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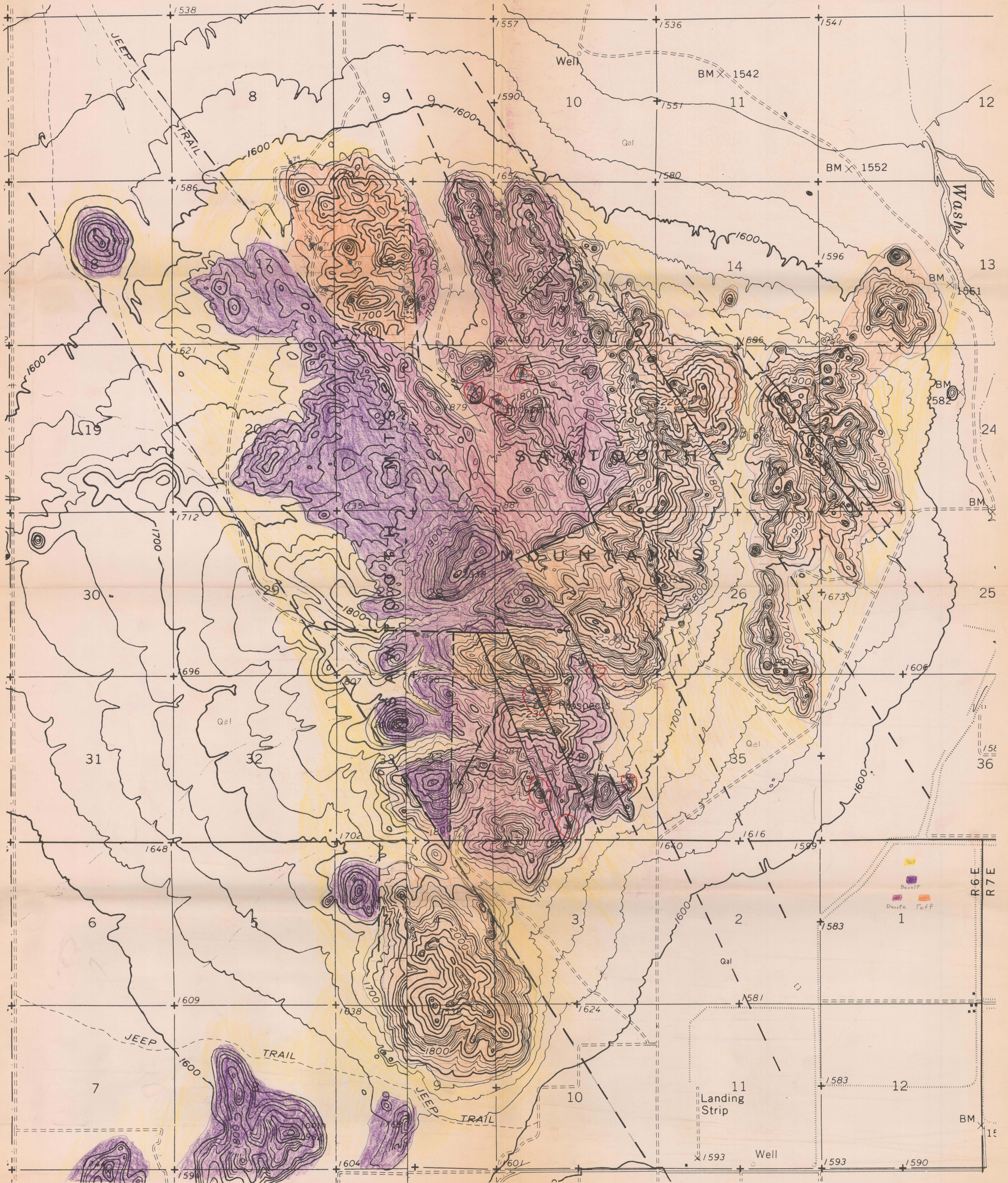
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JEOP

TRAIL

Well

BM X 1542

BM X 1552

Wash

BM X 1561

BM X 1582

BM

Gal  
Dauvoigt  
Dauvoigt  
Tuff

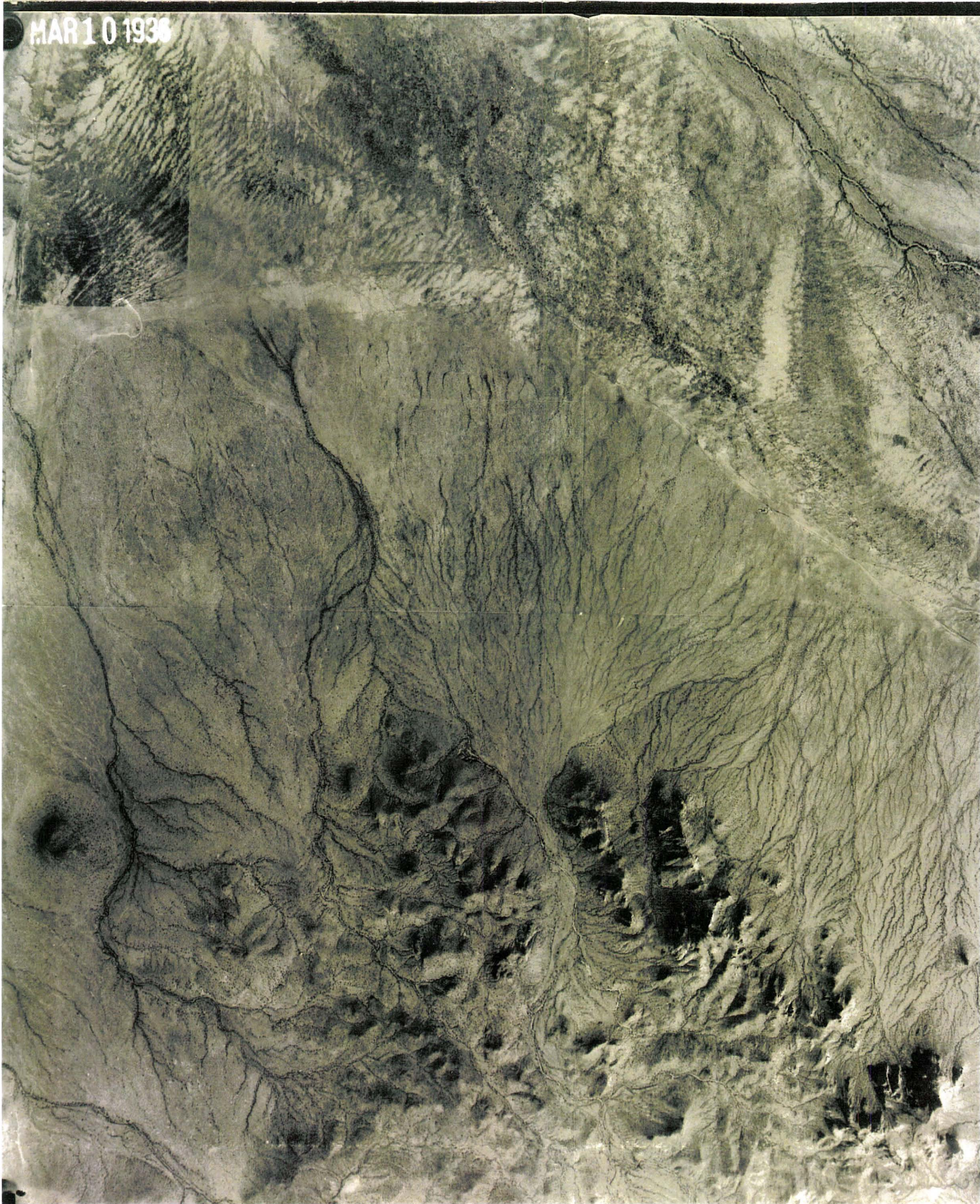
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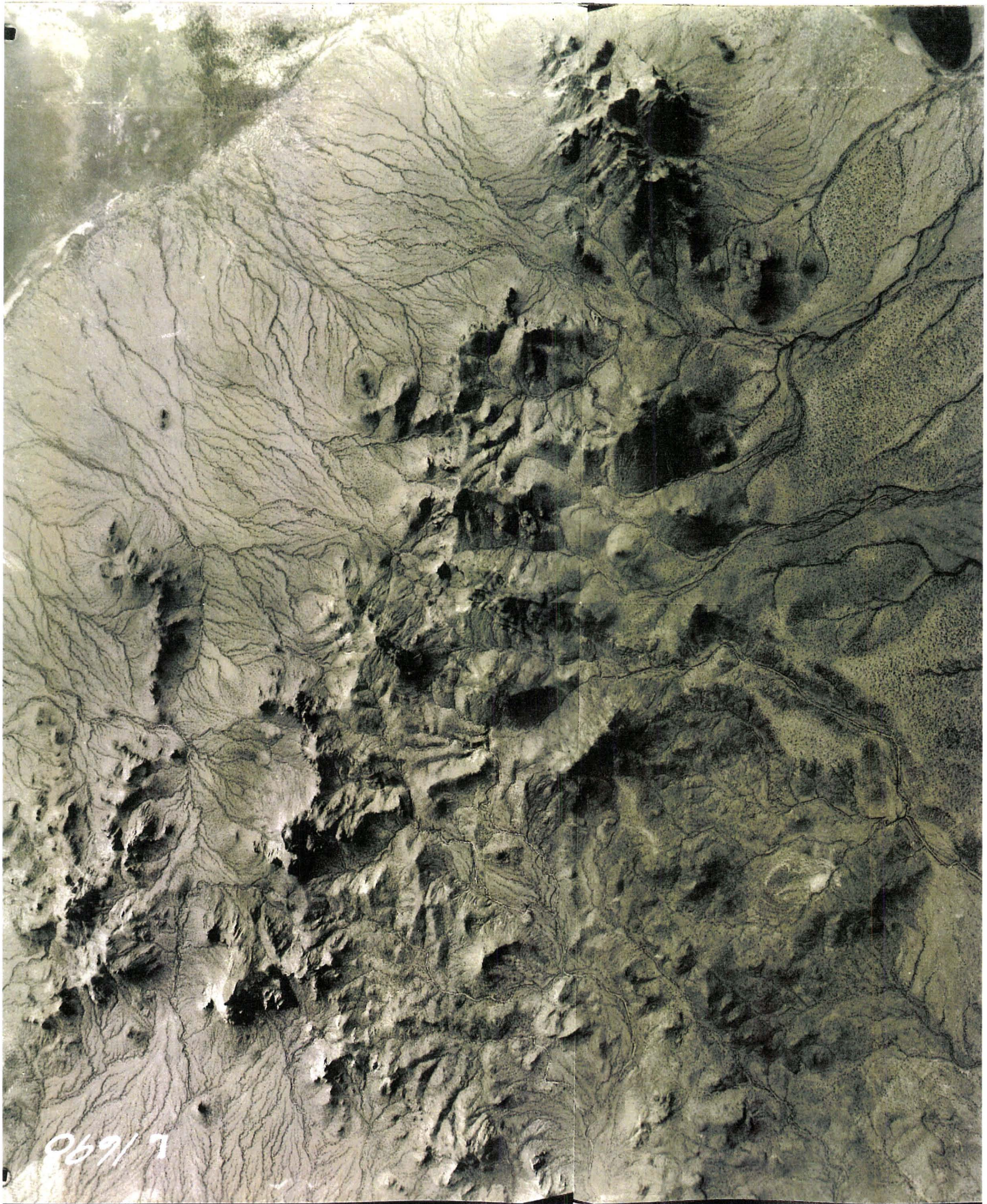
Landing Strip

Well

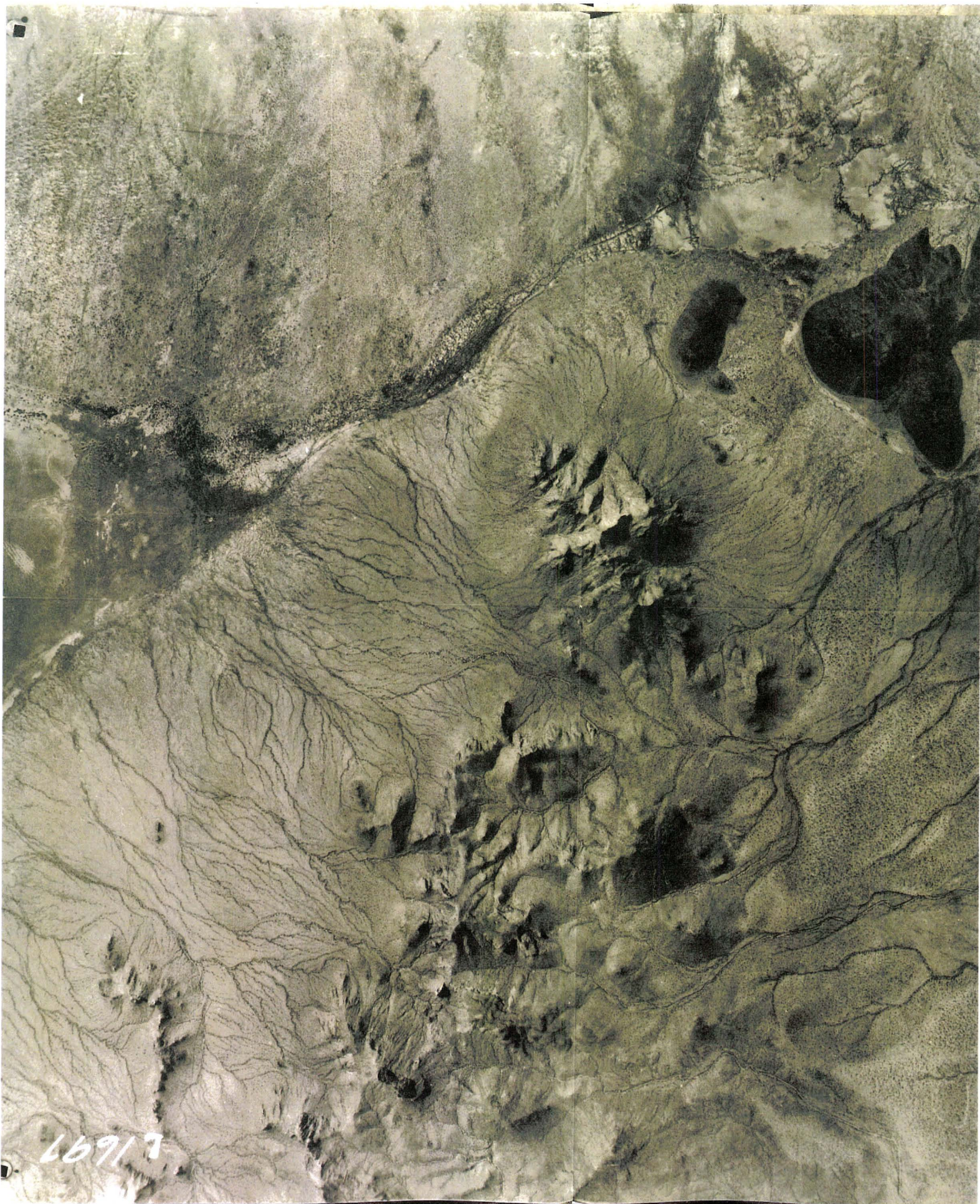
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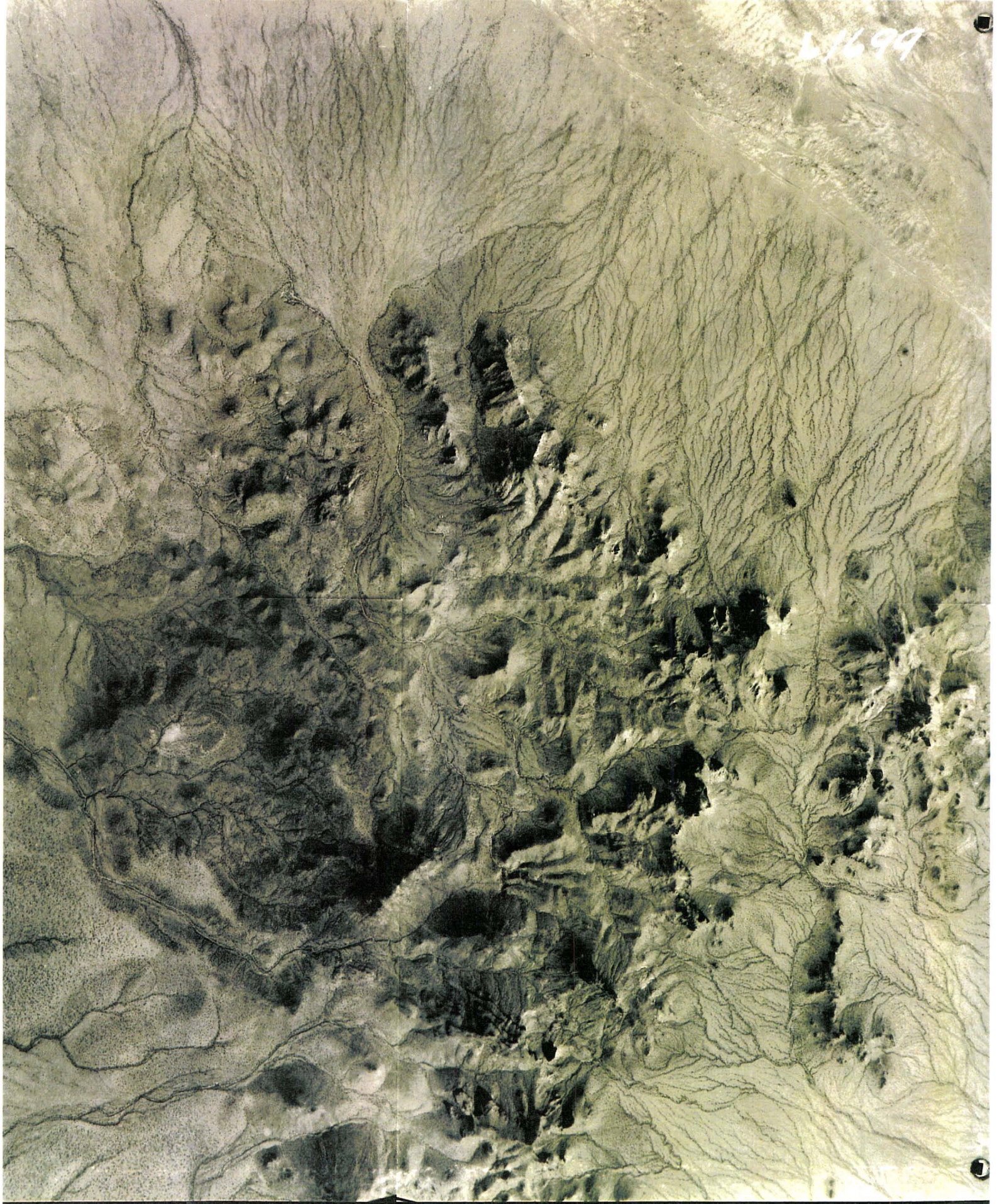


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SAWTOOTH MOUNTAINS RECONNAISSANCE  
PINAL COUNTY, ARIZONA

by  
Wm. Hovey Smith &  
Noel Cousins

for  
NORTH AMERICAN MINES

May 1973

HEINRICHS GEOEXPLORATION COMPANY  
Mineral Engineering Consultants and Contractors  
P.O. Box 5964 Tucson, Arizona

GEOEX Job #769



SAWTOOTH MOUNTAINS RECONNAISSANCE

PINAL COUNTY, ARIZONA

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I L L U S T R A T I O N S

Geology and Sample Location Map----- in pocket

## SAWTOOTH MOUNTAINS RECONNAISSANCE

### PINAL COUNTY, ARIZONA

#### INTRODUCTION

A geological reconnaissance of the Sawtooth Mountains for North American Mines, Inc. was done to determine if the reported olivenite  $\text{Cu}_2(\text{OH})\text{AsO}_4$  manganese oxide mineralization might be ultimately derived from a nearby copper porphyry. The Ventura and Rincon claims which have this type of mineralization were examined during the course of mapping and sampling. These claims are held by Ira Wagon and others. Seven days were spent in field investigations which had the purpose of selecting an area where deep I.P. studies would have the best chance of locating a hidden porphyry.

#### CONCLUSIONS AND RECOMMENDATIONS

The Sawtooth Mountains are composed of much-faulted dacite and basalt flows with thick sequences of tuff and welded tuff. Although a Tertiary intrusive appears on the state and county geologic maps, it was not found. A tuff occupies the area mapped as intrusive (see figure 1).

The observed olivenite-manganese oxide mineralization appears to be derived from weathering and supergene enrichment of manganese, copper, and arsenic containing black calcite veins. Veins are controlled by N30W striking faults and related shear zones.

Because of the absence of the mapped Tertiary intrusive, the lack of sulfide or precious metal mineralization in the veins, and the virtual absence of alteration in the dacite, the conclusion is tentatively drawn

that if a porphyry source is responsible for the olivenite-manganese oxide mineralization it is probably distant or very deep.

No further investigation of the Sawtooth Mountains is recommended at this time. A literature and preliminary geologic examination of the Silver Reef Mountains to the northwest and the Slate Mountains to the south might indicate an area for further work, but for the highly adverse problem of negotiating a satisfactory agreement on the Indian lands. The Lakeshore mine operation of Hecla and El Paso Gas Co. already occupies the apparently favorable portions of the Slate Mountains, except for the alluvial covered eastern margin of the main granitoid mass.

## GEOLOGY

The Sawtooth Mountains consist of a severely faulted sequence of volcanic flows and tuffs exposed for about six miles along a broad, N30W trending strike-slip fault zone. Elsewhere in the region the volcanic rocks are seen to overlie a sedimentary sequence consisting largely of carbonates.

### Description of Rock Units

Tuff - The most widespread unit in the area is a tuff. At least two sheets of this material are present and these are separated by approximately 300 feet of dacite which conformably overlies one of the sheets and is conformably overlain by the other.

The lower tuff is present in the central and southern parts of the area. The lowest exposed portions of this sheet show graded bedding. Coarse lapilli tuff passes upward into crystal tuff containing large (up to 5mm) crystals of hornblende. The crystal tuff grades upward into finer grained lapilli tuff.

The upper tuff sheet consists of fine grained lapilli tuff with thick welded zones. The welded zones are quite resistant and cap many of the mesas in the area. Near the major faults, these zones are strongly brecciated.

Dacite - Two consecutive dacite flows are present in the area. In the lower flow, biotite phenocrysts and sub-parallel laths of hornblende are present in approximately equal proportions. Small, anhedral, plagioclase phenocrysts are present but are not easily distinguished against the violet groundmass.

The upper dacite contains large, white, subhedral plagioclase phenocrysts which are readily apparent against a maroon groundmass. Biotite phenocrysts are larger and more abundant than hornblende phenocrysts.

Basalt - This unit, present only in the western part of the area, is extremely fine grained and vesicular. Occasional small pyroxene phenocrysts can be distinguished with the aid of a hand lens. The basalt is light gray in color and becomes dark gray to black near the borders of individual flows.

### Structure

The Sawtooth Mountains are severely affected by several large, through-going, N30W striking faults. It was not possible to determine the displacement along most of these faults. For a large fault passing through the center of the area, however, certain similarities of the tuffs and dacites near the southern edge of the area to those near the northern edge suggests a strike-slip separation of about two miles in a left lateral sense.

Because local faulting resulting from the extrusion of the silicic lavas would neither affect the later basalts, nor be of a strike-slip nature, the faulting is thought to be a regional phenomenon.

#### Mineralization

Veins containing olivenite-manganese oxide mineralization often occur as irregular open space fillings between brecciated dacite fragments or they may form rather compact, sharp walled veins. Dacite is the favored host rock although mineralization is also found in tuff and basalt. Alteration of the dacite is very weak or nonexistent; however, tuff and the basalt are discolored and altered near the veins. Calcite, black calcite, and less common quartz are gangue minerals. The manganese oxide minerals are commonly botryoidal, and often form compact masses which have been brecciated and then recemented by calcite. A notable exception being the highly siliceous vein on the Andrade claims. Olivenite (actually conichalcite  $4[\text{Cu}, \text{Ca}] \text{As}_2\text{O}_5 - 1 \frac{1}{2} \text{H}_2\text{O}$  as identified by X-ray techniques) occurs as small green crystals lining cavities or less commonly in intimate mixture with the manganese oxides.

Mineralized portions of the vein systems are typically narrow, ranging from a few inches to a few feet in thickness, even though the fracture system may be many times that width.

#### Sampling and Analyses

A total of 28 samples were taken from mineralized faults and shear zones and were analyzed for manganese, copper, arsenic, gold, and silver by Rocky Mountain Geochemical Corp. of Tucson. Manganese values over 60


APPENDIX

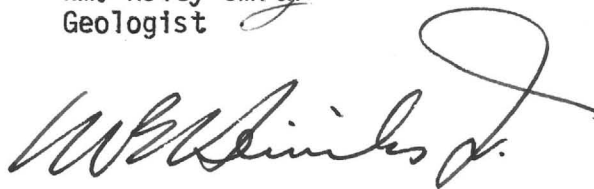
(Sample Data Sheets)

percent were obtained from some samples, the highest copper value was 2.07 percent from the highly siliceous vein on the Andrade claims, and precious metal values were almost nil. The highest silver value was 2 ppm, and all analyses reported gold as less than 1 ppm (see sample location map and Appendix).

An attempt was made to determine if there was any consistent relationship between these elements, but none was found. It appears that the manganese-copper ratio varies depending on the amount of weathering and supergene enrichment during which olivinite and the manganese oxide minerals are somehow partitioned.

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JOB NUMBER: 769  
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DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWPSP.-RANGE	DESCRIPTION
30 April 1973	5251	Rock Chip	Cu=0.42% Mn=49.5% Ag=-.1ppm Au=-0.1ppm As=880ppm	Geology & Sample Location Map	SW 1/4, Sec. 34 T9S, R6E	Free manganese oxides and black calcite cementing breccia in a series of narrow (4"-6"), parallel veinlets striking N10E. Dip 85E.
"	5252	"	Cu=0.18% Mn=37.5 Ag=-.1ppm Au=-0.1ppm As=20ppm	"	SE 1/4, Sec. 34 T9S, R6E	Black calcite cementing breccia in fault zone. Fault trends N30W, near vertical.
"	5253	Dump Sample	Cu=900ppm Mn=38.5% Ag=-.1ppm Au=-0.1ppm As=15ppm	"	"	Major fault zone. N20E, vertical. Sample from prospect.
1 May 1973	5254	"	Cu=0.74% Mn=24.6% Ag=-.1ppm Au=-0.1ppm As=+1000ppm	"	"	Dump sample from small prospect on vein (1 ft. wide, N30W, 45W).
"	5255	"	Cu=475ppm Mn=8.25% Ag=-.2ppm Au=-0.1ppm As=380ppm	"	"	Dump sample from small prospect on Maj. N20E. striking fault. Black and white calcite fillings and cements breccia.
"	5256	"	Cu=225ppm Mn=2.10% Ag=2ppm Au=-0.1ppm As=120ppm	"	SW 1/4, Sec. 34 T9S, R6E	Sample from prospect on 1' wide black calcite vein. This is a fissure filling along a N30W striking, large, vertical fault.
"	5257	"	Cu=2.07% Mn=6.65% Ag=-.1ppm Au=-0.1ppm As=+1000ppm	"	SE 1/4, Sec. 27 T9S, R6E	Highly silicified manganese oxides in fissure filling along a N20W striking fault.
2 May 1973	5258	Dump and Rock Chip Sample	Cu=0.60% Mn=21.8% Ag=-.1ppm Au=-0.1ppm As=+1000ppm	"	SW 1/4, Sec. 34 T9S, R6E	Narrow fissure and breccia fillings. Stickensides: N30W, 75E



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DESCRIPTION



DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWP.-RANGE	DESCRIPTION
2 May 1973	5259	Dump Sample	Cu=0.28% Mn=40.5% Ag=-1ppm Au=-0.1ppm As=60ppm	Geology & Sample Location Map	SW 1/4, Sec. 34 T9S, R6E	Manganese oxides fill 1 ft. wide north-south fissure along N30W striking fault.
"	5260	"	Cu=0.45% Mn=71.5% Ag=-1ppm Au=-0.1ppm As=10ppm	"	NW 1/4, Sec. 34 T9S, R6E	Black calcite fills N30W striking, near vertical fissure.
"	5261	"	Cu=0.19% Mn=19.8% Ag=-1ppm Au=-0.1ppm As=850ppm	"	"	Manganese oxides and aragonite fill 1 ft. wide N30W striking fissure.
"	5262	"	Cu=1.05% Mn=67.5% Ag=-1ppm Au=-0.1ppm As=190ppm	"	"	From shaft on N30W striking, 1 ft. wide fissure; black calcite and aragonite.
	5263	Rock Chip	Cu=75ppm Mn=2.20% Ag=3ppm Au=-0.1ppm As=-5ppm	"	NW 1/4, Sec. 15 T9S, R6E	4" compact black calcite from 2' vein in stream bed.
	5264	Rock Chip	Cu=65ppm Mn=3.10% Ag=5ppm Au=-0.1ppm As=-5ppm	"	NW 1/4, Sec. 15 T9S, R6E	Sample over 8' along black calcite vein in stream bed.
	5265	No Sample				
10 May 1973	5266	Dump	Cu=0.55% Mn=45.5% Ag=-1ppm Au=-0.1ppm As=10ppm	"	NW 1/4, Sec. 22 T9S, R6E	N55°E striking 2' vein dip 70°N. Exposed in trench 20' long. Tuff on both walls. Common nodular manganese oxide minerals.

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DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWP.-RANGE	DESCRIPTION
10 May 1973	5267	Dump	Cu=825ppm Mn=21.5% Ag=-1ppm Au=-0.1ppm As=5ppm	Geology & Sample Location Map.	SE 1/4, Sec. 16 T9S, R6E	N12W trending vein with 90° dip. Manganese oxide minerals in calcite-quartz vein. West wall tuff east wall dacite. Some botryoidal apparently secondary manganese oxide minerals.
"	5268	"	Cu=350ppm Mn=11.5% Ag=2ppm Au=-0.1ppm As=25ppm	"	"	A green-brown carbonate mineral from location below which forms masses up to 4" thick in vein.
"	5269	"	Cu=975ppm Mn=18.8% Ag=-1ppm Au=-0.1ppm As=130ppm	"	"	From manganese oxide-calcite-black calcite vein material scattered on floor of dozer cut near hill top. Exposure is in tuff with horizontal bedding. Vein orientation is unknown.
"	5270	"	Cu=750ppm Mn=19.9% Ag=-1ppm Au=-0.1ppm As=720ppm	"	SW 1/4, Sec. 16 T9S, R6E	N45°E vein dipping 70°SE. Calcite manganese oxide vein is approximately 1' wide in cobbley tuff. Tuff is red and vein material is manganese stained.
"	5271	"	Cu=0.60% Mn=1.70% Ag=-1ppm Au=-0.1ppm As=-5ppm	"	NE 1/4, Sec. 17 T9S, R6E	Dump by road containing malachite and chryscolite stained quartz vein fragments. Vein wall fragments are altered and contain secondary hornblende and chlorite. This material did not originate from the Sawtooth Mountains, and probably resulted from cleaning out a truck prior to hauling manganese ore.
"	5272	"	Cu=175ppm Mn=6.10% Ag=-1ppm Au=-0.1ppm As=-5ppm	"	"	N70W trending fault containing 4" of silicious manganese oxide vein identical in appearance to that from the Andrade Claims. Both deposits are probably related to the same fault. Vein is in reddish tuff.
"	5273	Dump	Mn=52.5% Ag=-1ppm Au=-0.1ppm As=15ppm	"	NE 1/4, Sec. 17 T9S, R6E	N30E striking 1' manganese oxide-calcite-quartz vein in tuff. Upper portion of vein has compact botryoidal apparently secondary manganese oxides which surround cobbles in tuff.

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DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWP.-RANGE	DESCRIPTION
10 May 1973	5274	Dump	Cu=0.13% Mn=11.9% Ag=-1ppm Au=-0.1ppm As=50ppm	Geology & Sample Location Map	SE 1/4, Sec. 8 T9S, R6E	N35E striking calcite-quartz-black calcite brecciated zone. Manganese oxide minerals along fractures with small amounts of light green chlorite.
9 May 1973	5275	"	Cu=0.19% Mn=48.5% Ag=-1ppm Au=-0.1ppm As=10ppm	"	SE 1/4, Sec. 28 T9S, R6E	Lone Wolf workings. One foot vein N26°W in basalt. Vein is exposed in 50' trench. Banded calcite with lesser amounts of black calcite. Botryoidal manganese oxide minerals in upper workings.
8 May 1973	5276	"	Cu=175ppm Mn=20.7% Ag=-1ppm Au=-0.1ppm As=5ppm	"	SE 1/4, Sec. 23 T9S, R6E	North trending 2' shear zone manganese oxide minerals apparently replacing breccia fragments.
10 May 1973	5277	"	Cu=0.15% Mn=23.2% Ag=-1ppm Au=-0.1ppm As=5ppm	"	NE 1/4, Sec. 21 T9S, R6E	N40E striking vein with 80° dip to N.W. Vein is in dacite and has 3' of white gouge along hanging wall. Sample mostly dacite fragments covered by manganese oxide minerals. Calcite and quartz
"	"	"	Cu=0.40% Mn=20.7% Ag=-1ppm Au=-0.1ppm As=-5ppm	"	"	gauge minerals. Vein explored by 2 short adits and trench. Note: Bees in upper adit.
"	5278	"	Cu=0.21% Mn=22.0% Ag=-1ppm Au=-0.1ppm As=-5ppm	"	"	N40E striking shearzone. Probably offset extension of vein described above, but not as well explored.
"	5279	"	"	"	NW 1/4, Sec. 22 T9S, R6E	Along 6' parallel trending vein in tuff. Sparse manganese oxide minerals.

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DATE SAMPLE NO. TYPE ANALYSIS MAP REF. SEC.-TWP.-RANGE DESCRIPTION



30 APR 173	5251	Rock chip	Ca 3.00% Mn 2.88%	Geol. and Sample Location Map	SW 1/4 Sec 34 T9S, R6E	Free manganese oxides and black calcite cementing breccia in a series of narrow (4"-6") parallel veinlets striking N10E. Dip 85E.
11	5252	11	Ca 9.10% Mn 18.0%	11	SE 1/4 Sec 34 T9S, R6E	Black calcite cementing breccia in fault zone. Fault trends N30W, near vertical.
11	5253	Dump Sample	Ca 4.25% Mn 9.18%	11	11	Major fault zone. N20E, vertical. Sample from prospect.
1 MAY 173	5254	" Dump Sample	Ca 7.30% Mn 10.01%	11	11	Dump sample from small prospect on vein (1ft wide, N30W, 45W).
11	5255	" Dump Sample	Ca 4.05% Mn 1.98%	11	11	Dump sample from prospect on maj. N20E striking fault. Black and white calcite fills veinlets and cements breccia.
11	5256	11	Ca 1.55% Mn 0.56%	11	SW 1/4 Sec 34 T9S R6E	Sample from prospect on 1' wide black calcite vein. This is a fissure filling along a N30W striking, large, vertical fault.
11	5257	11	Ca 14.30% Mn 1.40%	11	SE 1/4 Sec 27, T9S R6E	Highly silicified manganese oxides in fissure filling along a N20W striking fault.
2 MAY	5258	Dump Sample and Rock Chip	Ca 54.00% Mn 7.44%	11	SW 1/4 Sec 34 T9S R6E	Narrow fissure and breccia fillings. Slickensides; N30W, 75E

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DATE SAMPLE NO. TYPE ANALYSIS MAP REF. SEC.-TWP.-RANGE DESCRIPTION



DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWP.-RANGE	DESCRIPTION
2 May	5259	Dump Sample	Ca 1300 Mn 18.1%	Geology and Sample location Map	SW 1/4 Sec 34 T9S R6E	Manganese oxides fill 1ft. wide N-S fissure along N30W striking fault.
11	5260	11	Ca 1800 Mn 30.0%	11	NW 1/4 Sec 34 T9S R6E	Black calcite fills N30W striking, near vertical fissure.
11	5261	11	Ca 2100 Mn 7.73%	11	11	Manganese oxides and aragonite fill 1st wide N30W striking fissure.
11	5262	11	Ca 6900 Mn 29.2%	11	11	From shaft on N30W striking, 1st wide fissure; Black calcite and aragonite.
	5263	No SAMPLE				
	5264	Rock chip		"	NW 1/4 SEC 15 T9S R6E	4" compact black calcite <del>fill</del> in stream bed.
	5265	Rock chip		"	"	SAMPLE OVER <sup>ALONG</sup> BLACK CALCITE VEIN IN STREAM BED.
May 10	5266	Dump Rock chip	Ca 000 Mn 2.0%	"	NW 1/4 SEC 22 T9S R6E	N550E striking 2' vein <sup>EXPOSED</sup> IN TRENCH 20' LONG. TURF ON BOTH WAHS. COMMON NODULAR AN OXIDE MINERALS.

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DESCRIPTION



DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWP.-RANGE	DESCRIPTION
May 10	5267	Dump	Au 400 Mn 7.85% Cu 1.10% Ni 3.19%	Geology AND SAMPLE LOCATION MAP.	SE 1/4 Sec 16 T9S R6E	N12W TRENDDING VEIN WITH 90° DIP. MN OXIDE MINERALS <sup>IN</sup> calcite-quartz vein. Mn with <del>W</del> Tuff E. with dacite. Some botryoidal apparently secondary Mn oxide minerals.
"	5268	Dump	Cu 2.10 Mn 3.19%	"	"	A GREEN-brown CARBONATE MINERAL FROM LOCATION BELOW WHICH FORMS MASSES UP TO 4" THICK IN VEIN.
"	5269	"	Cu 5.60 Mn 7.22%	"	"	FROM MN OXIDE-calcite - barite calcite VEIN MATERIAL <del>#</del> scattered on floor OF DOLER OUT NEAR HICK TOP. EXPOSURE IS IN TUFF WITH HORIZONTAL BEDDING. VEIN ORIENTATION IS UNKNOWN.
"	5270	"	Cu 7.40 Mn 9.55%	"	SW 1/4 Sec 16 T9S R6E	N45°E VEIN DIPPING 70° SE. Calcite Mn oxide vein is approximately 1' wide in cobbly tuff. Tuff is red and vein material is manganese stained.
"	5271	"	Cu 6.300 Mn 0.53%	"	NE 1/4 Sec 17 T9S R6E	Dump by road containing malachite and chrysocolla stained quartz vein fragments. <del>vein</del> vein with fragments and altered and contain secondary hornblende and chlorite. This material did not originate from <del>the</del> the sawtooth mountains, and probably resulted from churning out a truck prior to hauling Mn ore.
"	5272	"	Cu 1.50 Mn 1.54%	"	"	N70W TRENDDING fault containing <sup>4" W</sup> siliceous Mn oxide <del>vein</del> vein identical in appearance to that from the ANDRADE chains. Both deposits are probably related to the same fault. Vein is in reddish tuff

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DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWP.-RANGE	DESCRIPTION
MAY 10	<del>5273</del>	DUMP	Cu 405 Mn 24.50%	GEOLOGY AND SAMPLE LOCATION MAP	NE 1/4 SEC 17 T 9 S R 6 E	N30E STRIKING 1' MN OXIDE-CAKITE-QUARTZ VEIN IN TUFF. UPPER PORTION OF VEIN HAS COMPACT BOTRYOIDAL APPARENTLY SECONDARY MN OXIDES WHICH SURROUND CAKITES IN TUFF.
	5274	"	Cu 795 Mn 4.06%	"	SE 1/4 SEC 8 T 9 S R 6 E	N35E STRIKING CAKITE-QUARTZ-BLACK CAKITE BRECCIATED TONE. MN OXIDE MINERALS ALONG FRACTURES WITH SMALL AMOUNTS OF KAPTEGREEN CHALCITE.
MAY 9	5275	"	Cu 795 Mn 22.90%	"	SE 1/4 SEC 8 T 9 S R 6 E	NONE WORK WORKINGS. ONE FOOT VEIN N76W IN BASALT. VEIN IS EXPOSED IN 60' TRENCH. BANNED CAKITE WITH LESSOR AMOUNTS OF BLACK CAKITE, BOTRYOIDAL MN OXIDE MINERALS IN UPPER MEMBER.
MAY 8	5276	"	Cu 100 Mn 8.18%	"	SE 1/4 SEC 13 T 9 S R 6 E	N <del>30</del> TENDING 2' SHEAR TONE MN OXIDE MINERALS APPARENTLY REPLACING BRECCIA FRAGMENTS
MAY 10	5277	"	Cu 700 Mn 10.24%	"	NE 1/4 SEC 1 T 9 S R 6 E	N40E STRIKING VEIN WITH 800 DIP TO N.W. VEIN IS IN DACITE AND HAS 3' OR W.K.T.E. Gouge ALONG HANGING WALL. SOME PIE MOSTLY DACITE FRAGMENTS COVERED BY MN OXIDE MINERALS. CAKITE AND QUARTZ GANGLUE MINERALS. VEIN EXPOSED BY 3 SKIRT DOTS AND TRENCH. NOTE: BIFES IN UPPER ADIT.
"	5278	"	Cu 2000 Mn 8.09%	"	"	NOTE STRIKING SHEAR TONE. PROBABLY OFFSET EXTENT OF VEIN DESCRIBED ABOVE, BUT NOT AS WELL EXPOSED.
"	5279	Rock Chip	Cu 1700 Mn 9.69%	"	NW 1/4 SEC 2 T 9 S R 6 E	Along G' parallel to N12W TENDING VEIN IN TUFF SPARSE MN OXIDE MINERALS.

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 AREA: Red Sawtooth  
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DATE SAMPLE NO. TYPE ANALYSIS MAP REF. SEC.-TWP.-RANGE DESCRIPTION



DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWP.-RANGE	DESCRIPTION
30 APR 1973	5251	Rock chip	Ca 3000 Mn 228%	Geol. and Sample Location Map	SW 1/4 sec 34 T95, R6E	Free manganese oxides and black calcite cementing breccia in a series of narrow (4"-6") parallel veinlets striking N10E. Dip 85E.
11	5252	11	Ca 910 Mn 18.0%	11	SE 1/4 sec 34 T95, R6E	Black calcite cementing breccia in fault zone. Fault trends N30W, near vertical.
11	5253	Dump Sample	Ca 425 Mn 9.18%	11	11	Major fault zone. N20E, vertical. Sample from prospect.
1 May 1973	5254	" Dump Sample	Ca 7300 Mn 10.01%	11	11	Dump sample from small prospect on vein (1st wide, N30W, 45W)
11	5255	" Dump Sample	Ca 405 Mn 1.98%	11	11	Dump sample from prospect on maj. N20E striking fault. Black and white calcite fills veinlets and cements breccia.
11	5256	11	Ca 155 Mn 0.56%	11	SW 1/4 sec 34 T95 R6E	Sample from prospect on 1' wide black calcite vein. This is a fissure filling along a N30W striking, large, vertical fault.
11	5257	11	Ca 14,300 Mn 1.40%	11	SE 1/4 sec 27, T95 R6E	Highly silicified manganese oxides in fissure filling along a N20W striking fault.
2 May	5258	Dump Sample and Rock chip	Ca 5400 Mn 7.44%	11	SW 1/4 sec 34 T95 R6E	Narrow fissure and breccia fillings. Slickensides; N30W, 75E



HEINRICHS GEOEXPLORATION COMPANY  
 Box 5964, Tucson, Arizona 85703  
 Ph: (602) 623-0578

JOB NUMBER: 769  
 AREA: Sawtooth  
 Page      of     

DATE      SAMPLE NO.      TYPE      ANALYSIS      MAP REF.      SEC.-TWP.-RANGE      DESCRIPTION     



DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWP.-RANGE	DESCRIPTION
2 May	5259	Dump Sample	Ca 1300 Mn 1818g	Geology and Sample location Map	SW 1/4 Sec 34 T9S R6E	Manganese oxides fill 1ft. wide N-S fissure along N30W striking fault.
11	5260	11	Ca 1800 Mn 3000g	11	NW 1/4 Sec 34 T9S R6E	Black calcite fills N30W striking, near vertical fissure.
11	5261	11	Ca 2100 Mn 7132g	11	11	Manganese oxides and aragonite fill 1st wide N30W striking fissure.
11	5262	11	Ca 6900 Mn 29.2g	11	11	from shaft on N30W striking, 1ft wide fissure; Black calcite and aragonite.
	5263	No SAMPLE				
	5264	Rock chip		"	NW 1/4 SEC 15 T9S R6E	4" compact black calcite from 2' vein <del>exposed</del> in stream bed.
	5265	Rock chip		"	"	SAMPLE OVER B' <sup>along</sup> black calcite vein in stream bed,
May 10	5266	Dump Rock chip	Ca 1000 Mn 2100g	"	NW 1/4 SEC 22 T9S R6E	N550E striking 2' vein <sup>EXPOSED</sup> in trench 20' long. Turf on both sides. Common nodular iron minerals.

HEINRICH'S GEOEXPLORATION COMPANY  
 Box 5964, Tucson, Arizona 85703  
 Ph: (602) 623-0578

JOB NUMBER: 769  
 AREA: Sawtooth  
 Page      of     

DATE      SAMPLE NO.      TYPE      ANALYSIS      MAP REF.      SEC. - TWSP. - RANGE      DESCRIPTION     



DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC. - TWSP. - RANGE	DESCRIPTION
May 10	5267	Dump	Au 7.86% Ag 3.19% Cu 1.50% Mn 1.54%	Geology and SAMPLE LOCATION MAP.	SE 1/4 SEC 16 T9S R5E	NW 1/4 TRENDS VEIN WITH 90° D.P. MN OXIDE MINERALS IN calcite-quartz vein. WITH TUFF E. WITH DACITE. SOME botryoidal APPARENTLY SECONDARY MN OXIDE MINERALS. A GREEN-BROWN CARBONATE MINERAL FROM LOCATION BELOW WHICH FORMS MASSES UP TO 4" THICK IN VEIN.
"	5268	Dump	Cu 5.60% Mn 7.22%	"	"	FROM MN OXIDE-calcite-black chlorite VEIN MATERIAL <del>#</del> SCATTERED ON FLOOR OF DOZER OUT NEAR HILL TOP. EXPOSURE IS IN TUFF WITH HORIZONTAL BEDDING. VEIN ORIENTATION IS UNKNOWN.
"	5269	"	Cu 7.40% Mn 9.55%	"	"	N45°E VEIN DIPPING 70° SE. CALCITE MN OXIDE VEIN IS APPROXIMATELY 1' WIDE IN COBBLED TUFF. TUFF IS RED AND VEIN MATERIAL IS MANGANESE STAINED.
"	5270	"	Cu 6.300% Mn 0.53%	"	NE 1/4 SEC 17 T9S R6E	DUMP BY ROAD CONTAINING MALACHITE AND chrysocolla STAINED QUARTZ VEIN FRAGMENTS. <del>VEIN</del> VEIN WITH FRAGMENTS ARE ALTERED AND CONTAIN SECONDARILY FORMED AND chlorite. THIS MATERIAL DID NOT ORIGINATE FROM <del>THE</del> THE SAWTOOTH MOUNTAINS, AND PROBABLY RESULTED FROM CHEMINING OUT A TRUCK OPERATOR TO HAULING MN ORE.
"	5271	"	Cu 1.50% Mn 1.54%	"	"	NW 1/4 TRENDS VEIN WITH 90° D.P. SIGNIFICANT VEIN IDENTICAL IN APPEARANCE TO THAT FROM THE ANDRADE CLAIMS. BOTH DEPOSITS ARE PROBABLY RELATED TO THE SAME FAULT. VEIN IS IN REDDISH TUFF

HEINRICH'S GEOEXPLORATION COMPANY  
 Box 59664, Tucson, Arizona 85703  
 Ph: (602) 623-0578

JOB NUMBER: 769  
 AREA: Saw Tooth  
 Page      of     

DATE SAMPLE NO. TYPE ANALYSIS MAP REF. SEC.-TWP.-RANGE DESCRIPTION



DATE	SAMPLE NO.	TYPE	ANALYSIS	MAP REF.	SEC.-TWP.-RANGE	DESCRIPTION
MAY 10	5273	DUMP	Ca 40% Mg 24.50%	GEOLOGY AND SAMPLE LOCATION MAP	NE 1/4 SEC 17 T 9 S R 6 E	N30E STRIKING 1' Mn OXIDE-cakeite-quartz vein in tuff. Upper portion of vein has compact botryoidal apparently secondary Mn oxides which surround cobbles in tuff.
MAY 9	5274	"	Ca 79.5% Mg 4.06%	"	SE 1/4 SEC 8 T 9 S R 6 E	N35E striking cakeite-quartz-basalt cakeite brecciated zone. Mn oxide minerals along fractures with small amounts of light green chalcite.
MAY 8	5275	"	Ca 79.5% Mg 22.90%	"	SE 1/4 SEC 28 T 9 S R 6 E	None Wolf workings. One foot vein N 60W in basalt. vein is exposed in trench. Banded cakeite with lesser amounts of black cakeite, botryoidal Mn oxide minerals in upper member.
MAY 10	5276	"	Ca 100% Mg 8.18%	"	SE 1/4 SEC 23 T 9 S R 6 E	N <del>30</del> trending 2' shear zone Mn oxide minerals apparently replacing breccia fragments
"	5277	"	Ca 700% Mg 10.24%	"	NE 1/4 SEC 21 T 9 S R 6 E	N 40E striking vein with 800 dip to N.W. vein is in dacite and has 3' of white gouge along hanging wall. Some of the mostly dacite fragments covered by Mn oxide minerals. Cakeite and quartz gangue minerals. vein explored by 2 short adits and trench. Note: BERS in upper adit.
"	5278	"	Ca 2800% Mg 0.08%	"	"	NOTE striking shear zone. Probably offset extension of vein described above, but not as well explored.
"	5279	Rock Chip	Ca 1700% Mg 9.69%	"	NW 1/4 SEC 22 T 9 S R 6 E	Along G' paralleling N12W trending vein in tuff. Sparse Mn oxide minerals.

May 22, 1969

Mr. Q. A. Shaw  
North American Mines  
60 State Street  
Boston, Mass.

Re: Geologic Reconnaissance of  
Claims in Sawtooth Mtns.  
Pinal Co., Arizona

Dear Mr. Shaw:

Mr. Bill Mackay and I spent 13 May 1969 examining claims in the Sawtooth Mountains. On 17 May 1969, Mr Mackay, Mr. Ira Wagnon took you and I over the claims as well so that all concerned would have benefit of everyones ideas.

The workings show mostly manganese oxides with minor copper oxides in fracture filling in volcanic rocks. Assay results show some copper but the mineral has not been definitely identified. A semi-detailed petrographic examination showed that the greenish mineral is olivine with extremely small copper oxide and carbonate minerals in the cracks and fractures.

At this time it does not seem reasonable to continue working on these claims as the chance of economic copper mineralization appears to be remote.

The manganese oxides are notorious for trapping small amounts of other metals but seldom are they very economic. The manganese oxides would also have some I. P. effects and might be the only thing to show up. The terrain is such that rapid production of the field work is not possible.

Respectfully,

HEINRICHS GEOEXPLORATION COMPANY

Donald B. Cooley  
Geologist

DBC:db

15 May 1969

TO: Mr. Q. A. Shaw  
FROM: Donald B. Cooley  
SUBJECT: Job #396-69 - Geologic Reconnaissance of  
claims in Sawtooth Mountains, Pinal Co., Arizona

Mr. Bill Mackay and I spent 13 May 1969 examining claims in the Sawtooth Mountains. Included are claim maps supplied by Mr. Ira Wagnon.

The workings visited show only manganese oxides (mostly psilomelane) which have been worked in the past when manganese prices were up. Reportedly the manganese also carries considerable copper in places as shown in the accompanying assay results. The significance of this can only be determined by careful sampling and a petrographic examination by a qualified mineralogist to determine the copper source minerals.

The occurrences are small veins in a series of volcanic rocks and some mapping and sampling should be carried out to determine their extent and values. No dissemination of the mineralization was seen on this trip and probably will be somewhat rare.

If surface mapping and sampling shows a favorable area of sufficiently good grade copper, drilling could be considered at that time. Probably one week in the field would be enough to determine the extent of the mineralization.

The surface conditions do not indicate a large ore body beneath the surface. The rocks are volcanic in nature, mostly extrusive, some brecciated, and not very mineralized. I.p. would not be very practical at this time as the manganese oxides would give some I.P. effect, but the manganese probably would not be economic.

---

Donald B. Cooley

DBC/plg

Enclosures

**INSTRUCTIONS TO DELIVERING EMPLOYEE**

Show to whom, date, and address where delivered  Deliver ONLY to addressee  
*(Additional charges required for these services)*

**RECEIPT**

*Received the numbered article described below.*

REGISTERED NO.	1 2 3	SIGNATURE OR NAME OF ADDRESSEE <i>(Must always be filled in)</i>
CERTIFIED NO. 580636		SIGNATURE OF ADDRESSEE'S AGENT, IF ANY
INSURED NO.		SHOW WHERE DELIVERED <i>(only if requested)</i>
DATE DELIVERED 6/16/69		

Shaw

c55-16-71548-10 GPO

*Q. A. SHAW - N. Am. Mines*



**HEINRICHS GEOEXPLORATION COMPANY**

806 WEST GRANT ROAD, TUCSON, ARIZONA, 85703. P.O. BOX 5671. PHONE: (AREA CODE 602) 623-0578

**STATEMENT**

May 29, 1969

North American Mines  
60 State Street  
Boston, Mass. 02100

Re: Geology Recon.  
Sawtooth Mts., Arizona  
Job 396-69

**Professional Services:**

May 13 and 17 Mr. D. B. Cooley, Geologist  
(Standard rate 2 days @ \$150.00/day)  
Charge: 2 days @ \$125.00/day-----\$250.00

Conferences 5/16/69  
E. G. Heinrichs, W. E. Heinrichs & D. B. Cooley----- 96.25

TOTAL:-----\$346.25

HEINRICHS  
**GEOEX**  
GEOPHYSICAL ENGINEERS  
TUCSON, ARIZONA



REC'D JUN 20 1969

BOX 5671 TUCSON, ARIZONA 85703  
Phone: (AREA 602) 623-0578

(301) 660

STATEMENT

May 29, 1969

North American Mines  
60 State Street  
Boston, Mass. 02100

Re: Geology Recon.  
Sawtooth Mts., Arizona  
Job 396-69

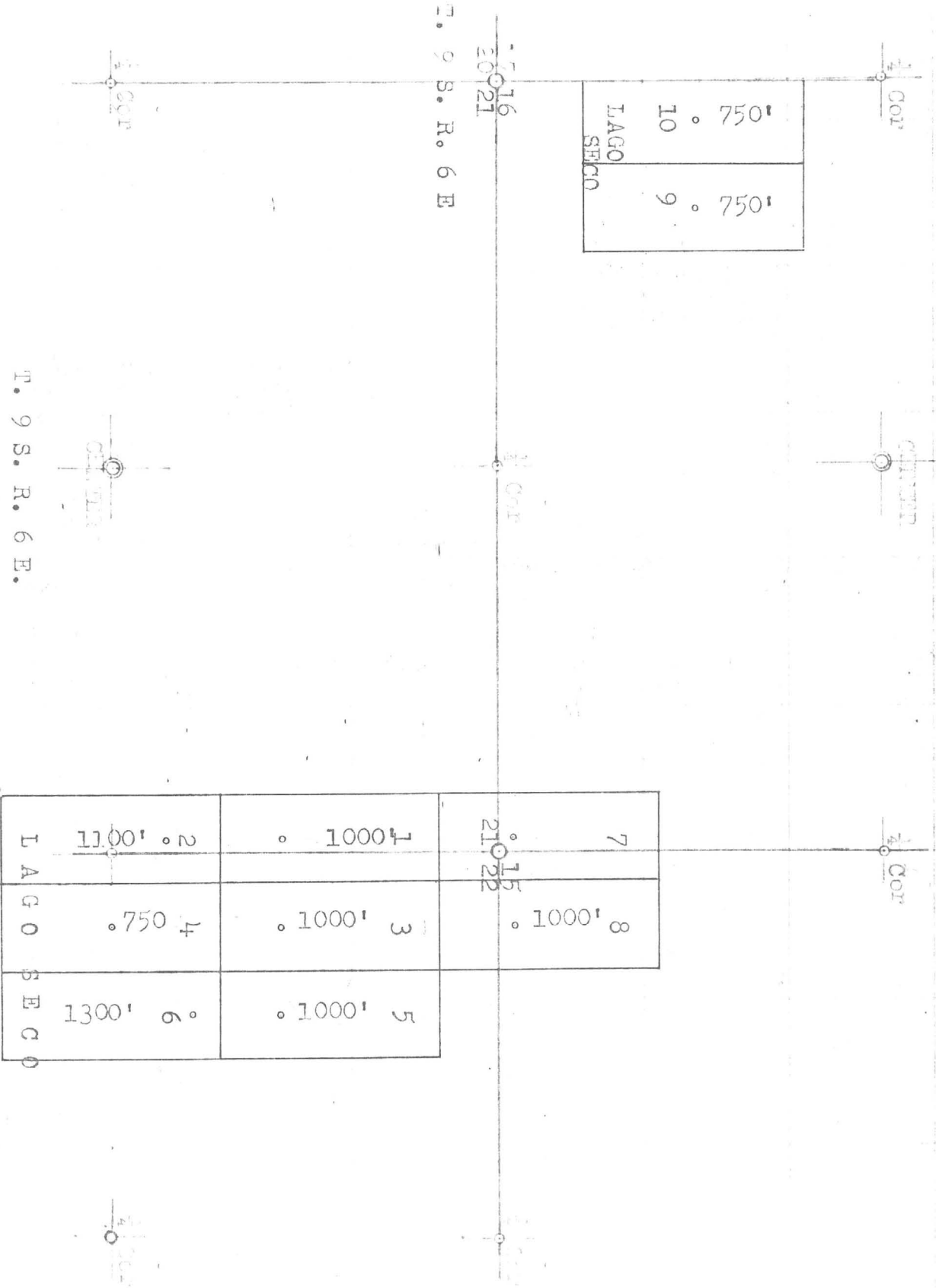
Professional Services:

May 13 and 17 Mr. D. B. Cooley, Geologist  
(Standard rate 2 days @ \$150.00/day)  
Charge: 2 days @ \$125.00/day-----\$250.00

Conferences 5/16/69  
E. G. Heinrichs, W. E. Heinrichs & D. B. Cooley----- 96.25

TOTAL:-----\$346.25





T. 9 S. R. 6 E.

Scale: 1" = 1000'

NORTH

T. 9 S. R. 6 E.

28 27



600'	600'	600'	500'	500'
9	6	7	8	10
BARRANCA				
Bolsa 8	7	6	Bolsa 5	
1450'	1450'	1450'	1450'	
1450'	1450'	1450'	1450'	
4	3	2	1	
Bolsa				

Cor.

Cor.

Center

Center

Cor.

Cor.

33 34

4 3

T. 10 S. R. 6 E.

SCALE: 1" = 1000'

# SOUTHWESTERN ASSAYERS & CHEMISTS, Inc.

REGISTERED ASSAYERS

FELIX K. DURAZO  
WIL WRIGHT  
ARIZONA REG. NO. 5875

P. O. BOX 7517  
TUCSON, ARIZONA 85713

710 E. EVANS BLVD.  
PHONE 602-294-5811

North American Mines  
312 E. 4th St.  
Tucson, ARIZ.

JOB # 004301  
RECEIVED May 12, 1969  
REPORTED May 13, 1969

SAMPLE NUMBER	GOLD OZ.*	SILVER OZ.*	LEAD %	COPPER %	ZINC %	MOLYBDENUM %
Barranca						
# 1				2.05		
# 2				2.80		
# 3				1.05		
Balsa # 1				.59		

CHARGE \$ 8.00

\* Gold and Silver reported in troy oz. per 2,000 lb. ton.

INVOICE

30 So. Main St.  
P. O. Box 1889



**Jacobs Assay Office**  
Registered Assayers

PHONE WA 2-0813

85702 Tucson, Arizona

Sample Submitted by Mr.

*North America*

*Mina*

*Bell Mexico*

April 17<sup>th</sup> 1962

Sample Marked	GOLD Ozs. per ton ore	GOLD Value per ton ore *	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay
#1	0.01	0.35	0.3/10	2 12/100				
2	0.03	1.05	0.57/10	2 43/100				
69								

\* Gold Figured \$85.00 per oz. Troy  
Charges \$ 9.00

Very respectfully,

*Wm. A. Jacobs*

NAM

June 26, 1973

Verity & Smith  
902 Transamerica Building  
Tucson, Arizona 85701

Attention: Mr. John Lacy

Re: Job #769

Dear John:

Enclosed are three copies of our report "Sawtooth Mountains Reconnaissance Pinal County, Arizona" for transmission to Mr. Clemmens, Ira Wagnon, and the Andrade brothers.

Mr. Shaw requested that we send them a copy as an expression of thanks to them for letting us examine their properties. Since a formal agreement was not completed, I do not think we are under any obligation to furnish work affidavits, however, the work we did and these reports may be applicable toward same to one degree or another.

The Pico Reports will be ready later this week.

Sincerely,

Heinrichs GEOEXploration Co.

Wm. Hovey Smith  
Geologist

WHS:mt  
cc: Mr. Q. Shaw

VERITY L SMITH  
ATTN. MR. JOHN LACY

~~see~~

IRE: Job 769

DEAR JOHN,

ENCLOSED ARE THREE COPIES OF  
OUR REPORT "SAVTOOTH MOUNTAINS  
RECONNAISSANCE PINAL COUNTY, ARIZONA"  
FOR TRANSMISSION TO MR. ~~CHENMENS~~<sup>CHENMENS</sup>,  
IRA WAGNER, AND THE ANDRADE BROTHERS.

MR. SHAW REQUESTED THAT WE SENT  
THEM A COPY AS AN EXPRESSION OF  
THANKS TO THEM FOR LETTING US EXAMINE  
THEIR PROPERTIES. SINCE A FORMAL  
AGREEMENT WAS NOT COMPLETED I DO  
NOT THINK WE ARE UNDER ANY OBLIGATION  
TO FURNISH WORK AFFIDAVITS, HOWEVER, THE WORK  
WE DID AND THESE REPORTS MAY BE APPLICABLE TO SOME TO ONE DEGREE OR ANOTHER.  
THE PICO REPORTS WILL BE READY LATER THIS WEEK.

SINCERELY,

WM. HOVEY SMITH  
GEOLOGIST

HEINRICHS GEOEXPLORATION Co

cc. Mr. Q. Shaw



TUCSON OFFICE

# ROCKY MOUNTAIN GEOCHEMICAL CORP.

2050 E. 14TH STREET • TUCSON, ARIZONA 85719 • PHONE: (602) 622-5702

## Certificate of Analysis

Page 1 of .....2.....

Date: May 19, 1973  
Client: Heinrichs Geoexploration  
P.O. Box 5964  
Tucson, Arizona

HEINRICH  
GEOEX

Cable: GEOEX



RMGC Numbers:

Local Job No.: 73-6-10T

Foreign Job No.: .....

Invoice No.: T 4349

Client Order No.: 769

REC'D MAY 18 1973 REC'D

BOX 5964 TUCSON, ARIZONA 85703

Phone: (AREA 602) 623-0578

Report On: 26 samples

Submitted by: Mr. William Hovey Smith

Date Received: May 7, 1973

Analysis: Copper Manganese Gold Silver

Analytical Methods: All determined by atomic absorption

Remarks: Arsenic results will be reported from the Midvale office.  
Manganese results are reproducible to within + or -15%.  
cc: Accuracy is greater in the ppm range.

Enc.  
RMGC: SLC  
MHH/cm

All values are reported in parts per million unless specified otherwise. A minus sign (—) is to be read "less than" and a plus sign (+) "greater than." Values in parenthesis are estimates. This analytical report is the confidential property of the above mentioned client and for the protection of this client and ourselves we reserve the right to forbid publication or reproduction of this report or any part thereof without written permission.  
ND = None Detected      1 ppm = 0.0001%      1 Troy oz./ton = 34.286 ppm      1 ppm = 0.0292 Troy oz./ton

<u>Sample No.</u>	<u>Copper</u>	<u>Manganese</u>	<u>Gold</u>	<u>Silver</u>
5251	0.42%	49.5	-0.1	-1
5252	0.18%	37.5	-0.1	-1
5253	900	38.5	-0.1	-1
5254	0.74%	24.6	-0.1	-1
5255	475	8.25	-0.1	-2
5256	225	2.10	-0.1	2
5257	2.07%	6.65	-0.1	-1
5258	0.60%	21.8	-0.1	-1
5259	0.28%	40.5	-0.1	-1
5260	0.45%	71.5	-0.1	-1
5261	0.19%	19.8	-0.1	-1
5262	1.05%	67.5	-0.1	-1
5266	0.55%	45.5	-0.1	-1
5267	825	21.5	-0.1	-1
5268	350	11.5	-0.1	-2
5269	975	18.8	-0.1	-1
5270	750	19.9	-0.1	-1
5271	0.60%	1.70	-0.1	-1
5272	175	6.10	-0.1	-1
5273	1.10%	52.5	-0.1	-1
5274	0.13%	11.9	-0.1	-1
5275	0.19%	48.5	-0.1	-1
5276	175	20.7	-0.1	-1
5277	0.15%	23.2	-0.1	-1
5278	0.40%	20.7	-0.1	-1
5279	0.21%	22.0	-0.1	-1







MIDVALE OFFICE

# ROCKY MOUNTAIN GEOCHEMICAL CORP.

P. O. BOX 337 • 1323 W. 7900 SOUTH • MIDVALE, UTAH 84047 • PHONE: (801) 255-3558

## Certificate of Analysis

Page 1 of 1

Date: May 15, 1973  
Client: Heinrichs Geoexploration Company  
P.O. Box 5964  
Tucson, Arizona 85703

RMGC Numbers:  
Local Job No.: 73-2-28M  
Foreign Job No.:  
Invoice No.: A-380

Client Order No.:

Report On: 1 Sample  
Submitted by: WM. Hovey Smith

Date Received: May 2, 1973

Analysis: X-ray diffraction & Microscopic examination

Analytical Methods:

Remarks:

cc: Enc.  
file (2)

JJJ:ab

By James J. Johnson  
James J. Johnson *ab*

Sample No. 1

The green material in the vein was analyzed by X-ray and optically, in thin section, as requested.

X-ray diffraction showed that the mineral is conichalcite  $4(\text{Cu,Ca})\cdot\text{As}_2\text{O}_5\cdot 1\frac{1}{2}\text{H}_2\text{O}$ . Some calcite is also present. Optical examination confirmed the identification.

All values are reported in parts per million unless specified otherwise. A minus sign (—) is to be read "less than" and a plus sign (+) "greater than." Values in parenthesis are estimates. This analytical report is the confidential property of the above mentioned client and for the protection of this client and ourselves we reserve the right to forbid publication or reproduction of this report or any part thereof without written permission.  
ND = None Detected      1 ppm = 0.0001%      1 Troy oz./ton = 34.286 ppm      1 ppm = 0.0292 Troy oz./ton



MIDVALE OFFICE

# ROCKY MOUNTAIN GEOCHEMICAL CORP.

P. O. BOX 337 • 1323 W. 7900 SOUTH • MIDVALE, UTAH 84047 • PHONE: (801) 255-3558

## Certificate of Analysis

Page 1 of 1

**Date:** May 15, 1973  
**Client:** Heinrichs Geoexploration Company  
P.O. Box 5964  
Tucson, Arizona 85703

**RMGC Numbers:**  
**Local Job No.:** 73-2-28M  
**Foreign Job No.:** .....  
**Invoice No.:** A-380

**Client Order No.:**

**Report On:** 1 Sample  
**Submitted by:** Wm. Hovey Smith

**Date Received:** May 2, 1973

**Analysis:** X-ray diffraction & Microscopic examination

**Analytical Methods:**

**Remarks:**

**cc:** Enc.  
file (2)  
  
JJJ:ab

By James J. Johnson  
James J. Johnson

**Sample No. 1**

The green material in the vein was analyzed by X-ray and optically, in thin section, as requested.

X-ray diffraction showed that the mineral is conichalcite  $4(\text{Cu,Ca}) \cdot \text{As}_2\text{O}_5 \cdot 1\frac{1}{2}\text{H}_2\text{O}$ . Some calcite is also present. Optical examination confirmed the identification.

*crack*  
PLOYER BOND

All values are reported in parts per million unless specified otherwise. A minus sign (—) is to be read "less than" and a plus sign (+) "greater than." Values in parenthesis are estimates. This analytical report is the confidential property of the above mentioned client and for the protection of this client and ourselves we reserve the right to forbid publication or reproduction of this report or any part thereof without written permission.  
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UNITED STATES OF AMERICA  
GENERAL SERVICES ADMINISTRATION

*National Archives and Records Service*  
Washington, DC 20408



May 4, 1973

Mr. William H. Smith  
Geologist  
Heinrich's Geoeexploration Company  
806 West Grant Road  
Tucson, Arizona 85703

HEINRICH'S  
GEOEX

Cable: GEOEX



REC'D MAY 10 1973 REC'D

BOX 5964 TUCSON, ARIZONA 85703

Phone: (AREA 602) 623-0578

Dear Mr. Smith:

We recently sent you contact prints of the Pima Papago Project which you ordered. Because the photographs were taken at a scale of 1:31,680 we were unable to provide 14 x 14 inch enlargements. Since the cost of the photography was \$8.75, we are requesting our Cashier to refund your overpayment of \$7.25. You will receive a check for that amount from the Treasury Department.

Sincerely,

*Gary L Morgan*

*for* Ralph E. Ehrenberg  
Director  
Cartographic Archives Division

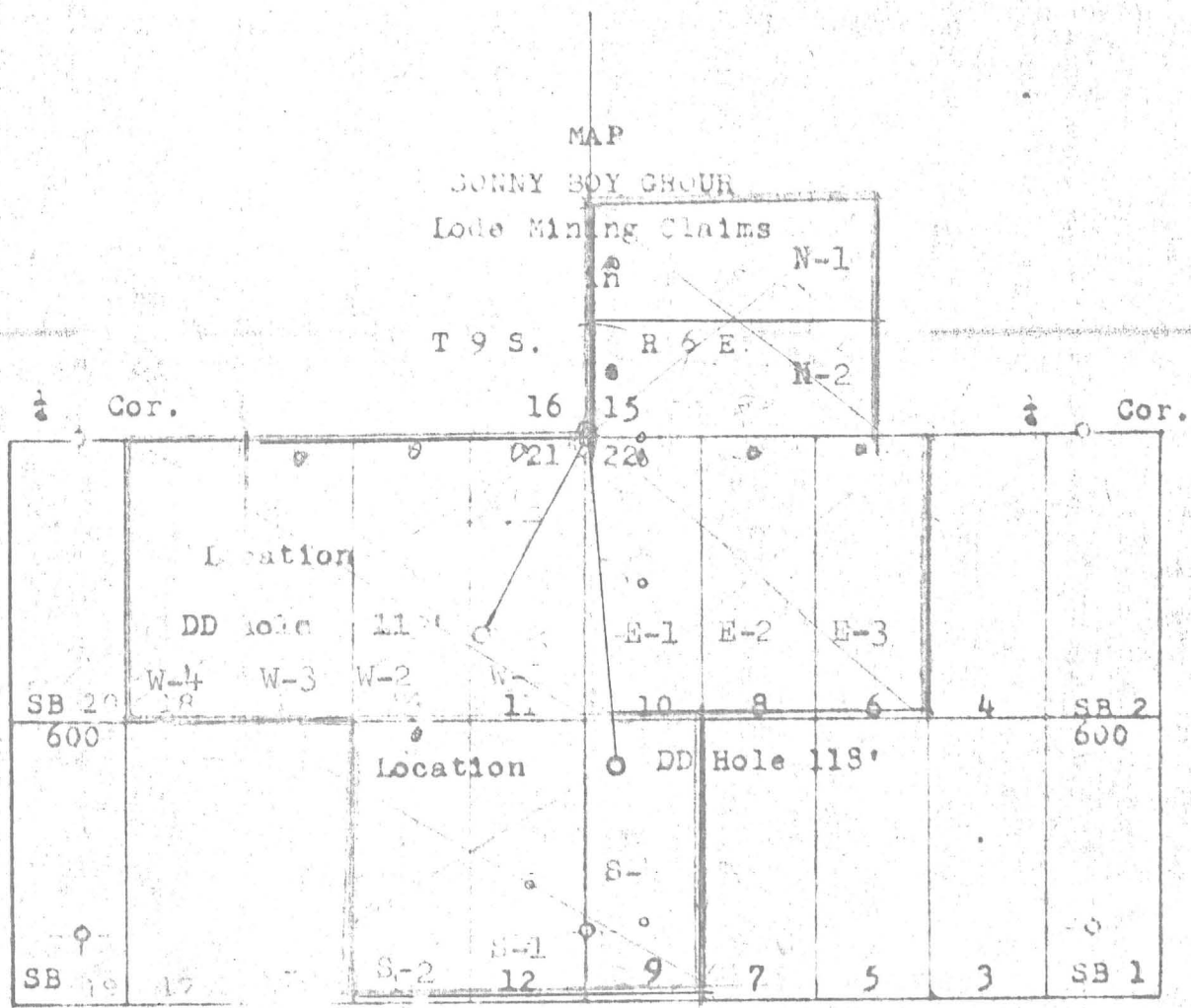
*Re: Job # 770*

RINCON LODE CLAIMS

Located:

March 26ht, 1973

Apri



CLAIM MAP

RINCON of  
The ~~SONNY BOY~~ GROUP of Lode  
Mining Claims located in the  
Casa Grande Mining District  
Pinal County, Ariz.

~~RICHARD S. CLEMANS, Locator.~~

VENTURA MINES, INC. Locator.

March 26, 1973.



MIDVALE OFFICE

# ROCKY MOUNTAIN GEOCHEMICAL CORP.

P. O. BOX 337 • 1323 W. 7900 SOUTH • MIDVALE, UTAH 84047 • PHONE: (801) 255-3558

## Certificate of Analysis

Page 1 of 2

**Date:** May 22, 1973  
**Client:** Heinrichs Geoexploration  
808 N. Grant Road  
Tucson, Arizona 85703

**RMGC Numbers:**  
**Local Job No.:** 73-47-24SL-C  
**Foreign Job No.:** 73-6-10T  
**Invoice No.:** M-1354

**Client Order No.:** None  
**Report On:** 26 pulp samples  
**Submitted by:** Mr. Wm. Hovey Smith  
**Date Received:** May 14, 1973  
**Analysis:** Arsenic  
**Analytical Methods:** Determined colorimetrically.

**Remarks:**

**cc:** Enc.  
File - Tucson  
File (2)  
  
LRR:kmm

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ND = None Detected      1 ppm = 0.0001%      1 Troy oz./ton = 34.286 ppm      1 ppm = 0.0292 Troy oz./ton

<u>Sample No.</u>	<u>ppm Arsenic</u>	<u>Sample No.</u>	<u>ppm Arsenic</u>
5251	880	5267	5
5252	20	5268	25
5253	15	5269	130
5254	+1000	5270	720
5255	380	5271	-5
5256	120	5272	-5
5257	+1000	5273	15
5258	+1000	5274	50
5259	60	5275	10
5260	10	5276	5
5261	850	5277	5
5262	190	5278	-5
5266	10	5279	-5

*Shirley*  
 PLOVER BOND  
 ASSOCIATION PAPER

By *Lawrence R. Reid*  
 Lawrence R. Reid





MIDVALE OFFICE

# ROCKY MOUNTAIN GEOCHEMICAL CORP.

P. O. BOX 337 • 1323 W. 7900 SOUTH • MIDVALE, UTAH 84047 • PHONE: (801) 255-3558

## Certificate of Analysis

Cable: GEOEX

Page 1 of 1

REC'D MAY 24 1973 REC'D

Date: May 22, 1973

BOX 5064 TUCSON, ARIZONA 85703

RMGC Numbers:

Client: Heinrichs Geoexploration  
808 North Grant Road  
Tucson, Arizona 85703

Phone: (AREA 602) 623-0578

Local Job No.: 73-47-25SL-C

Foreign Job No.: 73-6-18T

Invoice No.: M-1352

Client Order No.: 770

Report On: 2 pulp samples

Submitted by: Mr. Wm. Hovey Smith

Date Received: May 14, 1973

Analysis: Arsenic

Analytical Methods: Determined colorimetrically.

Remarks:

cc: Enc.  
File - Tucson  
File (2)

LRR:kmm

Sample No.	ppm Arsenic
5263	-5
5264	-5

By Lawrence R. Reid  
Lawrence R. Reid

All values are reported in parts per million unless specified otherwise. A minus sign (—) is to be read "less than" and a plus sign (+) "greater than." Values in parenthesis are estimates. This analytical report is the confidential property of the above mentioned client and for the protection of this client and ourselves we reserve the right to forbid publication or reproduction of this report or any part thereof without written permission.  
ND = None Detected      1 ppm = 0.0001%      1 Troy oz./ton = 34.286 ppm      1 ppm = 0.0292 Troy oz./ton



TUCSON OFFICE

# ROCKY MOUNTAIN GEOCHEMICAL CORP.

2050 E. 14TH STREET • TUCSON, ARIZONA 85719 • PHONE: (602) 622-5702

## Certificate of Analysis

Page 1 of 1

Date: May 18, 1973  
Client: Heinrichs Geo Exploration  
808 W. Grant Rd.  
Tucson, Arizona 85703

RMGC Numbers:  
Local Job No.: 73-6-18T  
Foreign Job No.:  
Invoice No.: T4346

Client Order No.: 770

Report On: 2 samples

Submitted by: Hovey Smith

Date Received: May 9, 1973

Analysis: Copper, Gold, Silver, Manganese

Analytical Methods: All were determined by atomic absorption.

Remarks: Arsenic results will be reported from our Midvale office.

cc: Enc.  
RMGC: SLC  
file  
MHB/cm

Sample No.	ppm Copper	% Manganese	ppm Silver	ppm Gold
5263	75	2.20	3	-0.1
5264	65	3.10	5	-0.1

By Martin H. Hibbetts  
Martin H. Hibbetts

All values are reported in parts per million unless specified otherwise. A minus sign (—) is to be read "less than" and a plus sign (+) "greater than." Values in parenthesis are estimates. This analytical report is the confidential property of the above mentioned client and for the protection of this client and ourselves we reserve the right to forbid publication or reproduction of this report or any part thereof without written permission.  
ND = None Detected      1 ppm = 0.0001%      1 Troy oz./ton = 34.286 ppm      1 ppm = 0.0292 Troy oz./ton



1435 SOUTH 10TH AVENUE  
P. O. BOX 1889

# Jacobs Assay Office

Registered Assayers



PHONE 622-0813

85702 Tucson, Arizona, *Nov. 14<sup>th</sup>*, 1972

Sample Submitted by Mr. *Henrichs Geoproduction Co # 769*

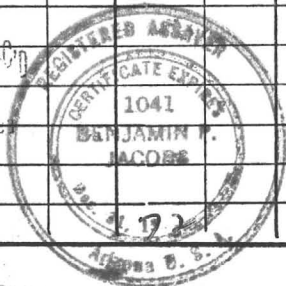
Sample Marked	GOLD Ozs. per ton ore	GOLD Value per ton ore *	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay
# 5616	0.01	—	0.15	1.85				
17	Trace	—	0.05	0.14				
18	0.01	—	0.25	3.88				
19	0.005	—	0.15	1.07				
20	Trace	—	0.10	0.29				
21	0.01	—	0.15	1.15				

**GEOEX**

Cable: GEOEX



REC'D NOV 15 1972



BOX 5964 TUCSON, ARIZONA

Phone: (AREA 602) 623-0578

\* Gold Figured \$35.00 per oz. Troy

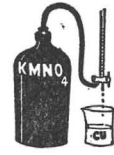
Charges \$ *28.50*

Very respectfully,

*Ben F. Jacobs*

1435 SOUTH 10TH AVENUE  
P. O. Box 1889

# Jacobs Assay Office



PHONE 622-0813

## Registered Assayers

Duplicate

85702 Tucson, Arizona, Nov. 14, 1972

Sample Submitted by Mr. Henrichs Exploration Co # 769

Sample Marked	GOLD Ozs. per ton ore	GOLD Value per ton ore *	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay
# 5616	0.01	—	0.15	1.85				
17	Trace	—	0.05	0.14				
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20	Trace	—	0.10	0.29				
21	0.01	—	0.15	1.15				



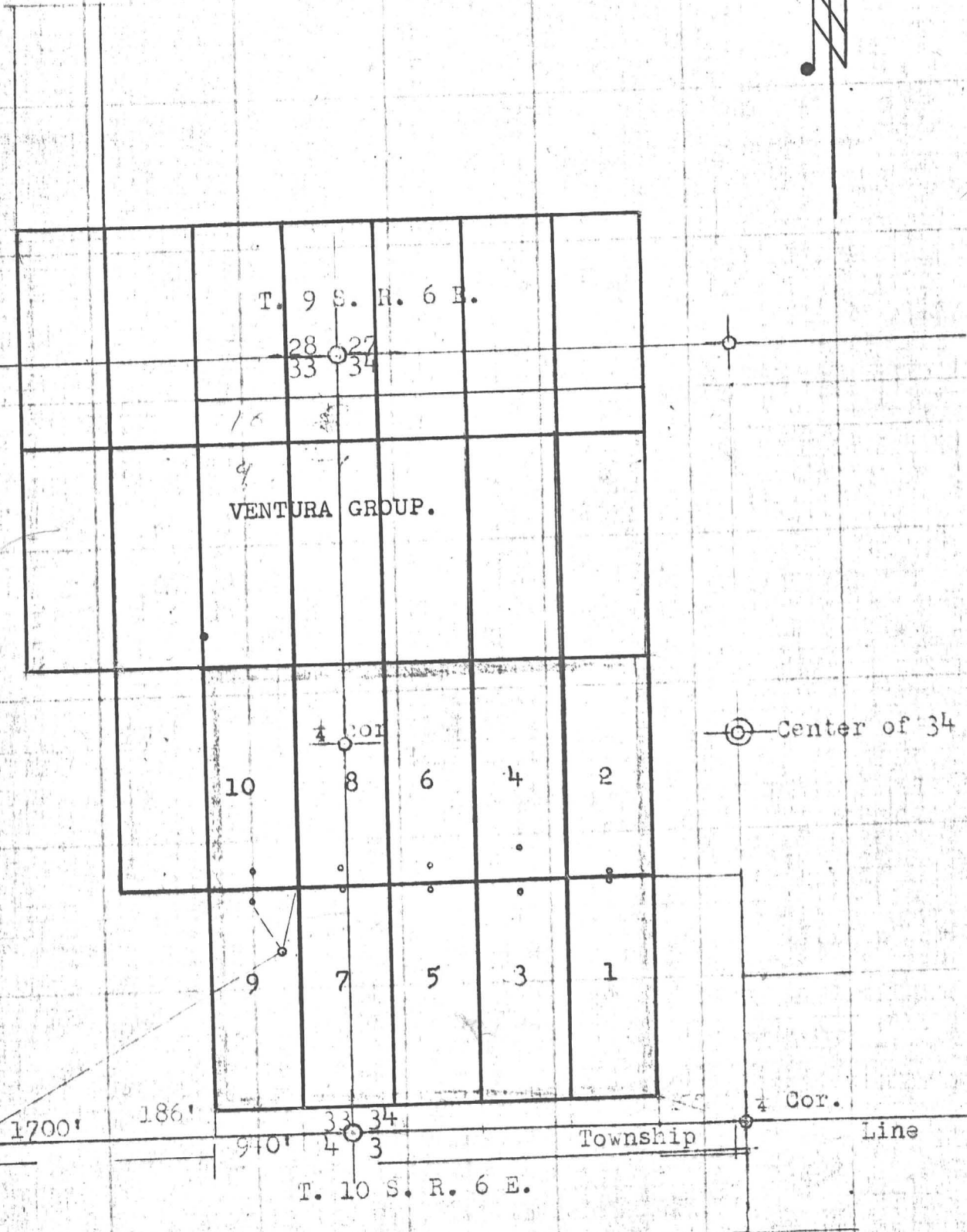
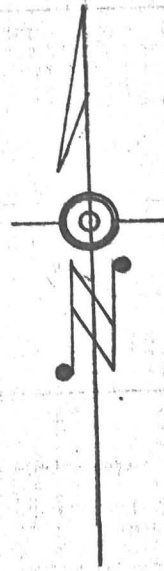
\* Gold Figured \$35.00 per oz. Troy

Charges \$ 28.50

Very respectfully,

*Ben P. Jacobs*

VENTURA MINES, INC.  
 MAP  
 VENTURA LODE CLAIMS.



SAMPLE  
DESCRIPTIONS

Date Nov. 1, 1972

Description:

Job #437

Sawtooth Mtns (Ira Wagon)

Cu As<sub>2</sub>O<sub>4</sub> ??

Assay for Cu, Au, Ag

(Bag # 14)

No 5614

Heinrichs GEOEXploration Co.  
Box 5964, Tucson, Ariz. 85703 Date \_\_\_\_\_

No 5614

Date 11/9/72

Description:

Job # ~~437~~ 769

Sawtooth Mtns

Area #1

Olivenite samples from  
prospect

Assay for Cu, Ag & Au

 No 5616

Heinrichs GEOEXploration Co.  
Box 5964, Tucson, Ariz. 85703 Date \_\_\_\_\_

No 5616

Date 11/9/72

Description:

Job # 769

Sawtooth Mtns

Area # 1

High silica samples

? fine grained metallic  
no obvious copper

Assay for Cu, Ag, Au

No. 5617

Heinrichs GEOEXploration Co.  
Box 5964, Tucson, Ariz. 85703 - Date \_\_\_\_\_

No. 5617

Date 11/9/72

Description:

Job # 769

Sawtooth Mtns

Area # 2 - olivenite  
high grade from prospect pit  
assay for Cu, Au & Ag

No 5618

Heinrichs GEOEXploration Co.,  
Box 5964, Tucson, Ariz. 85703 \_Date\_\_\_\_\_

No 5618



Date 11/9/72

Description:

Job # 769

Sawtooth Mtns

Area # 2

High manganese samples  
no obvious copper

Assay for Cu, Ag & Au

No 5619

Heinrichs GEOEXploration Co.  
Box 5964, Tucson, Ariz. 85703 \_Date\_\_\_\_\_

No 5619

Date 11/9/72

Description:

Job # 769

Sawtooth Mtns

Area # 3 prospected pit

Manganese samples with  
no obvious copper

Assay for Cu, Ag & Au

No 5620

Heinrichs GEOEXploration Co.  
Box 5964, Tucson, Ariz. 85703 \_Date\_\_\_\_\_

No 5620

HEINRICH'S GEOEXPLORATION CO.  
P.O. BOX 5964 • TUCSON, ARIZONA 85703

Date 11/9/72

Description:

Job # 769  
Sawtooth Mtns  
Wagon cut olivenite grabs

Nº 5621

Heinrichs GEOEXploration Co.  
Box 5964, Tucson, Ariz. 85703 \_Date\_\_\_\_\_

Nº 5621

VICTOR #9 16 SEPT 1970

JOHN R. KEELING?

ELOY AUY

AMAX - LEASES

VICTOR Claims #1-14

JOHN R. KEELING

loc 9/16/70 DC-609-420<sup>To</sup>  
433

VICTOR 15-19 9/16/70

AFFIDAVIT OF LABOR

1-8 ET AL.

HO. B. BOHANNON

DC 618

944 TO

948

2/17/73

DC 678

625

→ Paid by KEELING

WAGGON IAA ET AL.

Pico #1 #2

7/15/69

DC 577/301

CLEMENS, R.G.

Casa Grande

5/2/71

Sonny Boy 1-20

NO RES. AFFID.

DC 636

979

998

CHEMUNENS R. G. FOIR

VENTURA MINES LTD. HOPE  
# 1-6 NO AFFID OF LABOR 12/20/70 DC. 624 682 677

VENTURA MINES LTD.

Shy 1-10 ; 13 & 14  
NO AFFID. 12/19/70 DC 623 582 -  
593

Ralph J. Smith

VENTURA 1-10

AFFID OF LABOR DC. 599 478 TO  
487  
# 1 TO 10 1/4/73  
692 (563?)

VENTURA MINES INC.

ALTO #1-12 A/16/73

Book 703

FRED ANDRADE

Black BARON #1 #2

© With HEAD DC 538 <sup>572</sup>  
573

5/13/68

ANDRADE SANTA ROSA #1 & 2

CASA GRANDE

4/20/68 DC 539 <sup>7A1</sup>  
7A2

SANTA ROSA #5-8

Save TOOTH 3/28/69

DC 571 <sup>276</sup>  
279

La JOTA 1-3

Save TOOTH 2/26/70

DC 593 <sup>236</sup>  
238

La Jota A-6

Saw Tooth 3/17/70

DC 594      367 To  
                 369

BONANZA # 1-10

Saw Tooth 10/2/70

DC 612      153 To  
                 162

ANDRADE Richard and

Rag BONANZA # 11 11/27/70

DC 619      261

VICTOR CHAINS

DC. 678 P. 625

9/5/72

COOSE LEAF NO. 372

J. L. DARLING CORP.

WATERPROOF

in the name

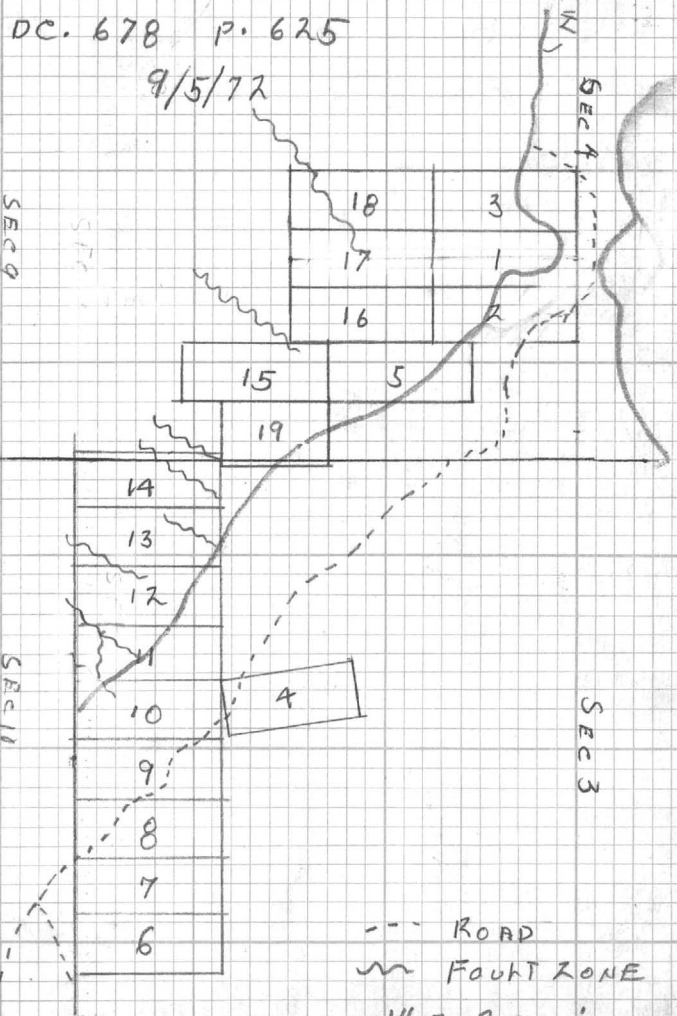
SEC 4

SEC 10

MT. FRONT

SEC 4

SEC 3



--- ROAD  
~ FAULT ZONE  
1" = 2000'



NOEL COUSINS # 122

5276 - 5300

STRIKE OF BEDDING IN TUFF N 10 W 10.

N 10 E DIP NEAR V. T. CHE

SEQUENCE a TUFF WITH

VITROPHANE / RED SCORREOUS

FLOW - TUFF? WHITE WITH

NUMEROUS hornblende phenocrysts

Rock Descriptions

TUFF - with boros with fragments

in strongly argillitic matrix -

WEATHERED TUFF FRESHER APPEARING

Oxidized mafic minerals and

Vitropane

halite white on weathered

surface abundant hornblende

crystals white to light  
ground mass quartz at least  
sparingly present in  
ground mass.

RED SCORIEOUS DACITE?

WITH THIN DACITE FLWS AND  
FLOW BRECCIA

5276 MN STAINED BRECCIA -

ROCK CHIP. OLD PROSPECT

PITS AND ~~THE~~ STONE MONUMENT

SHEAR ZONE STRIKES N 0° IS

APPROXIMATELY VERTICAL AND

HAS AN APPARENT WIDTH OF 2'

MN OXIDE MINERALS PARTLY REPHASE SOME  
ROCK FRAGMENTS IN BRECCIA & FRACTURES  
COAT OF FIBR

UPPER DACITE APPARENT DIP OF

76° E.S.T. VERTICALLY STRIKE

N26W

Everything BELOW DACITE TUFF

5275 Sample from home

Wohlf. 1' VEIN N26°W Venetische

Dip DISCONTINUATION AND APPARENT

ALTERATION OF DACITE? Wahls.

VEIN IS EXPOSED by TRENCH 50'

long. Banded calcite with

LESSON QUANTITIES OF black

calcite FOAM VEIN WITH

(boiteridek) MIN. oxides

5274 / N35°E striking

calcite. Qtz-black calcite

breccia ZONE MINOR, /

along fractures WITH small

QUANTITIES of GREEN chlorite

~~also~~ ZONE IS perhaps

N 40° W Dip 47° NE on  
white amphibolite N 20° W  
E. 55°

Found N. 20° W strike both walls  
in Tuff.

---

12-15' N. 10° E Dip 47° NE on

vein in dacite

5273 ✓ N 30° E striking 1' N. 10°

~~vein in~~ calcite-Quartz vein

in tuff upper portion

of vein shows compact

bot. tr. calc. <sup>iron</sup> oxides. with

calcite in and around veins

iron oxides commonly pretty

encrust and surround

cobbles in tuff most appear

secondary.

✓ 5272 Silicious Mn oxide  
minerals in 70 W trending fault  
IDENTICAL IN APPEARANCE TO  
MATERIAL FOUND IN ANDREADI  
BROS PROSPECT Though exposure  
IS HERE ONLY 4" THICK  
Fault in a REDDISH TUFF  
BEDDING IS HORIZONTAL

✓ 5271 Dump by ROAD @ QUARTZ  
VEIN WITH COMMON MALACHITE  
AND CHRYSOLOTE staining.  
VEIN HAS ALTERED WALLS  
AND SECONDARY HALBE AND  
CHLONTE RESEMBLES VEIN  
on MINERALIZATION in  
YAVAPA Schist.

Strike of beds  $N80^{\circ}E$  Dip  $N 20^{\circ}$

✓ 5270  $N45^{\circ}E$  VEIN dipping  $70^{\circ}$

SE Calcite - MnO VEIN

VEIN is probably @ 1' wide is

in Cobbley Tuff SOME

VEIN MATERIAL heavily stained

with hematite.

✓ 5269 SAMPLE FROM DOZER

CUT ON hill TOP Mn-oxide

Calcite - black Calcite VEIN

with Tuff Fragments.

BEDDING HORIZONTAL DOZER

Work spoiled crop VEIN

has UNKNOWN ORIENTATION

✓ 5268, A green-brown  
carbonate mineral from  
same location. Forms masses  
to 4" thick in vein.

✓ 5267 N 12° W TRENCHING <sup>VERTICALLY</sup> VEIN  
IN TUFF MINOXIDES COHESIVE-  
QUARTZ SOME bot. nod. or apparently  
SECONDARY MIN.

✓ 5266 N 55° E STRIKING <sup>D.P. 70° - N</sup> VEIN <sup>2' TH.</sup>  
EXPOSED IN TRENCH 20' LONG  
TUFF on both walls <sup>&</sup> COMMON  
NODULAR-bot. nod. MIN OXIDES

5277 N40°E striking

VEIN 80° Dip To NW. Most  
alteration observed along  
any vein hanging wall &  
footwall in dacite!

About 3' of white gouge against

footwall. Sample mostly dacite

fragments <sup>covered</sup> ~~partly replaced~~ <sup>by</sup>

~~Mn oxides~~ and perhaps partly

replaced by Mn oxides. Calcite

and quartz one gang mineral.

NOTE: BEE HIVE <sup>UPPER</sup> IN DACITE

5278 N40E striking shear

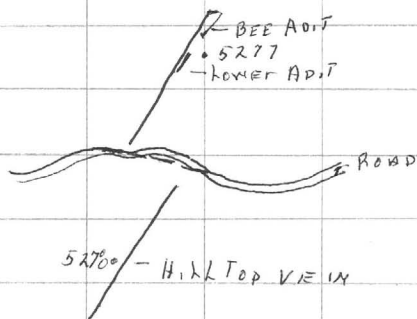
zone both walls in dacite

masses of Mn oxides in altered

dacite. Probably offset extension



○ F 5277, but NOT as well  
EXPOSED. SCATTERED MIN MINERALS  
IN DOZED ~~OVER~~ VEIN EXPOSURE  
VEIN MINERALOGY AS 5277



N12W 5279 Rock Chip FROM SHALLOW

TRENCHES ON N12°W SHEAR ZONE  
IN TUFF SPARSE MIN SE OXIDES

YU WORKINGS

1435 SOUTH 10TH AVENUE  
P. O. BOX 1889

# Jacobs Assay Office

Registered Assayers

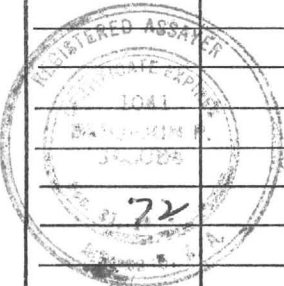


PHONE 622-0813

85702 Tucson, Arizona, Nov. 7<sup>th</sup>, 1972

Sample Submitted by Mr. Heinrichs Geo exploration project 437

Sample Marked	GOLD Ozs. per ton ore	GOLD Value per ton ore *	SILVER Ozs. per ton ore	COPPER Per cent Wet Assay	LEAD Per cent Wet Assay	Mo Per Cent Wet Assay	Per Cent Wet Assay	Per Cent Wet Assay
#5613	0.02	0.70	57 6/10	0.34	23 5/10	0.013	JOB# 770	
5614	0.01	0.35	0 4/10	1.93			769	
5615	0.02	0.70	28 5/10	0.12	8 6/10	0.002	770	



HEINRICHS  
GEOEX



Cable: GEOEX

REC'D NOV 9 1972 REC'D

BOX 664 TUCSON, ARIZONA 85703  
Phone: (AREA 602) 623-0578

\* Gold Figured \$35.00 per oz. Troy

Charges \$ 2.14

Very respectfully,

*Ben P. Jacobs*



**Arizona Testing Laboratories**  
 817 West Madison · Phoenix, Arizona 85007 · Telephone 254-6181

Chemists  
 Engineers  
 Geologists

For: Mr. Richard Clemans  
 1104 North Pinal Avenue  
 Casa Grande, Arizona 85222

Date: October 25, 1972

Lab. No.: 3378 & 3379

Sample: Ore

Marked: #1 & #2

Received: ---

*Sawtooth Mine  
 Olivineite*

Submitted by: same

REPORT OF QUALITATIVE SPECTROGRAPHIC EXAMINATION

ELEMENT

APPROXIMATE PERCENT

	<u>#1</u>	<u>#2</u>
	-Major Constituent-	
Silicon	2.0	4.0
Aluminum	0.1	0.3
Magnesium	0.1	0.05
Lead	8.0	3.0
Copper	1.0	0.9
Iron	3.0	6.0
Calcium	0.1	0.1
Vanadium	3.0	2.0
Sodium	0.02	0.02
Titanium	0.01	0.01
Nickel	1.0	1.0
Potassium		

Respectfully submitted,

ARIZONA TESTING LABORATORIES

*Claude E McLean Jr*

Claude E. McLean, Jr.

May 22, 1969

Mr. Q. A. Shaw  
North American Mines  
60 State Street  
Boston, Mass.

Re: Geologic Reconnaissance of  
Claims in Sawtooth Mtns.  
Pinal Co., Arizona

Dear Mr. Shaw:

Mr. Bill Mackay and I spent 13 May 1969 examining claims in the Sawtooth Mountains. On 17 May 1969, Mr. Mackay, Mr. Ira Wagnon took you and I over the claims as well so that all concerned would have benefit of everyone's ideas.

The workings show mostly manganese oxides with minor copper oxides in fracture filling in volcanic rocks. Assay results show some copper but the mineral has not been definitely identified. A semi-detailed petrographic examination showed that the greenish mineral is olivine with extremely small copper oxide and carbonate minerals in the cracks and fractures.

*will  
NOT OBTAIN*

At this time it does not seem reasonable to continue working on these claims as the chance of economic copper mineralization appears to be remote.

The manganese oxides are notorious for trapping small amounts of other metals but seldom are they very economic. The manganese oxides would also have some I. P. effects and might be the only thing to show up. The terrain is such that rapid production of the field work is not possible.

Respectfully,

HEINRICHS GEOEXPLORATION COMPANY

Donald B. Cooley  
Geologist

DBC:db

15 May 1969

TO: Mr. O. A. Shaw  
FROM: Donald B. Cooley  
SUBJECT: Job #396-69 - Geologic Reconnaissance of  
claims in Sawtooth Mountains, Pinal Co., Arizona

Mr. Bill Mackay and I spent 13 May 1969 examining claims in the Sawtooth Mountains. Included are claim maps supplied by Mr. Ira Wagon.

The workings visited show only manganese oxides (mostly psilomelane) which have been worked in the past when manganese prices were up. Reportedly the manganese also carries considerable copper in places as shown in the accompanying assay results. The significance of this can only be determined by careful sampling and a petrographic examination by a qualified mineralogist to determine the copper source minerals.

The occurrences are small veins in a series of volcanic rocks and some mapping and sampling should be carried out to determine their extent and values. No dissemination of the mineralization was seen on this trip and probably will be somewhat rare.

If surface mapping and sampling shows a favorable area of sufficiently good grade copper, drilling could be considered at that time. Probably one week in the field would be enough to determine the extent of the mineralization.

The surface conditions do not indicate a large ore body beneath the surface. The rocks are volcanic in nature, mostly extrusive, some brecciated, and not very mineralized. I.P. would not be very practical at this time as the manganese oxides would give some I.P. effect, but the manganese probably would not be economic.

---

Donald B. Cooley

DBC/plg

Enclosures