CONTACT INFORMATION
Mining Records Curator
Arizona Geological Survey
416 W. Congress St., Suite 100
Tucson, Arizona 85701
520-770-3500
http://www.azgs.az.gov
inquiries@azgs.az.gov

The following file is part of the

James Doyle Sell Mining Collection

ACCESS STATEMENT

These digitized collections are accessible for purposes of education and research. We have indicated what we know about copyright and rights of privacy, publicity, or trademark. Due to the nature of archival collections, we are not always able to identify this information. We are eager to hear from any rights owners, so that we may obtain accurate information. Upon request, we will remove material from public view while we address a rights issue.

CONSTRAINTS STATEMENT

The Arizona Geological Survey does not claim to control all rights for all materials in its collection. These rights include, but are not limited to: copyright, privacy rights, and cultural protection rights. The User hereby assumes all responsibility for obtaining any rights to use the material in excess of "fair use."

The Survey makes no intellectual property claims to the products created by individual authors in the manuscript collections, except when the author deeded those rights to the Survey or when those authors were employed by the State of Arizona and created intellectual products as a function of their official duties. The Survey does maintain property rights to the physical and digital representations of the works.

QUALITY STATEMENT

The Arizona Geological Survey is not responsible for the accuracy of the records, information, or opinions that may be contained in the files. The Survey collects, catalogs, and archives data on mineral properties regardless of its views of the veracity or accuracy of those data.

KEEP THIS ON TOP

Subject: WALKER BUTTE COPPER PROSPECT
Blackwater Dist.
Pinal Co., AZ

Sec. 13, 14, 23, 24 T4S, R8E
Blackwater & Florence 7 1/2' Quads
Mesa AMS

Includes: Florence Quad I.P. Survey

ASARCO

Southwestern Exploration Division

January 25, 1979

TO: F. T. Graybeal

FROM: H. G. Kreis

Reconnaissance of the
Walker Butte Copper Prospect
Pinal County, Arizona

The Walker Butte copper prospect lies 4 miles west-northwest of Asarco's Poston Butte deposit and one-half mile east of the Gila River Indian Reservation. The prospect consists of a zone of pervasive weak copper oxide mineralization that is increasing in width and copper grade to the east before being covered by gravels of a relatively shallow pediment. As interpreted from reconnaissance geology and a detailed geochemical survey, the weak copper mineralization may be part of a porphyry copper sulfide system as hypothetically drawn on the attached map. The importance of the Walker Butte prospect was recognized by myself in 1978 while examining outcrops around the Florence pediment as part of the Florence pediment project. When preliminary land studies were completed within the last month it became apparent that the area of interest could be available for acquisition. Immediately a detailed geochemical survey was run and detailed land studies were initiated.

Rock Types

The weak copper oxide mineralization of the Walker Butte prospect is hosted by Precambrian Oracle granite that is intruded by a few narrow (less than 30' wide) dikes of Laramide-type biotite-quartz-feldspar porphyry and one dike of fine-grained quartz monzonite. Immediately to the southwest of the copper bearing Precambrian granite is granodiorite of the Laramide Sacaton Peak stock (see attached figure).

The Precambrian granite is typical Precambrian Oracle granite with a coarse-grained, slightly porphyritic texture and a granite to quartz monzonite composition. The Precambrian granite contains approximately 5 to 10% biotite, 15 to 25% plagioclase, 30 to 40% K-feldspar, and 30 to 40% quartz.

The granodiorite of the Sacaton Peak stock is medium grained and appears equigranular in hand sample. About 10% of the rock is quartz phenocrysts, and the quartz phenocrysts average about 6 mm in diameter. A few percent of plagioclase phenocrysts may also be present. The granodiorite is composed of 5% hornblende, 5% biotite, 45% plagioclase, 20% orthoclase, and 25% quartz.

Post-mineral cover consists of alluvium-conglomerate and a few outcrops of andesitic and rhyolitic volcanics. The geology of the area and Asarco resistivity surveys (Farley, July 1971) suggest that bedrock is less than 1000' deep in the area of the hypothetical chalcopyrite zone of the attached map.

Structure

The outcropping contact between the Laramide granodiorite and the Precambrian granite is shown on the attached map. Schlieren and the topographic expression of the contact suggest the contact strikes N30 to 60W and dips 50° northeasterly. Drill hole intersections of granodiorite and an outcrop of Precambrian granite indicate the contact continues east from the Walker Butte prospect through the north halves of sections 23, 24, and 19.

The contact between Precambrian schist and Precambrian granite 1000' south of the center of section 15 is a fault contact. More field work is needed to see if there is evidence of NE-SW faulting passing through the north quarter corner of section 22 where gravel cover separates locally very weakly mineralized Precambrian granite from the Laramide granodiorite and copper-bearing Precambrian granite of the Walker Butte prospect.

Certain fractures of the Precambrian granite in the Walker Butte prospect are mineralized with goethite and chrysocolla after disseminated chalcopyrite (to be discussed). These mineralized fractures are erratically spaced but average about one fracture per foot or less than a foot. They have a preferred orientation of NE to ENE with a steep dip.

Mineralization-Alteration

Both vein mineralization and pervasive weak fracture-disseminated mineralization are present in the outcrops of the Walker Butte prospect. Over a half dozen prospect pits have been dug on the veins and also in chrysocolla mineralization along the contact of a porphyry dike.

Several quartz-former sulfide veins are present in the Precambrian granite and the Laramide granodiorite. The veins are all less than a foot thick and are composed of more than 85% quartz and less than 15% former sulfide minerals. Oxidation of the vein material caused chrysocolla to form in the vein and exotically in the wall rock. Hypogene-supergene clay-sericite alteration extends less than a foot from any of the veins.

Pervasive mineralization in outcrop consists of traces of chrysocolla and traces of geothite that are interpreted to have originated from trace to 0.1% to locally up to 0.5% (volume) former total sulfides. The former sulfides are interpreted to have been chalcopyrite and much lesser amounts of pyrite. The former sulfide mineralization is 80 to 90% disseminated on fractures and 10 to 20% disseminated amongst the rock forming minerals. This pervasive mineralization is confined to the Precambrian granite but an occasional mineralized fracture can be found in the Laramide granodiorite. Outcrops of mineralized Precambrian granite cover an area of 4 million square feet with a maximum east-west length of 2,500' and a maximum north-south width of 1,500'. A geochem survey was run to more accurately define the copper mineralization.

The geochem survey was performed by running north-south traverses with a 500' east-west spacing. Each sample was comprised of chips of outcropping rock that were collected along each 300' (average) of traverse. The average

sample consisted of about 20 chips totaling two pounds in weight. Thirty-three samples were taken in the immediate area of copper mineralization. All samples were run for copper and molybdenum by American Analytical and Research Laboratories. A select group of samples are being individually run for lead, zinc, gold, and silver.

As outlined from the geochem results the area of greater than 500 ppm copper, the area of greater than 1000 ppm copper, and the area of greater than 10 ppm molybdenum are shown on the attached map. All three of these areas continue under post-mineral cover to the east. The area of greater than 500 ppm copper covers 3.2 million square feet and averages 1000 ppm (0.10%) copper. The area of greater than 1000 ppm copper averages 1600 ppm (0.16%) copper and is coincident with the greater than 10 ppm molybdenum area which averages 18 ppm molybdenum.

The geochem results report slightly higher copper values than one would predict from estimates of the percentage of former total sulfides or estimates of the visual percentage of chrysocolla. However, most of the chrysocolla appears to have migrated from nearby (less than six inches) former sulfide sites marked by indigenous goethite. It is possible that some of the copper is exotic and derived from overlying higher copper grade rocks prior to erosion.

The alteration of the Precambrian granite in the area of copper mineralization needs to be studied in more detail with the use of thin sections. Hand samples of the Precambrian granite are obviously fresh looking. Closer inspection, however, shows 10% of the biotite is replaced by secondary biotite. Outcrops show clay-sericite selvages extending up to an inch from a few of the mineralized fractures, but most mineralized fractures show no evidence of alteration.

Two thin sections of the Precambrian granite from the eastern portion of the mineralized outcrops show evidence of secondary biotite-K-feldspar alteration. One thin section contained 3% secondary biotite and 2% secondary(?) K-feldspar, and the other section showed 7% secondary biotite and 6% secondary K-feldspar. The secondary biotite replaces biotite and feldspar, and the secondary K-feldspar replaces plagioclase. Both thin sections were anomalously free of sericite and clay.

Out on the pediment a distance of 7000' to the east-northeast from the eastern-most outcrops of the copper mineralization is a small outcrop of apparently weakly altered and weakly mineralized Precambrian granite (see map). The mineralization consists of 2% reddish brown limonite and local minor quantities of jarosite that appear to be after trace to 1.5% former total sulfides. The geochemistry of two samples of this Precambrian granite averages 51 ppm copper, 7 ppm molybdenum, 29 ppm lead, 17 ppm zinc, trace gold, and 0.18 oz/ton silver. The alteration appears to be weak (less than 10% of the rock) clay-sericite-muscovite-epidote. Because of the low geochem values another field inspection of the outcrop, a couple check geochem samples, and a few thin sections are needed to confirm what appears to be weak hydrothermal alteration and mineralization.

Core chips of Precambrian granite that are unaltered and unmineralized in hand sample were found on an abandoned drill site (pre-1975) 800' to the

south of the forementioned weakly altered and mineralized outcrop. The chips have geochem values of 645 ppm copper, 9 ppm molybdenum, 760 ppm lead, and 267 ppm zinc. These geochem results seem too high considering the unmineralized appearance of the cuttings and should be rechecked. — why not already

Target Description

Interpretation of the results of the reconnaissance geology and the geochem survey suggests that the copper bearing outcrops of the Walker Butte prospect may be the core of a porphyry copper sulfide system. The fresh appearance of the Precambrian granite host rock and the preliminary evidence of secondary biotite and K-feldspar in Precambrian granite at the contact of a Laramide intrusive are suggestive of the type of alteration found within the core of porphyry copper deposits in the Florence-Casa Grande area. The low percentage of former total sulfides, the high ratio of former chalcopyrite to pyrite, the pervasive nature of the mineralization, and the anomalous but low molybdenum values are indicative of sulfide mineralization commonly found in the core of porphyry copper sulfide systems.

The most likely case of possible sulfide zoning associated with the copper bearing outcrops is shown on the attached map. The geology of these hypothesized sulfide zones and the alteration zones which would be associated with them is described in my Santa Cruz Peripheral Lands report of April 1978. Experience with similar sulfide zoning suggests that plus 0.3% copper as chalcopyrite could have and still may exist as close as 1000' (±500') to the plus 1000 ppm copper outcrops. Plus 0.3% copper as chalcopyrite may exist below the plus 1000 ppm copper outcrops. However, the outcrop evidence shows the Precambrian granite-Laramide granodiorite to be dipping moderately to the northeast under the copper bearing outcrops, and the copper values of the plus 1000 ppm copper outcrops are more likely to decrease than increase with depth, a direction towards the Laramide granodiorite. Plus 0.3% copper as chalcopyrite may have existed above the plus 1000 ppm copper outline, but there is no significant evidence to suggest that considerable amounts of copper were leached from such mineralization and deposited in a blanket below the present-day outcrops.

i'd say steeply → based on outcrop pattern

Plus 0.3% copper as chalcopyrite, if present in the area, is most likely to exist immediately east-northeast of the plus 1000 ppm copper outline as shown on the map. If such a plus 0.3% copper zone as chalcopyrite exists then there is a favorable potential for finding a chalcocite enrichment blanket. The potential for finding copper reserves mineable by open pit methods is as great or better than they were when the Sacaton and Poston Butte exploration drilling projects were first begun.

Land Status

Bob Crist is evaluating the land status of the area of interest. What is presently known of the land status is indicated on the attached map.

Recommendation for Further Exploration

Reconnaissance geology of the copper bearing Precambrian granite outcrops of the Walker Butte prospect suggests that these outcrops may be the core

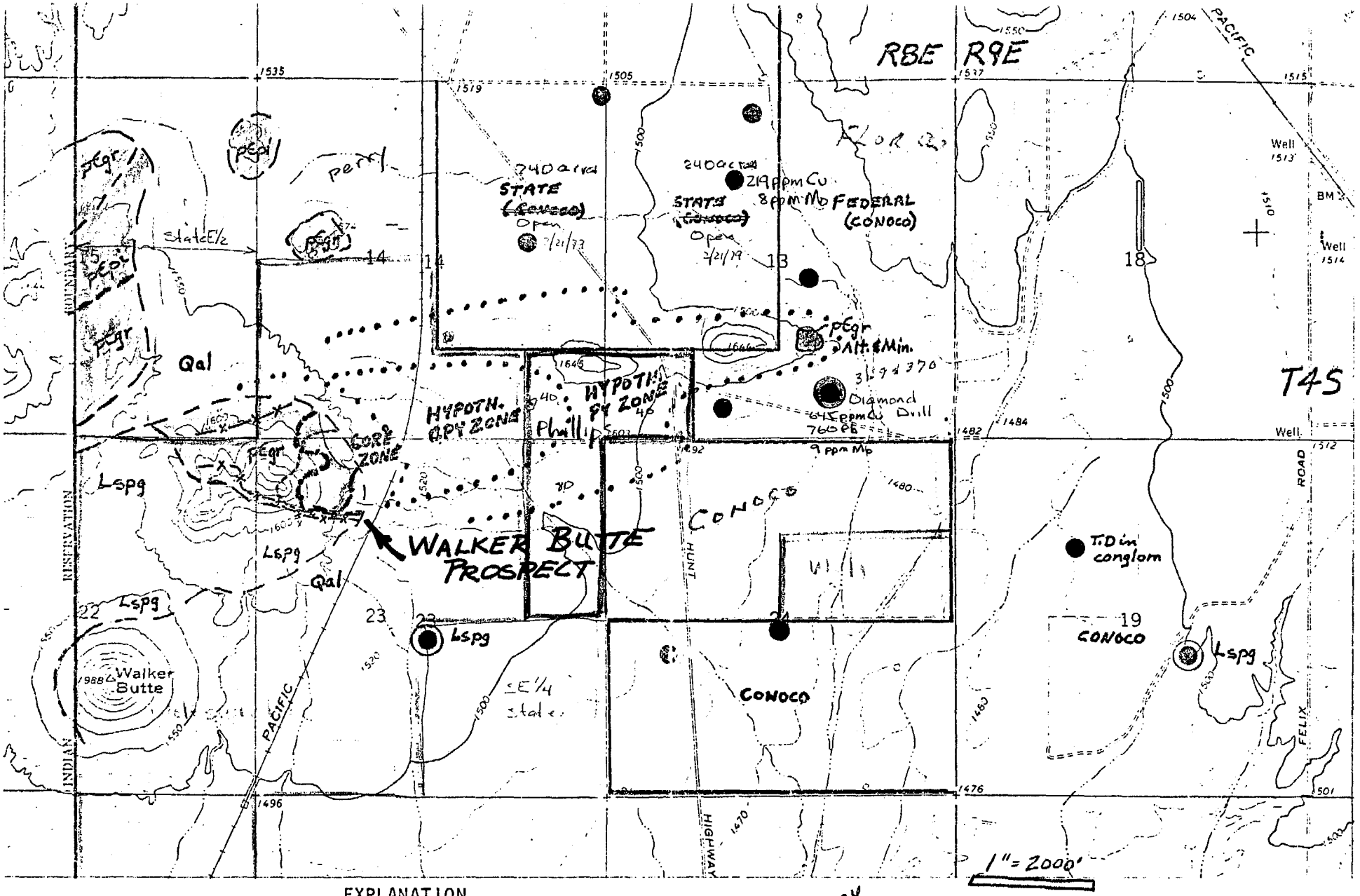
of a porphyry copper sulfide system and that ore grade mineralization, if it exists in the area, is most likely to occur under the gravel cover to the immediate east-northeast. The detailed land status, past and present, of the Walker Butte area needs to be completed. If the land over the hypothesized sulfide system as shown on the attached map is available it should be acquired and so should private land within one mile and any open state and federal lands within two miles of the area of interest. Once the land has been acquired detailed geologic mapping and evaluation of the alteration and mineralization should be performed to determine the best area to drill. At this time the south quarter corner of section 14 is the most favorable location for an exploration drill hole on the pediment. A 1000' core-drill hole should be drilled in the center of the plus 1000 ppm copper outcrops to check copper grades at depth and evaluate the potential for low grade copper (0.3-0.4%) leach reserves.

Probably enough for at this time to spot a drill hole.

H. G. Kreis

H. G. Kreis

HGK:lb
Att.



EXPLANATION

Qal Post mineral cover

Lspg Laramide Sacaton Peak granodiorite

pEgr Precambrian granite

pEpl Precambrian schist

—x—x— Outline of >500 ppm Cu

—•—•— Outline of >1000 ppm Cu

—— Outline of >10 ppm Mo

○ Competitive drill hole

PRELIMINARY ROUGH DRAFT

RECONNAISSANCE OF THE WALKER BUTTE PROSPECT SHOWING TARGET OF HYPOTHETICAL CHALCOPYRITE ZONE

H. Kreis Jan. 22, 1979

1" = 2000'

ASARCO

Southwestern Exploration Division

June 27, 1979

TO: F. T. Graybeal

FROM: H. G. Kreis

Monthly Progress Report
Walker Butte Project
June, 1979

Rotary-spot core drilling of the Walker Butte pediment began June 12. The results are summarized below.

Drill Hole	From	To	Interval	Geology
WBF-1	0	100'	100'	Alluvium.
	100'	485'T.D.	385'	Precambrian granite. Trace chrysocolla and neotocite. Approx. 0.1% former total sulfides (probably chalcopyrite).
WBF-2	0	300'	300'	Alluvium and conglomerate.
	300'	495'T.D.	195'	Precambrian granite. Approx. 0.2% former total sulfides (probably pyrite).
WBF-3	0	200'	200'	Alluvium and conglomerate. Drilling in progress.

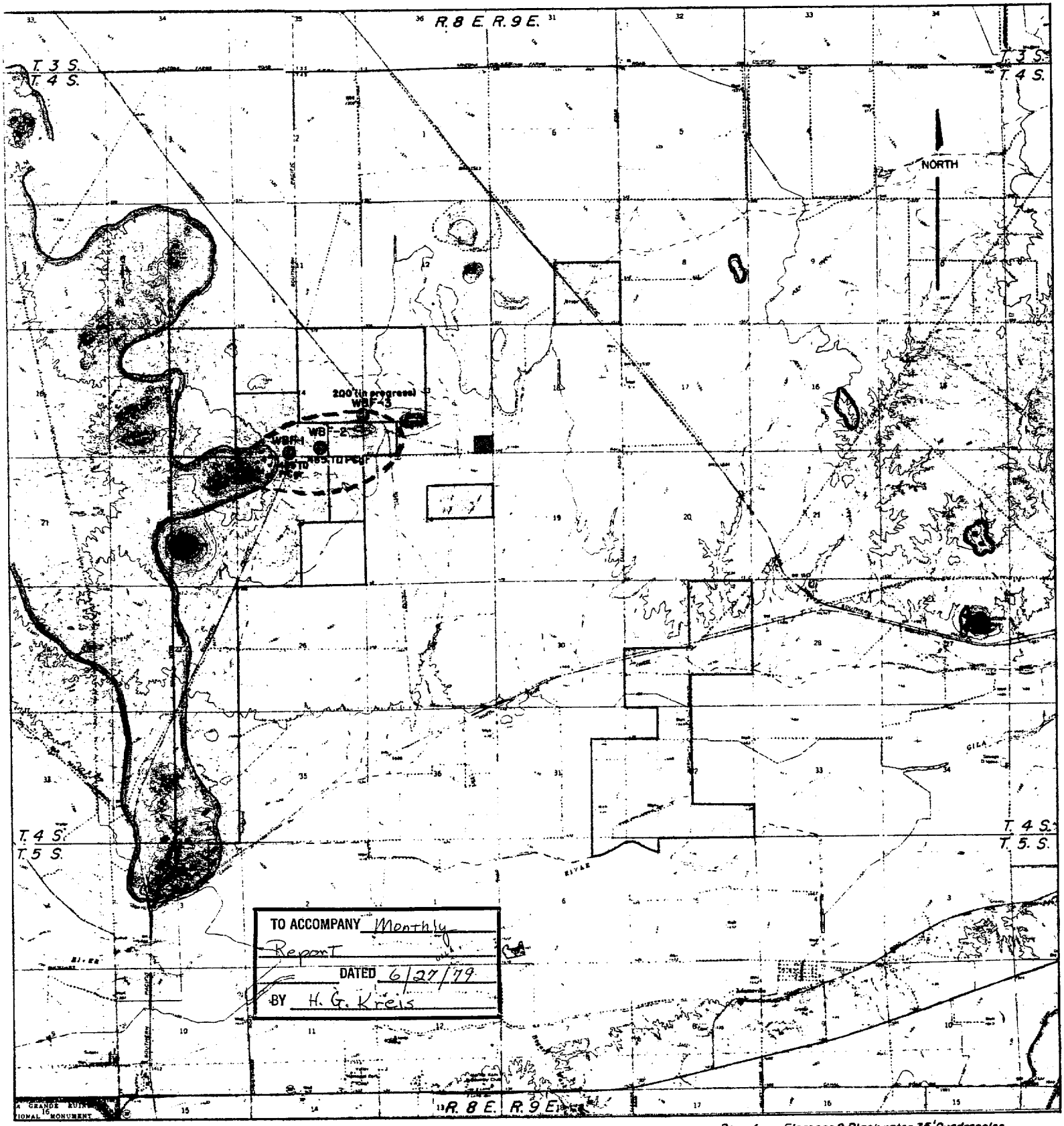
Two more widely spaced drill holes (rotary-spot core) are scheduled for drilling and should be completed by the end of the first week in July.

Estimated expenditures for the month were $14,200, leaving a balance of $55,800.

H. G. Kreis

H. G. Kreis

HGK:lb
Att: Map



Base from Florence & Blackwater 7.5' Quadrangles.

EXPLANATION

- ASARCO-Poston Butte
- Wolfswinkle Surface & Mineral
- Wolfswinkle Surface Only
- Phillips
- ASARCO-State Prospecting Permit
- Area of Premineral Outcrop
- Copper Mineralization in Outcrop
- Hypothetical Target Zone
- Proposed Drill Hole
- WBF-1 / 485' TD — ASARCO Drill Hole (Showing depth & rock type)

WALKER BUTTE PROJECT

Pinal County, Arizona

SCALE: 1" = 1 mile

F.T. Graybeal

May 31, 1979

ASARCO

Southwestern Exploration Division

July 27, 1979

F.T.G.

TO: F. T. Graybeal

FROM: H. G. Kreis

Monthly Progress Report
Walker Butte Project
July, 1979

Drilling of the Walker Butte pediment area was completed on June 30th. A total of 2,438.5' of rotary and spot core drilling was done in a total of five drill holes. The results of WBF-1 and WBF-2 were reported in my June monthly progress report. The results of WBF-3, -4, and -5 are summarized below. The highest copper grade bedrock penetration was WBF-1 with 385' at 350 ppm copper (100'-485'T.D.).

Drill Hole	From	To	Interval	Geology
WBF-3	0	300'(?)	300'	Alluvium and conglomerate.
	300'(?)	885'T.D.	585'	Precambrian granite. No former sulfide mineralization.
WBF-4	0	120'	120'	Alluvium and conglomerate.
	120'	248.5'T.D.	128.5'	Precambrian granite. Approx. 0.1% former total sulfides.
WBF-5	0	200'	200'	Alluvium and conglomerate.
	200'	325'T.D.	125'	Laramide Sacaton Peak granodiorite. No former sulfide mineralization.

At this time the only potential for near-surface copper reserves in the project area is under the anomalous copper outcrops at the edge of the pediment (see my Walker Butte report of January 25, 1979). This potential is being taken under consideration.

Estimated expenditures for the month were $15,000, leaving an estimated balance of $15,900.

H. G. Kreis

H. G. Kreis

HGK:lb

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

COMPOSITES

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 18, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-3								
600-700			86			< 1		
700-820			103			< 1		
825-870			112			< 1		
WBF-4								
140-80				22	30	< 1		
180-190 + 195-240				27	35	1		
WBF-5								
180-280				17	21	< 1		

REGISTERED ASSAYER CERTIFICATE NO. 6852 PETE S. FLORES Date Signed 7/18/79 Arizona U.S.A.

CHARGES $ 36.30

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 11, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-5 0-20			110					
20-40			266					
40-60			189					
60-80			183					
80-100			170					
100-120			112					
120-140			167					
140-160			86					
160-180			81					
180-200			104					
200-220			124					
220-240			115					
240-260			296					
260-280			427					
280-300			229					
300-320			191					

REGISTERED ASSAYER CERTIFICATE NO. 6852 PETE S. FLORES Date Signed 7/11/79 Arizona U.S.A.

CHARGES $ 40.00

Invoice # 16469

ASSAYER-CHEMIST

Inv. / Walker Dulo

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS · CHEMISTS · METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 11, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-4 0-20			53					
20-40			67					
40-60			88					
60-80			119					
80-100			141					
100-120			97					
120-140			72					
140-160			69					
160-180			95					
180-190			88					
195-200			73					
200-220			135					
220-240			118					

REGISTERED ASSAYER CERTIFICATE NO. 6852 PETE S. FLORES Date Signed 7/11/79 Arizona

CHARGES $ 32.50

Invoice # 16160

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS · CHEMISTS · METALLURGISTS

TUCSON, ARIZONA 85714

COMPOSITE

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 9, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-3 0-100			79					
100-200			75					
200-300			111					
300-400			159					
400-500			52					
500-600			55					

REGISTERED ASSAYER CERTIFICATE NO. 6652 PETE S. FLORES Date Signed 7/9/79 Arizona U. S. A.

CHARGES $ 18.00

Invoice # 16468

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 5, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-1 250-260			319			7		
260-270			430			11		
270-280			356			7		
280-290			262			5		
290-300			225			3		
300-310			177			2		
310-320			182			7		
320-330			197			8		
330-340			291			7		
340-350			334			11		
350-360			227			9		
360-370			186			4		
370-380			200			4		
380-390			339			5		
390-400			351			8		
400-410			170			3		
410-420			404			24		
420-430			228			5		
430-440			281			7		
440-450			453			15		
450-460			233			8		
460-470			222			4		
470-480			357			15		
480-485			593			22		

REGISTERED CERTIFIED ASSAYER 6252 PETE S. FLORES Date Signed Arizona U. S. A.

CHARGES $ 120.00

Invoice # 16462

ASSAYER-CHEMIST

Inc. / Walker Bull

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

COMPOSITE

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 29, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-1								
100-140				22	21			
145-190				37	24			
WBF-2								
393-~~400~~ 440				26	23	7		
452-490				13	14	5		

REGISTERED ASSAYER
CERTIFICATE NO. 6857
PETE S. FLORES
Date Signed 6/29/79
Arizona U. S. A.

CHARGES $ 22.10

Invoice # 16444

ASSAYER-CHEMIST

D.G. / Walker Valley File

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 27, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-1 145-155			851			16		
155-165			864			9		
165-175			709			15		
175-185			373			5		
185-190			461			6		

REGISTERED ASSAYER CERTIFICATE NO. 6857 PETE S. FLORES Date Signed 6-27-79 Arizona U. S. A.

CHARGES $ 28.75

Invoice # 16443

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 27, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-1 190-195			358			10		
195-205			289			7		
205-215			332			6		
215-225			346			103		
225-235			311			10		
235-245			232			9		
245-250			490			15		

REGISTERED ASSAYER
CERTIFICATE No. 852
DELE S. FLORES
Date Signed 6/27/79
Arizona

CHARGES $ 35.00
Invoice # 16443

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS · CHEMISTS · METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 27, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-2								
393-400			115					
400-410			105					
410-420			134					
420-430			155					
430-440			134					
440-447			304					
452-460			166					
460-470			138					
470-480			115					
480-490			118					
490-495			218					

REGISTERED ASSAYER
CERTIFICATE NO. 5852
PETE S. FLORES
Date Signed 6/27/79
Arizona U.S.A.

CHARGES $ 35.75

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 27, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
CB-56 West			193	15	11	5		
CB-56 East			165	25	10	4		

REGISTERED ASSAYER CERTIFICATE No. 6852 PETE S. FLORES Date Issued 6/27/79 Arizona U. S. A.

CHARGES $ 16.00

Invoice # 16443

ASSAYER-CHEMIST

K.G. / Walker Bu

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

COMPOSITE

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 22, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-2								
100-200				59	23			
200-300				65	21			
300-340				63	27			
340-385				54	23			

REGISTERED ASSAYER
CERTIFICATE NO. 6852
PETE S. FLORES
Date Signed 6/22/79
Arizona U. S. A.

CHARGES $ 13.50
Invoice # 16438

ASSAYER-CHEMIST

Pt.G. / Warner Pass

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS • CHEMISTS • METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC. DATE June 20, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-2 0-20			124			4		
20-40			58			6		
40-60			81			2		
60-80			130			6		
80-100			183			4		
100-120			175			5		
120-140			112			3		
140-160			58			3		
160-180			106			5		
180-200			179			7		
200-220			103			3		
220-240			152			5		
240-260			61			2		
260-280			70			6		
280-300			106			4		
300-320			191			7		
320-340			203			4		
340-360			108			4		
360-380			141			2		
380-385			143			3		

REGISTERED ASSAYER CERTIFICATE NO. 6852 PETE S. FLORES Date Signed 6/20/79 Arizona U. S. A.

CHARGES $ 110.00

INVOICE NO. 16434

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC. DATE June 15, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PERCENT COPPER	PERCENT LEAD	PERCENT ZINC	PERCENT MOLYBDENUM	PERCENT IRON	
WBF-1 0-20			240					
20-40			267					
40-60			306					
60-80			213			14		
80-100			440			21		
100-120			335			12		
120-130			302			7		
130-140			511			8		

CHARGES $ 32.50

INVOICE NO. 16427

REGISTERED ASSAYER CERTIFICATE NO. 8852 PETE S. FLORES Date Signed 6/15/79 Arizona U. S. A.

ASSAYER-CHEMIST

ASARCO

Southwestern Exploration Division

September 26, 1979

TO: F. T. Graybeal

FROM: H. G. Kreis

Monthly Progress Report
Walker Butte Project
September, 1979

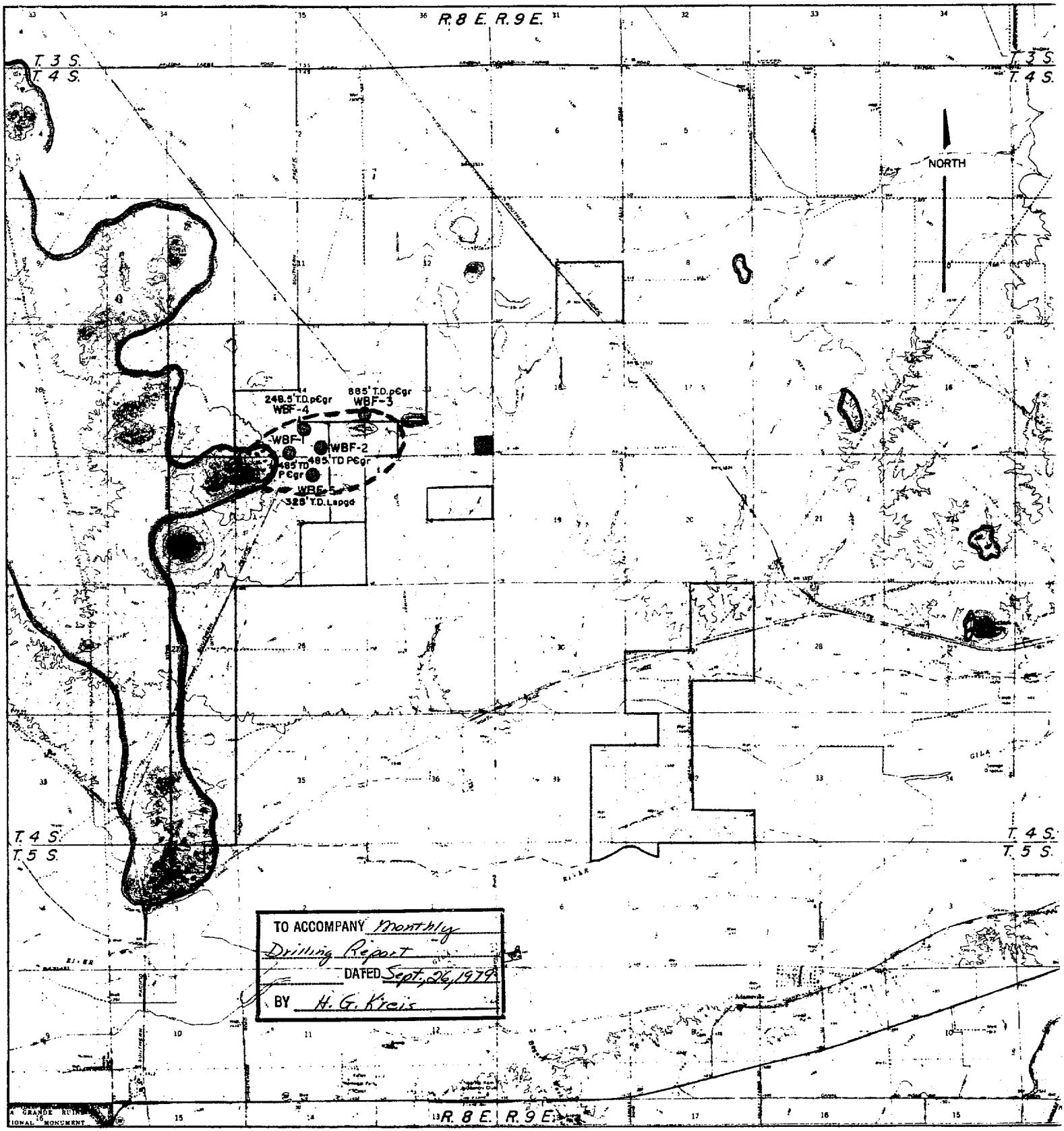
The Walker Butte project is being closed out. A rough draft of the final report has been prepared, and the final draft will be issued in two weeks.

Estimated expenses for the month were $360, leaving an estimated balance of $15,300.

H. G. Kreis

H. G. Kreis

HGK:lb
Att: Map



Base from Florence & Blackwater 7.5' Quadrangles.

EXPLANATION

- ASARCO - Poston Butte
- Wolfswinkle Surface & Mineral
- Wolfswinkle Surface Only
- Phillips
- ASARCO - State Prospecting Permit
- Area of Premineral Outcrop
- Copper Mineralization in Outcrop
- Hypothetical Target Zone
- Proposed Drill Hole
- WBF-1 / 485' TD / pЄgr — ASARCO Drill Hole (Showing depth & rock type)

WALKER BUTTE PROJECT

Pinal County, Arizona

SCALE: 1" = 1 mile

F. T. Graybeal — May 31, 1979

MVK - 5123

ASARCO

Southwestern Exploration Division

October 15, 1979

TO: F. T. Graybeal

FROM: H. G. Kreis

Final Report on the
Walker Butte Project
Pinal County, Arizona

The final report on the Walker Butte Project accompanies this letter. The report combines the drilling results with the outcrop geology to demonstrate the potential for ore-grade copper mineralization no longer exists under the pediment gravels. Accordingly the Walker Butte Project is being terminated.

H. G. Kreis

H. G. Kreis

HGK:lb
Att.

WALKER BUTTE PROJECT
PINAL COUNTY, ARIZONA

H. G. Kreis
October 12, 1979

CONTENTS

	Page
Introduction	1
Summary and Conclusions	1
Geology	1
Rock Type	1
Structure	5
Mineralization-Alteration	5
Drilling Results	7
Residual Targets	8
Land Status	8
Expenditures	8

ILLUSTRATIONS

Figure 1	Index Map	2
Figure 2	Land Status Map	3
Figure 3	Geologic Map	4

APPENDIX

Appendix I	Geologic Logs
Appendix II	Target Description
Appendix III	Geochemical Determinations

INTRODUCTION

The Walker Butte Project lies four miles west-northwest of Asarco's Poston Butte deposit at Florence, Arizona (Figs. 1 and 2) and one-half mile east of the Gila River Indian Reservation. The project was initiated to evaluate a pediment with adjoining mineralized and altered outcrops. The potential of the Walker Butte prospect was recognized by the author in 1978 while examining outcrops around the Florence pediment as part of the Florence Pediment Project. Asarco drilled the pediment in June 1979; and, due to the lack of encouragement, the project and land holdings are being terminated. This is a final report on the Walker Butte Project, and it integrates the drilling results with my earlier report of January 25, 1979, entitled "Reconnaissance of the Walker Butte Copper Prospect."

SUMMARY AND CONCLUSIONS

The Walker Butte prospect contains a large outcrop area of Precambrian granite with geological features similar to, but weaker than, the low grade cores of porphyry copper deposits located elsewhere in the Florence-Casa Grande area. The anomalous geological features project east under the pediment adjoining the anomalous outcrops. A small, weakly altered and mineralized outcrop of Precambrian granite is found out on the pediment one mile to the east-northeast. The potential for chalcopyrite and its oxidized and leached-enriched equivalents existed under the pediment gravels between the two outcrop areas.

In June of 1979 Asarco drilled five holes (totalling 2438.5') in the pediment area. The pediment area was found to contain weaker alteration-mineralization than the outcrops, and the potential for ore-grade copper mineralization on the pediment was reasonably eliminated. A marginal potential for a copper oxide deposit exists under the copper anomaly in the outcropping Precambrian granite, but the potential is not of sufficient interest to justify more drilling by Asarco at this time.

The Walker Butte Project is being terminated and all the land will be dropped. The expenditures amounted to an estimated $55,232, leaving an estimated balance of $14,768 in the authorization.

GEOLOGY

Rock Type: The two major premineral rock types in the Walker Butte prospect are Precambrian granite and Laramide granodiorite of the Sacaton Peak stock. As shown in Figure 3, Precambrian granite outcrops and continues under the pediment gravels to the east where it was intersected by drill holes WBF-1, -2, -3, and -4. Granodiorite outcrops immediately south of the Precambrian granite and continues to the east under the pediment gravels where it was intersected by drill hole WBF-5.

The Precambrian granite is typical Precambrian Oracle granite with a coarse-grained, slightly porphyritic texture and a granite to quartz monzonite composition. The Precambrian granite contains approximately 5 to 10% biotite, 15 to 25% plagioclase, 30 to 40% K-feldspar, and 30 to 40% quartz.

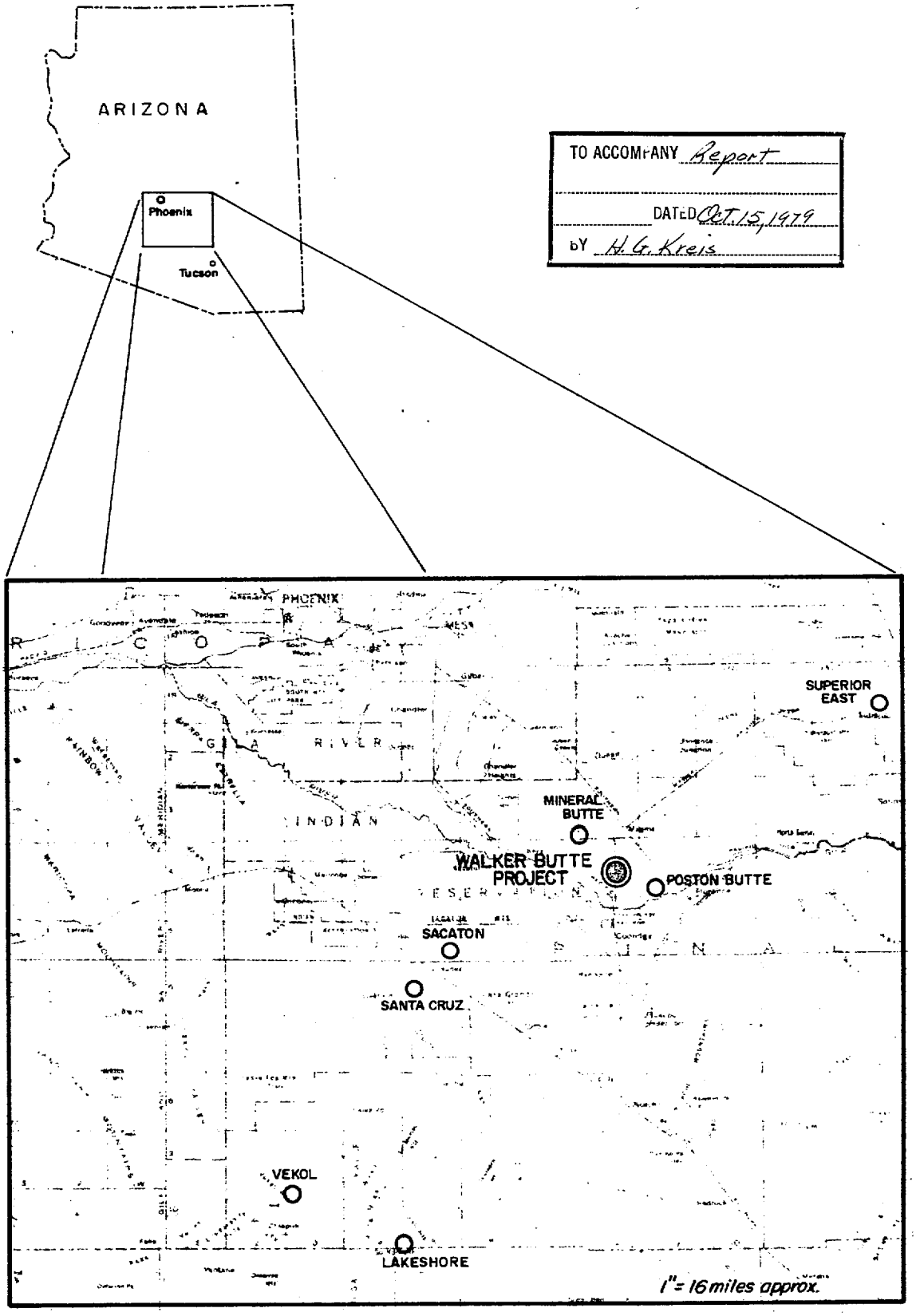
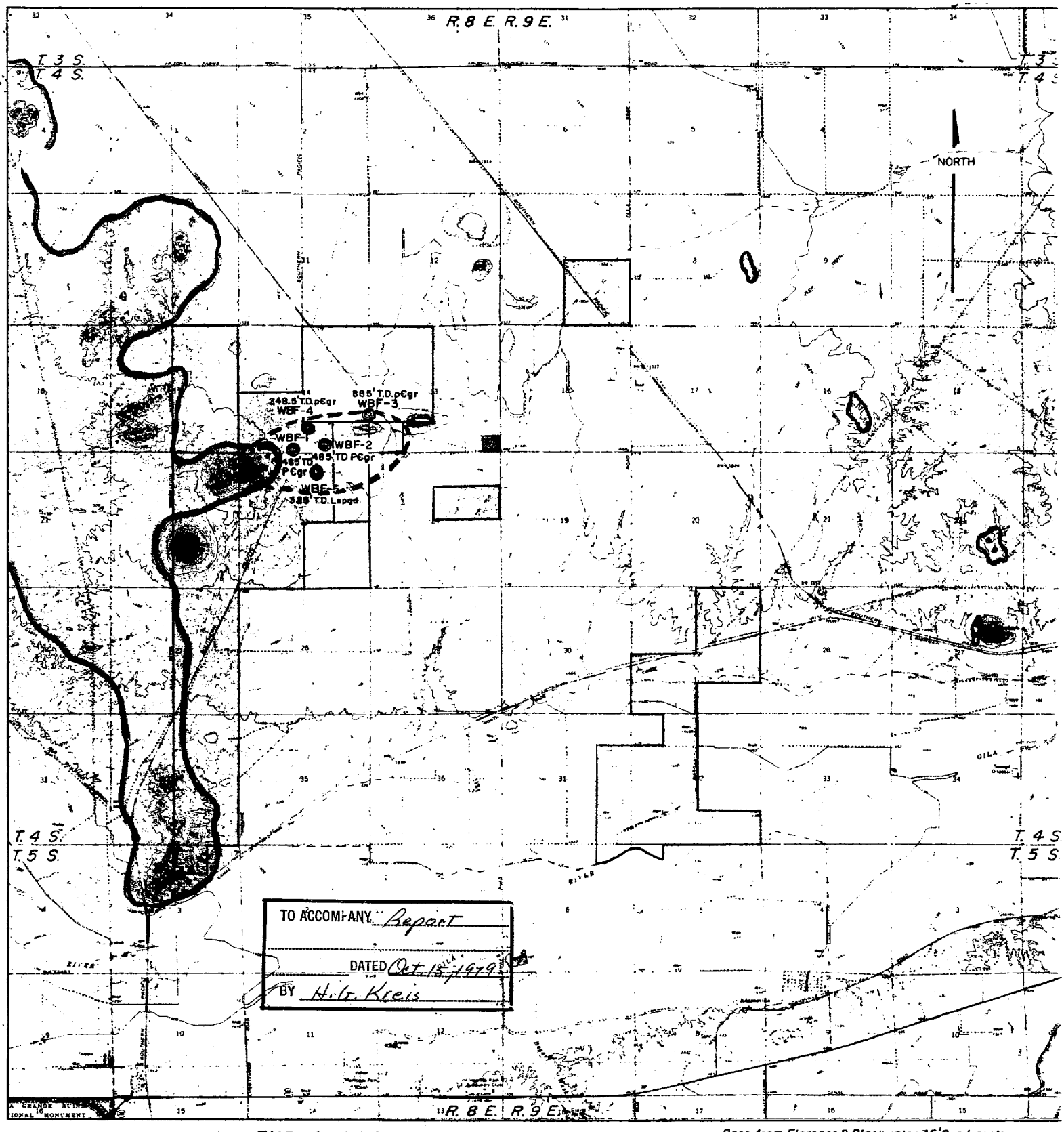


FIGURE-1
INDEX MAP
WALKER BUTTE PROJECT
PINAL COUNTY, ARIZONA
H.G.K. 10-79



Base from Florence & Blackwater 7.5' Quadrangles.

EXPLANATION

- ASARCO - Poston Butte
- Wolfswinkle Surface & Mineral
- Wolfswinkle Surface Only
- Phillips
- ASARCO - State Prospecting Permit
- Area of Premineral Outcrop
- Copper Mineralization in Outcrop
- Hypothetical Target Zone
- Proposed Drill Hole
- WBF-1 / 485' TD pCgr — ASARCO Drill Hole (Showing depth & rock type)

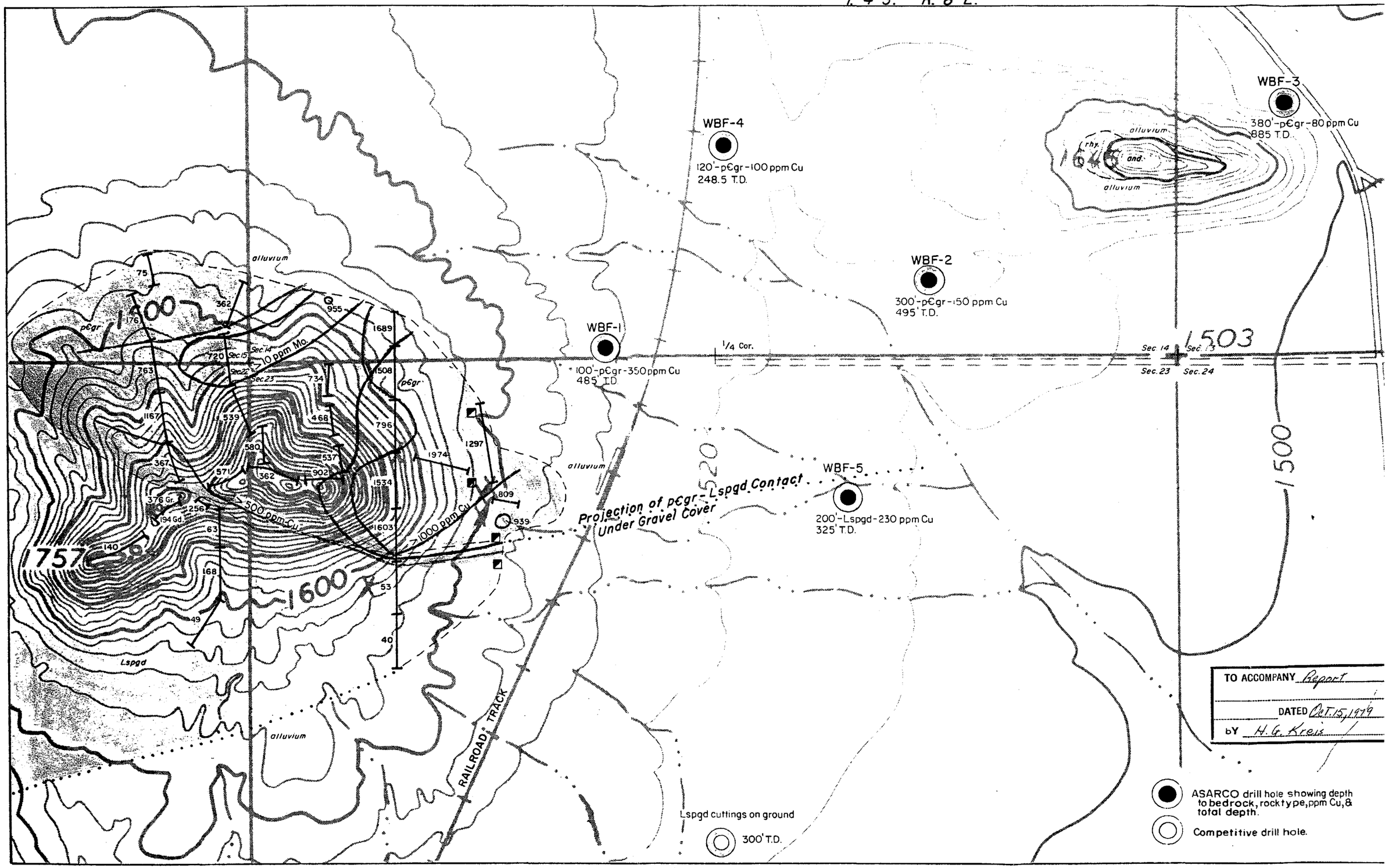
WALKER BUTTE PROJECT

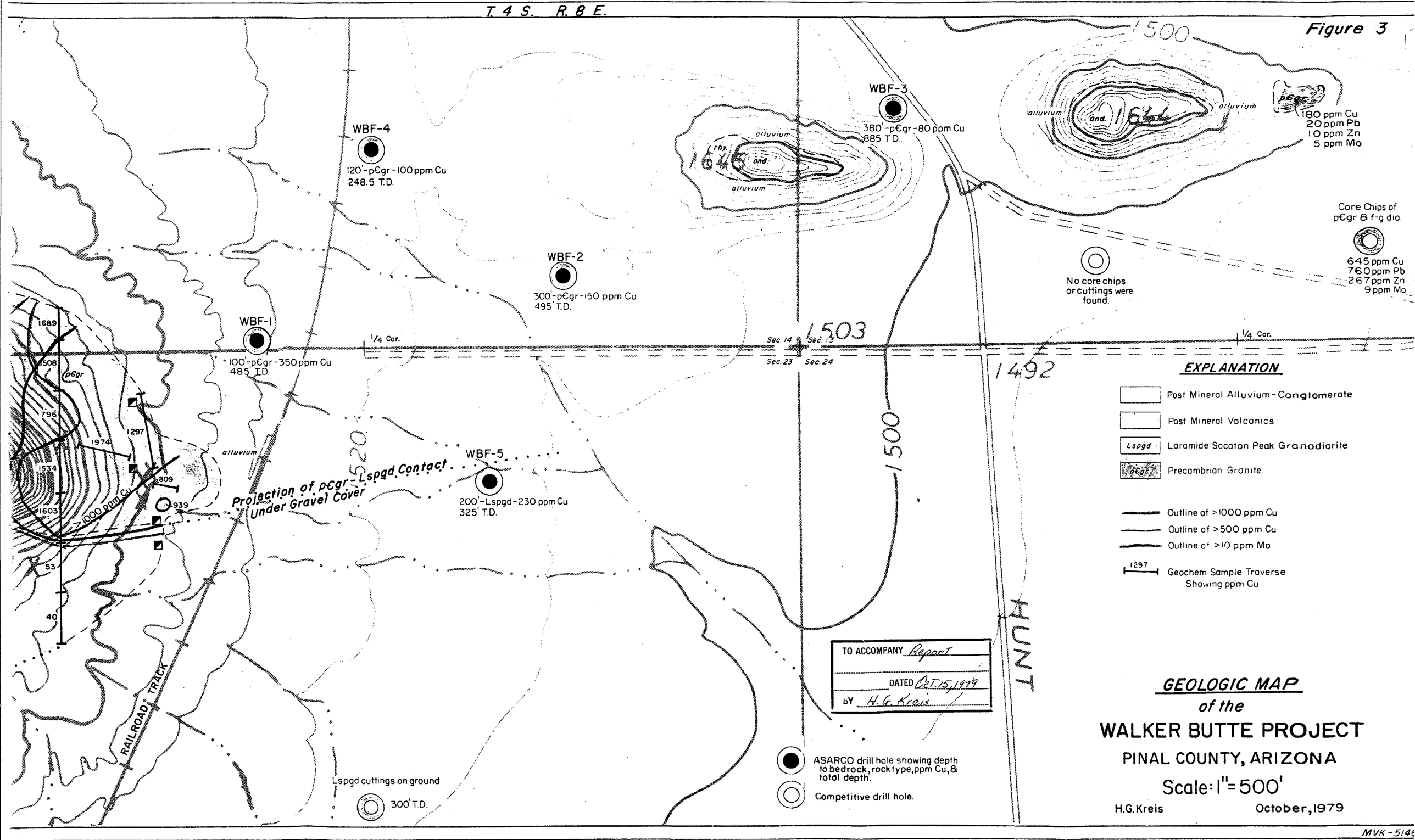
Pinal County, Arizona

SCALE: 1" = 1 mile

F. T. Graybeal — May 31, 1979

MVK - 512


T. 4 S. R. 8 E.
WBF-4
120'-pЄgr-100 ppm Cu
248.5 T.D.
WBF-3
380'-pЄgr-80 ppm Cu
885 T.D.
WBF-2
300'-pЄgr-150 ppm Cu
495' T.D.
WBF-1
100'-pЄgr-350 ppm Cu
485' T.D.
WBF-5
200'-Lspgd-230 ppm Cu
325' T.D.
alluvium
rhy.
and.
1/4 Cor.
Sec 14
Sec 13
Sec. 23
Sec. 24
1503
1500
1520
1600
1646
757
pЄgr
Lspgd
10 ppm Mo.
500 ppm Cu
1000 ppm Cu
Projection of pЄgr - Lspgd Contact
Under Gravel Cover
RAILROAD TRACK
Lspgd cuttings on ground
300' T.D.
TO ACCOMPANY Report
DATED Oct. 15, 1979
BY H. G. Kreis
ASARCO drill hole showing depth to bedrock, rock type, ppm Cu, & total depth.
Competitive drill hole.


T. 4 S. R. 8 E.
Figure 3
WBF-4
120'-p€gr-100 ppm Cu
248.5 T.D.
WBF-3
380'-p€gr-80 ppm Cu
885 T.D.
WBF-2
300'-p€gr-150 ppm Cu
495' T.D.
WBF-1
100'-p€gr-350 ppm Cu
485' T.D.
WBF-5
200'-Lspgd-230 ppm Cu
325' T.D.
alluvium
rhy.
and.
p€gr
180 ppm Cu
20 ppm Pb
10 ppm Zn
5 ppm Mo
Core Chips of
p€gr & f-g dio.
645 ppm Cu
760 ppm Pb
267 ppm Zn
9 ppm Mo
No core chips
or cuttings were
found.
1/4 Cor.
Sec. 14
Sec. 13
Sec. 23
Sec. 24
1500
1503
1492
1520
1689
1508
796
1297
1974
1534
809
1603
939
53
40
>1000 ppm Cu
Projection of p€gr-Lspgd Contact
Under Gravel Cover
RAILROAD TRACK
HUNT
Lspgd cuttings on ground
300' T.D.
ASARCO drill hole showing depth
to bedrock, rock type, ppm Cu, &
total depth.
Competitive drill hole.
TO ACCOMPANY Report
DATED Oct. 15, 1979
BY H. G. Kreis
EXPLANATION
Post Mineral Alluvium-Conglomerate
Post Mineral Volcanics
Lspgd Laramide Sacaton Peak Granodiorite
p€gr Precambrian Granite
Outline of >1000 ppm Cu
Outline of >500 ppm Cu
Outline of >10 ppm Mo
1297 Geochem Sample Traverse
Showing ppm Cu
GEOLOGIC MAP
of the
WALKER BUTTE PROJECT
PINAL COUNTY, ARIZONA
Scale: 1" = 500'
H.G. Kreis
October, 1979

The granodiorite of the Sacaton Peak stock is medium grained and appears equigranular in hand sample. About 10% of the rock is quartz phenocrysts, and the quartz phenocrysts average about 6 mm in diameter. A few percent of plagioclase phenocrysts may also be present. The granodiorite is composed of 5% hornblende, 5% biotite, 45% plagioclase, 20% orthoclase, and 25% quartz.

In the outcrop area both the granodiorite and the Precambrian granite are intruded by narrow (less than 30' wide) dikes of Laramide biotite-quartz-feldspar porphyry. None of these porphyry dikes were intercepted in the drill holes. A fine-grained quartz monzonite dike (less than 30' wide) intrudes Precambrian granite in the northeast corner of the outcrop area, and a similar rock outcrops at the south edge of the Precambrian granite outcrop located 1500' NNE of the south quarter corner of Section 13 (T4S, R8E).

Post-mineral cover consists of alluvium-conglomerate and a few outcrops of andesitic and rhyolitic volcanics. Thicknesses of post-mineral cover varied from 100' to 380'. The clasts of the alluvium and conglomerate were examined for alteration-mineralization indicative of buried mineralization in the area; however, no evidence of such mineralization could be found.

Structure: The outcropping contact between the Laramide granodiorite and the Precambrian granite is shown in Figure 3. The drill hole information, schlieren, and the topographic expression of the contact suggest the contact strikes about N70°W and dips 50-60° northeasterly. The contact is a normal igneous intrusive contact.

Certain fractures of the Precambrian granite in the Walker Butte prospect are mineralized with geothite and chrysocolla after disseminated chalcopyrite (to be discussed). These fractures are erratically spaced, but average about one to two fractures per foot. They have a preferred orientation of NE to ENE with a steep dip.

Mineralization-Alteration: Both vein mineralization and pervasive weak fracture-disseminated mineralization are present in the outcrops of the Walker Butte prospect. Over a half dozen prospect pits have been dug on the veins and in chrysocolla mineralization along the contact of a porphyry(?) dike.

Several quartz-former sulfide veins are present in the Precambrian granite and the Laramide granodiorite. The veins are all less than a foot thick and are composed of more than 85% quartz and less than 15% former sulfide minerals. Oxidation of the vein material caused chrysocolla to form in the vein and exotically in the wall rock. Hypogene-supergene clay-sericite alteration extends less than a foot from any of the veins.

Pervasive mineralization in outcrop consists of traces of chrysocolla and traces of geothite that are interpreted to have originated from trace to 0.1% to locally up to 0.5% (volume) former total sulfides. The former sulfides are interpreted to have been chalcopyrite (or bornite or chalcocite) and much lesser amounts of pyrite. The former sulfide mineralization is 80 to 90% disseminated on fractures and 10 to 20% disseminated amongst the rock-forming minerals. This pervasive mineralization is confined to the Precambrian granite in the area enclosed by the >500 ppm in outline in Figure 3. An occasional mineralized fracture can be found in the Laramide granodiorite.

The pervasive mineralization in outcrop continues under the pediment gravels to the east where it was intercepted in drill holes WBF-1 and WBF-2. The abundance of former sulfides in the Precambrian granite bedrock of WBF-1 and WBF-2 is the same as the mineralized outcrops just described. However, the low copper geochem values in WBF-2 (150 ppm Cu) and WBF-1 (350 ppm Cu) suggest that the former sulfide mineralization was pyrite in WBF-2 and that WBF-1 was in the transition from interpreted former chalcopyrite mineralization on the west to interpreted former pyrite mineralization on the east.

The Precambrian granite of drill hole WBF-4, located north of WBF-1 and -2, has a 1/4% to 1/2% mixture of limonite and MnOx on fractures that is suggestive of possible trace former total sulfides. Bedrock intercepts in WBF-3 and WBF-5 show no evidence of former sulfide mineralization.

Prior to drilling, a geochem survey was run to define the copper mineralization in outcrop. The geochem survey consisted of north-south traverses with a 500' east-west spacing. Each sample was comprised of chips of outcropping rock that were collected along each 300' (average) of traverse. The average sample consisted of about 20 chips totalling two pounds in weight. Thirty-three samples were taken in the immediate area of copper mineralization. The results of the geochem survey are shown in Figure 3. The area of greater than 1000 ppm copper averages 1600 ppm copper and is coincident with the greater than 10 ppm molybdenum area which averages 18 ppm molybdenum.

The geochem results report slightly higher copper values than one would predict from estimates of the percentage of former total sulfides or estimates of the visual percentage of chrysocolla. However, most of the chrysocolla appears to have migrated from nearby (less than six inches) former sulfide sites marked by indigenous goethite. It is possible that some of the copper is exotic and derived from overlying higher copper grade rocks prior to erosion.

The geochem anomaly continues in the bedrock under the pediment gravels to the east, but has significantly decreased to only 350 ppm copper in drill hole WBF-1 located 800' from the nearest outcrop. Copper geochem values in the bedrock intercepts of outlying holes WBF-2, -3, -4, and -5 varied from 80 to 230 ppm as shown in Figure 3; and there was no evidence to suggest copper had been leached or enriched in these intercepts.

The alteration of the Precambrian granite in the area of the mineralized outcrops, WBF-1, WBF-2, and WBF-4, was observed in outcrop, handsample, and thin sections. Approximately 10 to 20% of the rock-forming biotite is replaced by fine-grained, secondary biotite. In addition to secondary biotite after biotite, 1 to 3% of the rock is fine grained biotite that is disseminated (commonly replacing feldspar and occasionally dusting fractures). The clay-sericite content of the Precambrian granite is anomalously low, and it amounts to 2% or less. Roughly a third of the thin sections show 1 to 3% K-feldspar that appears to replace plagioclase along mutual grain boundaries. A few fractures in the outcrops are partially coated with K-feldspar. A few thin sections at the west end of the 500 ppm copper anomaly show 2 to 4% of the rock is aggregates of fine to medium-grained biotite, K-feldspar, apatite, magnetite, and quartz; however, the origin of these aggregates is unknown. All of the K-feldspar is orthoclase except in drill hole WBF-3 and the outcrop 2000' east of WBF-3 where microcline is the dominant K-feldspar type.

The classification of alteration in the area of the copper anomalous outcrops, WBF-1 and WBF-2 (and WBF-4?), is that of very weak biotite-orthoclase alteration. This alteration and the evidence for very weak chalcopyrite mineralization in the same area as the alteration collectively suggest very weak core-type alteration-mineralization. The abundance of alteration and sulfide mineralization is approximately 10% of that observed in the cores of porphyry copper sulfide systems located elsewhere in the Florence-Casa Grande district; however, the copper grade of the outcrops is similar to that observed in the cores.

Out on the pediment a distance of 7000' to the east-northeast from the easternmost outcrops of the copper mineralization is a small outcrop of weakly altered and weakly mineralized Precambrian granite (see Fig. 3). The mineralization consists of 2% reddish brown limonite and local minor quantities of jarosite that appear to be after pyrite in quantities varying from trace to 1.5%. The geochemistry of a couple recent check samples is shown in Figure 3. The alteration is weak (less than 10% of the rock) clay-sericite-muscovite-epidote.

Core chips of Precambrian granite with traces of former sulfides on fractures were found on an abandoned drill site (pre-1975) 800' to the south of the forementioned weakly altered and mineralized outcrop. The chips have geochem values of 645 ppm copper, 9 ppm molybdenum, 760 ppm lead, and 267 ppm zinc.

DRILLING RESULTS

Five drill holes totalling 2,438.5' of rotary and spot core drilling were drilled to check for higher grade copper mineralization under the pediment gravels east of the copper anomalous outcrops. As described in detail in Appendix II, the pediment target was a hypothesized chalcopyrite zone associated with the weak core-like geology of the copper anomalous outcrops. The results of the drilling are summarized in the following table, and geologic-assay logs are available in Appendix I.

Drill Hole	From	To	Interval	Cu (ppm)	Rock Type
WBF-1	0	100'	100'		Alluvium
	100'	485'T.D.	385'	350	Precambrian granite
WBF-2	0	93±'	93'		Alluvium
	93±'	97±'	4'		Andesite
	97±'	300'	203'		Conglomerate
	300'	495'T.D.	195'	150	Precambrian granite
WBF-3	0	380±'	380'		Alluvium and conglomerate
	380±'	885'T.D.	505'	80	Precambrian granite
WBF-4	0	120'	120'		Alluvium
	120'	180'	60'	80	Precambrian granite(?)
	180'	248.5'T.D.	68.5'	120	Precambrian granite
WBF-5	0	200'	200'		Alluvium and conglomerate
	200'	325'T.D.	125'	230	Granodiorite (Lspg)

The drill results in the bedrock of the pediment area show that the anomalous geologic features of the outcrops grade into fresh rock (WBF-3) to the east-northeast. Furthermore, the results demonstrate that under the pediment cover there is no reasonable potential for an ore-grade copper deposit within 1500' of the ground surface. The alluvium and conglomerate rotary cuttings were examined for evidence of mineralization-alteration in outlying gravel covered areas, and the results were negative.

RESIDUAL TARGETS

A potential of marginal interest still exists under the copper-bearing outcrops. As previously discussed the plus 1000 ppm copper outline of Figure 3 averages 0.16% copper, but the grade is higher than one would estimate from the abundance of visual copper minerals or from the percentage of former total sulfides. Since the outcrop area was not drilled, it is not known if the surface copper values represent considerable surficial enrichment or if they carry below the surface. If higher grade copper values exist below the copper anomaly, a small (say 50 million tons) copper oxide deposit could exist.

LAND STATUS

The land status of the Walker Butte Project at the time of Asarco drilling is shown in Figure 2. Present plans are to drop all the land.

EXPENDITURES

Total expenditures for the Walker Butte Project amounted to an estimated $55,232 at the end of September 1979, leaving an estimated balance of $14,768 in the authorization. The expenditures are itemized in the following

table. No major charges or expenditures are outstanding or expected in the near future.

Walker Butte Expenditures

Item	Total	Cost/Ft.
Drilling*	$21,226	$ 8.71
Road, site work	1,789	0.73
Sampling, assaying	870	0.36
Geology	1,946	0.80
Land**	25,000	10.25
Administration***	3,808	1.56
Miscellaneous	593	0.24
Total	$55,232	$22.65

*Contractor service and material costs.
**Does not include $2,000 Phillips option that was charged to General Exploration.
***Includes drilling supervision.

H. G. Kreis

H. G. Kreis

HGK:lb

APPENDIX I

GEOLOGIC LOGS

APPENDIX II

TARGET DESCRIPTION

APPENDIX II. TARGET DESCRIPTION OF WALKER BUTTE PROSPECT

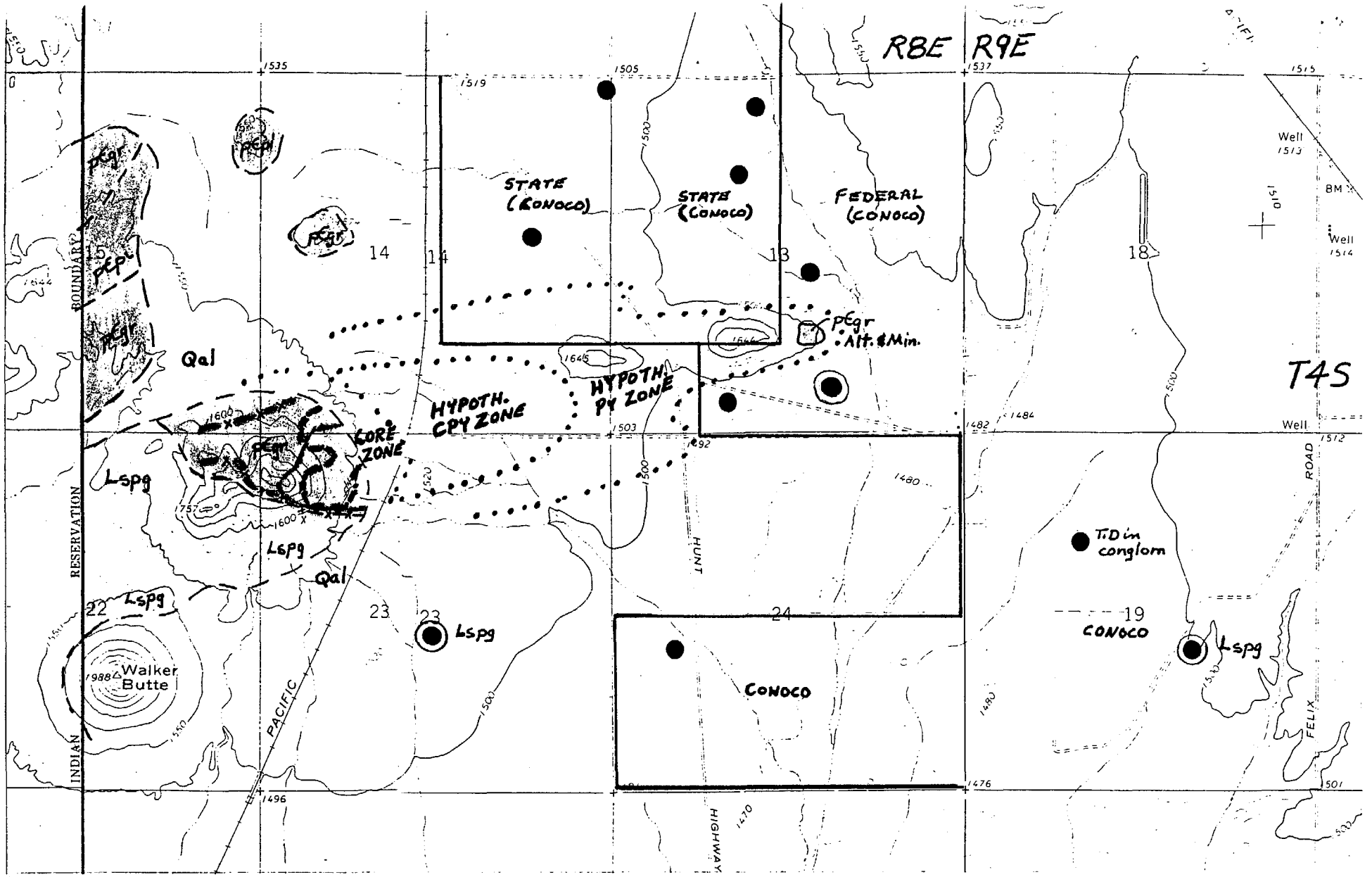
Below and on a following page are a description and a map of the Walker Butte copper target prior to Asarco's drilling of the pediment area. The description is taken directly from H. G. Kreis' report of January 25, 1979 entitled "Reconnaissance of the Walker Butte Copper Prospect."

Target Description

Interpretation of the results of the reconnaissance geology and the geochem survey suggests that the copper bearing outcrops of the Walker Butte prospect may be the core of a porphyry copper sulfide system. The fresh appearance of the Precambrian granite host rock and the preliminary evidence of secondary biotite and K-feldspar in Precambrian granite at the contact of a Laramide intrusive are suggestive of the type of alteration found within the core of porphyry copper deposits in the Florence-Casa Grande area. The low percentage of former total sulfides, the high ratio of former chalcopyrite to pyrite, the pervasive nature of the mineralization, and the anomalous but low molybdenum values are indicative of sulfide mineralization commonly found in the core of porphyry copper sulfide systems.

The most likely case of possible sulfide zoning associated with the copper bearing outcrops is shown on the attached map. The geology of these hypothesized sulfide zones and the alteration zones which would be associated with them is described in my Santa Cruz Peripheral Lands report of April 1978. Experience with similar sulfide zoning suggests that plus 0.3% copper as chalcopyrite could have and still may exist as close as 1000' (±500') to the plus 1000 ppm copper outcrops. Plus 0.3% copper as chalcopyrite may exist below the plus 1000 ppm copper outcrops. However, the outcrop evidence shows the Precambrian granite-Laramide granodiorite to be dipping moderately to the northeast under the copper bearing outcrops, and the copper values of the plus 1000 ppm copper outcrops are more likely to decrease than increase with depth, a direction towards the Laramide granodiorite. Plus 0.3% copper as chalcopyrite may have existed above the plus 1000 ppm copper outline, but there is no significant evidence to suggest that considerable amounts of copper were leached from such mineralization and deposited in a blanket below the present-day outcrops.

Plus 0.3% copper as chalcopyrite, if present in the area, is most likely to exist immediately east-northeast of the plus 1000 ppm copper outline as shown on the map. If such a plus 0.3% copper zone as chalcopyrite exists then there is a favorable potential for finding a chalcocite enrichment blanket. The potential for finding copper reserves mineable by open pit methods is as great or better than they were when the Sacaton and Poston Butte exploration drilling projects were first begun.



EXPLANATION

- Qal — Post mineral cover
- Lspg — Laramide Sacaton Peak granodiorite
- pEgr — Precambrian granite
- pEpt — Precambrian schist
- Outline of >500 ppm Cu
- Outline of >1000 ppm Cu
- Outline of >10 ppm Mo
- Competitive drill hole

PRELIMINARY ROUGH DRAFT

RECONNAISSANCE OF THE WALKER BUTTE PROSPECT SHOWING TARGET OF HYPOTHETICAL CHALCOPYRITE ZONE

H. Kreis Jan. 22, 1979

TO ACCOMPANY report

DATED Oct. 15, 1979

BY H.G. Kreis

APPENDIX III

GEOCHEMICAL DETERMINATIONS

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC. DATE June 15, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PERCENT COPPER	PERCENT LEAD	PERCENT ZINC	PERCENT MOLYBDENUM	PERCENT IRON	
WBF-1 0-20			240					
20-40			267					
40-60			306					
60-80			213			14		
80-100			440			21		
100-120			335			12		
120-130			302			7		
130-140			511			8		

CHARGES $ 32.50

INVOICE NO. 16427

REGISTERED ASSAYER CERTIFICATE NO. 5852 PETE S. FLORES Date Signed 6/15/79 Arizona U. S. A.

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS · CHEMISTS · METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 27, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-1 145-155			851			16		
155-165			864			9		
165-175			709			15		
175-185			373			5		
185-190			461			6		

REGISTERED ASSAYER
CERTIFICATE NO. 6852
PETE S. FLORES
Date 6/27/79
Signed
ARIZONA U. S. A.

CHARGES $ 28.75

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS · CHEMISTS · METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 27, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-1 190-195			358			10		
195-205			289			7		
205-215			332			6		
215-225			346			103		
225-235			311			10		
235-245			232			9		
245-250			490			15		

REGISTERED ASSAYER
CERTIFICATE NO. 8952
JESUS S. FLORES
6/27/79
Date Signed
Arizona

CHARGES $ 35.00
Invoice # 16443

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS · CHEMISTS · METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 5, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-1 250-260			319			7		
260-270			430			11		
270-280			356			7		
280-290			262			5		
290-300			225			3		
300-310			177			2		
310-320			182			7		
320-330			197			8		
330-340			291			7		
340-350			334			11		
350-360			227			9		
360-370			186			4		
370-380			200			4		
380-390			339			5		
390-400			351			8		
400-410			170			3		
410-420			404			24		
420-430			228			5		
430-440			281			7		
440-450			453			15		
450-460			233			8		
460-470			222			4		
470-480			357			15		
480-485			593			22		

REGISTERED CERTIFIED ASSAYER 6852 PETE S. FLORES Date Signed 7/9/79 Arizona U.S.A.

CHARGES $ 120.00

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

COMPOSITE

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 29, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-1								
100-140				22	21			
145-190				37	24			
WBF-2								
393-~~400~~ 440				26	23	7		
452-490				13	14	5		

REGISTERED ASSAYER
CERTIFICATE NO. 6882
PETE S. FLORES
Date Signed 6/29/79
Arizona U. S. A.

CHARGES $ 22.10

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS • CHEMISTS • METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC. DATE June 20, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-2 0-20			124			4		
20-40			58			6		
40-60			81			2		
60-80			130			6		
80-100			183			4		
100-120			175			5		
120-140			112			3		
140-160			58			3		
160-180			106			5		
180-200			179			7		
200-220			103			3		
220-240			152			5		
240-260			61			2		
260-280			70			6		
280-300			106			4		
300-320			191			7		
320-340			203			4		
340-360			108			4		
360-380			141			2		
380-385			143			3		

CHARGES $ 110.00

INVOICE NO. 16434

REGISTERED ASSAYER CERTIFICATE NO. 6852 PETE S. FLORES Date Signed 6/20/79 Arizona U. S. A.

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 27, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-2 393-400			115					
400-410			105					
410-420			134					
420-430			155					
430-440			134					
440-447			304					
452-460			166					
460-470			138					
470-480			115					
480-490			118					
490-495			218					

REGISTERED ASSAYER
CERTIFICATION
5852
PETE G. FLORES
6/27/79
Signed

E.L.S. / Walker Bu

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS · CHEMISTS · METALLURGISTS

TUCSON, ARIZONA 85714

COMPOSITE

SAMPLE SUBMITTED BY ASARCO, INC.

DATE June 22, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-2								
100-200				59	23			
200-300				65	21			
300-340				63	27			
340-385				54	23			

REGISTERED ASSAYER
CERTIFICATE No. 6852
ELIE S. FLORES
Date Signed 6/22/79
Arizona U. S. A.

CHARGES $ 13.50

ASSAYER - CHEMIST

Ltd./Walker Black

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

COMPOSITE

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 9, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-3 0-100			79					
100-200			75					
200-300			111					
300-400			159					
400-500			52					
500-600			55					

REGISTERED ASSAYER CERTIFICATE No. 6-5 PETE S. FLORES Date Signed 7/11/79 Arizona U. S. A.

CHARGES $ 18.00

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS · CHEMISTS · METALLURGISTS

TUCSON, ARIZONA 85714

COMPOSITES

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 18, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-3								
600-700			86			< 1		
700-820			103			< 1		
825-870			112			< 1		
WBF-4								
140-80				22	30	< 1		
180-190 + 195-240				27	35	1		
WBF-5								
180-280				17	21	< 1		

CHARGES $ 36.30

REGISTERED ASSAYER CERTIFICATE NO. 6852 PETE S. FLORES Date Signed 7/18/79 Arizona U.S.A.

Ex. 6 / Walker Sales

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS · CHEMISTS · METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 11, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-4								
0-20			53					
20-40			67					
40-60			88					
60-80			119					
80-100			141					
100-120			97					
120-140			72					
140-160			69					
160-180			95					
180-190			88					
195-200			73					
200-220			135					
220-240			118					

REGISTERED ASSAYER CERTIFICATE NO. 6842 PETE S. FLORES Date Signed 7/11/79 Arizona

CHARGES $ 32.50

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS - CHEMISTS - METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE July 11, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WBF-5 0-20			110					
20-40			266					
40-60			189					
60-80			183					
80-100			170					
100-120			112					
120-140			167					
140-160			86					
160-180			81					
180-200			104					
200-220			124					
220-240			115					
240-260			296					
260-280			427					
280-300			229					
300-320			191					

REGISTERED ASSAYER CERTIFICATE NO. 6852 PETE S. FLORES Date Issued 7/11/79 Arizona U.S.A.

CHARGES $ 40.00

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS • CHEMISTS • METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC.

DATE Jan. 9, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WB-1			1297			12		
WB-2			654			10		
WB-3 A			77			5		
WB-3 B			90			5		
WB-4			57			5		
WB-6			939			24		
WB-7			809			19		
WB-8			1974			14		
WB-9			796			27		
WB-10			1508			24		
WB-11			1689			5		
WB-12			1534			10		
WB-13			1603			17		
WB-14			53			2		
WB-15			40			3		
WB-16			38			3		
WB-17			124			3		
WB-18			36			5		
WB-19			112			5		
WB-20			62			5		
WB-21			> 2000			238		
WB-22			49			5		
WB-23			168			3		
WB-24			63			3		
WB-25			256			5		

CHARGES $ 118.75

INVOICE NO 16127

Patricia Flores 1/9/79

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS • CHEMISTS • METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC. DATE Jan. 9, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WB-26			571			4		
WB-27			362			5		
WB-28			902			11		
WB-29 A			194			12		
WB-29 B			376			7		
WB-30			140			4		
WB-31			367			6		
WB-32			1167			10		
WB-33			763			10		
WB-34			176			4		
WB-35			75			4		
WB-36			362			5		
WB-37			720			21		
WB-38			539			6		
WB-39			580			6		
WB-40			537			7		
WB-41			468			6		
WB-42			734			9		
WB-43			955			11		

CHARGES $ 90.25

INVOICE NO. 16127

1/9/79

ASSAYER-CHEMIST

3441 East Milber

Phone 889-5787

AMERICAN ANALYTICAL and RESEARCH LABORATORIES

ASSAYERS • CHEMISTS • METALLURGISTS

TUCSON, ARIZONA 85714

SAMPLE SUBMITTED BY ASARCO, INC. DATE Jan. 25, 1979

SAMPLE MARKED	GOLD OZ./TON	SILVER OZ./TON	PPM COPPER	PPM LEAD	PPM ZINC	PPM MOLYBDENUM		
WB-2	.003	0.47		15	55			
WB-4	.001	0.17		10	88			
WB-9	.002	0.23		13	54			
WB-10	.003	0.30		11	36			
WB-11	.002	0.27		14	65			
WB-12	.001	0.21		12	51			
WB-13	.003	0.29		14	48			
WB-14	.002	0.25		10	25			
WB-15	.001	0.13		8	19			
WB-16	.001	0.24		23	64			
WB-17	.001	0.16		9	29			
WB-18	.004	0.39		12	33			
WB-19	.002	0.25		14	30			
WB-20	.001	0.23		19	36			
WB-35	Trace	0.06		21	57			
WB-36	.001	0.18		22	51			
WB-43	.001	0.1[illegible]		23	36			

Paid Jones
1/25/79

CHARGES $ 127.50

INVOICE NO. 16146

ASSAYER-CHEMIST