CONTACT INFORMATION
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602-771-1601
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ARIZONA TESTING LABORATORIES
A DIVISION OF CLAUDE E. McLEAN & SON LABORATORIES, INC.
PHONE ALpine 3-6272 817 WEST MADISON ST. P. O. BOX 1888 PHOENIX 1
Chemists . . . Engineers

For Mr. Gerald Weathers
3928 East Meadowbrook
Phoenix, Arizona

Date January 18, 1963

Sample of Ore

Received: 1-17-63

Submitted by: Same

ASSAY CERTIFICATE

Gold figured at $35.00 per ounce.

Silver figured at $ 1.00 per ounce.

Lab. No.	Identification	Gold		Silver		Percentages	
		Oz. per Ton	Value	Oz. per Ton	Value	COPPER (Cu)	
155885	2172	0.01	$0.35	Nil		Nil	
155886	2173	0.02	0.70	0.20	$0.20	0.25	
155887	2174	0.01	0.35	nil		Nil	
155888	2175	0.01	0.35	Nil		Nil	
155889	2176	0.01	0.35	Nil		Nil	
155890	2178	0.02	0.70	1.40	1.40	0.45	
155891	2179	0.01	0.35	0.40	0.40	0.20	

REGISTERED ASSAYER
CERTIFICATE EXPIRES
CLAUDE E. McLEAN
DEC. 31, 1962
ARIZONA, U.S.A.

Respectfully submitted,
ARIZONA TESTING LABORATORIES

Claude E. McLean

9-13-62

PROGRESS REPORT COVERING GEOLOGIC EXAMINATION OF THE SILVER PLATE GROUP OF MINING CLAIMS NEAR JEROME, ARIZONA

INTRODUCTION

The writer was retained August 20, 1962 to Geologically examine the Silver Plate group of mining claims, which includes 16 unpatented lode claims. The results of this Geologic survey were to be presented in written form to the County Recorder's Office to apply toward the required annual expenditure in labor necessary to hold the unpatented lode claims.

PROCEDURE

1. Written reports pertaining to the Jerome area were perused to become acquainted with the local Geology and the nature of the ore bodies.

2. A field reconnaissance of the property was made to become familiar with the claim locations and the local Geology.

3. Mines in the district were examined to become familiar with the ore locus within the Geological structure.

4. Available maps of the area were obtained.

GEOLOGIC MAPPING

The field Geologic survey conducted during the period August 20th to 31st was spent primarily on the unpatented group of claims near the southeastern portion of the property. This examination revealed that portion of the property to be underlain by progressively older rocks from southeast to northwest to the Verde fault. The Verde fault is marked by the contact of the Pre-Cambrian quartz porphyry on the northwest with younger Paleozoic sediments to the southeast. These rock types and structures, as determined by the Geologic survey completed to date, are presented in the report filed in the County Recorder's Office.

The Geologic Survey conducted from August 31st to date, was spent in a reconnaissance of the northwestern portion of the property and a more detailed study and mapping of the surface and subsurface workings on the cliff property.

The results of this examination revealed the gossan on the cliff claim to have been cut off by a flat fault and also to have been displaced eastward by another fault. The fault was traced eastward north of the cliff workings and a mineralized area was found on the hillside about 2,000 feet eastward. This mineralization had been previously examined by means of a hand dug pit. In fact the property is literally honeycombed with shafts, adits and prospect pits, some well placed and others apparently dug at random.

BASE MAP

Although various maps of the area were located, a suitable base is not available. Therefore, a portion of the Mingus Mountain quad sheet was blown up to a scale of 1,000 feet to the inch. A corrected map of the claims will be drawn upon this map.

Five unpatented claims not appearing on the claim map presented to the writer were found by searching the mining record books for their locations. These are old claims well described in the book of records and for the most part are fractions taken to cover unclaimed areas with the entire property.

This base map will assist in the more exact location of Geologic features on the property since the markings on the claim posts have been obliterated by weathering processes.

CLAIMS SPLITTING SILVER PLATE PROPERTY

The Silver Plate property is split into a northern group and a southern group of claims. An examination of the records revealed the owners of these claims to be as follows:

Owner: Phelps Dodge
Claims: May Queen, Bear, Lost Mine, Columbus, Lion, Blowout, 88, and Green Monster.

Owner: Hulda Larson, Box 144, Jerome, Arizona.
L S No. 673, Porrus Iron, Exchange, Lookout, Surprise, Union Jack, 96, Silver Plate (7/8) and Nancy (1/8)

FUTURE

It is planned to plot the Geology upon the base map now in preparation.

The Geological examination will continue to work out the structural framework, as well as the relation of the ore deposits to the Pre-Cambrian rocks.

Various important areas will be mapped using larger scale and from these cross sections will be prepared.

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MINING
GROUND WATER
ENGINEERING GEOLOGY

CRestwood 4-9795

A PRELIMINARY GEOLOGICAL REPORT ON THE CLIFF (SILVER PLATE) PROPERTY JEROME AREA, ARIZONA

November 1, 1962

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EXHIBITS

ILLUSTRATIONS

GERALD WEATHERS
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A PRELIMINARY GEOLOGICAL REPORT ON THE CLIFF (SILVER PLATE) PROPERTY JEROME AREA, ARIZONA

INTRODUCTION

The writer was retained August 20, 1962 by Mr. Henry Maag and Mr. Frederick Kallof to make a Geological survey of 16 unpatented lode mining claims, which are a part of a large group of patented and unpatented claims referred to as the Cliff or Silver Plate property. The results of this survey were applied toward the annual expenditure in labor required to hold the unpatented claims. The Geological survey was continued over the entire property to delineate an exploration target area in search for an underlying copper, gold, silver ore body.

SIZE OF THE MINING PROPERTY

This property consists of 74 patented and 16 unpatented mining claims covering an area in excess of 1,400 acres of land. Patented mining claims are: The Mescal fraction, Fools, Broad Gauge, Double Eagle, Curtis, Hidden Spring, Florence, Ohio, Cliff, Union Jack, Cherry, John and Johnathan, Blue Bell, Badger, Ground Hog, Lone Pine, Black Horse, Ninety-eight, Copper Plate, Galveston, El Paso, Amazon, Little Joe, Golden Eagle, Cloverdale, Revenue, Limbo, Missouri, Silver-tip, Grand Bounce, Protector, Oversight, Oregon, Prince, East Extension Grand Bounce, Fraction, Slim Fraction, Morgan, Humbert, Bailey, Valley View, Silver Cup, Wedge, Closure, Layman fraction, Elusive, Wild Rose,

South Plat, Silver Plate, Copper Bell, Triangle, Last Chance, Prosperity, Indiana, Golden West, Axtel, Mountain View, Descanso, Vulcan, Olympia, Domingo, Key West, Arizona, Steamboat, Monmont, Muscal, Reservation, Red Willow, Columbian, Copper Glance, Deer Trail, Belevue, Spoke, and Chautauqua. Unpatented mining claims are: The Michigan, Dewey fraction, Verde Fraction, Backbone Fraction, McKenzie, Dry Ranch, Richard, Parallel, Independence, Dry Climate, Iron Cap, Brad, Hancock, Airship, Green Parrot, and Mountain Goat. The claims are depicted on the Jerome Mining District map, Fig. 2. The patented claims are preceded by a patent number; the unpatented claims are unnumbered, but named.

LOCATION AND ACCESSIBILITY

The claims are located in Sections 6, 7, 26, 35 and 36, Township 15 North, Range 2 and 3 East, Verde Mining District, Yavapai County, Arizona, (See Fig. I, Arizona State Highway Map) immediately southeast of Jerome, Arizona.

The property can be reached by travelling southwest of Cottonwood, Arizona, on the County maintained Copper Chief gravel road for 5 miles to the Cliff Mine, located within the southeastern portion of the property. (See Fig. 3, Mingus Mountain Quadrangle)

CLIMATE AND VEGETATION

The property lies within the mountain region along the eastern slopes of the northwestward trending Black Hills and ranges from 4,200 feet to 6,500 feet in elevation. Temperatures over a 16 year period in nearby Clemenceau varied from a winter low of 9 degrees to a summer

high of 110 degrees. Precipitation over the same period of time averaged 11.29 inches per year. Vegetation consists of scrub oak, Mexican locust, manzanita, juniper, catsclaw, cottonwood and grass lands.

HISTORY AND DEVELOPMENT

Oxidized copper ores were mined by the Indians long ago from the site of the now famous United Verde Mine at Jerome. Active exploration in the district began in 1882. Production of bullion from the United Verde Mine began in 1883. Production was intermittent during these early years, then the mining of copper, gold, silver and zinc continued uninterrupted until February, 1953.

In 1904-5, sulfide copper ore was mined and smelted from the Copper Chief mine, located south of the Silver Plate property, and continued sporadically through 1949. In December 1914, the rich chalcocite ore body of the United Verde Extension Company was encountered 1,200 feet below the surface and east of the United Verde ore body.

The discovery of the United Verde Extension Copper ore body caused a mining boom during which time many pits, shafts and drifts were dug throughout the entire Jerome area in search for another bonanza.

According to Weeds Handbook, 1922, one of these exploration companies, the Green Monster Mining Company, held 68 claims between the Copper Chief Mine and the United Verde Mine, 3 miles northwestward.

This company sunk a shaft 983 feet deep and drove numerous crosscuts from it. In addition, they drove numerous long adits into the surrounding hillsides, but were unsuccessful in their search for ore. A limited zone of mineralized quartz porphyry was explored by means of adits and raises on the Cliff Claim along the western edge of the Green Monster property. This exploration also failed to develop an underlying ore body.

The Green Monster property makes up the bulk of the Silver Plate property described in this report.

Other significant mining companies active in the area during the exploration of the early 1920's were The Jerome Del Monte Copper Co., Gadsden Copper Co., Verde Combination Copper Co., Pittsburg-Jerome Mining Co., Cleopatra Copper Co., Calumet-Jerome Copper Co., Jerome-Grande Copper Co., Arkansas and Arizona Copper Co. and the Jerome Superior Copper Co.

Mining activities in the area have been discontinued due to the depletion of the known ore reserves, except for a small leasor operation in the United Verde pit. However, exploration for another United Verde, chiefly by means of diamond drilling programs, has continued at intervals without success to date. The difficulty of locating additional depositscan readily be understood when one realizes they are either hidden under the Pre-Cambrian rocks west of the Verde Fault or covered by thick blankets of Tertiary and Paleozoic sediments east of the fault. Also, they are chimney-like with small surface area and in sharp contact with the surrounding host rock.

PRODUCTION

The United Verde Mine and the United Verde Extension Mine (judged to be the downfaulted segment of the United Verde Mine) accounted for about 99% of the total production from the Verde Mining District. During the period 1883 through 1951, it is estimated the recoverable metal value produced from the Verde District was $650,000,000, consisting of 1,565,000 ounces of gold, 57,000,000 ounces of silver and 1,860,000 tons of copper.

GEOLOGY

Stratigraphy

The stratigraphic sequence in the Jerome area from top to bottom consists of a series of Tertiary flows and limy lake bed sediments underlain by nearly horizontal Paleozoic sediments resting on pre-Cambrian sediments and tuffs, that are underlain by rhyolite ~~and quartz porphyry~~, which in turn overlies basalt. Quartz Diorite Gabbro and andesite dikes have intruded the pre-Cambrian series. This stratigraphic column is shown in Figure 4.

Structure

The complex structural framework exhibited in this district has been caused by many different periods of faulting. Regional metamorphism first altered the pre-Cambrian rocks into broad northward trending folds. Subsequent faulting, trending both east-west and north-south, have displaced the entire stratigraphic sequence. In addition to the structural deformation, the pre-Cambrian rocks have been highly altered by chlorization and strong hydrothermal solutions normally related to ore deposition.

Fig. 5 depicts the broad structural pattern found in the Jerome area. Note the dominating structure is a doubly plunging anticlinal structure that has been warped into a reverse S pattern. The next most prominent structure is the northwestward trending Verde fault that has downdropped the eastern block approximately 1,500 feet exposing Paleozoic sediments on the eastern side of the fault and pre-Cambrian rocks on its western side. The third most prominent structure was caused by block faulting, creating planes of weakness in the rocks now followed by the present drainage system.

A fault known as the Copper Chief fault can be traced from the Copper Chief Mine southward to the Shea and Grand Island Mines and also northward to the Cliff Mine on the Silver Plate property. This is a thrust fault trending northwestward and dipping about 20° toward the northeast. It cut off the bottom portion of the Copper Chief ore body and also the Cliff Mine. D'Arcy, former superintendent of the Copper Chief, sunk a winze along it for a short distance encountering "drag" copper mineralization, but no ore body before he abandoned this project. A fault with approximately the same strike and dip and assumed to be a continuation can be followed north of the Cliff Mine as shown on the Geologic map, Fig. 6. Numerous adits and shallow shafts were sunk along it at intervals revealing limonite and copper oxides in their dumps.

Mineralogy

Minerals commonly occurring in the ore deposits are massive pyrite, chalcopyrite, bornite, galena, sphalerite, tetrahedite,

tennantite, gold and hematite. Silver occurs chiefly in the tetrahedrite and tennatite, and gold in the pyrite. Erosion has caused the oxidation products of these minerals to occur in the oxide caps of the ore bodies. Chalcocite is found in the zone of supergene enrichment.

Characteristics of the ore deposits

The ore deposits occur as massive sulphides and fissure veins within the pre-Cambrian rocks. The narrow fissure veins were mined for their precious metal content.

The massive sulfide deposits are pipe-like in form and are made up of granular aggregates of sulfide minerals.

The Copper Chief deposit, occurring in the pre-Cambrian Shea Basalt, is elongated in an east-west direction measuring about 800 feet long by 60 feet wide. It was mined to a depth of 300 feet or to its intersection with the nearly flat fault that displaced the ore deposit.

The largest deposit mined to date in the district, the United Verde ore body, covers an area of about 500 ~~square feet~~ feet square at the surface. It is in the form of a pipe or cone and dips eastward, gradually narrowing in width at depth. Workers in the area, who have studied it in great detail, have developed the following criteria they believe necessary for the localization of the ore:

A. Stratigraphy - the ore occurs in the purple portion of the quartz porphyry.

B. Folding - the ore occurs in a drag fold plunging 65°, N 20° W.

C. Shear Zone - the ore occurs in a highly foliated shear zone.

D. Gabbro - the ore occurs in an embayment in gabbro, or in a gabbro lobe.

Based upon these concepts and projections of the gabbro lobes eastward across the Verde fault, several holes were drilled by a major company in 1961 in the Del Monte - Green Monster area. It is believed these results were negative and no gabbro lobes were encountered east of the Verde fault. Refer to Fig. 7 for the structural interpretation of this area.

Another criteria illustrated on the structural map is the occurrence of ore along the nose of a plunging anticline. In addition, the rock in the vicinity of the sulfide deposits has been highly altered by chloritization and hydrothermal solutions.

GEOLOGICAL SURVEY PROCEDURE AND RECOMMENDED EXPLORATION AREAS

Although many of the claims within the property are patented and a part of the property is covered by the U. S. Quadrangle map, the claim boundaries proved difficult to locate as many of the patent markers and also section posts are missing.

After making a field reconnaissance of the property to become acquainted with the general geology and development, a thorough literature search of the Jerome District was made. (See Bibliography) The major mines and various rock types were then examined.

A Geological survey was made of the southeastern portion of the property covered by the unpatented claims. These claims proved to be underlain by recent to Paleozoic formations, as shown on the

Geologic Map, Fig. 6. Next, those pre-Cambrian formations, which have proven to be host rocks for the ore deposits in the district, were examined in detail.

Many pits, adits, and dumps adjacent to the numerous shafts were examined and rock type and mineralization noted. As a result of this surface Geological survey, two areas judged favorable for subsurface exploration were located. These locations are shown on the Geologic Map, Fig. 6, as Exploration Areas No. 1 and No. 2.

Exploration Area No. 1:

Exploration Area No. 1 is about 500 feet north and 1,500 feet east of the Cliff Mine. Factors deemed favorable for the possibilities of an underlying ore body are as follows:

1. Gossan - A nearly flat fault mineralized with iron and copper oxides can be followed completely around the hillside bounding the area. The mineralized zone varies from 50 feet on the northern side to over 100 feet thick on its southern side. Although it is realized this could represent a thrust fault cutting through the hillside, the gossan could also represent an underlying ore body.

2. Direction of fault movements - The nearly flat fault shown cutting across the Cliff, Copper Chief and Shea deposits is a thrust fault in which the upper portion moved southward. Thus, the mineralization encountered is in the upper block and the lower missing sulfide mineralized portions should be north of their oxide caps. The direction of movement is readily apparent when the slickensides along the fault face are observed; however, the distances of horizontal movement (heave) is difficult to ascertain as no recognizable displaced

marker beds were observed. A younger east-west trending fault has displaced the block of quartz porphyry north of the Cliff Mine toward the east. The apparent displacement of the quartz porphyry block indicates the missing lower portion of the Cliff Mine should be in the target area No. 1; however, this location is still indeterminate since the heave of the prior thrust fault remains unsolved. Should the horizontal movement of the thrust fault be about 300 feet, as determined by Reber after studying it in the vicinity of the Copper Chief Mine, then this is a valid target area for the continuation of the Cliff body.

3. Occurrence of Copper Sulfide in the area - Copper sulfide in the form of a pod of brecciated bornite was observed in the back of a drift driven along a narrow east-west trending silver-gold vein located along the southern boundary of the target area. This silver-gold vein closely resembles the Shea easterly trending silver-gold vein located about 600 feet south of the Copper Chief ore body.

4. Presence of Favorable Rock Types - The target area is underlain by highly altered and chloritized Shea Basalt and quartz porphyry in which schistose lenses are common. These are the same rock types and alterations normal to the ore bodies of the district.

Exploration Area No. 2:

Exploration Area No. 2 is about 4,000 feet northeast of the Cliff Mine on the Missouri patented claim situated immediately west of the Verde fault. It is located in an area having geological features believed necessary for the localization of copper ore in this district, as follows:

1. It is in the pre-Cambrian Cleopatra quartz porphyry adjacent to a Gabbro lobe.

2. The Verde shear has caused foliation of the quartz porphyry in this area.

3. It is in an area in which a fold trends northeastward.

4. It is along the northwestward trending anticline.

5. The porphyry has been greatly altered by chloritization and hydrothermal solutions.

6. Shallow pits have been dug into the rock surrounding the area exposing limonite and occasional copper oxide minerals.

EXPLORATION PROGRAM

An exploration program is recommended, designed to obtain the maximum Geologic information with the limited funds available.

To accomplish this objective, it is proposed the initial exploration program consist of a vertical diamond core drill hole each in the recommended target areas. The two holes should collar using an NX size bit (3") and be reduced in size as necessary. The program is designed to allow the holes to be drilled to a depth of 1,000 feet each. If results are encouraging, it is recommended that additional capital be alloted for the continuation and expansion of the drilling program.

A bid has been received from Boyles Bros. Drilling Contractors, who are drilling in the district now for another company. The bid price submitted is $5.60 per foot for the first 500 feet and $6.30 per

foot from 500 to 1,000 feet of hole depth or $5,950. per 1,000 feet of depth. Additional drilling costs include water truck rental, cementing, core boxes, and preparation of drill sites. (Refer to the attached Boyles Bros. Drilling Bid) The drilling rate should average 30 feet per day.

The drilling contractor will require access roads to the drill sites that can be traversed by a two-wheel drive truck. Therefore, the present roads which allow access by four-wheel drive vehicle will have to be improved.

Contractors based near Cottonwood, who are equipped to construct access roads and drill sites, will be contacted immediately to bid on and bulldoze the access roads to the two sites.

It is planned to commence drilling Hole No. 1 on November 12, 1962. By closely supervising the drilling operation and constantly checking the core, it may be possible to drill an additional hole with the allotted exploration funds, since drilling can be stopped as soon as the drill passes through the favorable zone and the drill moved to another location.

Gerald Weathers

GERALD WEATHERS

November 12, 1962

DIAMOND CORE DRILLING
DIAMOND DRILLING EQUIPMENT
GROUTING
FOUNDATION TESTING
MINING
QUARRYING
SHAFT SINKING
TUNNEL DRIVING
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BRANCH OFFICES
PHOENIX
RENO
SPOKANE
DENVER
SACRAMENTO
ST. LOUIS

October 29, 1962

Mr. Gerald Weathers
3928 E. Meadowbrook Ave.
Phoenix, Arizona

Dear Mr. Weathers:

For your proposed drilling near Cottonwood, Arizona, we submit the following prices:

1. Mobilization and demobilization, $200.00. This to be refunded if 1000 ft. or more are drilled.

2.

Drilling	All Sizes
0 to 500 ft.	5.60
500 to 1000 ft.	6.30

3. Cementing if necessary, $10.00 per hour plus cost of cement or cement substitutes including drilling mud.

4. Water truck rental of $190.00 per month plus 15 cents per mile.

5. Core boxes can be furnished at $1.00 per box.

6. Roads and drill stations to be furnished by you at no expense to us.

Thanks for asking for our prices.

Sincerely yours,

J. E. Roberts
District Manager

JER/bc

System	Series	Formation	Map symbol	Thickness (feet)	Section	Kind of rock
QUATERNARY AND TERTIARY	Pleistocene	Younger gravels	Qg	20-50		Heterogeneous unconsolidated accumulation of boulders, cobbles, pebbles, and some finer grained sediments
	Pliocene or Pleistocene	Verde formation	QTvg and QTvl	1,400		Lenticular alluvial fan deposits, QTvg, interbedded with lake deposits, QTvl. The alluvial fans consist chiefly of boulder gravel and cobble gravel, but contain minor amounts of sand and silt. The lake deposits comprise intercalated buff marls and limy silts and white fine grained tough limestone. A few thin basaltic flows are intercalated in the lake deposits
	Pliocene(?)	Hickey formation	Ths and Thv	1,200		Interbedded basaltic volcanic rocks and gravel. The volcanic rocks comprise chiefly olivine basalt and lesser amounts of olivine andesite, agglomerate, and basaltic sedimentary rock. The gravel beds consist of boulders and cobbles derived chiefly from local bedrock. Locally the gravel is crudely bedded and cemented by lime
PENNSYLVANIAN AND PERMIAN		Supai formation	PPs	368+		Red beds comprising chiefly red sandstone and siltstone cemented by lime and subordinate amounts of light-colored limestone and red shale. Locally a zone of breccia and rubble occurs at the base of the formation
MISSISSIPPIAN		Redwall limestone	Mr	255-286		A basal lenticular unit of slabby arenaceous limestone overlain by a massive cliff-forming bluish limestone unit, which is overlain by a light colored coarsely crystalline unit characterized by abundant conspicuous light-colored chert. An upper unit of white coarsely crystalline crinoidal limestone
DEVONIAN	Middle(?) and Upper Devonian	Martin limestone	Dm	440-465		Impure dolomite and dolomitic limestone characterized by diverse lithology and by thin interbeds of shale and mudstone. Divisible into four distinct units
CAMBRIAN		Tapeats sandstone(?)	Ꞓt	0-100		An upper unit of red to yellow limy siltstone and marl grading downward into red well-bedded coarse sandstone and pebble conglomerate separated by thin siltstone partings

FIGURE 2.—Stratigraphic column of Paleozoic, Tertiary, and Quaternary rocks in the Jerome area.

FROM GEOLOGICAL SURVEY PROFESSIONAL PAPER 308.

FIG. 4

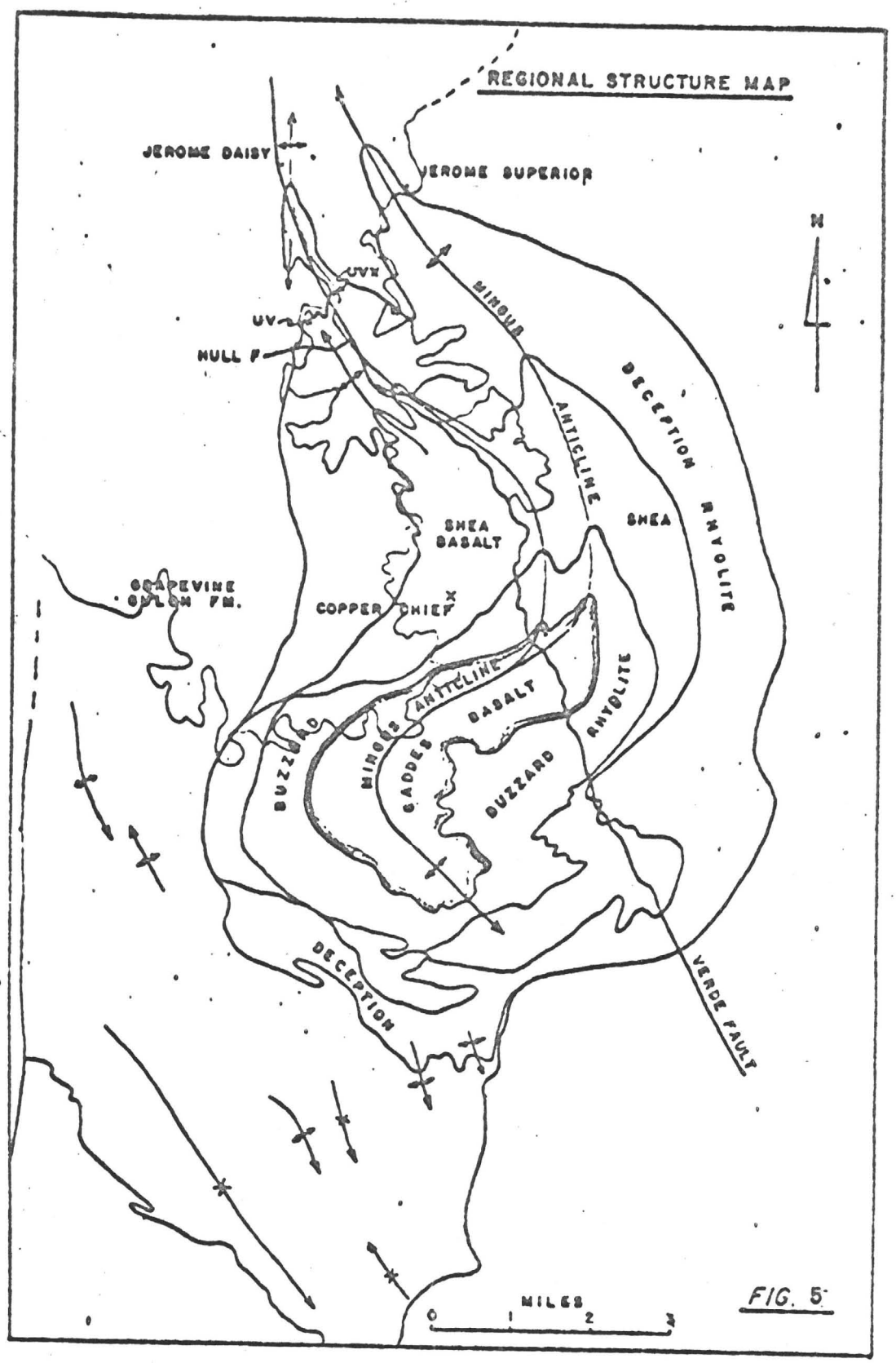
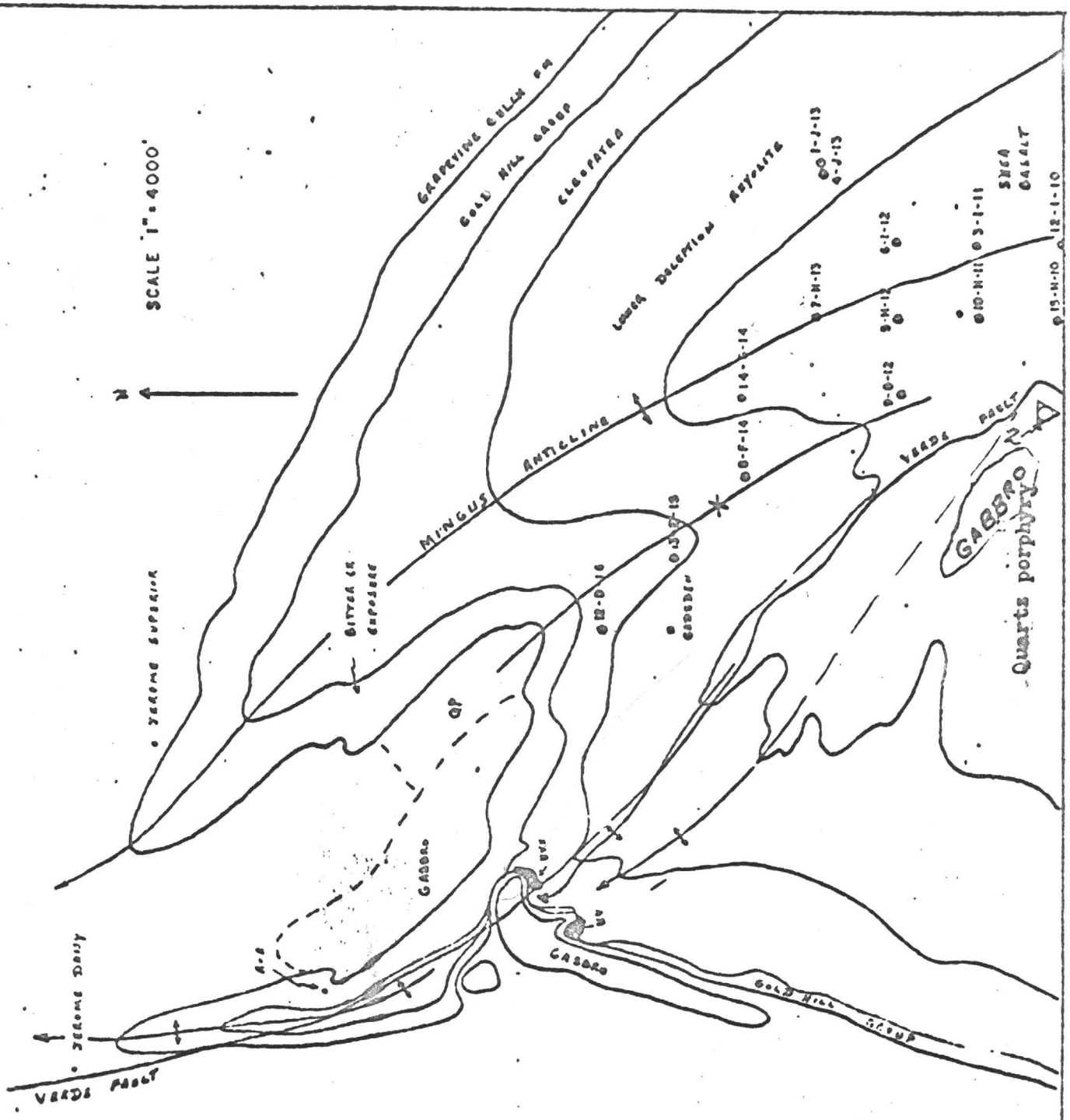

REGIONAL STRUCTURE MAP
JEROME DAISY
JEROME SUPERIOR
N
UVX
UV
HULL F
MINGUS
ANTICLINE
DECEPTION
RHYOLITE
SHEA
SHEA BASALT
GRAPEVINE
COPPER CHIEF
ANTICLINE
BASALT
RHYOLITE
BUZZARD
MINGUS
SADDLE
BUZZARD
DECEPTION
VERDE FAULT
MILES
0
1
2
3

FIG. 5



MAP
SHOWING
PRE VERDE FAULT
FOLD INTERPRETATION (PREFERRED)
EL. 6000'

FIG 7

GLOSSARY

ADIT - A nearly horizontal passage from the surface.

ANTICLINE - An up-arched fold in which beds dip outward from the crest.

BASALT - An igneous rock of volcanic origin composed of pyroxene and plagioclase feldspar. Usually fine-grained and black.

BORNITE - Peacock ore, a copper-iron sulfide mineral (34% Cu) 57%

CHALCOCITE - A mineral, copper sulfide, 79% copper.

CHALCOPYRITE - A yellow, copper-iron sulfide mineral (34% Cu).

CHLORITIZATION - A sum of processes whereby minerals are replaced by chlorite.

FAULT - A break or shear on which there has been displacement.

GABBRO - Igneous rock of granitoid texture composed chiefly of high calcic plagioclase feldspar.

GALENA - A lead sulfide mineral (86% Pb)

HEAVE - The horizontal component of a fault movement, normal to its strike.

HEMATITE - An iron oxide mineral (70% Fe).

HYDROTHERMAL - Pertaining to hot water solutions that dissolve, redeposit and produce mineral changes.

LIMONITE - A hydrous iron oxide, usually brown.

METAMORPHISM - Processes of endogenetic origin that transform a rock into a new type through recrystallization.

PRE-CAMBRIAN - A general term for rocks prior to Cambrian, the earliest period of the Paleozoic era.

PYRITE - A hard, yellow mineral composed of iron sulfide (46% Fe)

QUARTZ PORPHYRY - Here an altered igneous rock containing phenocrysts of quartz and alkali-feldspar in a similar groundmass. Usually dark gray, green or purple.

RHYOLITE - Volcanic rock of felsitic texture, composed chiefly of alkali-feldspar and quartz.

SEDIMENTS - Deposits from waters of streams, lakes, seas.

SLICKENSIDES - Polished and grooved surfaces along a fault face.

SPHALERITE - A zinc sulfide mineral.

SUPERGENE - Ores or minerals formed by downward enrichment.

SYNCLINE - A trough in the rocks toward which beds dip.

TENNANTITE - A copper-arsenic sulfide similar to Tetrahedrite.

TETRAHEDRITE - A copper-antimony sulfide (52% Cu).

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DRILLING RESULTS
CLIFF PROPERTY, JEROME, ARIZONA DIST.

By Gerald Weathers

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ENGINEERING GEOLOGY

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DRILLING RESULTS
CLIFF PROPERTY, JEROME, ARIZONA DISTRICT

By Gerald Weathers

INTRODUCTION AND SCOPE OF WORK

A Geological report was prepared November 1, 1962, covering the Cliff property in which two exploration areas were recommended; the first because of the probability of it being underlain by the faulted segment of the Cliff body and the second because of its geological similarity to the Verde Mine. The original suggestion of two relatively deep drill holes in these two areas was altered to four, more shallow diamond core drill holes. The holes were spaced so as to include the two target areas, as well as the area in between in an effort to obtain the maximum subsurface geological information for the funds allotted for this phase of exploration.

METHODS

Access roads were bulldozed to each drill site at a cost of $2,380.00. Vertical diamond core drill holes, C-1, C-2, C-3 and C-4 were drilled at the locations shown on the attached Geological map during the period November 16, 1962 through December 30, 1962. The core recovered commenced as NX size (2 5/32") and was reduced to BX size (1 21/32") when necessary. A

total of 1,642 feet were drilled at a cost of $10,190.56, or an average of $6.20 per foot. The casing was left in each hole and capped in the event it is judged necessary to re-enter the holes and deepen them for additional subsurface Geological knowledge.

The core was placed in cardboard diamond core drill boxes, each containing 10 feet of core.

A detailed megascopic study of the core was made and the observations recorded as a log. The information from these logs was condensed and a composite diamond drill log of each hole was prepared. (See attached logs of C-1, C-2, C-3 and C-4).

Samples of the core were taken by splitting the core to be assayed lengthwise with a core splitter and replacing half of the split core back in the core boxes. The halves of the core retained for sampling purposes were submitted to the Arizona Testing Laboratories, Phoenix, Arizona, and assayed for their copper, gold and silver content. The rejects or unassayed pulped portion of the samples were retained in the event further assaying is desired. Assay results are shown in the following table.

TABLE I

ASSAY RESULTS

Sample No.	Hole	From- To	Feet	Rock Description	% Copper	Au Oz/Ton	Ag Oz/Ton
2172	C-1	50.4'-54.7'	4.3	Greenstone, tuffaceous sediments	0	0.01	0
2173	C-1	68.8'-71.1'	2.3	Greenstone schistose clay and quartz	0.25	0.02	0.20

TABLE I (Cont'd)

Sample No.	Hole	From - To	Feet	Rock Description	% Copper	Au Oz/Ton	Ag Oz/Ton
2174	C-1	232-233'	1.0	Massive Pyrite	0.0	0.01	0
2175	C-1	290-291'	1.0	Pyrite in white silica	0.0	0.01	0
2176	C-2	136.8-142'	5.2	Gabbro	0.0	0.01	0
2177	C-3	24.0-30.0'	6.0'	Greenstone schist & limonite	0.0	0.01	0
2178	C-3	121.5-127.0'	5.5	Greenstone schist & limonite	0.45	0.02	1.40
2179	C-4	288.7-289.7	1.0	Quartz porphyry	0.02	0.01	0.40

SUMMARY OF DRILLING RESULTS

After studying the ore deposits in this district both visually and through a perusal of the available literature, it was concluded that the Pre-Cambrian host rocks associated with the copper, gold, silver ores are the Grapevine Gulch formation, (locally referred to as greenstone), quartz porphyry, gabbro, black schist and massive sulfide.

Holes C-1 and C-3 were drilled, collaring in mineralized greenstone, in search for the faulted segment of the ore from the nearby Cliff Mine. Both drill hole cores contained iron oxide gossan material mineralized with copper, gold and silver similar to the oxide portions of the ore bodies in this district; however, the mineralization was not of ore grade. C-1 and C-3 cores also contained

blebs of bornite in the greenstone as well as a lens of massive sulfide in the quartz porphyry.

Diamond drill hole C-2 probed a gabbro intrusion occurring immediately west of the Verde fault on the patented Missouri claim. Shallow surface pits on either side of the hole location disclose the presence of copper oxides and sulfides along the contact of the gabbro with the Grapevine Gulch formation. The hole was drilled in an effort to find a hidden ore body along the gabbro contact similar to the "big hole" at Jerome; however, the drilling was stopped in gabbro and did not penetrate the contact zone. Specular hematite is common throughout the core. A typical sample of the core submitted for assay verified the presence of gold. Very fine grains of a black metallic mineral in the core have not been identified.

Diamond core drill Hole C-4 was drilled approximately midway between C-1 and C-2 into the favorable host rocks occurring in an overturned fold. Surface outcrops and shallow diggings in this area contain gold in iron oxides. The hole was stopped in very hard quartz porphyry. Assays of samples again verified the presence of copper, gold and silver minerals of sub-ore grade.

CONCLUSIONS AND RECOMMENDATIONS

Since Hole C-2 was stopped in gabbro, no information was obtained as to whether or not mineralization occurs at the contact of the gabbro intrusive with its host rock. The casing was capped in the event that sufficient funds are made available for deepening this hole. It is recommended that a spectrographic analysis be made of the

rejects of the sample assayed to determine the elements represented in the very fine-grained black metallic minerals present in the core.

Hole C-4 was stopped in hard quartz porphyry sparsely mineralized with pyrite. As further subsurface geologic knowledge of this area is gained, it may be desirable to deepen this hole, thus it too was left cased and capped.

A geologic section through Holes C-3 and C-1 is attached. These holes, drilled in search for the faulted segment of the Cliff ore body, encountered abundant iron oxide gossan material in their upper portions. Assays of samples verified the presence of copper, gold and silver. The presence of massive sulfide in these holes is interpreted as a sulfide lens from a nearby larger massive sulfide body. The white silica lens is interpreted as a low angle fault in which the gouge has been replaced by cryptocrystalline silica. It is believed the mineralization encountered is part of the faulted Cliff body, which is now judged to lay west of the C-1 and C-3 hole locations. A search of the surface exposures west of these hole locations did reveal an outcrop mineralized with chalcopyrite.

Assays of samples from C-3, the most westward hole, show a greater mineral content than the remaining holes and tend to support this theory of higher grade mineralization westward.

In conclusion, it is recommended that the drilling program be continued by drilling holes west of the C-3 location in search for the faulted segment of the Cliff ore body. The locations should be

selected after a close Geological study has been made of the area recommended.

January 22, 1963

Enclosures:

1. Geological map of Cliff property showing C-1, C-2, C-3 and C-4 drill hole locations.

2. Composite diamond drill logs of Holes C-1, C-2, C-3 and C-4.

3. Section through C-1 and C-3.

4. Arizona Testing Laboratory assay certificate.

COMPOSITE DIAMOND DRILL LOG

HOLE Nº C-2

COMPANY: MAAG MINE: CLIFF CLAIM: MISSOURI DISTRICT: VERDE

COUNTY: YAVAPAI STATE: ARIZ. TWS: 15N RGE: 3E SEC: 36 N.S. _____ E.W. _____

BEARING: _____ ANGLE: VERT ELEVATION: 4700± FT. T.D.: 453 FT. DATE STARTED: 11-28-62 DATE COMP: 12-5-62

DEPTH	ELEV.	ROCK TYPE	GEOLOGIC DESCRIPTION & REMARKS	HOLE: CASING:	CORE SIZE	CORE RUNS	CORE REC.%	MINERALIZATION	ASSAYS %
305–450			GABBRO, SCHISTOSE CONTAINS DISSEMINATED PYRITE.		BX	320, 340, 360, 380, 400, 420, 440			
340–365			GABBRO, COARSELY CRYSTALLINE AUGITE, INTERSPERSED WITH FELDSPAR & QUARTZ. QUARTZ SEALED FRACTURES.						
365–450			GABBRO, SCHISTOSE, CONTAINS DISSEMINATED HEMATITE.						
455–300			BOTTOM OF HOLE @ 453' 12-5-62 14' OF NX CASING LEFT IN HOLE, COLLAR OF HOLE CAPPED G. WEATHERS			460, 480, 200, 220, 240, 260, 280, 300			

COMPOSITE DIAMOND DRILL LOG

HOLE Nº C-2

COMPANY: MAAG MINE: CLIFF CLAIM: MISSOURI DISTRICT: VERDE

COUNTY: YAVAPAI STATE: ARIZ TWS: 15N RGE: 3E SEC: 36 N.S. _____ E.W. _____

BEARING: _____ ANGLE: VERT ELEVATION: 4700± FT. T.D.: 453 FT. DATE STARTED: 11-28-62 DATE COMP: 12-5-62

DEPTH	ELEV.	ROCK TYPE	GEOLOGIC DESCRIPTION & REMARKS	HOLE: CASING:	CORE SIZE	CORE RUNS	CORE REC% (50-100)	MINERALIZATION	ASSAYS % CU %	ASSAYS % AU g/T	ASSAYS % AG g/T
5–300			GREENSTONE, PRE-CAMBRIAN GRAPEVINE GULCH FORMATION, FINEGRAINED SILICIFIED, SILTSTONE, CHERT & TUFF, SCHISTOSE, ALTERNATING, GREEN, PINK & GRAY HUES. MUCH LIMONITE PARTIALLY SEALING OPEN FRACTURES. HVY PYRITIZATION FROM 28'	NX	NX	24					
			GABBRO, PRE-CAMBRIAN INTRUSIVE, PYROXENITE, VARIETY AUGITE, COARSELY CRYSTALLINE, DARK GRAY GREEN, MASSIVE THIN FRACTURES SEALED WITH QUARTZ. DISSEMINATED PYRITE		2 5/32"	20, 40, 60, 80					
					BX	100, 120					
					1 21/32"	140, 160, 180, 200, 220, 240, 260, 280, 300		5.2'	2.17%	0	.01	0
			-HEMATITE ALONG FRACTURE PLANES								
			QUARTZ & FELDSPAR SURROUNDS AUGITE CRYSTALS								
			SPECULARITE ALONG FRACTURES								
			SAME BUT SCHISTOSE								

COMPOSITE DIAMOND DRILL LOG

HOLE Nº C-1

COMPANY: MIAAG MINE: CLIFF CLAIM: SOUTH PLAT DISTRICT: VERDE

COUNTY: YAVAPAI STATE: ARIZ. TWS: 15 N RGE: 2 1/2 E SEC: 1 N.S. _____ E.W. _____

BEARING: _____ ANGLE: VERT ELEVATION: 5000 ± FT. T.D.: 426 ± FT. DATE STARTED: 11-16-62 DATE COMP: 11-27-62

DEPTH	ELEV.	ROCK TYPE	GEOLOGIC DESCRIPTION & REMARKS	HOLE: CASING:	CORE 0–100 SIZE	RUNS	REC.%	MINERALIZATION	ASSAYS %
305			PRE-CAMBRIAN SHEA BASALT		BX				
310			BLACK, DENSE, FINE GRAINED						
315									
320						320			
325									
330									
335									
340						340			
345									
350									
355									
360						360		Fe S	
365									
370								Fe S	
375									
380						380			
385									
390									
395									
400						400		Fe S	
405									
410									
415									
420						420		Fe S	
425									
430			BOTTOM of HOLE 426 ±						
435									
140			11-16-62			440			
145									
150									
155									
160						160			
165									
170			CASING LEFT IN HOLE +						
175									
180			COVER PLACED OVER COLLAR			180			
185									
190			OF HOLE G.W.						
195									
200									
205						200			
210									
215									
220									
225						220			
230									
235									
240									
245						240			
250									
255									
260									
265						260			
270									
275									
280									
285						280			
290									
295									
300						300			

SHEET 1 of 2

COMPOSITE DIAMOND DRILL LOG

HOLE № C-1

COMPANY: MAAG MINE: CLIFF CLAIM: SOUTH PLAT DISTRICT: VERDE
COUNTY: YAVAPAI STATE: ARIZ. TWS: 15N RGE: 2 1/2 E SEC: 1 N.S. ______ E.W. ______
BEARING: ______ ANGLE: VERT ELEVATION: 5000 ± FT. T.D.: 426.3 FT. DATE STARTED: 11-16-62 DATE COMP: 11-27-62

DEPTH	ELEV.	GEOLOGIC DESCRIPTION & REMARKS	HOLE: CASING:	CORE SIZE	CORE RUNS	MINERALIZATION	ASSAYS % CU %	Au oz/T	Ag oz/T
5–15		OVERBURDEN + BOWLDERS	N.C.	N.X.					
15–55		GREENSTONE, PRE-CAMBRIAN GRAPEVINE GULCH FORMATION, FINE GRAINED SILICIFIED SHALE INTERBEDDED WITH SCHISTOSE TUFF, CHERT AND SILTSTONE GREEN, PINK, WHITE, + RED HUES, MANY FRACTURES SEALED WITH LIMONITE, BRECCIATED ROCK PREDOMINENT		2 5/32"	20 40	Fe Ox GOSSAN			
						4' #2172	0	0.01	0
55–90		SIMILAR TO ABOVE, PYRITE THROUGHOUT WITH OCCASSIONAL BLEBS OF CHALCOPYRITE + BORNITE, FRAGMENTS OF JASPER MORE EVIDENT			60	Fe ox Fe S, CuS			
						2.5 #21[illegible]	0.25	0.02	0.20
					80	Fe S Fe Ox Fe S			
90–230		PRE-CAMBRIAN QUARTZ PORPHYRY INTRUSIVE, PINK FELDSPAR + SILICA, VERY FINE GRAINED, VERY HARD, DENSE, WITH PHENOCRYSTS OF ROUNDED QUARTZ PARTICLES. PREDOMINENTLY ALTERNATING GREEN, GRAY-BROWN AND RED HUES. FRACTURES SEALED WITH LIMONITE + DENDRITIC MANGANESE. MOTTLED ORANGE MOTTLED MARROON COLOR MOTTLED RED, + GRN HUES		BX 1 21/32"	100 120 140 160 180 200 220	Fe S 1, Fe S			
						1' 2174	0	0.01	0
230–255		MASSIVE PYRITE IN BLACK DIABASE GROUND MASS			240				
255–278		FAULT, SILICA, WHITE, VERY FINE GRAINED, JASPER FRAGMENTS, DISSEMINATED PYRITE			260	Fe S			
278–300		PRE-CAMBRIAN SHEA BASALT, BLACK, DENSE, MASSIVE, FINE GRAINED, DISSEMINATED PYRITE THROUGHOUT			280				
						1' #2175	0	0.01	0
					300	Fe S			

COMPOSITE DIAMOND DRILL LOG

HOLE Nº C-3

COMPANY: MAAG MINE: CLIFF CLAIM: DISTRICT: VERDE

COUNTY: YAVAPAI STATE: ARIZ TWS: 15N RGE: 2 1/2E SEC: 1 N.S. E.W.

BEARING: 800' S75°W FROM C-1 ANGLE: VERT ELEVATION: 5200± FT. T.D.: 346 FT. DATE STARTED: 12-8-62 DATE COMP: 12-15-62

DEPTH	ELEV.	ROCK TYPE	GEOLOGIC DESCRIPTION & REMARKS	HOLE: CASING:	CORE SIZE	CORE RUNS	CORE REC.% (50 100)	MINERALIZATION	ASSAYS %
305			DIABASE, HIGHLY ALTERED						
310			QP		BX			Fe S	
315			MASSIVE SULFIDE, PYRITE IN DIABASE						
320			PRE-CAMBRIAN, SHEA BASALT, BLACK,			320		Fe S	
325			DENSE, WITH LENSES OF QTZ PORPHYRY						
330			NEAR CONTACT.						
335			SILICA, WHITE, VERY FINE GRAINED						
340						340		Fe S	
345									
350			BOTTOM OF HOLE @ 346'						
355			12-8-62						
360						360			
365			10' OF CASING LEFT IN						
370									
375									
380			HOLE, HOLE CAPPED			80			
385									
390									
395			G. WEATHERS						
400						100			
405									
410									
415									
420						120			
425									
430									
435									
440						140			
445									
450									
455									
460						160			
465									
470									
475									
480						180			
485									
490									
495									
500						200			
505									
510									
515									
520						220			
525									
530									
535									
540						240			
545									
550									
555									
560						260			
565									
570									
575									
580						280			
585									
590									
595									
600						300			

COMPOSITE DIAMOND DRILL LOG

HOLE Nº C-3

COMPANY: MAAG MINE: CLIFF CLAIM: DISTRICT: VERDE

COUNTY: YAVAPAI STATE: ARIZ TWS: 15N RGE: 2 1/2 E SEC: 1 N.S. E.W.

BEARING: 900' S 75° W FROM C-1 ANGLE: VERT ELEVATION: 5200± FT. T.D.: 346 FT. DATE STARTED: 12-8-62 DATE COMP: 12-15-62

DEPTH	ELEV.	ROCK TYPE	GEOLOGIC DESCRIPTION & REMARKS	HOLE: CASING:	CORE SIZE	CORE RUNS	CORE REC% (50-100)	MINERALIZATION	ASSAYS % Cu%	ASSAYS % Au oz/t	ASSAYS % Ag oz/t
5			OVERBURDEN								
10–100			GREENSTONE, PRE-CAMBRIAN GRAPEVINE GULCH FORMATION, DARK GRAY, DENSE, SILICIFIED SHALE AND SILTSTONE, MANY OPEN FRACTURES, FREQUENT LENSES OF JASPER + QUARTZ. ABUNDANT OCCURRENCES OF SPONGY LIMONITE (GOSSAN MATERIAL) DENDRITIC MANGANESE ALONG FRACTURE PLANES. ABUNDANT LIMONITE BOX WORK		NX	20, 40, 60, 80, 100, 120, 140, 160		ABUNDANT Fe Ox			
								G' # 2177			
								Fe Ox			
					5/32"			BLEBS of BORNITE			
								PYRITE			
								5.5' # 2178 Fe S	0.45	.02	1.40
					2			Cu Ox COMMON			
165–275			PRE-CAMBRIAN QUARTZ PORPHYRY, INTERBANDED PINK QUARTZ + FELDSPAR, DENSE, FINE GRAINED LARGER QUARTZ PHENOCRYSTS THROUGHOUT. OPEN FRACTURES PARTIALLY SEALED WITH LIMONITE.		BX	180, 200, 220, 240, 260, 280, 300					
					21/32"						
275–285			DIABASE DIKE, BLACK, DENSE, FINE GRAINED FELDSPAR LATHS ABUNDANT								
285–300			SAME AS ABOVE BUT WITH LENSES of QUARTZ PORPHYRY								

COMPOSITE DIAMOND DRILL LOG

HOLE Nº C-4

COMPANY: MAAG MINE: CLIFF CLAIM: LITTLE JOE DISTRICT: VERDE

COUNTY: YAVAPAI STATE: ARIZ. TWS: 15N RGE: 3E SEC: 36 N.S. _____ E.W. _____

BEARING: _____ ANGLE: VERT ELEVATION: 4600± FT. T.D.: 417 FT. DATE STARTED: 12-15-62 DATE COMP: 12-30-62

DEPTH	ELEV.	ROCK TYPE	GEOLOGIC DESCRIPTION & REMARKS	HOLE: CASING:	CORE SIZE	CORE RUNS	CORE REC%	MINERALIZATION	ASSAYS % Cu %	ASSAYS % Au oz/T	ASSAYS % Ag oz/T
5–10			OVERBURDEN, BOULDERS AND WEATHERED ROCK	NX	NX						
15–20			GREENSTONE, PRE-CAMBRIAN GRAPEVINE GULCH FORMATION, SCHISTOSE TUFFACEOUS SEDIMENTS, DARK GRAY WITH OCCASIONAL LENSES OF PINK FELDSPAR AND MAROON SHALE. MANY OPEN FRACTURES PARTIALLY SEALED WITH LIMONITE			20		Fe Ox			
25–40					5/32"	40		Fe Ox			
45–60						60					
65–80						80		Fe Ox			
85–100			BASALTIC, DARK GREEN, FINE GRAINED, MASSIVE, VERY SOFT. CONTAINS DISSEMINATED PYRITE. LARGE OPEN FRACTURE 104-109		BX	100	30				
105–120						120					
125–140			PRE-CAMBRIAN QUARTZ PORPHYRY. MOTTLED GRAY, HARD, WITH QUARTZ PHENOCRYSTS. MANY OPEN FRACTURES AND GRAVEL FRAGMENTS @ 133'		1 21/32"	140		Fe S			
145–160						160					
165–180			PRE-CAMBRIAN SHEA BASALT, BLACK, FINE GRAINED, MASSIVE, DISSEMINATED PYRITE THROUGHOUT LENSES OF QUARTZ PORPHYRY 141-142½, 145-146, 147½-156½			180					
185–200						200					
205–220			PRE-CAMBRIAN QUARTZ PORPHYRY INTRUSIVE, MOTTLED LIGHT TO MED. GRAY-PINK, GLASSY QUARTZ PHENOCRYSTS THROUGHOUT, MANY RANDOMLY ORIENTED, THIN SEALED FRACTURES			220					
225–240						240		Fe S			
245–260						260		Fe S			
265–280						280		Fe S			
285–300			SCHISTOSE LENS			300		Fe S	0.20	0.01	0.40

COMPOSITE DIAMOND DRILL LOG

HOLE Nº C-4

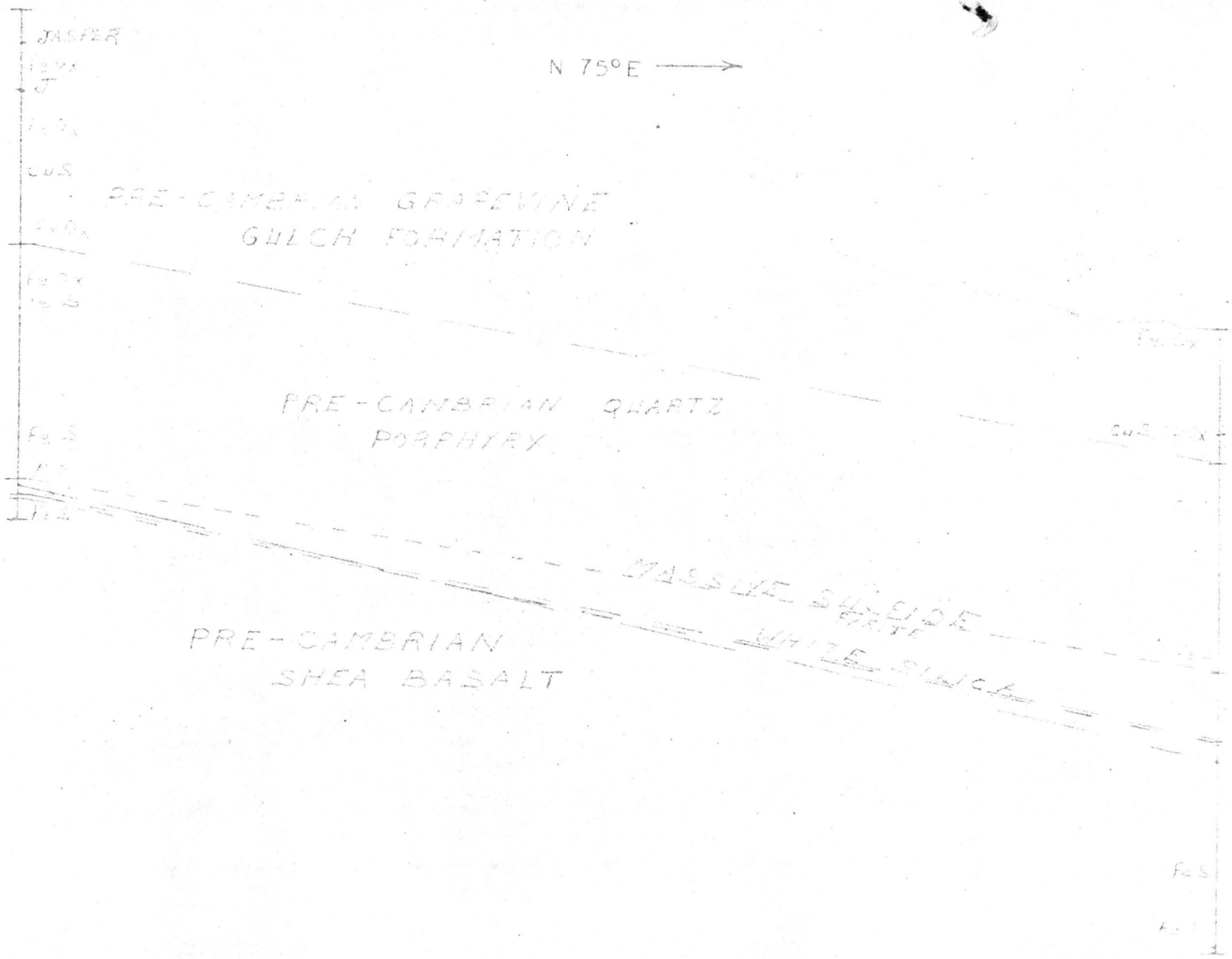
COMPANY: MAAG MINE: CLIFF CLAIM: LITTLE JOE DISTRICT: VERDE

COUNTY: YAVAPAI STATE: ARIZ TWS: 15N RGE: 3E SEC: 36 N.S. _____ E.W. _____

BEARING: _____ ANGLE: VERT ELEVATION: 4600± FT. T.D.: 417 FT. DATE STARTED: 12-15-62 DATE COMP: 12-30-62

DEPTH	ELEV.	ROCK TYPE	GEOLOGIC DESCRIPTION & REMARKS	HOLE: CASING:	CORE SIZE	CORE RUNS	CORE REC% (50-100)	MINERALIZATION	ASSAYS %		
305			PRE-CAMBRIAN QUARTZ PORPHYRY INTRUSIVE		BX						
310								FeS			
315											
320						320					
325											
330								FeS			
335											
340						340					
345											
350											
355											
360						360					
365											
370											
375											
380						380					
385											
390											
395			DIABASE DIKE, DARK GRAY, VERY FINE GRAINED WITH DISSEMINATED PYRITE THROUGHOUT								
400						400		FeS			
405											
410											
415			PRE-CAMBRIAN QUARTZ PORPHYRY								
420			BOTTOM OF HOLE @ 417'			420					
425			12-30-62								
430											
435											
440			15 FEET OF NX CASING			140					
445											
150											
155											
160			LEFT IN HOLE, HOLE CAPPED			160					
165											
170			G. WEATHERS								
175											
180						180					
185											
190											
195											
200						200					
205											
210											
215											
220						220					
225											
230											
235											
240						240					
245											
250											
255											
260						260					
265											
270											
275											
280						280					
285											
290											
295											
300						300					

C-3



SECTION THROUGH H' & C-3

SCALE 1"=100'

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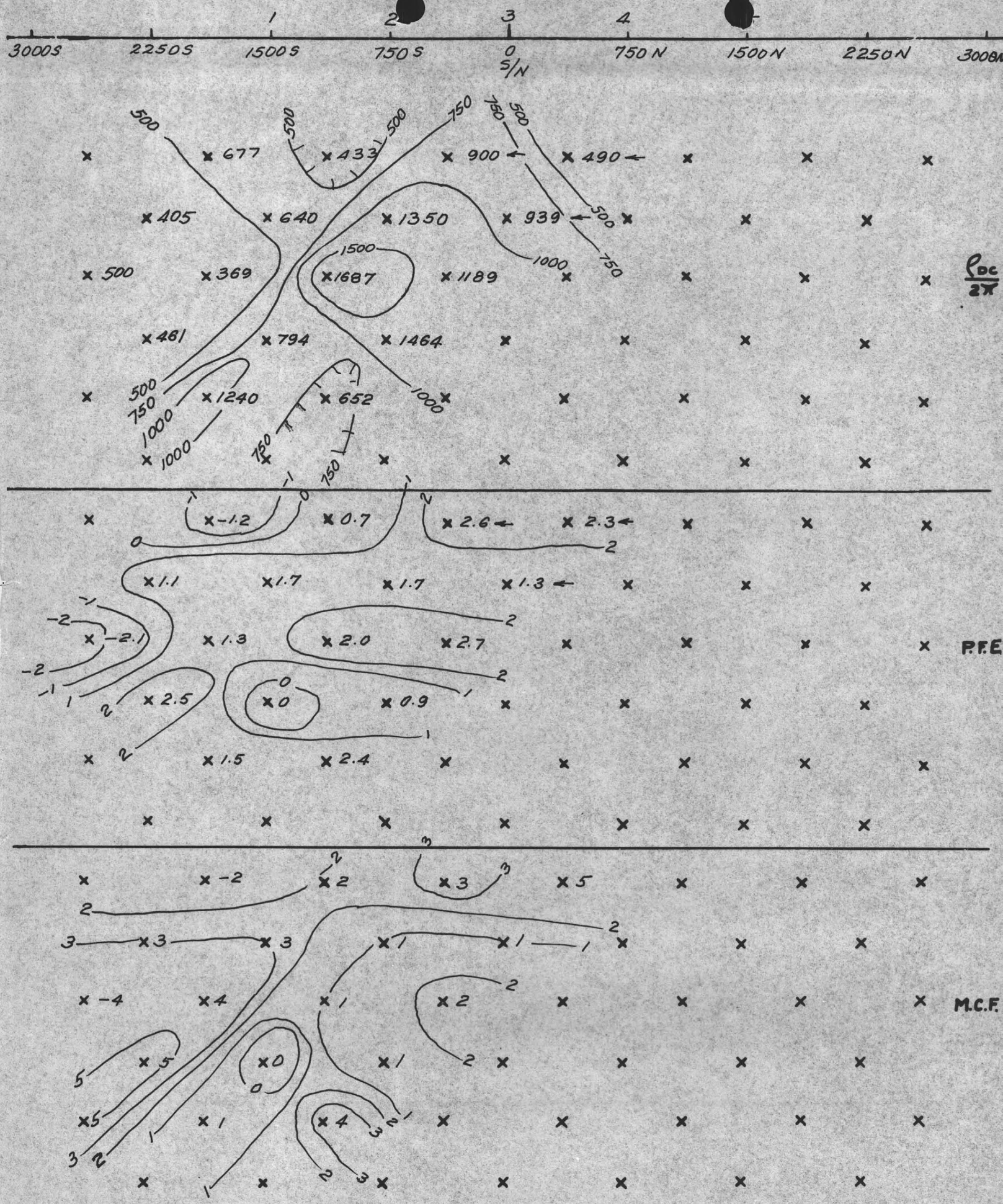
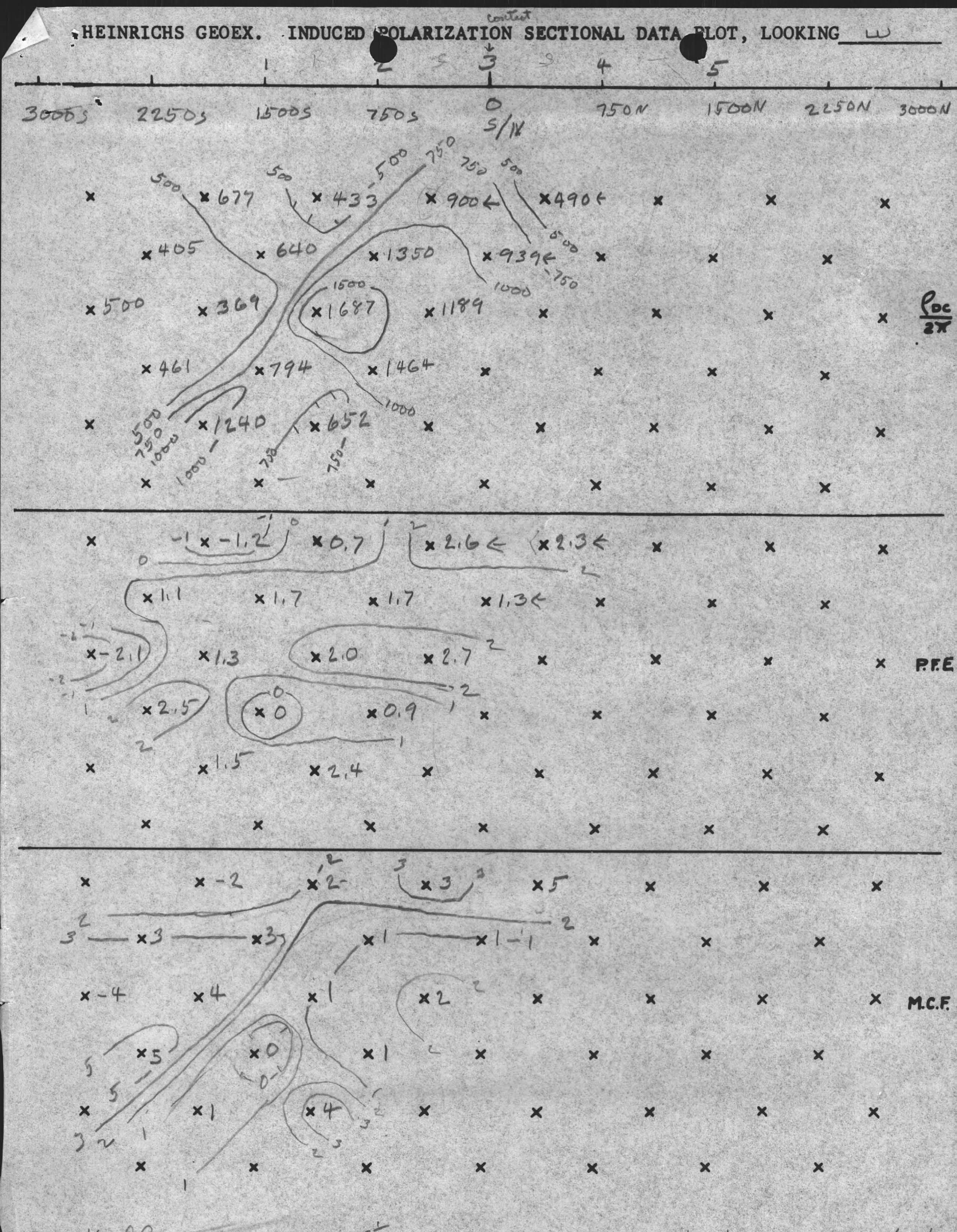


AREA KALLOF LINE 1 S½ a = 750' SCALE: 1" = 750' DATE: 8/27/66

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING W



AREA Kallof LINE 1 5½ a = 750' SCALE: 750' = 1" DATE: 8/27/66

HEINRICHS GEOEXPLORATION COMPANY
INDUCED POLARIZATION SURVEY COMPUTATION SHEET

Page_____

Project Kolbof Line 1 5½ Field date 24 Data page_____ Comp. date_____. Comp by J.W.L

(A) Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
(B) Receive	0-750S	750-1500S →		1500-2250S		→	2250-3000S		→		3000-3750	
(C) n separation	1	1	2	1	2	3	1	2	3	4	2	3
(D) I	1.6	2.0	2.0	1.6	1.6							→
(E) Vdc (avg) ①	610	1400	365	539	420	148	842	199	210	91.1	126	45.9
(F) DCcal	.571											→
(G) Kn x 10^{-3}	2.25	2.25	9.0	2.25	9.0	22.5	2.25	9.0	22.5	45.0	9.0	22.5
(H) ρdc=ExFxGx10^3/D	490	900	939	433	1350	1189	677	640	1687	1464	405	369
(I) Vac Σ ②	596	1325	350	520	401	140	828	190	200	87.7	121.1	44
(J) AC noise x 2												
(K) Vac(corr) =$\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	.971						1.000					
(M) ρdc/ρac=ExL/K Ans	1023	1026	1013	1007	1017	1027	.988	1017	1020	1009	1011	1013
(N) PFE=(M-1)(10^2)	2.3	2.6	1.3	0.7	1.7	2.7	-1.2	1.7	2.0	0.9	1.1	1.3
(O) MCF=(M-1)(10^5)/H	5	3	1	2	1	2	-2	3	1	1	3	4

Project_____ Line_____ Field date_____ Data page_____ Comp. date_____ Comp by_____

(A) Send	3-4	4-5	1-2	2-3	3-4	4-5		Cal.				
(B) Receive	→	→	3750	4500S	→	→		3-4				
(C) n separation	4	5	3	4	5	6						
(D) I						→		1.000				
(E) Vdc (avg)	49.4	23.2	62.2	28.7	44.1			.175				
(F) DCcal						→						
(G) Kn x 10^{-3}	45.0	78.75	22.5	45.0	78.75	126.0						
(H) ρdc=ExFxGx10^3/D	794	652	500	461	1240							
(I) Vac Σ	48	22	61.7	27.2	42.2	21.3		170				
(J) AC noise x 2												
(K) Vac (corr) =$\sqrt{I^2 - J^2}$												
(L) AC-DC cal.	0		1000									
(M) ρdc/ρac =ExL/K	0	1024	.979	1025	1.015							
(N) PFE=(M-1)(10^2)	0	2.4	-2.1	2.5	1.5							
(O) MCF=(M-1)(10^5)/H	0	4	-4	5	1							

(x)(Dc) : $\left(\frac{Dc}{Ac} - 1\right)100$: PFE

AC

DC

.357

175

170

(x) (175 − 170)

$\rho = \frac{(.571)(Dc\,Av)(Km)}{1.6}$

$x = \frac{170}{175}$

INDUCED POLARIZATION SENDER NOTES

Project: Ko Line: 1 Date: 23 Aug 66

Send	4-5	3-4	4.5	2-3	3-4	4-5	1.2	2-3	3-4	4.5		3
Receive	0-750	750 —	1500	1500 —	2250	→	2250 —	3000	→			
Current ~~Time~~	2X800 ± 0	2X100 0+	2X1000 0+	2X800 ± 0	2X800 ± 0	2X800 ± 0	2X800 ± 0	2X800 ± 0	2X800 ± 0	2X800 ± 0		
Range												
Total Current	1.600	2.000	2.000	16.00	1.600	1.600	1.600	1.600	1.600	1.600		
Send	1-2	2-3	3 4	4-5	1-2	2-3	3-4	4-5		CAL. 1 AMP	3-4	
Receive	3000 —	3750	→		3750 —	4500	→					
Current ~~Time~~	2X800 ± 0	2X800 ± 0	2X800 ± 0	2X800 ± 0	2X800 ± 0	2X800 ± 0	2X800 ± 0	2X800 ± 0				
Range												
Total Current	1.600	1.600	1.600	1.600	16.00	16.00	16.00	16.00				

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Kalbor Line: _____ Int.Cal _____ Date: _____

Send	4-5	3-4	4-5	2-3	3-4	4-5	1-2	2-3	3-4	4-5	1-2	2-3
Rec.	0-750S	750-1500S →		15-22.5S →			22.5-3000S →				30-3750S	
Time R	1000	1000	300	1000	300	300	1000	300	300	100	100	100
DC-1	305 305	699 699	182 183	266 272	214 209	75 73	421 421	99 100	105 105	44.5 46	63.8 61.8	24 21.9
DC-2	305 305	699 699	183 182	272 267	209 211	73 75	421 421	100 99	105 105	46 44.6	61.8 63.8	21.9 23.8
Σ	610 610	1398 1398	365 365							91.5 90.6	125.6 125.2	45.9 45.7
DC-3	308 302	699 699		272 267	211 209						63.8 62	23.8 21.9
Dc-4	302 307				209 211							21.9 24.2
Σ	610 609			539							125.8	45.7 46.1
DC-AV	609.75	1398	365	539	420	148	842	199	210	91.05	125.69	45.85
AC-1	298	663	175	260	201	70	417	95	100	43.8	60.8	22
AC-2	298	662	175	260	200	70	411	95	100	43.9	60.3	22
Σ	596	1325	350	520	401	140	828	190	200	87.7	121.1	4
S. P.	-15	+19		-21			+19					
AC-N	.3	.15		.05			.05					
Pot. Res	-3K	3K		2K			1K					

INDUCED POLARIZATION - RECEIVER NOTES PAGE _____

Project: Kallof Line: 5+ Int.Cal _____ Date: _____

Send	3-4	4-5	1-2	2-3	3-4	4-5		Cal				
Rec.	→		37.50	-45 S	→			3-4				
Time	100	30	100	30	30	30						
DC-1	25 24.1	11.4 ~~46~~ 11.6 ~~7~~	32 30.2	13.6 15.2	21.8 22.4			89 87				
DC-2	24.1 25.2	11.8 12.5 11.0 10.9	30.2 32	15.2 13.4	22.4 21.8			87 88				
Σ	29.1 29.3	23 23.4 22.8		28.8 28.6	44.2 44.2			175 176				
DC-3	25.2 24.2	11.0 10.9 12.0 12.2	32 30.2	13.4 15.3	21.8 22.2			88 87				
Dc-4	24.2 25.2	12.0 ~~12~~ 11.6		15.4 13.2	22.2 21.9							
Σ	29.4	23 23.1 23.6		28.7 28.6	44.0 44.1			175				
DC-AV	49.4	23.15	62.2	28.7	44.1			175				
AC-1	24	11	30.8	13.6	21.1	10.6		85				
AC-2	24	11	30.9	13.6	21.1	10.7		85				
Σ	48	22	61.7	27.2	42.2			170				
S. P.		+11	-5									
AC-N		—										
Pot. Res		1K	1K									

3cus?

no polarization

3000
2250
375
2625

Dear Mr. Kalloof.

Enclosed are copies of Induced Polarization data and the associated Plan location.

At your request the formal map presentation and report have been waived.

The South half of one induced polarization line was run giving 4500' of surface and 2650' of subsurface coverage. Measurements were made using the dual frequencies (.05 & 3 cps) and employing a dipole - dipole electrode configuration.

The line bears S18E and is centered roughly 2000' N74E of the Southern common corner of sections 35 & 36, T 15 N, R 3 E. Yavapai, Co. Arizona.

The data are presented on a sectional data sheet showing resistivity, Percent frequency effect (PFE) and Metallic conduction Factor (MCF) contoured in section.

Although no significant polarization effects were noted, it does look as though induced polarization can serve as a useful exploration guide for sulfide in this area.

This Report is to be Typed and Forwarded with Billing to Kellogg. (letter form)

If problems arise I will be calling in Tonight (wed 31) —

Thank you

John

August 31, 1966

Mr. Frederick Kallof
34 West Monroe Street
Phoenix 2, Arizona

Dear Mr. Kallof:

Enclosed are copies of induced polarization data and the associated plan location.

At your request, the formal map presentation and report have been waived.

The south half of one induced polarization line was run giving 4500' of surface and 2650' of subsurface coverage. Measurements were made using dual frequencies of .05 and 3 cps and employing a dipole-dipole electrode configuration.

The line bears S18E and is centered roughly 2000' N74E of the southern common corner of sections 35 and 36, T15N, R3E, Yavapai County, Arizona.

The data are presented on a sectional data sheet showing resistivity, percent frequency effect (PFE) and metallic conduction factor (MCF) contoured in section.

Although no significant polarization effects were noted, it does look as though induced polarization can serve as a useful exploration guide for sulfide in this area.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

John W. Langs
Geophysicist

JWL:jc
Enclosure: 4

August 31, 1966

Mr. Frederick Kallof

34 West Mon

INSTRUCTIONS TO DELIVERING EMPLOYEE

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(Additional charges required for these services)

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CERTIFIED NO.

INSURED NO.

1 SIGNATURE OR NAME OF ADDRESSEE (*Must always be filled in*)

Jerry Weathers

2 SIGNATURE OF ADDRESSEE'S AGENT, IF ANY

Hazel R Weathers

DATE DELIVERED AUG 30 1966

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AUG 1966
GEOEX

NORTHEAST STA. PHOENIX, ARIZ.
AUG 30 1966

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NAME OF SENDER

Heinrich's Geoex

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P.O. Box 5671

POST OFFICE, STATE, AND ZIP CODE

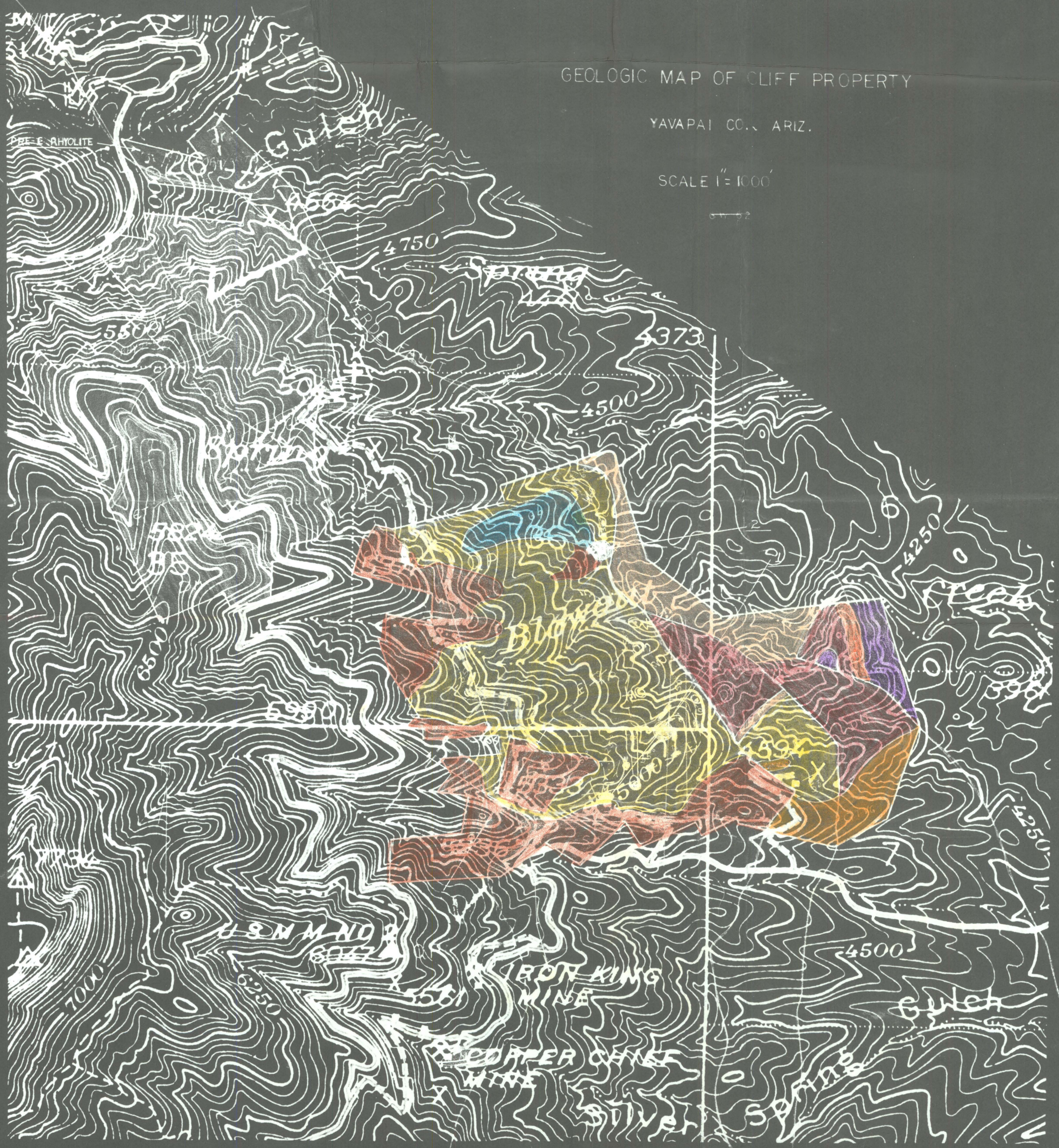
Tucson, Arizona 85703

POD Form 3811 Oct. 1965 c55—16—71548-8

GEOLOGIC MAP OF CLIFF PROPERTY

YAVAPAI CO., ARIZ.

SCALE 1" = 1000'



LEGEND

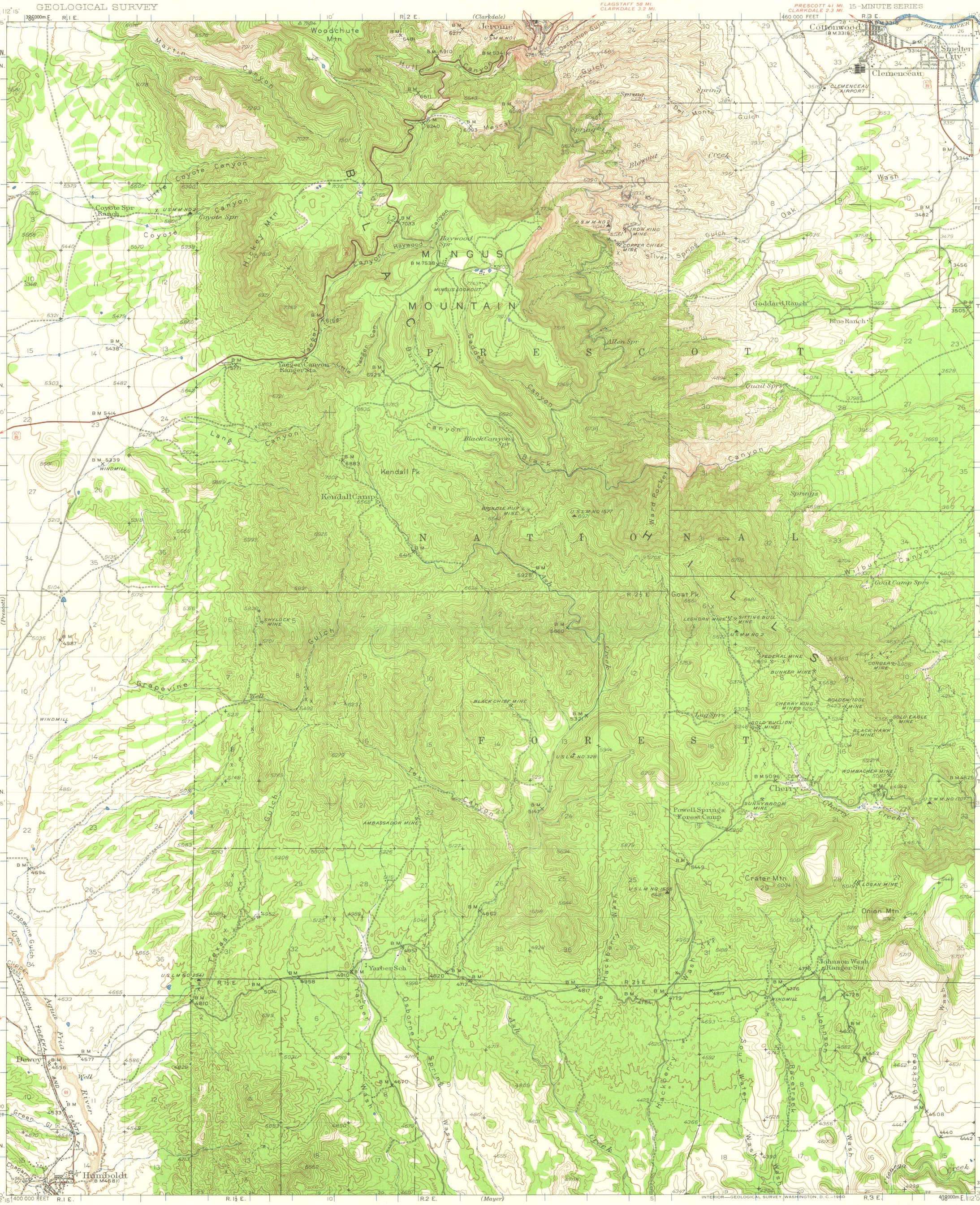
QTVG	VERDE FORMATION	QUATERNARY
THV	HICKEY FORMATION	TERTIARY
MR	REDWALL L.S.	MISSISSIPPIAN
DM	MARTIN L. S.	DEVONIAN
€T	TAPEATS S.S.	CAMBRIAN
GB	GABBRO	PRE-CAMBRIAN
QP	QUARTZ PORPHRY	"
SH	SHEA BASALT	"

M	METALLIZATION
×	PROSPECT
	ANTICLINE
	SYNCLINE
E	FAULT
50	STRIKE & DIP OF BEDS
25	STRIKE & DIP OF FOLIATION
	PROPOSED EXPLORATION AREAS

FIG. 6

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ARIZONA
(YAVAPAI COUNTY)
MINGUS MOUNTAIN QUADRANGLE
15-MINUTE SERIES



Mapped by the Geological Survey
1944

ROAD CLASSIFICATION

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

TRUE NORTH — MAGNETIC NORTH
14½°
APPROXIMATE MEAN DECLINATION, 1944

SCALE 1:62 500

1 ½ 0 1 2 3 4 MILES
3000 0 3000 6000 9000 12000 15000 18000 21000 FEET
1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1960

Certain land lines are omitted because of insufficient data
All recovered corners are shown

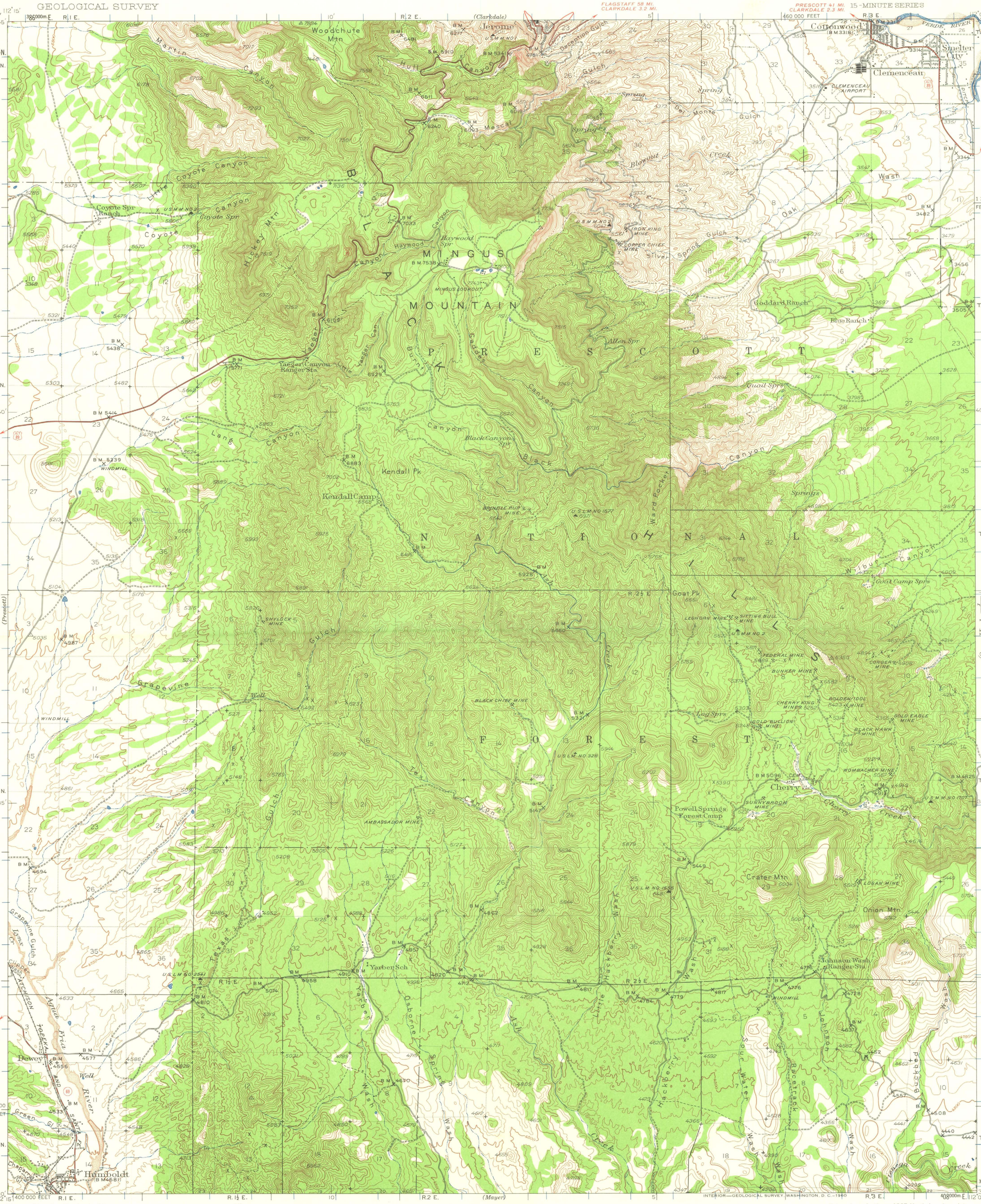
Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona (Central) rectangular coordinate system
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

MINGUS MTN., ARIZ.
N 3430—W 11200/15
1944

FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 25, COLORADO OR WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

ARIZONA
(YAVAPAI COUNTY)
MINGUS MOUNTAIN QUADRANGLE
15-MINUTE SERIES



Mapped by the Geological Survey
1944

ROAD CLASSIFICATION

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

TRUE NORTH — MAGNETIC NORTH
APPROXIMATE MEAN DECLINATION, 1944

SCALE 1:62500

CONTOUR INTERVAL 50 FEET
DATUM IS MEAN SEA LEVEL

INTERIOR—GEOLOGICAL SURVEY, WASHINGTON, D. C.—1960

Certain land lines are omitted because of insufficient data
All recovered corners are shown

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona (Central) rectangular coordinate system
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue

MINGUS MTN., ARIZ.
N 3430—W 11200/15

1944

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A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST