAMBRIAN

DESCRIPTION OF MAP UNITS

Qal ALLUVIAL DEPOSITS, UNDIFFERENTIATED -- Consist of unconsolidated alluvium in ephemeral stream channels, alluvial fans, talus cones, and debris flows near or on bedrock. Deposits are poorly sorted and consist of boulders, cobbles, gravel, sand, and silt. Coarse debris was derived mostly from Precambrian and Paleozoic rocks

Qls LANDSLIDE DEPOSITS -- Debris composed mostly of disarranged deposits of the Moenkopi Formation transported downslope by sliding or rotational slumping. Landslides are probably Quaternary because Tertiary and Quaternary(?) basalt is involved

QTb BASALT -- Dark-gray to black fine-grained dense olivine basalt flows. Vesicular features common, but vesicles usually concentrated on top of flows. Flows, averaging about 500 ft (152 m) in thickness, form resistant, cliffs-forming caps on mesas in study area and surrounding area. Age of similar basalt flows south of the Primitive study area range from about 2 to 7 m.y. (S. B. Keith, unpub. data 1976); these basalt flows correlate with those in study area. Basalt flows conformably overlie Tertiary and Quaternary(?) conglomerate and unconformably overlie the Chinle and the Moenkopi Formations

QTc CONGLOMERATE -- Composed of poorly bedded, consolidated to weakly consolidated cobbles, gravel, sand, and some silt; conglomerate consists mostly of Precambrian and Paleozoic clasts cemented with caliche and is an older, dissected alluvial deposit overlain by younger alluvial deposits or basalt flows. This unit is about 50 ft (15 m) thick in study area

Ꞧc CHINLE FORMATION (TRIASSIC) -- Interbedded reddish-brown to maroon claystone, siltstone, and fine-grained sandstone. Slope-forming sedimentary rocks are indistinctly bedded, but stratification is evident from color bands. Thickness of the Chinle exposed in study area is about 200 ft (61 m). These beds may belong to the Petrified Forest Member of the Chinle Formation

Ꞧss Shinarump Member -- Yellowish-gray, brown-weathering strata consist of fine to very coarse grained sandstone, conglomeratic sandstone, and conglomerate. Detritus is composed largely of quartz and chert; petrified wood fragments are commonly present. Beds are 1 ft (0.3 m) and more thick, and individual sandstone beds are commonly cross-stratified with graded laminae. In study area, the Shinarump is about 30 to 40 ft (9 to 12 m) thick and forms a resistant ledge

Ꞧm MOENKOPI FORMATION (Triassic) -- Composed chiefly of siltstone and sandstone; red beds and minor limestone. Upper part of unit consists of reddish-brown to moderate-red thin-bedded siltstone and sandstone interbedded with grayish-red thin- to thick-bedded gypsiferous siltstone and structureless white gypsum. Upper sequence of red beds is separated from a lower red bed sequence by a yellowish-gray limy and dolomitic siltstone and limestone sequence, which is about 5 ft (1.5 m) thick and is thin to thick bedded. A few siltstone and limy beds contain abundant pelecypod molds, gastropods, chert pebbles, and contorted flat pebbles. Lower red bed sequence consists of reddish-brown to grayish-red thin-bedded siltstone, gypsiferous siltstone, and white structureless gypsum. At base of red beds is a 4-ft-thick (1.2 m) sequence of yellowish-gray conglomerate, limy siltstone and sandstone; clasts consist mostly of chert granules and pebbles. Aggregate thickness of the Moenkopi Formation in study area is about 1,200 ft (365 m). Members of the Moenkopi Formation are not differentiated on the map; they are not mapped in study area because some are thin and inconspicuous. The Moenkopi Formation unconformably overlies the undivided Kaibab Limestone and Toroweap Formation

Pkt KAIBAB LIMESTONE AND TOROWEAP FORMATION, UNDIVIDED (PERMIAN) -- Consists of two similar cliff-forming limestone sequences separated by a thin slope-forming gypsiferous sequence. The Kaibab is about 500 ft (152 m) thick and consists of thick to thick bedded, coarsely crystalline, and bioclastic limestone contains chert concretions throughout. Red beds are thin bedded and consist of fine-grained sandstone and siltstone interbedded with gypsiferous beds. Combined thickness of limestone and red beds is about 800 ft (244 m). Unit conformably overlies Permian red beds

Pr RED BEDS -- Reddish-brown, pink, and orange-pink, fine to very fine grained sandstone and siltstone, composed largely of dolomite and quartz grains weakly cemented with calcareous cement. Thin- to medium-bedded strata form receding slopes. Planar beds commonly have ripple marks and show evidence of cross laminae. Unit is about 1,200 ft (320 m) thick, but thickness is variable owing to faulting. Unit probably is equivalent in part to the Queantoweap Sandstone of McNair (1951), Hermit Shale, and Coconino Sandstone

PIPc PAKOON LIMESTONE OF MCNAIR (1951) AND CALLVILLE LIMESTONE -- Consists of alternating beds of carbonate rock and sandstone. Sandstone is fine grained, calcareous, and cross laminated. Limestone and dolomitic limestone, pinkish- to yellowish-gray limy chert concretions are common in limestone beds. Most carbonate rocks are bioclastic, consisting of coarse fossil fragments and oolitic and pelletal grains; some limestone beds contain minor glauconite grains. Interbedded with limestone is maroon fine- to coarse-grained sandstone which is horizontally laminated and cross laminated. Limestone forms ledges and cliffs and alternates with less resistant, slope-forming shale. No complete measured stratigraphic sections of unit are about 1,300 ft (457 m) thick in study area

Mr MISSISSIPPIAN LIMESTONE (Mississippian) -- Consists of two limestone and chert sequences. Upper sequence consists of massive, cliff-forming, light-gray limestone and thin- to medium-bedded limestone and chert. Lower part of upper sequence, interbedded limestone and chert beds form receding slopes. Upper part of upper sequence, massive limestone sequence. Upper sequence consists mostly of relatively clean, fine-grained limestone and a few local occurrences of fine- to medium-grained organic detrital limestone. Locally, massive limestone contains abundant corals. Lower sequence consists of limestone and chert and generally forms steep, receding ledges. This sequence is composed of alternating beds of massive to thick-bedded limestone and medium- to thin-bedded ropey chert. Limestone generally consists of fine- to coarse-grained, oolitic and pelletal carbonate material in an aphanitic limestone matrix. Aggregate thickness is about 600 ft (183 m)

DOOc CARBONATE ROCKS, UNDIFFERENTIATED -- Limestone, dolomite, dolomitic limestone, siltstone, sandstone, and minor conglomerate. Upper part of undifferentiated unit consists of brownish-gray massive coarsely crystalline dolomite and dolomitic breccia, light-gray dolomitic siltstone and sandstone; and minor pinkish-gray silty limestone. Middle part of unit is composed of pinkish-gray glauconitic siltstone and sandstone, and coarsely crystalline dolomitic limestone containing glauconite. Below glauconitic beds are yellowish-gray laminated to thick bedded limestone and dolomite containing intraclastic conglomeratic limestone and mottled, arenaceous limestone. Lower part of this unit consists of dark-gray to brownish-gray laminated limestone and dolomitic limestone that contain rusty-colored oboolites. Overall, massive, thick-bedded, and medium-bedded rocks form craggy cliffs and ledges; unit is about 2,000 ft (610 m) thick

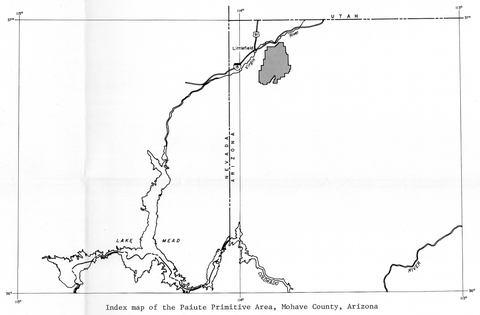
Ꞓt TAPEATS SANDSTONE AND BRIGHT ANGEL SHALE (Cambrian) -- Grayish-olive-green shale and light-brown siltstone grade downward to maroon and light-brown sandstone. Bright Angel Shale is composed of thinly laminated, micaceous shale and quartzose siltstone; these beds weather to a characteristic reddish-orange. Shale and siltstone contain thin layers of dolomite and rare intraformational thrusting structures. Basal part of the Tapeats Sandstone is medium to coarse grained, pebbly, conglomeratic, and quartzose. Beds are planar, medium to thick bedded; individual beds are internally cross laminated. Upsection, the sandstone is interbedded with thin-bedded and laminated siltstone and shale. Basal part of the Tapeats Sandstone forms ledges that give way to sloping beds of overlying Bright Angel Shale. Combined thickness of formations is about 900 ft (152 m). Unit unconformably overlies Precambrian gneiss and schist

pCqn GNEISS AND SCHIST -- Dominant rock types of Paiute Primitive study area are gneiss and schist. Rocks range from green ish black to various shades of gray. These strongly foliated metamorphic rocks are composed of quartz, biotite, hornblende-garnet gneiss, biotite-hornblende gneiss, amphibolite, mica schist, and small isolated occurrences of marble. Gneiss and schist are locally intruded by pegmatite composed chiefly of feldspar, quartz, and mica, and minor diopside, hornblende, and tourmaline. Metamorphic rocks form alternating bands of gneiss and schist, interrupted by irregularly shaped pegmatite. These rocks generally form steep, craggy slopes

pCgr GRANITE AND PEGMATITE -- Pink coarsely crystalline granite and white pegmatite occur as masses or dikes and sills commonly emplaced parallel to gneissic bands. Granite is generally composed of feldspar, quartz, minor hornblende,and biotite. Very coarse crystalline pegmatite is composed of feldspar, quartz, and muscovite. Dikes and sills vary in thickness, some are tens of feet wide; some pegmatite is less than 1 ft (30 cm) thick

Table 1. -- Mining and mineralized areas, commodities, and reserve assessments in the Paiute Primitive Area, Mohave County, Arizona

Map No.	Name	Commodity	Production and development	Reserve assessment
1	Hedricks Canyon shaft and prospects.	Copper.....	Production unknown; four shafts in relatively close proximity. Largest over 100 ft (30 m) in depth.	Copper was detected in amounts ranging from 8% to 720 ppm (samples 2463-2717). No foreseeable economic potential.
2	Hancock Canyon adit and prospect.	Silver and gold (?).	Production unknown; caved adit and 12 ft (3.7 m) trench.	Pyrite and magnetite visible. Traces of gold and silver (samples 2721-2724). No substantial quantities of economic minerals detected.
3	Hancock Canyon prospect	Tungsten.....	Production unknown; sidehill cut.	Very localized scheelite in a quartz and feldspar vein averaging about 6 inches (15 cm) wide. No tungsten detected in random sampling (samples 2725, 2726).
4	Dumortierite prospect	Dumortierite..	No production; prospect pit	Occurs as vein 2.5 ft (75 cm) wide in pegmatite. Unknown extent (sample 2769).
5	Mt. Bangs manganese prospects.	Manganese.....	No production; small pits.	Discontinuous occurrences as rock surface coatings.
6	Temple View prospect, Mt. Bangs.	Tungsten.....	No production (one shipment to Pioche, Nevada for assay); trench 20 ft (6.1 m) long.	Assay results show tungsten quantities less than 0.03 pct. (samples 2730, 2731).
7	Manganese prospect (caved adit ?), Mt. Bangs.	Manganese (?).	Production unknown; sidehill trench 40 ft (12.2 m) long.	Manganese visible as occasional rock surface coating. No other potentially economic minerals detected (samples 2732, 2733).
8	Southwand breccia-pipe shaft.	Copper.....	Production unknown; one shaft of undetermined depth with caved connecting adit.	Localized breccia-pipe deposit extending to unknown depth. Sample from stockpile contained 5.4 pct. copper and 1.15 pct. arsenic (samples 2734-2736). Stockpile size approximately one cubic yard (one cubic meter).
9	Goddess workings 0.5 mi (0.8 km) south of Primitive Area.	Silver, lead zinc.	10 tons (9.1 metric tons) (F. Lamerson, oral communication). Shaft, caved at a depth of approximately 10 ft (3 m). Trench (caved adit?), 40 ft (12.2 m) long. Pit, approximately 250 cubic yards (190 m^3) of excavated material.	Limestone/calcite karst zone. Local mineralization as open-space fracture filling. Assay results from the shaft indicate 0.5-2.9 oz/ton silver, 1.5-5.2 pct. lead, and 2.7-7.2 pct. zinc. At the pit assay results indicate 0-1.4 oz/ton silver, and 0.1-0.53 pct. lead, and 0.1-3.7 pct. zinc. Negligible amounts of economic minerals were detected at the trench (samples 2737-2758).
10	Sullivans Canyon upper adit.	Copper.....	Production unknown; 100 ft (30 m) adit.	Malachite and azurite along fracture surfaces. 0.41 pct. copper, trace silver, 0.31 pct. arsenic (sample 2772).
11	Sullivans Canyon lower adit (Blue Baby).	.....do	Production unknown; 14 ft (4.3 m) adit.	Breccia-pipe copper deposit. Malachite and azurite along fracture surfaces. 1.0-2.3 pct. copper, 0.1-0.2 oz/ton silver, 0.45-0.51 pct. arsenic (samples 2773, 2774).



Index map of the Paiute Primitive Area, Mohave County, Arizona

Base from U.S. Geological Survey, Littlefield, 1954, scale 1:62,500

Geology from Villalobos (1980); sampling of mines and mineralized areas by Lou Hamm and Gearld Willis, 1978

Contact - Dashed where approximately located or inferred

Fault - Dashed where inferred; dotted where concealed. Arrows in cross section show direction of relative movement

Anticline

Syncline

Strike and dip of beds

Inclined

Overturned

Dote, dotted

Strike and dip of foliation

Inclined

Vertical

BOUNDARY OF PRIMITIVE AREA

AREA UNDER OIL AND GAS LEASE

AREA WHERE GEMSTONE MINING CLAIMS ARE KNOWN TO EXIST

2727 SAMPLE LOCATION (OUTCROP) -- See table 2 for analytical data

MINE SYMBOLS

Shaft

Adit

Caved adit

Prospect

3 MINING LOCALITY -- See table 1

REFERENCES

McNair, A. H., 1951, Paleozoic stratigraphy of part of northwestern Arizona: American Association of Petroleum Geologists Bulletin, v. 35, no. 3, p. 503-541.

Villalobos, H. A., 1980, Geologic map of the Paiute Primitive study area, Mohave County, Arizona: U.S. Geological Survey Miscellaneous Field Studies Map MF-1160A.

Table 2. -- Results of analyses of samples from the Paiute Primitive Area, Mohave County, Arizona

[Gold and silver determined by fire assay; values reported in oz/ton. Copper, lead, zinc, tungsten, and arsenic determined by chemical analysis; values reported in ppm (parts per million) except where indicated by asterisk, in percent. Spectrographic analyses results are available for public inspection at the Bureau of Mines, Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, Colorado. Tr, trace; -, not detected; ND, not determined; *, value in percent; <, less than]

Sample No.	Type	Gold	Silver	Copper	Lead	Zinc	Descriptions
2463	Random grab.....	-	0.1	200	<30	20	Amphibolite dump material. Shaft.
2465	.....do	-	.4	150	<30	43	Granite gneiss dump material. Shaft.
2713	.....do	-	.1	84	<30	62	Do.
2714	.....do	-	.3	720	<30	44	Dark metamorphic rock with copper carbonate stain. Prospect pit.
2716	.....do	-	-	360	<30	43	Do.
2717	3.3 ft (1.0 m) chip..	-	-	100	<30	42	Blocky amphibolite sullrock. Prospect pit.
2719	Random chip.....	-	.2	ND	ND	ND	Pegmatitic outcrop. No mineralization visible.
2720	.....do	-	-	ND	ND	ND	Amphibolite outcrop. No mineralization visible.
2721	Random grab.....	-	Tr	92	<30	40	Granite gneiss and amphibolite. Some magnetite. Adit dump.
2722	4.8 ft (1.4 m) chip..	Tr	.2	220	<30	55	Granite gneiss shear zone, west half; pyrite, limonite. Adit portal.
2723	4.7 ft (1.4 m) chip..	Tr	Tr	110	<30	57	Granite gneiss shear zone, east half; pyrite, limonite. Adit portal.
2724	3.8 ft (1.1 m) chip..	-	-	26	<30	26	Quartz vein; limonite, manganese oxides. Sidehill cut.
2725	Random grab.....	Tr	-	ND	ND	ND	Amphibolite gneiss, quartz-feldspar veins, dump material. Sidehill cut. No tungsten detected.
2726	3.9 ft (1.2 m) chip..	-	-	ND	ND	ND	Quartz-feldspar veins with intervening gneiss-schist. Sidehill cut. No tungsten detected.
2727	3.3 ft (1.0 m) chip..	-	-	ND	ND	ND	Migmatite dike outcrop; granitic composition. No mineralization visible.
2728	3.0 ft (0.9 m) chip..	Tr	Tr	ND	ND	ND	Faulted contact outcrop; schist and gneiss. No mineralization visible.
2729	.....do	-	-	ND	ND	ND	Amphibolite with quartz-feldspar migmatites, iron oxides. Trail cut.
2730	Random grab.....	-	.1	37	<30	23	Granitic gneiss and quartz-feldspar vein material; mostly. Dump at ore chute. Tungsten <0.03 percent.
2731	2.8 ft (0.85 m) chip.	-	-	<10	<30	16	Granitic gneiss and quartz-feldspar veins. Trench. Tungsten <0.03 percent.
2732	Random grab.....	-	-	ND	ND	ND	Granite gneiss and marble; manganese oxides. Sidehill cut (caved adit ?).
2733	.....do	-	-	ND	ND	ND	Do.
2734	.....do	-	.6	5.4*	<30	230	Gray and red limestone locally brecciated, granite xenoliths (?), copper carbonate. Arsenic content 1.15 percent. Shaft-surface stockpile.
2735	.....do	-	-	ND	ND	ND	Granite with gray limestone. Shaft-surface dump.
2736	.....do	-	-	ND	ND	ND	Gray limestone, red brecciated limestone. Caved adit dump.
2737	.....do	-	.5	33	1.5*	2.7*	Limestone and calcite, traces of galena and sphalerite. Shaft-surface dump.
2738	5.0 ft (1.5 m) chip...	Tr	2.9	42	2.2*	7.2*	Limestone. Galena and zinc minerals with calcite as open-space fracture filling. Trench.
2739	4.0 ft (1.2 m) chip...	-	.1	140	.22*	.31*	Limestone. Galena and zinc minerals with calcite as open-space fracture filling. Trench.
2752	Random grab.....	-	-	10	.25*	.39*	Limestone and calcite, traces of galena and sphalerite. Trench dump.
2754	2.7 ft (0.8 m) chip...	Tr	.1	370	.10*	.20*	Limestone, hematite-stained, brecciated. Prospect pit.
2755	3.0 ft (0.9 m) chip...	-	.2	530	.26*	.74*	Limestone and clay, limonite-stained, brecciated. Prospect pit.
2756	2.0 ft (0.6 m) chip...	-	-	75	.14*	3.7*	Limonite-stained vein in limestone. Prospect pit.
2757	3.6 (1.1 m) chip.....	Tr	-	420	.18*	.19*	Limestone and calcite, iron oxides. Prospect pit.
2758	Random grab.....	-	1.1	100	.53*	3.0*	Limestone with iron oxides. Prospect pit dump.
2759	Random chip.....	-	-	ND	ND	ND	Limestone outcrop with stringered calcite. No mineralization visible.
2767	3.0 ft (0.9 m) chip...	-	Tr	ND	ND	ND	Crystalline limestone outcrop. No mineralization visible.
2768	3.0 ft (0.6 m) chip...	-	Tr	ND	ND	ND	Red sandstone outcrop. No mineralization visible.
2769	8.3 ft (2.5 m) channel	-	-	ND	ND	ND	Pegmatite with dumortierite. Prospect pit.
2770	5.8 ft (1.8 m) chip...	-	-	ND	ND	ND	Dark schist with quartz-feldspar veins, heavy limonite stain. Outcrop.
2771	5.0 ft (1.5 m) chip...	-	-	ND	ND	ND	Do.
2772	Random grab.....	-	Tr	.61*	50	95	Tan sandstone with local iron oxide staining, copper carbonates. Adit dump. Arsenic 0.31 percent.
2773	3.0 ft (0.9 m) chip...	-	.2	2.3*	40	110	Red-stained sandstone with copper carbonates. Adit. Arsenic 0.51 percent.
2774	Random grab.....	-	.1	1.0*	<30	48	Red-stained sandstone with copper carbonates. Adit dump. Arsenic 0.43 percent.

SCALE 1:24 000

1 ½ 0 1 MILE

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 80 FEET
DATUM IS MEAN SEA LEVEL

MINES AND PROSPECTS MAP OF THE PAIUTE PRIMITIVE AREA, MOHAVE COUNTY, ARIZONA

By

Louis W. Hamm

1980

Mineral Surveys
Related to Bureau of Land Management
Instant Study Areas

In accordance with the provisions of the Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976), the Geological Survey and the Bureau of Mines have conducted mineral surveys on certain areas, which formally had been identified as "natural" and "primitive" areas prior to November 1, 1975. This report discusses the results of a mineral survey of the Paiute Primitive Area, Mohave County, Arizona.

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1980

For sale by Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225