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80-881

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GEOLOGICAL SURVEY

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PRELIMINARY DATA SET CONTAINING GEOCHEMICAL ANALYSES OF SAMPLES OF
ROCK, STREAM SEDIMENT, AND NONMAGNETIC HEAVY-MINERAL CONCENTRATE,
WALKER LAKE 2° QUADRANGLE, CALIFORNIA AND NEVADA

By

M. A. Chaffee, R. H. Hill,
W. S. Speckman and S. J. Sutley

OPEN-FILE REPORT 80-881

1980

This report is preliminary and has not been edited or reviewed for
conformity with U.S. Geological Survey standards.

ACKNOWLEDGMENTS

We were assisted in the field and (or) laboratory by F. C. Benedict, C. A. Bannister, J. B. Bernard, D. L. Fey, J. R. Guisso, W. J. Keith, A. D. McCollaum, W. R. Premo, J. F. Seitz, R. B. Tripp, J. E. Tucker, R. L. Tucker, and J. R. Watterson. The cooperation of the Walker River Indian Tribe and numerous other property owners is greatly appreciated.

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- ✓ Chaffee, M. A., Hill, R. H., Speckman, W. S., and Sutley, S. J., 1980, Geochemical analyses of samples of rock, stream sediment, and panned heavy-mineral concentrate, southern part of the Walker River Indian Reservation, Mineral County, Nevada: U.S. Geological Survey Open-file Report 80-365, 17 p.
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Atomic-absorption methods of analysis useful in geochemical exploration:
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antimony in geological materials by atomic absorption spectrometry:
Analytica Chimica Acta, v. 76, p. 65-69.

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NOEL HORLOCKER EVALUATION 4/25/10
Calico Area For oxy

6000 0098 (089) JME 4/25
OCCIDENTAL MINERALS CORPORATION

8073 WEST 41TH AVENUE
WHEAT RIDGE, COLORADO U.S.A. 80033
TELEPHONE (303) 421-9440

REC'D INTER-OFFICE MEMORANDUM
PAB 4/25

TO: James A. Anderson
FROM: Noel Horlocker
SUBJECT: NEVADA - Calico Hills Area - Evaluation of the Porphyry Copper Potential
DATE: April 25, 1970
COPIES:

Summary

The Calico Hills area northwest trending horst composed of east dipping Triassic metasedimentary and igneous rocks intruded by quartz diorite of Cretaceous age. The basement rocks are overlain by Tertiary volcanic rocks and lake beds.

Nine exploration drill holes indicate the sedimentary rocks have been skarnified and contain significant amounts of pyrite-pyrrhotite and magnetite with much less chalcopyrite. Weak pyrite mineralization is present within adjacent quartz diorite containing weak epidote-chlorite alteration. Mineralization and alteration gradients are strongly zoned about the highly mineralized calc silicate horizons.

Eight IP lines and two expander IP lines, utilizing drill hole data, indicate a linear IP anomaly is coincident with the mineralized metamorphic rocks and immediately adjacent quartz diorite. The anomaly indicates significant sulfide mineralization persists only \pm 1500 feet east of the skarn zone. The anomaly is offset to the east in the northern portion of the Hills and probably reflects mineralization offset by a small horst north of drill hole W01.

Conclusions

The iron-copper mineralization in the Calico Hills is of the "contact" metasomatic type and is similar to other such deposits in the western cordillera. There is no evidence that this mineralization is related to a contemporaneous or younger porphyry copper system.

The Calico Hills may contain a completely blind porphyry copper deposit with no mineralization or alteration vector guide leading to it. A similar deposit may be hypothesized in the Hottentot area.

Mineralization similar to that present in the Calico Hills, although lacking magnetite, is present in metamorphic rocks in the Afterthought area. The association of this mineralization with acid differentiates suggests this mineralization may be related to a concealed porphyry copper deposit.

Recommendation

No additional drilling to test for a porphyry copper deposit in the Calico Hills is recommended. Two east-west IP lines are recommended between the Calico Hills and Afterthought area to test for a possible buried porphyry copper system.

Geology

The Calico Hills are a northwest trending horst composed of Triassic metasedimentary and igneous rocks intruded by quartz diorite of Cretaceous age. These units are overlain, with profound unconformity, by Tertiary volcanic rocks and lake beds.

The quartz diorite is probably a hybrid border facies of a large granodiorite batholithic underlying the reservation. Acidic differentiates (including quartz monzonite and aplite) are exposed north of the Calico Hills in the Afterthought area. Local gabbro (eg., in the lower portion of drill hole CA7) may be Triassic in age or possibly consanguineous with the granodiorite. The sedimentary rocks have been altered to hornfels, calc silicate rocks, and quartzite.

Correlation of a quartzite unit in holes CA1 and CA6 indicates the metamorphic rocks strike northwest and dip steeply to the east. They probably form a portion of the western limb of a southeast plunging synform, the offset nose of which appears to be located in the Afterthought area.

The Calico Horst is located within the Walker Lane Wrench fault zone, however, there is no evidence of lateral displacement within the horst. Numerous northeast and northwest trending normal faults are exposed in the Tertiary volcanic rocks. Most of these faults are probably confined to the volcanic cover, although several appear to penetrate basement and form small, east trending horsts and half grabens (eg., the east trending horst north of drill hole WC1). The Tertiary volcanic rocks and the lake beds have been tilted 10° to 30° to the southwest. This tilting has probably steepened, and possibly overturned, the bedding in the underlying metamorphic units.

That portion of the Calico Hills which has not been penetrated by drilling is interpreted to consist of a mixed assemblage of metamorphic rocks and quartz diorite.

Mineralization and Alteration

Nine Exploration drill holes intercepted sulfide and magnetite (in five holes) mineralization in skarnified sedimentary rocks with lesser amounts in adjacent quartz diorite. The strongest mineralization occurs in drill holes CA1 and CA5. The calc silicate zone in these holes contains 5 to 10 volume percent pyrrhotite-pyrite and 25-30 volume percent magnetite with minor chalcopyrite. The true width of this zone is ± 1000 feet. Drill holes CA3, 4 and 6 intercepted a portion of the calc silicate zone and contain similar, but less strong, mineralization. Argillaceous hornfels intercepted in hole CA2 (located west of drill hole CA5) contains less than two volume percent pyrite, minor pyrrhotite and trace to 10 volume percent magnetite. This zone appears to dip beneath the calc silicate zone. Drill holes WC1 and WC3 (located in the northern portion of

of the area) and hole CA7 (located in the southeast portion of the drilled area) penetrated quartz diorite, diorite and various hybrid rocks containing one to two volume percent pyrite with very minor chalcopyrite. The igneous rocks appear to border the calc silicate zone on the east. The overall copper content in the drill holes is ± 0.1 percent, with hole CA3 containing ± 100 feet of ± 0.75 percent copper. 149 0.72

Mineralization, particularly magnetite, is erratically distributed in the calc silicate zone. Sulfides and magnetite have replaced favorable units plunging to the east parallel to bedding. Chalcopyrite, the last mineral to crystallize, is confined to areas generally bordering the massive magnetite-pyrrhotite-pyrite zones.

The mineralization is strongly zoned about the calc silicate horizon. Away from this horizon magnetite and pyrrhotite decrease sharply, with total sulfides decreasing less rapidly (i.e., the pyrite/pyrrhotite ratio changes from much less than one to much greater than one).

The calc silicate zone displays greatest evidence of allochemical alteration with the development of pyroxenes, amphiboles, epidote and other calc silicates. The underlying argillaceous unit is primarily hornfelsed. Quartzite merely recrystallized. The quartz diorite contains weak epidote-chlorite alterations.

Geophysics (IP)

Eight IP lines and two expander lines have been run in the Calico Hills. The linear IP anomaly correlates with the interpreted limits of significant "contact" mineralization. Sulfide mineralization apparently does not persist away from this zone. The shift to the east of the anomaly on lines 4, 5, 6 and 7 may reflect the probably offset in mineralization due to the small horst north of drill hole WC1. At least a portion of the IP anomaly on the east end of line 6 may result from Tertiary volcanics.

Porphyry Copper Potential

The mineralization intercepted in Calico Hills drill holes appears to be of the "contact" metasomatic iron-copper type. Its characteristics are very similar to other "contact" metasomatic iron-copper deposits in the western Cordillera. Although such deposits may contain economic concentrations of copper mineralization, none appear to be associated with porphyry copper deposits. The iron-copper mineralization may not be genetically related to adjacent igneous rocks and several deposits have been reported to occur \pm one mile from any potential igneous source. The development of such deposits is apparently a function of regional environmental conditions.

There is no evidence (eg., whole rock diaphthoritic alteration of calc silicates, or sulfide bearing quartz veins) of a younger hydrothermal system being superimposed on the iron-copper mineralization. The linear IP anomaly, utilizing drill hole data, indicates significant sulfide mineralization terminates ± 1500 feet east of the zone of mineralized metamorphic rocks. The weak mineralization and alteration of quartz diorite in this restricted zone indicates the zone has little potential for a porphyry copper deposit. The porphyry copper potential to the north and south is negated by drill hole data and negative IP lines respectively. The pre mineral rocks have been apparently deeply depressed west of the border fault which trends northwest immediately east of drill holes CA3 and WC2.

It is concluded the iron-copper mineralization (and gradients therein) in the Calico Hills is unrelated to an adjacent porphyry copper deposit. A porphyry copper deposit may be concealed beneath the Calico Hills, however, it must be considered a blind target with no vector guides leading to it. Such a deposit may be hypothesized in the Hottentot area.

Mineralization similar to the Calico mineralization, although lacking magnetite, occurs within metamorphic rocks in the Afterthought area. The association with acidic differentiates suggests this mineralization may be related to a buried porphyry copper system located between the Calico Hills and the Afterthought area.

Calico Fe Cu

- 1) hole CA-3 had 130' section of .75% Cu
 - a) what about { Au, Ag, W, Sn, Ni, Pt Co
~~Tr~~ ^{Tr} Ag, Ag, Mo, }
- 2) where is core? PUIPS
- 3) drill hole logs?
- 4) 7 holes drilled 188,000,000 inferred ~ 40% Fe
- 5) CA2 range of .98 to 1.98 g/t Ag
- 6) WC-3 assayed for Co, 28 samples from 10 to 165 ppm
 Ni 2 samples 40 & 90 ppm Cu, 24 g/t
- 7) No samples run for W, Sn, Pt
- 8) Probably not much that can be done with this deposit except for minor additional assays

MISSING INFO

Calico

Geologic map by Lawrence - (plate 2)

do ?

(plate 1)

overlays for plate 1 (1-4 overlays)

CIA

Field geologic logs of Drill holes (see Carnithers)
Calico 4/or Tube.

W Calico

E Calico

Panel Diagrams 1, 2, 3

was little Calico drilled?

INDEX TO file

CaLico

- 1) Haxby R L & Chester William F 1967, an economic and geologic evaluation of The CaLico IRON Discovery Walker River Reservation Nevada
- 2) Lawrence Edmond F, Redmond Robert L, Exploration of The CaLico AREA Walker River Indian Reservation, Mineral Co NV (Walker Mortel MINING Co RENO Nevada)
- 3) NEWS Release 1966
- 4) Parker Gay Letter 1975 - concerns Porphyry Cu aeromagnetic signature of Calico. Parker has published 36 maps & volume on aeromagnetics of porphyry
- 5) Thin sec & polished work on Calico drill holes, 1966 - Sample No's not tied to hole or footage
- 6) 8 1/2 x 11 cross sec Calico Canyon 1966
- 7) Lawrence E F 1966 letter ~~was~~ to Robert Redmond Walker Mortel (Prelim report of work of the Calico area

Calico CONT.

* HOLT Robert E 1966 letter to Bob Redmond Walker metal
Geology an analogies between Yerington, Lyon, & Rossmore Fe dr
Holt feels the Lyon, YERINGTON & Calico are close in age
but not in plumbing, Holt suggested getting age dates

Sumner John S. 1967 letter susceptibility measurements of magnetite
from Calico exp.

Wright Philip M 1974 letter to Bill Wilson, regards Kennecott
IP work over Calico & Hottentot

Ross Howard 1974 IP survey of Calico & Hottentot deposits

Wilson Bill 1966 letter to RL Redmond, regards to drill
logs & assay data for Calico holes CA1, CA3

General 1966 ~~evaluation of~~ Drill hole inspection & depth etc
on Calico ~ 15,786 holes.

Wilson 1967 Complete Assay & Log for Calico CA-1

Mariacher Burt 1966 letter to R. Redmond Walker metal
metallurgical Tests on Calico

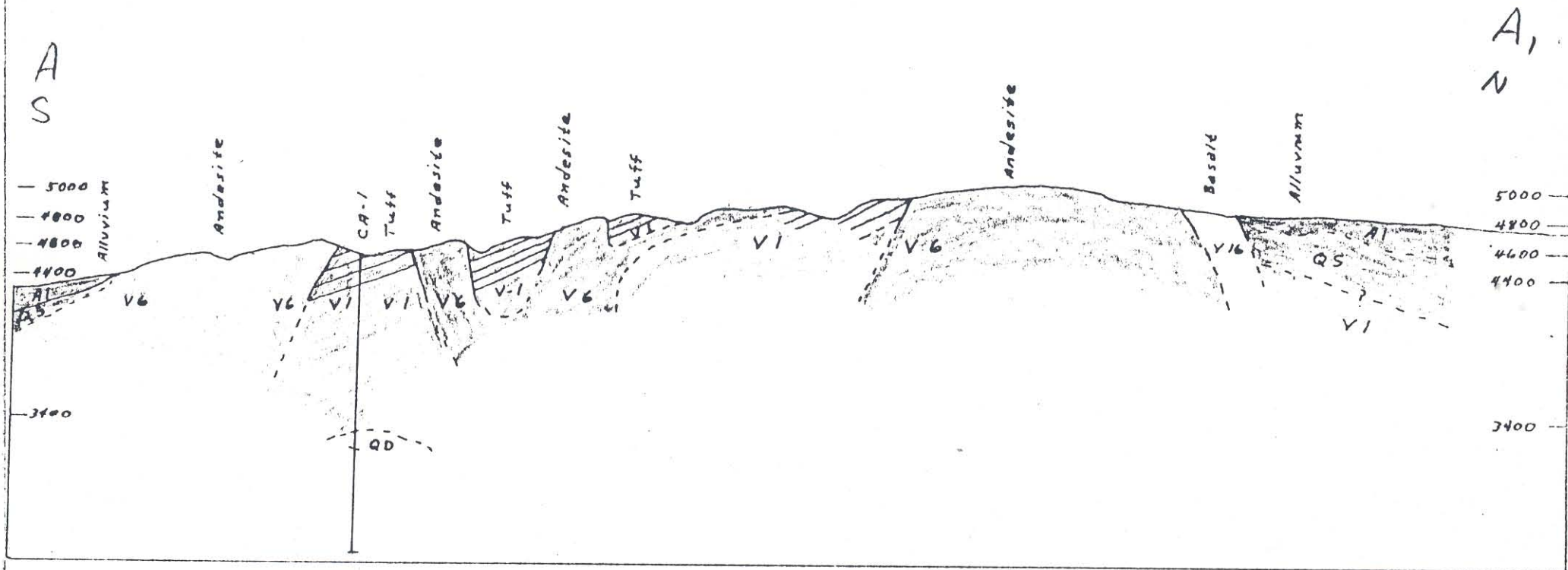
General 1966 assay work on CA-1 by Union assay office.
reports sent back to Walker metal Co Reno. They have $\frac{1}{2}$ the core

Calico CONT

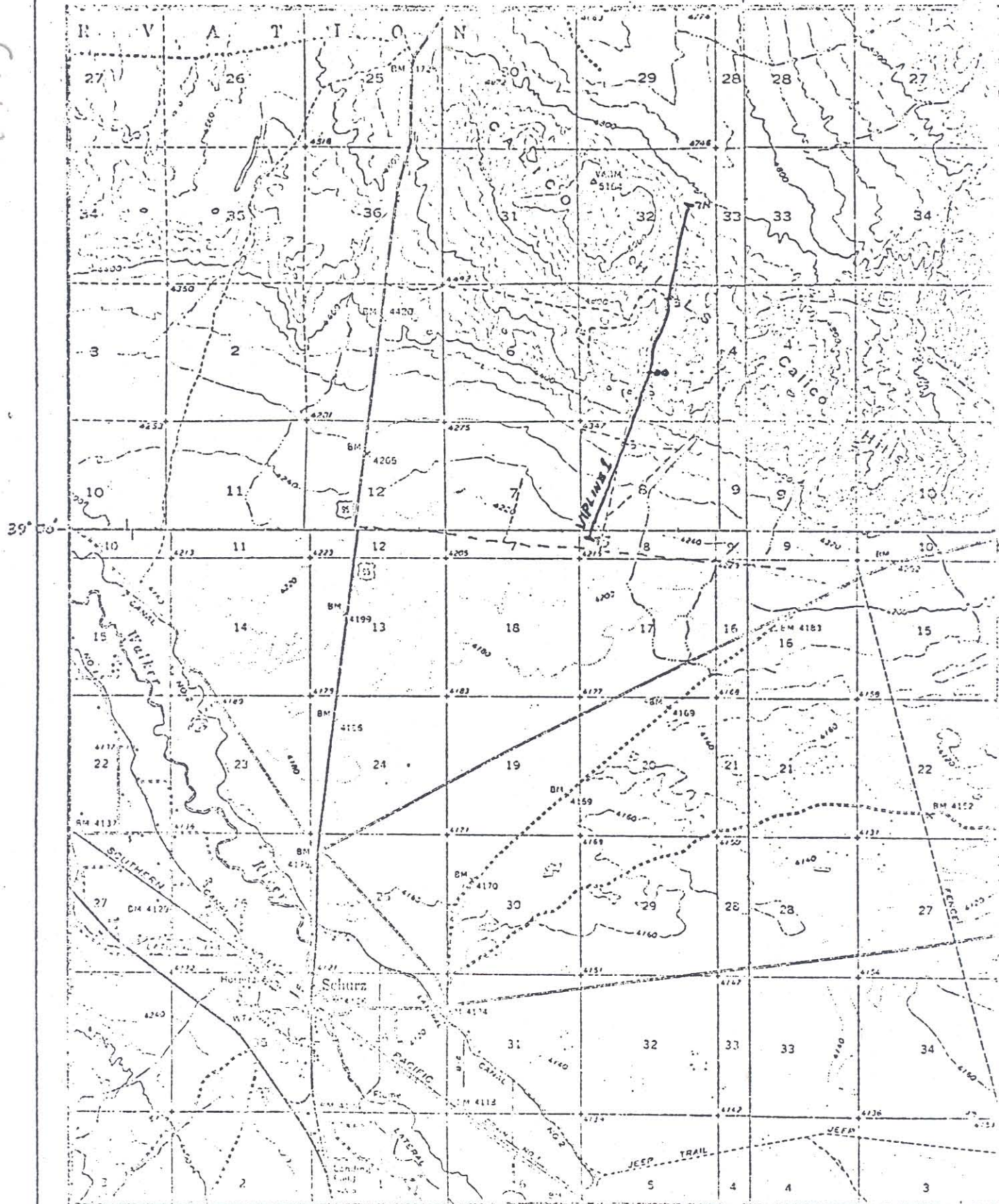
Wilson 1979 letter to Cliff mark (Cyprus)
Brief discussion of Calico, Hittite, + badge deposit

General 196? complete array Kenneth Calico

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Figure 3

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Date 6-5-75 Time 9:50 AM

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M. r. Parker Gay

of Applied Geophysics, Inc.

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CALLED TO SEE YOU		WILL CALL AGAIN
WANTS TO SEE YOU		URGENT

☐ RETURNED YOUR CALL

Message Came in to see you again.
Nog talked with him - I tried to
reach you at home thinking that
you might wish to speak with him
on the telephone but you were
already gone to graduation....
 (over) Operator


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OFFICE SUPPLY CO.

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S. PARKER GAY, JR.
GEOPHYSICIST

 **applied geophysics inc**

~~100 SOUTH 200 EAST SALT LAKE CITY, UTAH 84102~~
 SALT LAKE CITY, UTAH 84102

He is familiar with the Calico
and wishes to speak with you
once he found out that you
had that property. Says he
knows where the copper
porphyry deposit is. Nog told
him that he was sure you would
want to talk with him about
that. I had already told him
that you wanted to talk with
him.

He had to catch a plane back
to Salt Lake City at 12:00
today - was sorry he had missed
you, and thought perhaps you
could stop in Salt Lake City
sometime to talk with him.

Sarah
CO YAKUT 20770

ASSAY REPORT
UNION ASSAY OFFICE, Inc.

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L. G. HALL, Vice President
G. P. WILLIAMS, Treasurer
LILY M. HOTTINGER, Secretary
P. O. Box 1528

Salt Lake City, Utah 84110

RESULTS PER TON OF 2000 POUNDS

Aug. 12, 1908

NUMBER	GOLD Oz. per Ton	SILVER Oz. per Ton	LEAD Wet on Ore	COPPER Per Cent	BISSOL. Per Cent	ZINC Per Cent	SULPHUR Per Cent	IRON Per Cent	LIME Per Cent	Per Cent	Per Cent
1				0.006	888-878						
2				0.006	836-844						
3				0.006	754-762						
4				0.006	683-696						
5				0.006	480-484						
6				0.013	1787-1827			21.2			
7				0.044	1827-1848			25.2			
8				0.037	1852-1875			25.7			
9				0.075	1879-1885			40.9			
10				0.025	1895-1912			24.3			
11				0.081	1958-1972			9.4			
12				0.025	1994-2017			13.6			
13				0.056	2043-2052			15.2			
14				0.113	2077-2085			12.2			
15				0.069	2100-2110			19.1			
16				0.069	2816-2835			51.5			
17				0.151	2835-2857			56.3			
18				0.113	2857-2876			53.9			
19				0.100	2876-2897			51.5			
20				0.100	2897-2921			57.1			
21				0.037	2256 ^S -2264			12.0			
22				0.025	2282-2299			6.0			
23				0.037	2310-2313			12.4			
24				0.006	2329-2332			4.4			
25				0.025	2338-2345			9.2			
26				0.037	2352-2364			17.0			
27				0.012	2364-2375 ^S			7.2			
28				0.037	2383 ^S -2391 ^S			12.8			

Remarks

Charges \$ 116.25

W. Williams

(0000 0098 (0890))

REJECT SAMPLES STORED AT SCHURZ

On February 9, 1968 the following 2800 lb. shipment of reject samples was received from Pacific Intermountain Express in Reno and transported to Schurz for storage. All numbers are WM unless otherwise noted. All samples marked -2 consist of 2 bags.

				Void- ticket never printed				
	240	250-2	260	270	280	290	300	310
	241	251	261-2	271	281	291	301	311
	242-2	252	262	272	282	292	302	312
	243-2	253-2	263	273	283	293	303	313
	244	254-2	264	274	284	294	304	314
	245	255	265	275	285	295	305	315
236	246	256	266	276	286	296	306	316
	247	257	267	277	287	297	307	317
	248-2	258	268	278	288	298	308	318
239-2	249-2	259	269	279	289	299	309	319

330		350	360	370	380
331		351	361	371	381
332		352	362	372	382
333		353	363	373	383
334		354	364	374	
335		355	365	375	385
336		356	366	376	
337		357	367	377	
338	348	358	368	378	
339	349	359	369	379	

These samples were assayed by Union Assay Co., Salt Lake City, Utah

1168R is WC3 from 1126 to 1132

In addition, one bag marked 524V was noted and a bag of uncrushed core pieces marked "Broken samples from 243-244WM" was received.

At the present time, these samples are stored in the two outside stacks at the east end of the warehouse but may be moved later.

February 23, 1968

John H. Volgamore
John H. Volgamore
Geologist

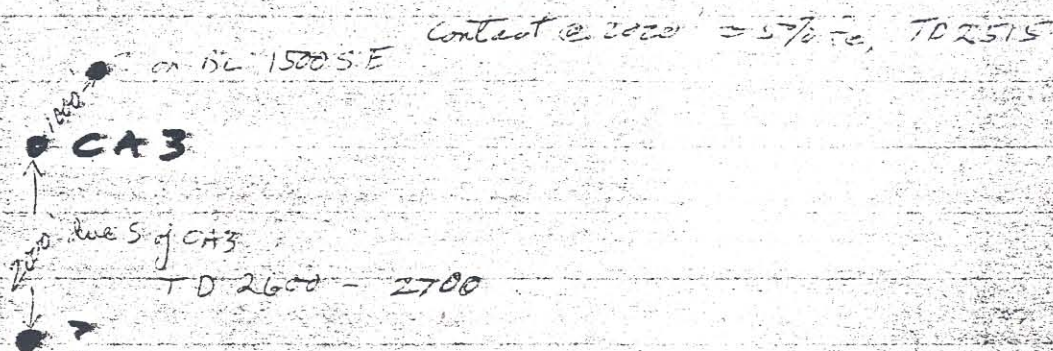
5/6/71

File Res.

But & Res.

JHV Says:

Drill holes on Calico



Red Ridge, between Little Cahis
and Black Eagle. JHV says Diorite
underlies No. side of Red Ridge.
Not Too Far From Black Eagle.

ask JHV if he can ground mag on Black
Eagle for day.

have him spot DH on map.

(0006 0098 (0890)



Rocky Mountain Geochemical Corporation

P. O. BOX 2217
SALT LAKE CITY, UTAH 84110

Phone 322-2396
Area Code: 801

CERTIFICATE OF ANALYSES

Date June 5, 1969

Page 1

Client Occidental Minerals
100 Washington St. Suite 4
Reno, Nevada

Report on: 20 rock samples

Submitted by: B. W. Adams

Date Received: May 29, 1969

Analysis: Copper, Iron.

Remarks: Above determined by atomic absorption.
Job No. 69-12-34 SL. 69-10-7 R. Sulphur analysis to
follow shortly.
cc: ENC ✓
RMGC-Reno
File (2)

LRR:mah

<u>Sample No.</u>	<u>ppm Copper</u>	<u>% Iron</u>
R6C-#1	315	27.5
" 2	775	52.0
" 3	+1000=.17%	51.0
" 4	795	51.5
" 5	+1000=.21%	54.5
" 6	950	48.5
" 7	240	40.0
" 8	585	5.0
" 9	460	11.0
" 10	590	19.0
" 11	620	14.0
" 12	700	20.5
" 13	900	26.0
" 14	+1000=.14%	23.5
" 15	850	20.5
" 16	+1000=.17%	6.5
" 17	+1000=.14%	12.5
" 18	+1000=.14%	22.0
" 19	+1000=.12%	13.0
" 20	120	2.1

By Lawrence R. Reid (D.O.)
Lawrence R. Reid

Sample No.	ppm Copper	% Iron
203' R6C-#1	315 .07	27.5
" 2	775 .08	52.0
" 3	+1000=.17%	51.0
" 4	795 .08	51.5
" 5	+1000=.21%	54.5
" 6	950 .10	48.5
273' " 7	240 .02	40.0
" 8	585 .06	5.0
" 9	460 .05	11.0
" 10	590 .06	19.0
" 11	620 .06	14.0
" 12	700 .07	20.5
" 13	900 .05	26.0
" 14	+1000=.14%	23.5
" 15	850 .09	20.5
" 16	+1000=.17%	6.5
" 17	+1000=.14%	12.5
" 18	+1000=.14%	22.0
" 19	+1000=.12%	13.0
" 20	120	2.1

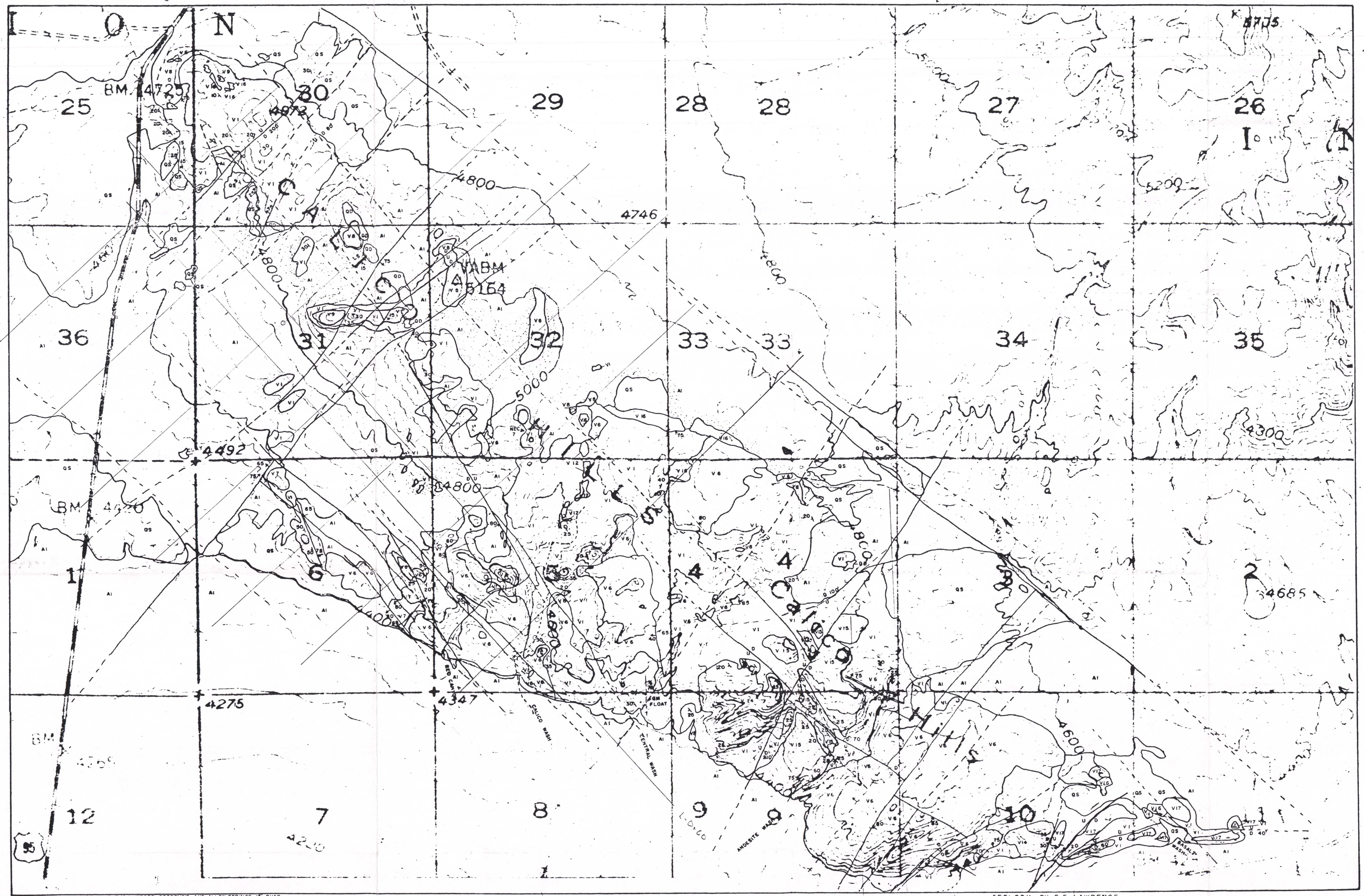
70' of
46.43 Fe
48.611 Fe
46.432 Fe

By Lawrence R. Reid (S.D.)
Lawrence R. Reid

Calico

0000 0098 (0890)

1969 info from Oxy min



EXPLANATION	
QUATERNARY	
A1	ALLUVIUM, WITH SAND
A1	ALLUVIUM
Q5	LAKE SEDIMENTS
V17	BASALT FLOWS
V16	BASALT, INTRUSIVE
V12	INTERMEDIATE INTRUSIVES
V9	RHYOLITE INTRUSIVES
V8	RHYOLITIC, (1) INTRUSIVE, (FLOW (F))
V7	ACIDIC INTRUSIVE
V6	ANDESITE INTRUSIVES
V14	RHYOLITE, FLOWS (F)
V3	TUFFS, QUARTZ LATITIC
V15	TUFF, RHYOLITIC, FINE GRAINED WELL INDURATED
V1	TUFFS, COARSE TO FINE GRAINED
TERTIARY	
L5	LIMESTONE, TACTITE ZONE
QD	GRANITIC INTRUSIVES QUARTZ DIORITE TO QUARTZ MONZONITE
MESOZOIC	
---	CONTACTS
---	FAULTS

CALICO AREA, WALKER RIVER PAIUTE RESERVATION, SCHURZ, MINERAL COUNTY, NEVADA

