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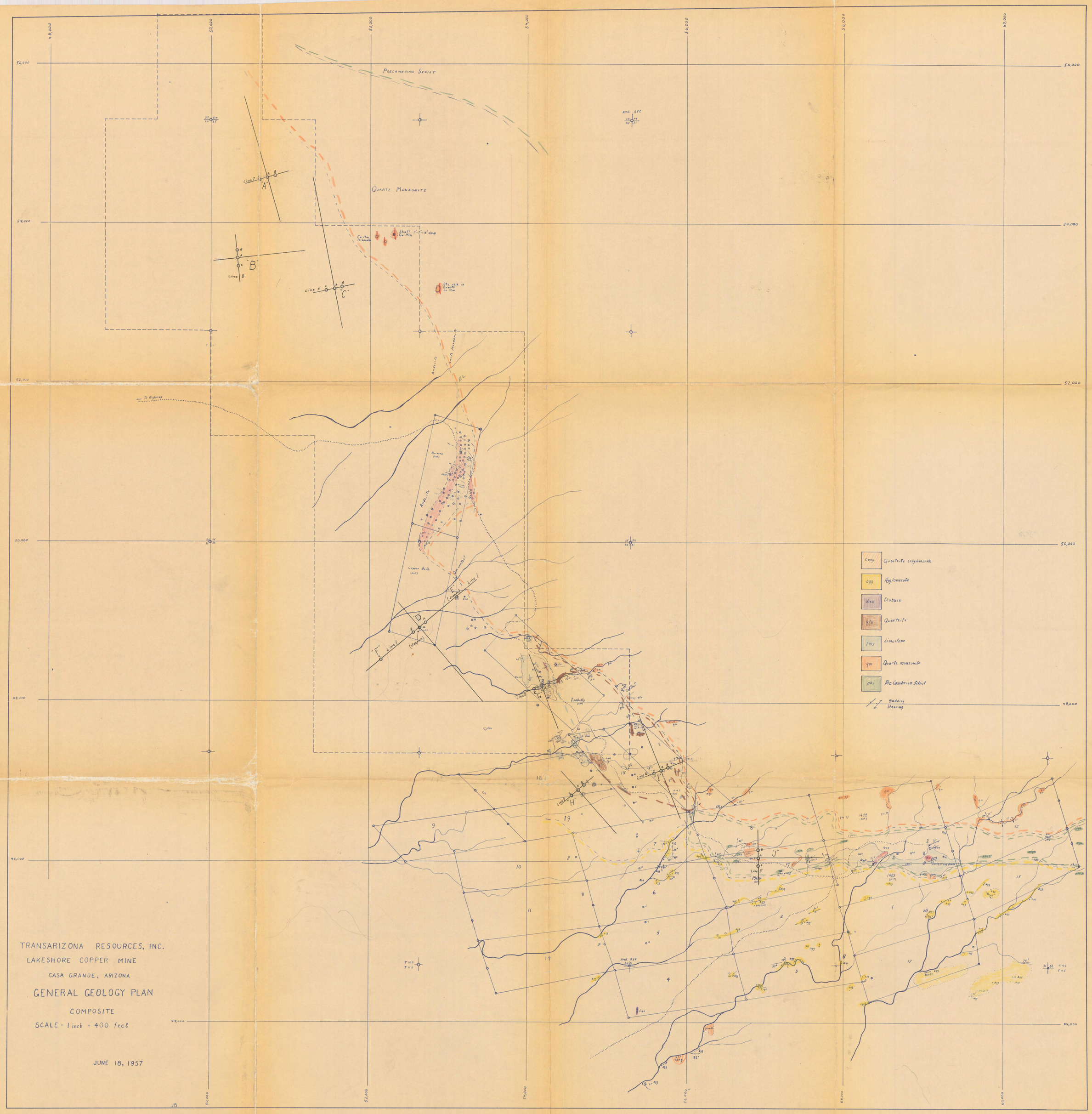


TRANSARIZONA RESOURCES, INC.

LAKESHORE COPPER MINE

CASA GRANDE, ARIZONA

GENERAL GEOLOGY PLAN

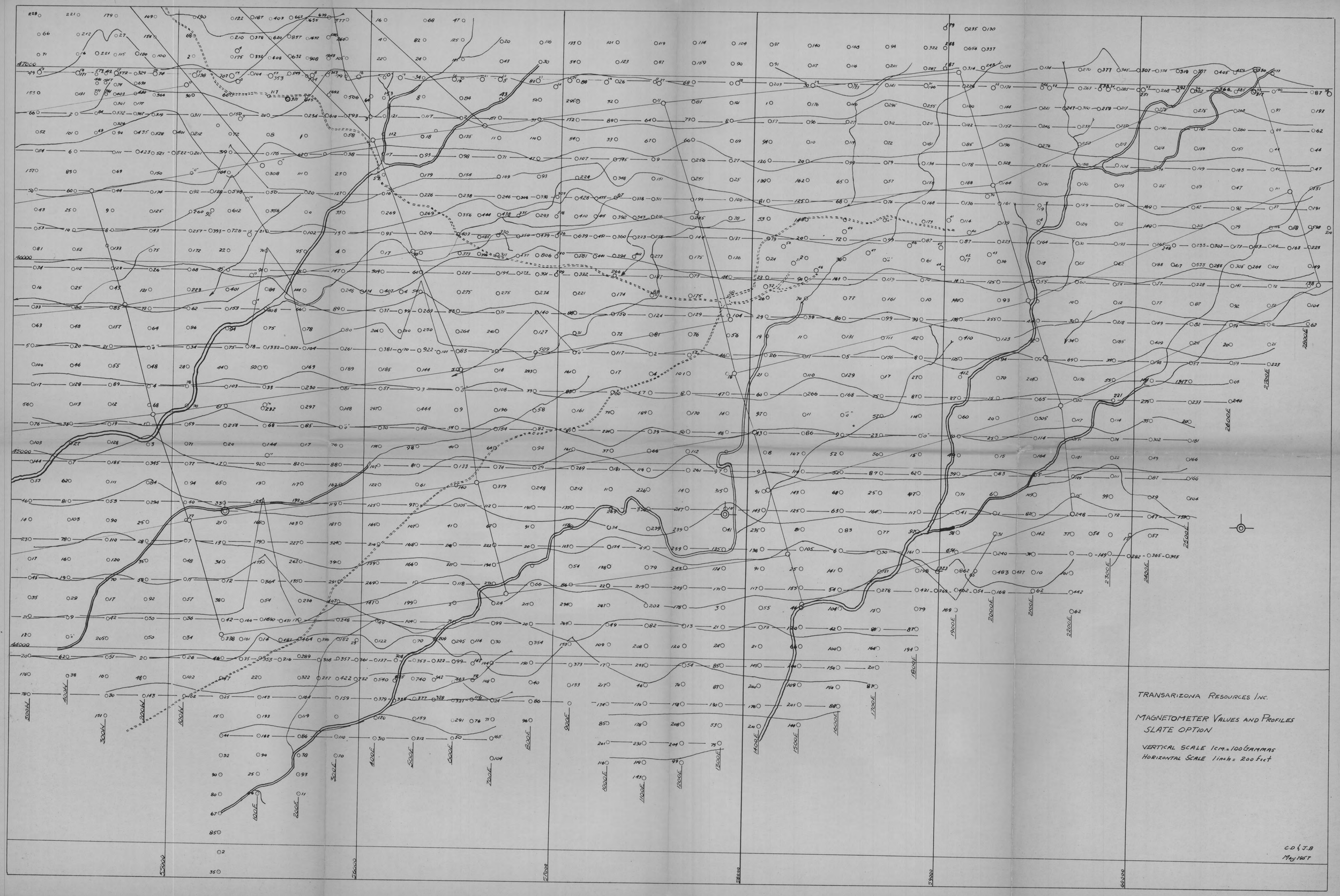
COMPOSITE

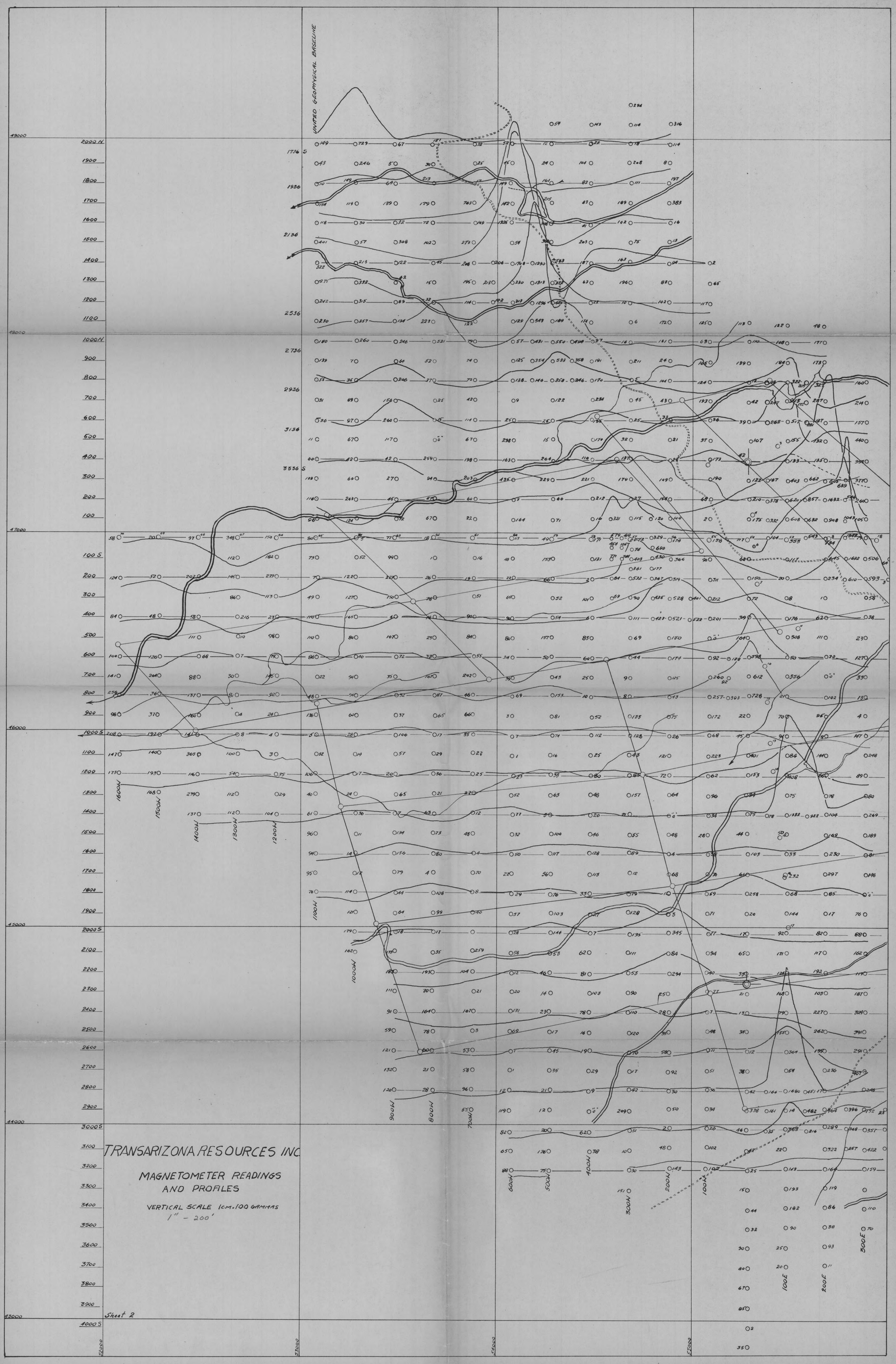
SCALE · 1 inch = 400 feet

JUNE 18, 1957

#5

Comp Geol


TRANSARIZONA RESOURCES INC.
MAGNETOMETER VALUES AND PROFILES
SLATE OPTION
VERTICAL SCALE 1cm.=100 GAMMAS
HORIZONTAL SCALE 1inch= 200 feet
C.D & J.B
May 1957


UNITED GEOPHYSICAL BASELINE
TRANSARIZONA RESOURCES INC
MAGNETOMETER READINGS
AND PROFILES
VERTICAL SCALE 1cm.=100 GAMMAS
1" - 200'
Sheet 2

REPORT OF SAMPLING THE JIM SNYDER PROPERTY

PIMA COUNTY, ARIZONA

For

Callahan Mining Corporation

April 1967

By

Heinrichs Geoexploration Company
P. O. Box 5671 Tucson, Arizona 85703
Phone: 623-0578, Area Code: 602

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SKETCHES OF SAMPLE LOCATION	Attached
PROSPECT AND SAMPLE LOCATIONS	Attached
SAMPLES DESCRIPTIONS, Pages 1 - 3	Attached

REPORT OF SAMPLING THE JIM SNYDER PROPERTY
PIMA COUNTY, ARIZONA

Introduction

During the period of April 6 thru 9, 1967 the Heinrichs Geoexploration Company, on behalf of the Callahan Mining Corporation, sampled a mineralized area on the west slope of the Cimarron Mountains in the Papago Indian Reservation southwest of Casa Grande, Arizona. The property is in an unsurveyed area near BM 2287 about one mile south of the Isabella Well as shown on the Gu Achi quadrangle. To reach the property from Casa Grande follow the paved highway southward toward Quijotoa for a distance of 23 miles, then proceed southwestward over a graded road which gradually changes to a jeep trail; this distance being about 34 miles.

Acknowledgements and Proceedures

This writer, who was retained by Heinrichs Geoexploration for the sampling project, was assisted for three days by Mr. Manny Padilla and for one day by Jim Snyder. Mr. Padilla and I drove from Tucson, April 6, in a 4-wheel drive pickup rented from American Auto Rental and we were met at the junction of the Vekol and Quijotoa roads by Mr. George Glick, Geologist, Callahan Mining Corporation, and Jim Snyder, one of the owners of the property. We were guided to the property by Mr. Glick who showed us the mineralized area, and the location and character of samples to be cut. Mr. Glick also made a transit-stadia survey and prepared a 1 inch equals 200 feet map showing the geology of the area, numerous shallow prospects, and sample localities. The writer designated the locality

numbers with the prefix "GG" in the sample books, but in the final compilation this was changed to the prefix C.M.C., as used on the attached table of samples. A total of 70 samples were cut and these were delivered April 10, 1967, to Jacob's Assay Office, Tucson, to be assayed for gold and silver. Instructions were left with Jacobs to transmitt the assay results and his statement directly to Callahan Mining Corporation rather than to Heinrichs Geoexploration or to this writer.

THE PROPERTY

The mineralized area is said to be covered with seven unpatented claims owned by Jim Snyder and Al Wilson. The property has been in the Snyder family for many years and predates withdrawal of the Papago Indian Reservation from mineral entry.

GEOLOGY

The claim area is underlain by a very complex group of apparantly hybrid rocks which seem to be present in relatively small patches within a large granite mass. Conditions analogous to other parts of Arizona suggest that the oldest rock is Pinal schist, a banded or schistose gneissoid rock which seems to occur as inclusions in a large mass of coarse grained light colored granite. A rock type of minor importance is dark colored, either gray or reddish brown, fine grained or dense, and this may be either sedimentary or volcanic in origin. Another rock of wider distribution is andesitic in character; it is medium to dark gray,

porphyritic with abundant phenocrysts of feldspar. This rock probably represents remnants of a flow. Probably the most important rock of the area is dark gray medium, fine grained, equigranular rock referred to as a granite, but it may be diorite or granodiorite. Locally, this rock contains zones that are pegmatitic or aplitic. This rock probably is the latest to form except for the andesite, and it probably is intrusive into the other rocks.

The area undoubtedly has undergone considerable structural deformation, the most obvious feature being a single north-trending fault or shear zone with an irregular west dip of 15-25 degrees. This has been explored by underground workings of shafts No. 1, No., 2, and No. 3, and in this area the zone seems to have been altered and mineralized. Elsewhere, throughout the property the rocks seem to be rather throughly broken by joints, fractures, and minor faults. Most of these are moderately stained with iron oxides and occassionally coated with secondary copper minerals, and in a few places there are minor quartz veins or breccias cemented with quartz. The general overall appearance of this area indicates that it has been widely but weakly mineralized and this is the reason for cutting numerous samples.

The above notes are not intended to be a geological report on the property but are for the purpose of recording the limited observations that could be made while cutting the samples.

SAMPLES

A total of 70 samples were cut from numerous prospects and outcrops and submitted for assays for gold and silver. The first six samples and a few others were typical grab samples representing the material that

could easily be knocked off an exposed surface with a geological pick. All others were channel or "V" groove samples carefully cut with a moil and single jack. All samples were cut large so as to get representative material and these were delivered directly to the assayer for final preparation and assaying. A brief description of the samples is given in the attached table and locations of a few of the samples with respect to some of the more signifigant prospects is shown in the attached sketches. A more complete location map and other signifigant information was compiled by Mr. George Glick.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

John N. Faick, Ph. D.
Registered Geologist
Arizona No. 6332

Approved:
Walter E. Heinrichs, Jr.
President & General Manager

April 18, 1967
Tucson, Arizona

APR 1 8 1967

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Fair Copy

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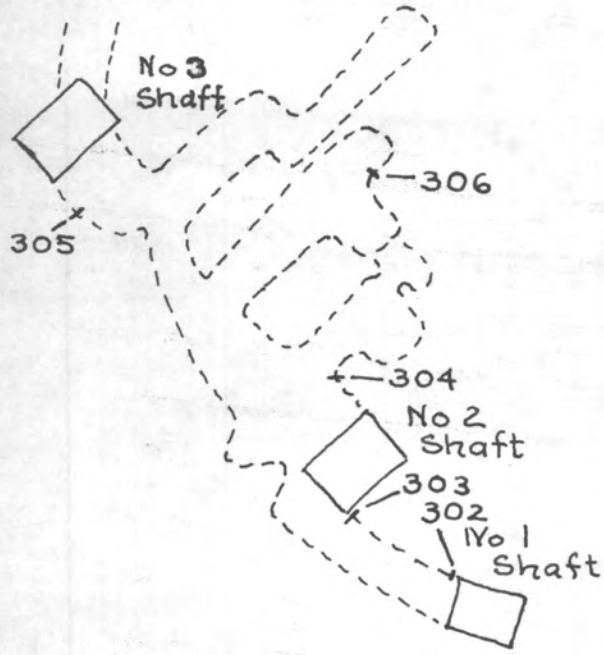
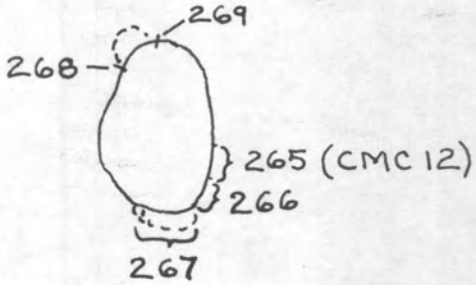
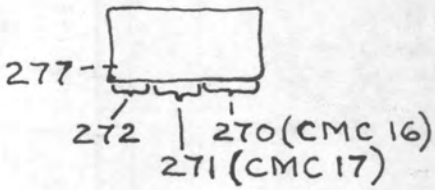
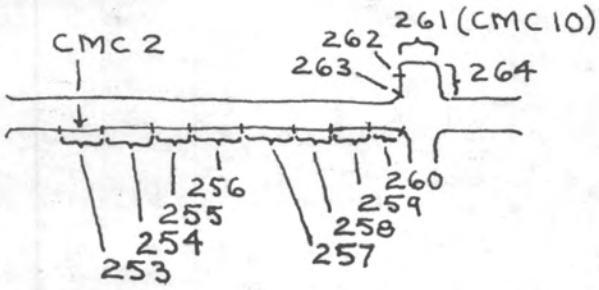
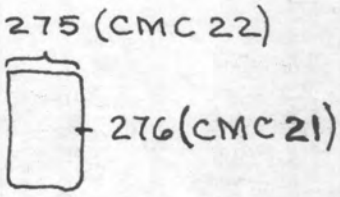
John N. Faick
Registered Geologist

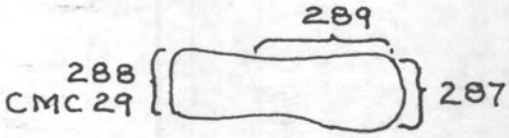


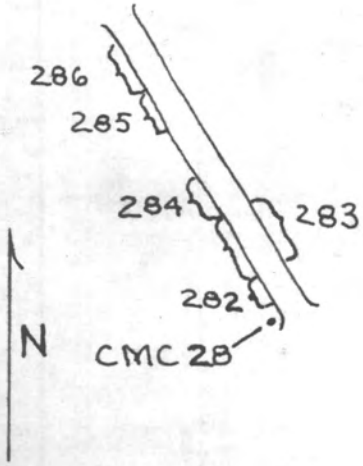


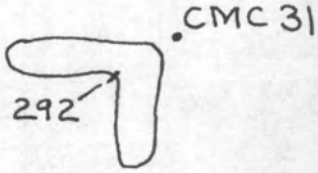










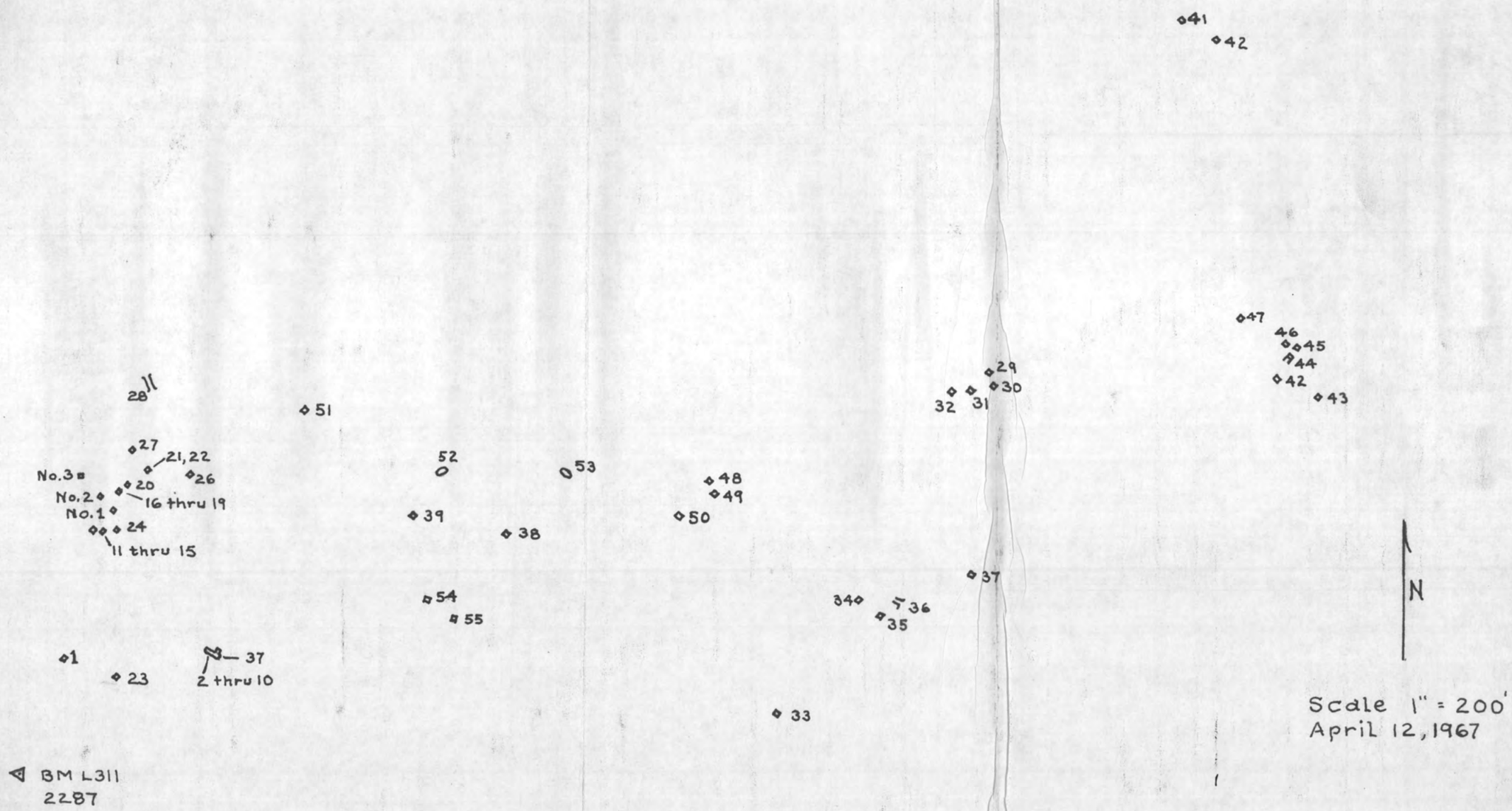


SKETCHES SHOWING RELATIVE LOCATION
OF SOME SAMPLES
Not to scale

By J.N.F.

APR 18 1967

HEINRICHS GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA



SNYDER PROPERTY
PROSPECT AND SAMPLE LOCATIONS

Stadia-Transit Survey by G.G.

Traced by J.N.F.

GEOEX
GEOPHYSICAL ENGINEERS
TUCSON, ARIZONA

HEINRICHS SAMPLE NUMBER	C.M.C STATION NUMBER	DIRECTION OF CUT	LENGTH IN FEET	DESCRIPTION	OZ. Ag PER TON	OZ Au PER TON	ESTIMATED GROSS VALUE
251	1	Horiz.	6.5	Grab sample of slightly iron stained granite; west wall 5×7×5 prospect.			
252	1	..	..	Fines from iron-bearing fractures in granite, residue from sample 251.			
253	2	..	3.5	Fractured pegmatite at SW end of trench; iron on fractures.			
254	3	..	5.8	Granite; south side of trench.			
255	4	..	3.0	Pegmatite in trench.			
256	5	..	6.0	Granite; south side of trench.			
257	-	..	6.0	Brecciated granite; introduced quartz.			
258	6	..	4.0	Granite. Lighter color than 257.			
259	7	..	4.0(?)	Granite; brecciated & silicified.			
260	-	..	4.5	.. .. .. Dark.			
261	10	..	4.0	Dark dense hornstone(?).			
262	9	Vertical	4.5	Sample crosses hornstone, granite & minor fault.			
263	8	..	4.5	Granite; fine grained, dark colored.			
264	-	Slope S.	4.5	Crosses fault & fracture zone at granite-hornstone contact.			
265	11	Horiz	5.0	Silicified granitic gneiss.			
266	12	Vertical	2.0	Altered, iron stained granite in footwall of low angle fault.			
267	13	Horiz.	3.0	Probable fault zone in small pit.			
268	14	Vert	3.0	Schist & fault breccia.			
269	15	Vert	2.5	Siliceous breccia in fault.			
270	16	Slope E	2.5	Footwall of fracture zone in granite.			
271	17	Horiz	2.8	Silicified zone or quartz vein.			
272	18	Slope	2.0	Silicified fracture zone in granite.			
273	19	Vert		Granite; dark colored. Trace Cu.			
274	20	Horiz	4.5	About 2 feet below surface.			
275	22	Slope	3.6	Cut across minor fractures.			
276	21	Vert	5.0	Minor fractures in dark granite.			
277	23	Slope	6.5	Sample crosses fractures, granite.			
278	24	..	5.7	Quartz rich pegmatite zone.			

APR 1 8 1967

HEINRICHS GEOEX GEOPHYSICAL ENGINEERS TUCSON, ARIZONA

HEINRICHS SAMPLE NUMBER	C.M.C STATION NUMBER	DIRECTION OF CUT	LENGTH IN FEET	DESCRIPTION	OZ Ag PER TON	OZ Au PER TON	ESTIMATED GROSS VALUE
279	26	Vert	5.5	Granite below micaceous pegmatite.			
280	27	..	4.0	Granite, with minor horiz. fractures.			
281	26	-	-	Grab sample of pegmatite.			
282	28	Horiz.	5.5	Granite; channel & grab sample.			
283	28	..	11.7	Gneiss, west dip. Iron stained.			
284	28	..	6.5	Gneiss & Schist with quartz bands.			
285	28	..	8.0	.. ..			
286	28	..	8.0	Schist, minor quartz & pegmatite.			
287	29	..	5.5	Andesite or horstone. Visible gold.			
288	29	..	3.4	Fine grained, dark granitic rock.			
289	29	..	11.0	Cut across fine dark granite on west and andesite on east.			
290	29	-	-	Grab sample of quartz vein on dump.			
291	30	Vert	3.5	Quartz vein 1 ft thick in granite.			
292	31	..	2.5	Silicified granite.			
293	32	Horiz.	4.0	Shattered granite.			
294	33	Slope	8.0	Granite with 2 ft thick pegmatite.			
295	34	Horiz	6.0	Granite beneath 5 ft of alluvium.			
296	36	Vert	4.5	Fault zone, altered, dark granite F.W.			
297	35	Horiz	9.0	Granite, dark. Cut across high-angle fractures in 10-ft shaft.			
298	37	Vert	7.0	Brecciated dark granite.			
299	37	..	7.0	Cut across west-dipping low-angle fault in incline. Hanging wall part.			
300	37	Slope	7.0	Granite. Iron stained, Minor fractures.			
301	37	Slope	6.0(?)	Granite with some pegmatite.			
302	Shafts	Vert	5.0	Quartz & silicified granite in fault at bottom of No. 1 shaft.			
303	..	Vert	7.0	Silicified granite in HW of shear zone Cut at S. corner of No. 2 shaft.			
304	..	Slope 70°	3.5	Low angle fault, 10 ft West of No 2 Shaft.			
305	..	Vert	4.2	Cut across low-angle fault, 15 ft east of No 3 shaft.			
306	..	Vert	5.7	Cut across low-angle fault, or shear.			

APR 18 1967

HEINRICHS GEOEX

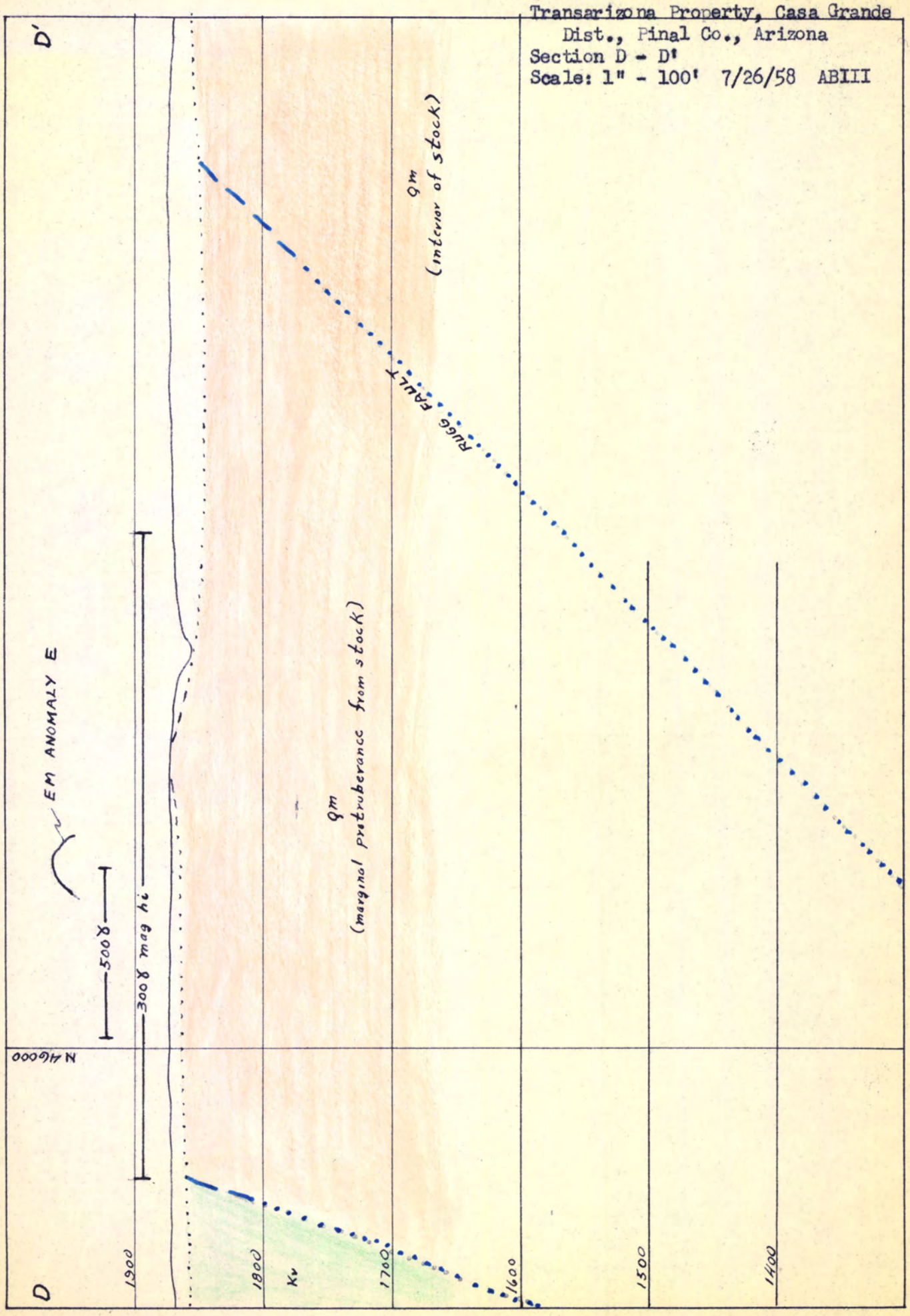
HEINRICHS SAMPLE NUMBER	C.M.C STATION NUMBER	DIRECTION OF CUT	LENGTH IN FEET	DESCRIPTION	OZ Ag PER TON	OZ AU PER TON	ESTIMATED GROSS VALUE
307	51	Vert	1.6	Siliceous zone with iron. Brecciated.			
308	52	Horiz	5.0	Dark granite, brecciated.			
309	39	..	3.0(?)	Andesite (?). Dark, porphyritic, hard.			
310	38	..	3.0	.. Minor pegmatite.			
311	53	..	6.0	Cut across contact. Pegmatite on east, granite on west. Dark.			
312	49	..	5.5	Cut across high-angle fractures in dark andesite(?).			
313	48	..	5.0	Dark igneous rock. Pegmatitic. Breccia.			
314	50	..	5.5	Dark, fine grain, granite. Pegmatitic.			
315	55	..	6.5	Granite (?) pegmatitic.			
316	54	..		Schist & gneiss. Banded, iron stained.			
317	43	..	7.0	Andesite; dark fine grained.			
318	44	Slope	6.5	Granite (?). Sample crosses projection of vein where USBLM cut good values.			
319	45	Vert	4.2	Granite, fine grained.			
320	47	..	6.0	Granite, fine grained, iron stained.			

APR 1 8 1967

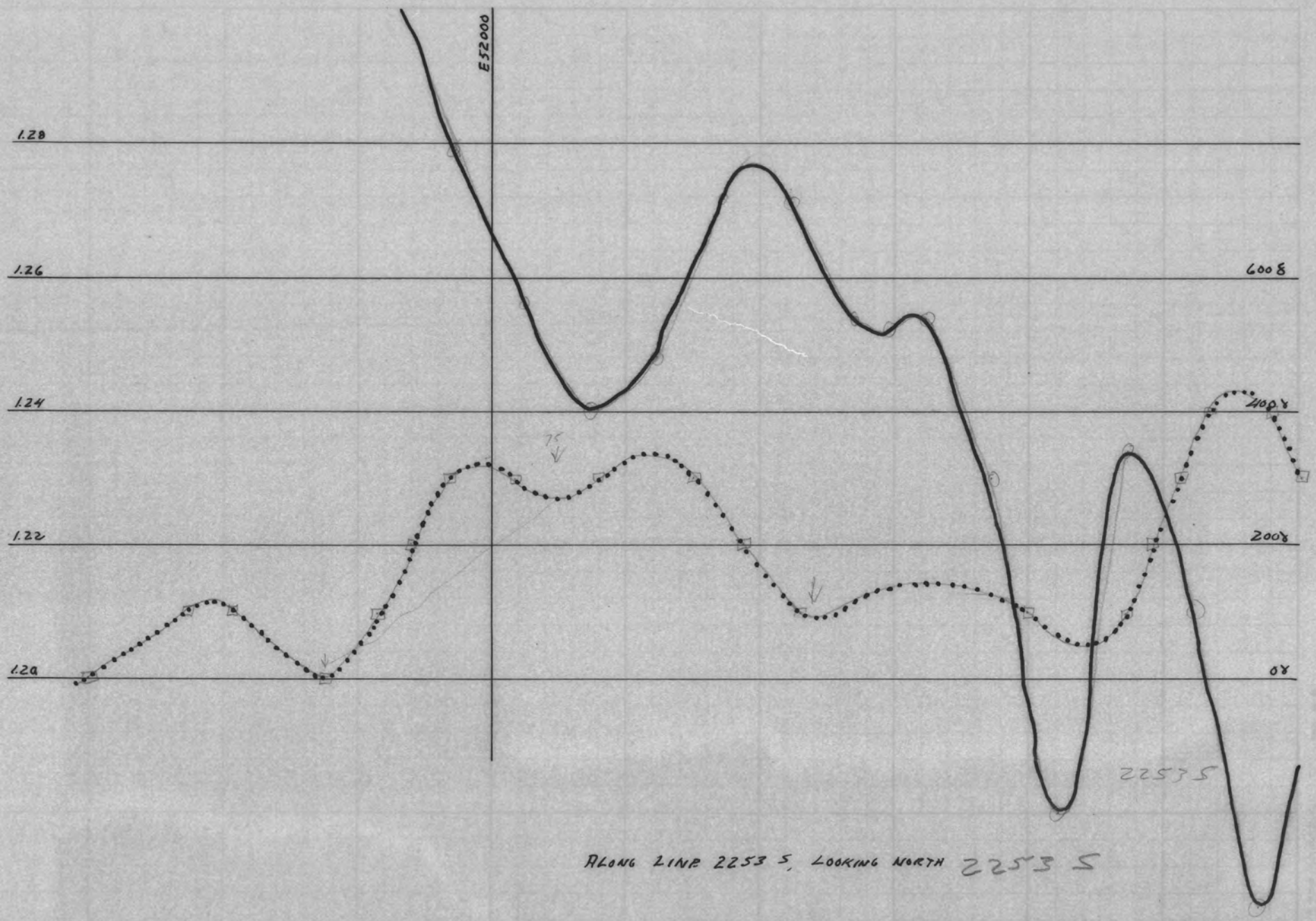
HEINRICHS GEOEX

COMPOSITE MAP ILLUSTRATING MAGNETOMETER ANOMALIES
AND GENERAL GEOLOGY
SCALE 1" = 1000'

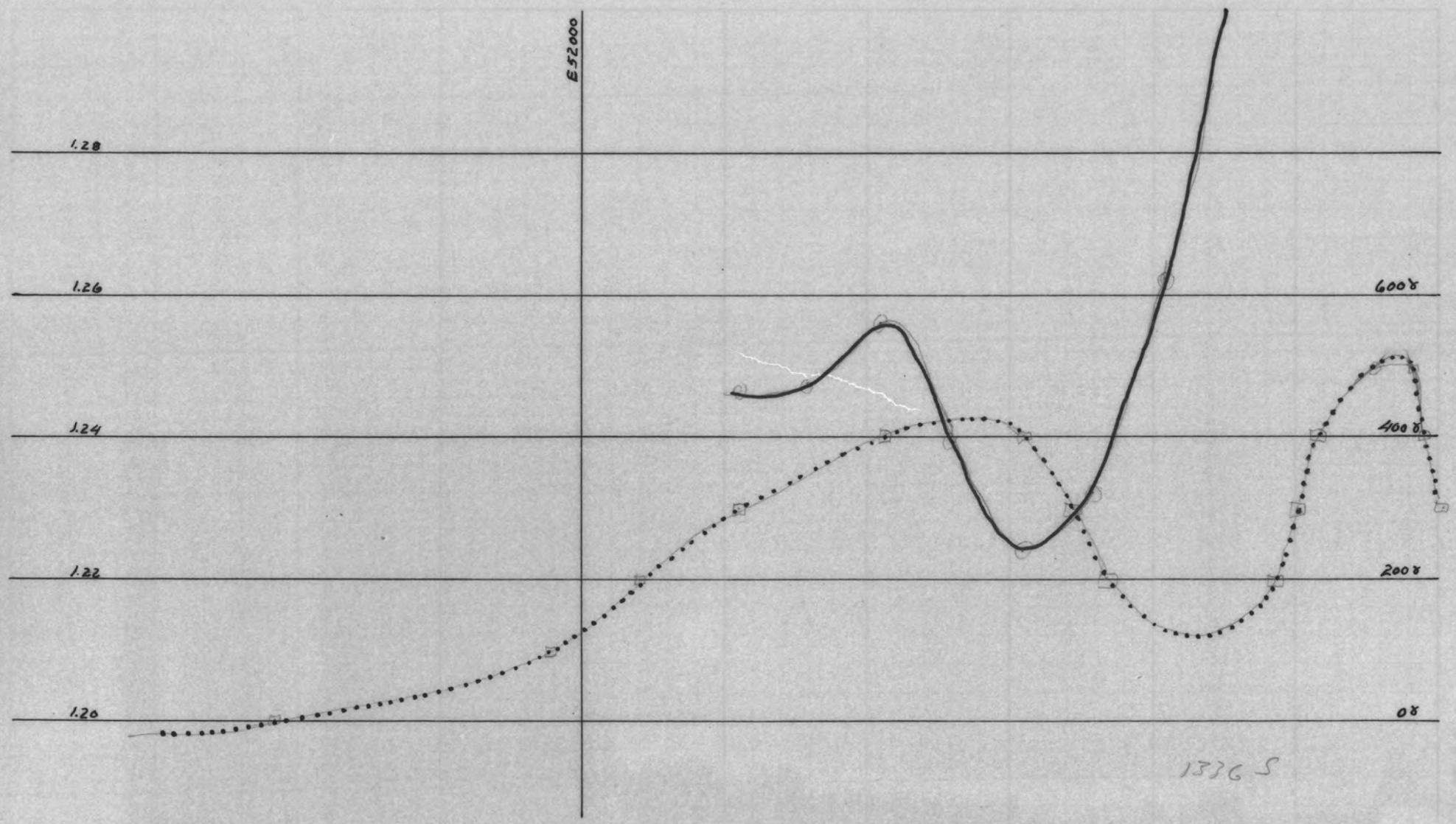
Drawing No. EGE 1
CALLAHAN MINING CORP.
Transarizona Property, Casa Grande Dist., Pinal Co., Arizona
Section D - D'
Scale: 1" - 100' 7/26/58 ABIII



Drawing No. EGE 2
CALIAHAN MINING CORP.
Transartizona Property, Casa Grande
Dist., Pinal Co., Arizona
Section E - E'
Scale: 1" - 100' 7/26/58 ABIII

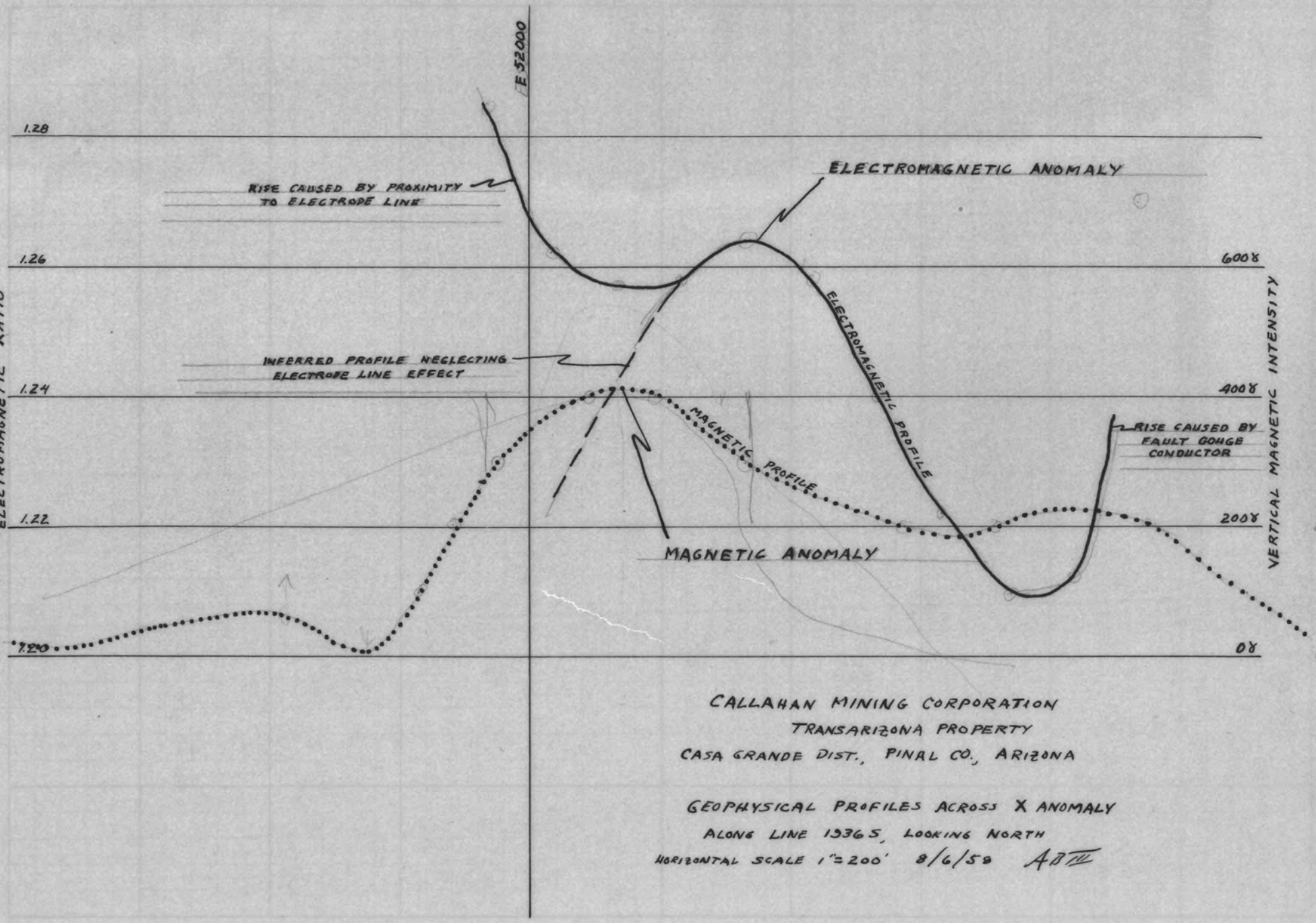


ALONG LINE 2253 S, LOOKING NORTH 2253 S



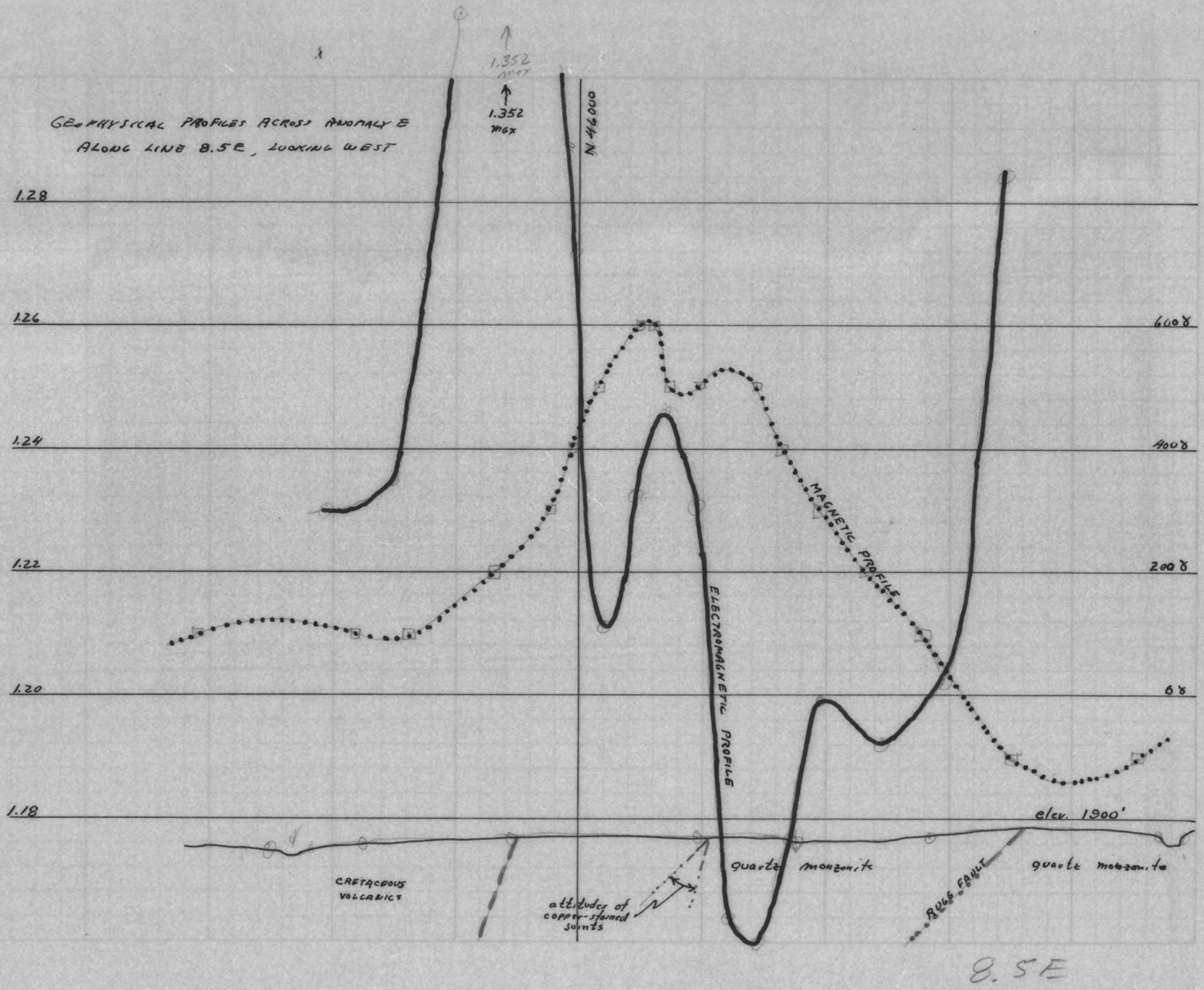
ALONG LINE 1336 S, LOOKING NORTH

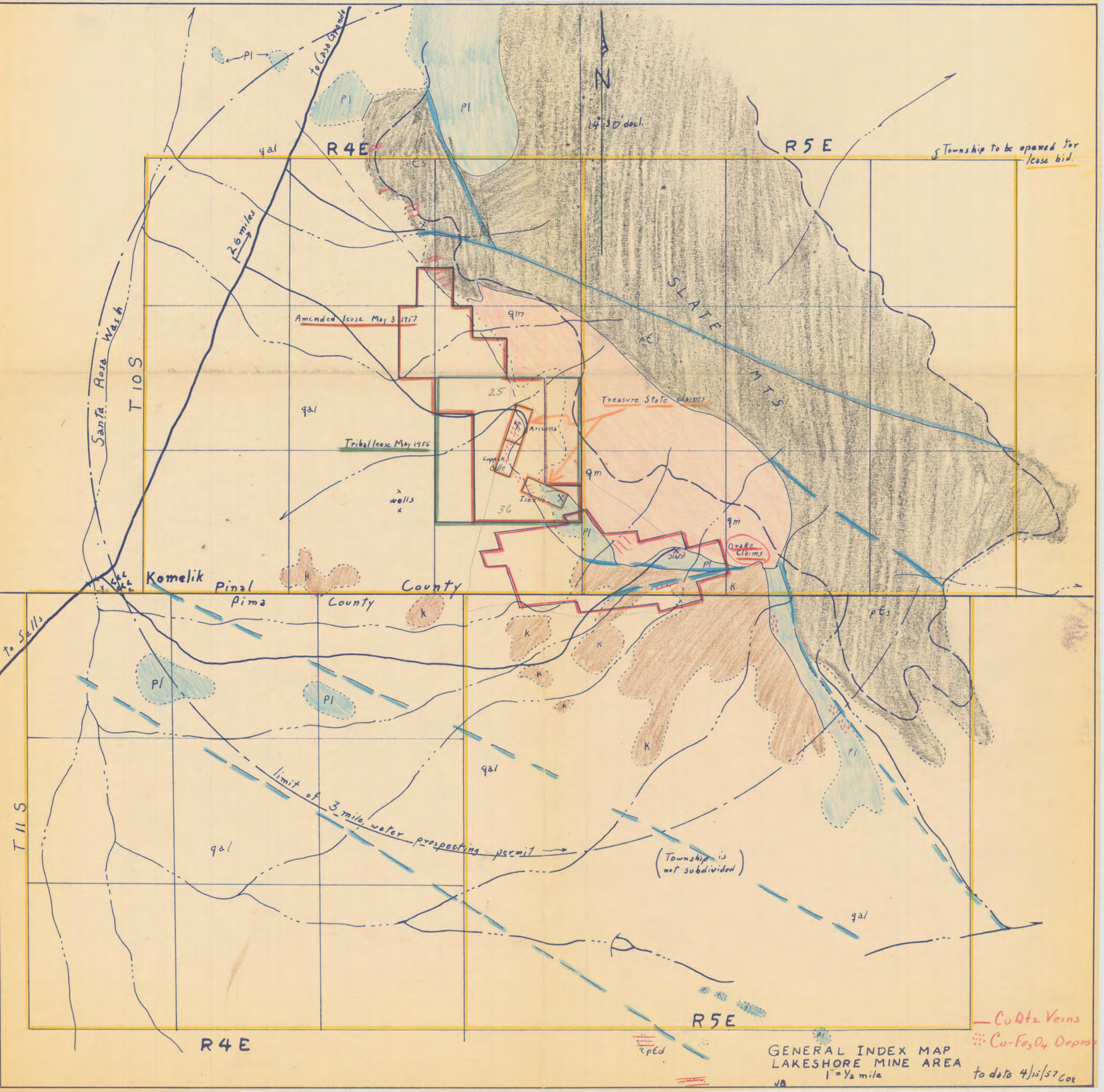
ALONG LINE 16365, LOOKING NORTH



CALLAHAN MINING CORPORATION
TRANSARIZONA PROPERTY
CASA GRANDE DIST., PINAL CO., ARIZONA

GEOPHYSICAL PROFILES ACROSS X ANOMALY
ALONG LINE 13365, LOOKING NORTH
HORIZONTAL SCALE 1" = 200' 8/6/58 ABM


GEOPHYSICAL PROFILES ACROSS ANOMALY E
ALONG LINE 8.5E, LOOKING WEST
1.352 max
1.352 max
N 46000
1.28
1.26
1.24
1.22
1.20
1.18
600γ
400γ
200γ
0γ
MAGNETIC PROFILE
ELECTROMAGNETIC PROFILE
elev. 1900'
CRETACEOUS VOLCANICS
attitudes of copper-stained joints
quartz monzonite
RUGG FAULT
quartz monzonite
8.5E



GENERAL INDEX MAP
LAKESHORE MINE AREA
1" = ½ mile

to date 4/15/57 Cox

JB

RECEIVED AUG 7 1958

CALLAHAN MINING CORPORATION

100 PARK AVENUE - NEW YORK 17, N. Y.
TELEPHONE OREGON 9-1300

OFFICE OF THE PRESIDENT

August 6, 1958

Mr. Walter E. Heinrichs, Jr.
Heinrichs Geoexploration Company
P. O. Box 5671
Tucson, Arizona

Dear Walt:

I returned home late last week to find your letter of July 18th and the official notices of the formation of the Heinrichs Geoexploration Company. I had received word while I was in Salt Lake City of your call to me, and I tried on several occasions to reach your home by phone. I never got past a "no answer" barrier.

I am sorry that Union Oil seems to be pulling out of the Minerals Exploration business. I had hoped that we would find a good partner with complementary experience with whom we might work to good advantage.

But as Minerals Exploration Company is laid to its rest, I send wishes to the Heinrichs Geoexploration Company and hope that you will have a long and successful life. I understand that we may be numbered among your first clients and that if you were not presently in Colorado you would be already consulting with Art Baker on our Lake Shore examination.

I shall indeed keep an eye open for situations requiring your special abilities. I think that Art will make it a point to keep in touch with you as time goes on. On the other hand, we shall welcome proposals for participation in projects which you feel have merit. I imagine that you have some ideas for exploratory bets that you would like to work on. If you think they warrant our backing, let us have a good look at them. At the present time, the quickest way to get started on such a project would be to convince Art Baker of its merit.

Good luck to you.

Sincerely,

Joseph T. Hall

JTH:aim
CC: A. Baker III

RECEIVED JUL 25 1958

CALLAHAN MINING CORPORATION

100 PARK AVENUE - NEW YORK 17, N. Y.
TELEPHONE OREGON 9-1300

OFFICE OF THE PRESIDENT

July 24, 1958

Mr. Walter E. Heinrichs, Jr.
Minerals Exploration Company
P. O. Box 5671
Tucson, Arizona

Dear Mr. Heinrichs:

In the absence of Mr. Joseph T. Hall from the office, we wish to acknowledge receipt of your letter to him of July 18th. Mr. Hall is presently out of town on a business trip and is expected back at the office at the end of the month at which time your letter will be brought to his prompt attention.

Very truly yours,

Adrienne I. Manian

Adrienne I. Manian
Secretary to Mr. Hall

CALLAHAN MINING CORPORATION

RECEIVED MAY 19 1958

100 PARK AVENUE - NEW YORK 17, N. Y.
TELEPHONE OREGON 9-1300

OFFICE OF THE PRESIDENT

May 16, 1958

Mr. Walter E. Heinrichs, Jr.
Minerals Exploration Company
P. O. Box 5671
Tucson, Arizona

Dear Walt:

We are very happy to learn from your letter of May 13th that your further study of a Transarizona situation indicates that you may be able to make significant contribution to our program.

We should know towards the end of the month definitely whether or not Shattuck Denn has decided to participate with us in this venture. For your information, I enclose copy of the letter agreement which Mason advises me has been signed in Vancouver and is proceeding for signature by McClure in Tucson or Phoenix. We, of course, will execute a copy when it reaches here signed by the others.

Art Baker is planning to arrive in Tucson or Casa Grande on about June 1st to undertake active direction of the four month examination program. If Shattuck Denn is joining us, I trust that Dan Kentro or someone else from their organization will be on the ground with him at the outset as the program is laid out. I would hope that they might meet with you so that we could have a clear idea of what the overall picture was and what contribution Minerals Exploration Company would be making to it.

It does not seem to me that we can reach final agreement as to the degree of your participation until that time. In general, I think we all have in mind a program which would cost in the neighborhood of $25,000 including a few scout drill holes to follow up the geophysical and geological work. This sum would also include the advances required under the letter agreement to cover assessment work and similar charges. It was my thought that if Minerals Exploration Company contributed the geophysical portion of the job, and perhaps some office facilities, they might gain the right to participate in subsequent portions of the agreement up to ten or fifteen percent or so.

It would be my feeling that any participant who decided to drop out at the end of the 120 days would have no further interest in the venture if any of the others carried forward. Those who carried forward at the end of 120 days would presumably enter into a formal agreement governing their relationship and participation in the future.

Mr. Philip D. Wilson, a Vice President of Callahan, is presently in New Mexico and will probably be coming to Tucson towards the middle or end of next week or a little later. I shall ask him to drop in on you to acquaint himself with your organization and also perhaps have a look at the Lake Shore property. You may feel perfectly free to talk over your ideas of a working relationship with him.

Following up the discussions we had with Mr. Edwards and with you, I hope that this project proves one where we can come to know each other better. I am hopeful that opportunities for mutual benefit will develop as we go forward.

With best wishes,

Sincerely,

Joseph T. Hall

JTH:aim

CALLAHAN MINING CORPORATION
100 Park Avenue
New York 17, N.Y.

May 9, 1958

Transcontinental Resources Limited
1158 Melville Street
Vancouver 5, Canada

Attention: Mr. James D. Mason, President

Dear Sirs:

This letter is written in confirmation of our conversation at Tucson, Arizona, April 15, 1958. If it correctly states your understanding of our agreement and if insofar as it relates to your agreement with Messrs. George A. Freeman and Dwight McClure it correctly sets forth that agreement, you and Messrs. George A. Freeman and Dwight McClure are requested to endorse your approval on the copy handed you herewith, and return it to us. As Transarizona Resources Inc. is a wholly owned subsidiary of your Company and holds title to or owns interests in the properties mentioned herein (except as hereinafter set forth), that Corporation is requested to execute these presents if the terms hereof are satisfactory to it.

For the purpose of this letter, we will refer to your Company as Continental and our Company as Callahan, and to Transarizona Resources Inc. as Arizona.

The properties and the contracts to which this letter relates are:

(1) A Mining Lease - Tribal Indian Lands, designated as number 14-20-450-729 dated May 9, 1956, between the Papago Council, Lessor, and Dwight McClure and George A. Freeman, Lessees, as modified by an agreement between those parties dated July 12, 1957, related to certain lands in Sections 23, 24, 25, 26, and 36, in Township 10 South, Range 4 East, Gila and Salt River Base Meridian.

(2) An Option to Lease and Purchase dated November 26, 1956 between Theodore P. Drake and Caroline L. Drake, his wife, Lessors, and Arizona, Lessee, related to the Assurance, Confidence and Prosperity patented lode mining claims, designated as Mineral Survey numbers 1488, 1489 and 1904; also 19 unpatented lode mining claims designated as Confidence No. 1 through Confidence No. 19 inclusive, all located in the Casa Grande Mining District, Pinal County, Arizona, as amended by agreement between the parties dated June 21, 1957, extending the period in which reduced minimum monthly payments are acceptable to May 26, 1958. An agreement modifying the terms of the said option favorable to Arizona has been negotiated and will be executed shortly and a copy will be sent to Callahan.

(3) Lease and Option Agreement dated November 14, 1955, between Treasure State Mining Company, a Montana corporation, Lessor, and George A. Freeman and Dwight McClure, a partnership, Lessees, and relating to the Arizona Copper Bell and Isabella patented lode mining claims situated in Casa Grande Mining District, Pinal County, Arizona, as extended and amended by agreement between the parties dated May 4, 1956, and as further amended by agreement of the parties dated July 8, 1957, extending the period in which reduced minimum monthly payments are acceptable to May 10, 1958.

(4) Agreement dated April 4, 1956 between the Papago Indian Tribe of Sells, Arizona, Lessor, and George A. Freeman, E. G. Frawley and Dwight McClure, Lessees, relating to the right to drill for water and to use water upon certain Indian lands therein described.

Pursuant to an agreement dated June 15, 1956, George A. Freeman and

Dwight McClure assigned to Arizona an undivided 85% interest in the aforesaid Treasure State Mining Company Lease and Option Agreement, as extended; and, subject to the approval of the Secretary of the Interior or his authorized representative, an undivided 85% interest in the lease and agreements referred to in paragraphs (1) and (4) above.

True copies of the agreements referred to in paragraphs (1) (2) (3) and (4) are attached hereto.

A. Continental and Arizona hereby represent to Callahan that all committments under the leases and agreements referred to in paragraphs (1) (2) (3) and (4) above have been met to date and that presently none of said leases and agreements are in default.

Arizona, George A. Freeman and Dwight McClure hereby grant to Callahan the exclusive right for 120 days from June 1, 1958 to make a study and survey of the properties covered by the aforesaid leases and agreements by whatever method or methods Callahan shall determine. During the said 120 days or so much thereof as Callahan shall require for such study and survey, Callahan shall pay all monthly minimum payments required to maintain said leases and agreements in good standing and shall expend not less than $15,000 in such study and survey.

B. If, within the said 120 days after making such study and survey, Callahan shall in writing, delivered to Arizona, elect to proceed with the further exploration and development of said properties, George A. Freeman, Dwight McClure and Arizona (herein called the Lessors) hereby agree to grant to Callahan a lease on their respective interests in such properties (subject, to the extent necessary, to the approval of the Secretary of the Interior or his authorized representative), which lease shall embody the following terms and conditions:

1. The term of said lease shall be 60 years with the right of Callahan to terminate at any time after sixty days' notice in writing to Arizona and upon full performance of all committments to date of termination. Upon termination, Callahan shall have no interest in the properties, except as provided in paragraph B.11 hereof.

2. For the period of the lease, Callahan will advance monies for all current property taxes, and payments required under property agreements, perform assessment work, keep the agreements referred to in paragraphs (1) (2) (3) and (4) above in good order and maintain property status without cost to the Lessor and will not suffer (or impose) any lien or charge to be imposed thereon.

3. Callahan shall advance all monies required in its sole judgement for exploration, development, equipment and operation of the properties, such expenditures (including expenditures for maintenance of property status) to aggregate not less than $75,000 in the year ending June 30, 1959, nor less than $200,000 by June 30, 1960, nor less than $350,000 by December 31, 1961; <u>provided</u> that Continental or Arizona shall have the right and option to advance its share of all funds necessary for operating requirements (to a maximum of $500,000) and in that event such funds for operating requirements shall not be deemed to be an advance by Callahan for the purposes of computing percentages under paragraph B 4 hereof.

4. Callahan shall retain (or to the extent appropriate, remit to the other parties making advances under paragraph B, 3 hereof) the proceeds of all products produced and sold until such time as total receipts shall equal total advances and expenditures during the term of the lease at the property on a cash basis; thereafter all cash gain after development and operating costs (before depreciation, depletion and income taxes) in excess of a working capital reserve of $500,000 shall be divided:

(a) 50% to the Lessors and 50% to Callahan if Callahan's maximum advances shall at such time have been $1,000,000. or less; and

(b) Callahan's share shall be increased by 1/10th of 1% for each added $10,000. or part thereof of said maximum advances, except that in

no event shall the Lessors' share be less than 25%. (As an example, if Callahan's maximum advances aggregate $1,520,000., Callahan's share of cash gain thereafter shall be 55-2/10% and the Lessors' 44-8/10%.

(c) The Lessors' share provided for above shall be divided as follows: If Callahan's maximum advances for the purposes of this paragraph B.4 have been $3,000,000. or less, three-quarters of the Lessors' share shall be paid to Arizona and one-quarter to George A. Freeman and Dwight McClure. If Callahan's maximum advances for the purposes of this paragraph B. 4 shall be over $3,000,000., George A. Freeman and Dwight McClure shall receive 7-1/2% of the total cash gain as aforesaid, and the balance of the Lessors' share shall be paid to Arizona.

(d) In the event that Callahan makes any offer to Arizona and/or Continental to purchase any further share than the share to which Callahan is entitled under this paragraph B.4. Arizona and Continental agree to make available to Freeman and McClure the right to share in such offer in the proportion to which they are entitled to participate in the Lessors' share for the purposes of paragraph B. 4(c). In the event that Callahan's offer is made prior to the time that the provisions of paragraph B. 4 became operative, Freeman and McClure shall have the right to participate in one-quarter of such offer.

15 ~~5~~ 5. Overhead and administrative expenses, i.e. those not incurred by Callahan personnel in the State of Arizona devoting full time to the project charged to the project, shall not exceed $1,000. per month prior to production nor $2,500. per month thereafter.

6. Any losses from development and operations are to be recovered from subsequent cash gains before further profit sharing.

7. Upon termination of lease Callahan will turn over all maps, surveys, operating statements, etc. to Arizona. Lessors

8. Lessors Arizona to have full access to records, accounts and engineering data including maps and drill hole logs and all metallurgical data, including data on segregation process.

9. Statements of account will be furnished by Callahan quarterly and payments of profits made quarterly.

10. Usual protective clauses on insurance, good mining practices, protection from liens, conformity with law, force majeure, etc. will be included in the formal lease.

11 11. Subject to the rights of Treasure State Mining Company and the Papago Indian Tribe pursuant to underlying agreements, Callahan shall retain ownership of all equipment, supplies and buildings placed on any of the properties until such time as its advances have been recovered in full; and upon termination of the lease prior to such time, Callahan may remove within sixty days thereafter all such equipment, supplies and buildings as it may have placed on any of the properties, except that Arizona shall have the option for sixty days after such termination of the Lessors lease to purchase from Callahan, free of encumbrance, all or any of such equipment, supplies and buildings at the depreciated value of Callahan's interest therein to be determined on an equitable basis, such option to be exercised by notice in writing to Callahan within the time aforesaid. In the event of any dispute arising about the depreciated value aforesaid, the same shall be settled by arbitration under the laws of the State of Arizona. If termination of the lease occurs after Callahan's advances have been recovered in full, the interest of Callahan and Lessors respectively in such equipment, supplies and buildings, as well as any working capital reserve, shall be the percentages to which they are entitled under paragraph B. 4 hereof.

12. The Lessors may cancel upon failure of Callahan to correct any breach of contract within thirty days of the Lessors calling attention to same.

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13. To the extent permitted by law, all parties shall have full right to assignment of their rights under this agreement, but such assignment shall not relieve the assignor of any of its or his obligations hereunder.

14. The Lessors shall make available to Callahan all records, engineering data, etc. available.

15. In addition it is agreed that the said lease shall contain the following provision:

Moratorium on Operations - Callahan agreed to persecute with diligence the exploration, development and mining operations on such properties at all times, provided, however, that should the market price of copper (New York quotation) fall below thirty-two cents (32¢) per pount, Callahan may at its discretion suspend such operations until the restoration of market conditions deemed by Callahan to be favorable to resumed development, construction or operations; PROVIDED FURTHER that during said period of suspended development, construction or operations, Callahan shall continue to make all payments to the Papago Tribal Council, Treasure State, or other lessors, together with any and all other payments necessary to retain all rights in the properties as an operating entity.

2800
1400
4250

C. It is understood that the Lessors are obligated to expend $5,600. on or before May 8, 1958, in exploration and development work upon the lands covered by Lease No. 14-20-450-729 referred to in paragraph (1) above; also, that the Lessors are obligated to perform prior to July 1, 1958 the annual assessment work of not less than $100. per claim upon the 19 unpatented mining claims referred to in paragraph (2) above. The Lessors agree to perform said work to the end that said contracts may be kept in full force and effect and title to said unpatented mining claims preserved, and Callahan is to reimburse the Lessors for one-half thereof. In the event, after the preliminary study herein provided for, Callahan shall elect to proceed with the further exploration and development of said property, it shall thereupon reimburse the Lessors for the remaining one-half of such expenditure. It is understood that Lessors ~~[illegible]~~ are obligated to pay $1,000. as camp site rental on May 9, 1958 to Papago Tribal Council under and by virtue of the agreement first recited herein and that they will pay the said sum and that Callahan will reimburse them for $500. of the said $1,000. in any event and will pay to them the remaining $500. if it elects to proceed with the further exploration and development of the property. All amounts so paid by Callahan shall be advances for the purposes of paragraphs B. 3 and B. 4 hereof.

$950

500
1450

D. It is agreed that if, during the currency of said lease, Callahan, Continental or any Lessor shall acquire any additional property by public auction or otherwise, lying within the SE 1/4 of Township 10 South, Range 4 East; SW 1/4 of Township 10 South, Range 5 East; NE 1/4 of Township 11 South, Range 4 East; NW 1/4 of Township 11 South, Range 5 East. of Gila and Salt River Base and Meridian, any other party shall have the option of including such additional property in said lease. In such event, the cost of acquiring said additional property shall be paid by Callahan and be included in its recoverable expenditures for the purposes of paragraphs B. 3 and B. 4 hereof, while title to the property shall be placed in the name of Arizona. However, upon the termination of the lease, Arizona shall convey to Freeman and McClure and undivided interest in such property which is proportionate to the percentages in which the Lessors have been sharing profits under paragraph B. 4 hereof; or, in the event the provisions of paragraph B. 4 have not become operative, a one-quarter undivided interest. If, to the knowledge of Callahan any or all of the said property becomes available for purchase by sale by auction or otherwise and should Callahan be unwilling to purchase the same, Callahan will give to Arizona at least ten days' notice in writing prior to the date of any proposed sale by Auction or otherwise of its intention not to purchase the same.

It is agreed that in the event Callahan exercises its option to take a lease upon the properties first hereinbefore recited, a formal lease embodying the general terms of this letter and the usual provisions customarily included in such leases, shall be prepared and executed by the parties.

E. AND WHEREAS Arizona has heretofore expended monies in metallurgical research and developments looking towards the operation of the properties concerned herein, to wit the segregation processes, and it is anticipated that Callahn will pursue these investigations and expend monies therein, it is agreed that in the event of Callahan's securing any patent rights arising from the pursuit of this segregation process then in that event all royalties and benefits whatsoever accruing to Callahan therefrom shall be divided between Callahan and Arizona in the proportions and in the method set forth in paragraph B. 4 hereof, with Arizona considered for this purpose as the sole Lessor.

F. To the extent not changed or altered by the terms of this agreement, all of the provisions of the agreement of June 15, 1956, between George A. Freeman, Dwight McClure and Arizona, and all amendments thereto, shall remain in full force and effect.

Very truly yours,

CALLAHAN MINING CORPORATION

Joseph T. Hall
President

Approved and accepted this 15 day of May, 1958
TRANSCONTINENTAL RESOURCES LIMITED

By /s/ J. D. Mason
James D. Mason, President

Agreed to this ~~15~~ 19th day of May, 1958

/s/ George A. Freeman
George A. Freeman

Agreed to this 19th day of May, 1958

/s/ Dwight McClure
Dwight McClure

Agreed to this 15 day of May, 1958
TRANSARIZONA RESOURCES INC.

By /s/ J. D. Mason

CALLAHAN MINING CORPORATION

RECEIVED MAY 19 1958

100 PARK AVENUE - NEW YORK 17, N. Y.
TELEPHONE ORegon 9-1300

OFFICE OF THE PRESIDENT

May 16, 1958

Mr. Walter E. Heinrichs, Jr.
Minerals Exploration Company
P. O. Box 5671
Tucson, Arizona

Dear Walt:

We are very happy to learn from your letter of May 13th that your further study of a Transarizona situation indicates that you may be able to make significant contribution to our program.

We should know towards the end of the month definitely whether or not Shattuck Denn has decided to participate with us in this venture. For your information, I enclose copy of the letter agreement which Mason advises me has been signed in Vancouver and is proceeding for signature by McClure in Tucson or Phoenix. We, of course, will execute a copy when it reaches here signed by the others.

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With best wishes.

Sincerely,

Joseph T. Hall

JTH:aim

CALLAHAN MINING CORPORATION
100 Park Avenue
New York 17, N.Y.

May 9, 1958

Transcontinental Resources Limited
1158 Melville Street
Vancouver 5, Canada

Attention: Mr. James D. Mason, President

Dear Sirs:

This letter is written in confirmation of our conversation at Tucson, Arizona, April 15, 1958. If it correctly states your understanding of our agreement and if insofar as it relates to your agreement with Messrs. George A. Freeman and Dwight McClure it correctly sets forth that agreement, you and Messrs. George A. Freeman and Dwight McClure are requested to endorse your approval on the copy handed you herewith, and return it to us. As Transarizona Resources Inc. is a wholly owned subsidiary of your Company and holds title to or owns interests in the properties mentioned herein (except as hereinafter set forth), that Corporation is requested to execute these presents if the terms hereof are satisfactory to it.

For the purpose of this letter, we will refer to your Company as Continental and our Company as Callahan, and to Transarizona Resources Inc. as Arizona.

The properties and the contracts to which this letter relates are:

(1) A Mining Lease - Tribal Indian Lands, designated as number 14-20-450-729 dated May 9, 1956, between the Papago Council, Lessor, and Dwight McClure and George A. Freeman, Lessees, as modified by an agreement between those parties dated July 12, 1957, related to certain lands in Sections 23, 24, 25, 26, and 36, in Township 10 South, Range 4 East, Gila and Salt River Base Meridian.

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(3) Lease and Option Agreement dated November 14, 1955, between Treasure State Mining Company, a Montana corporation, Lessor, and George A. Freeman and Dwight McClure, a partnership, Lessees, and relating to the Arizona Copper Bell and Isabella patented lode mining claims situated in Casa Grande Mining District, Pinal County, Arizona, as extended and amended by agreement between the parties dated May 4, 1956, and as further amended by agreement of the parties dated July 8, 1957, extending the period in which reduced minimum monthly payments are acceptable to May 10, 1958.

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Pursuant to an agreement dated June 15, 1956, George A. Freeman and

Dwight McClure assigned to Arizona an undivided 85% interest in the aforesaid Treasure State Mining Company Lease and Option Agreement, as extended; and, subject to the approval of the Secretary of the Interior or his authorized representative, an undivided 85% interest in the lease and agreements referred to in paragraphs (1) and (4) above.

True copies of the agreements referred to in paragraphs (1) (2) (3) and (4) are attached hereto.

A. Continental and Arizona hereby represent to Callahan that all committments under the leases and agreements referred to in paragraphs (1) (2) (3) and (4) above have been met to date and that presently none of said leases and agreements are in default.

Arizona, George A. Freeman and Dwight McClure hereby grant to Callahan the exclusive right for 120 days from June 1, 1958 to make a study and survey of the properties covered by the aforesaid leases and agreements by whatever method or methods Callahan shall determine. During the said 120 days or so much thereof as Callahan shall require for such study and survey, Callahan shall pay all monthly minimum payments required to maintain said leases and agreements in good standing and shall expend not less than $15,000 in such study and survey.

B. If, within the said 120 days after making such study and survey, Callahan shall in writing, delivered to Arizona, elect to proceed with the further exploration and development of said properties, George A. Freeman, Dwight McClure and Arizona (herein called the Lessors) hereby agree to grant to Callahan a lease on their respective interests in such properties (subject, to the extent necessary, to the approval of the Secretary of the Interior or his authorized representative), which lease shall embody the following terms and conditions:

1. The term of said lease shall be 60 years with the right of Callahan to terminate at any time after sixty days' notice in writing to Arizona and upon full performance of all committments to date of termination. Upon termination, Callahan shall have no interest in the properties, except as provided in paragraph B.11 hereof.

2. For the period of the lease, Callahan will advance monies for all current property taxes, and payments required under property agreements, perform assessment work, keep the agreements referred to in paragraphs (1) (2) (3) and (4) above in good order and maintain property status without cost to the Lessor and will not suffer (or impose) any lien or charge to be imposed thereon.

3. Callahan shall advance all monies required in its sole judgement for exploration, development, equipment and operation of the properties, such expenditures (including expenditures for maintenance of property status) to aggregate not less than $75,000 in the year ending June 30, 1959, nor less than $200,000 by June 30, 1960, nor less than $350,000 by December 31, 1961; provided that Continental or Arizona shall have the right and option to advance its share of all funds necessary for operating requirements (to a maximum of $500,000) and in that event such funds for operating requirements shall not be deemed to be an advance by Callahan for the purposes of computing percentages under paragraph B 4 hereof.

4. Callahan shall retain (or to the extent appropriate, remit to the other parties making advances under paragraph B, 3 hereof) the proceeds of all products produced and sold until such time as total receipts shall equal total advances and expenditures during the term of the lease at the property on a cash basis; thereafter all cash gain after development and operating costs (before depreciation, depletion and income taxes) in excess of a working capital reserve of $500,000 shall be divided:

(a) 50% to the Lessors and 50% to Callahan if Callahan's maximum advances shall at such time have been $1,000,000. or less; and

(b) Callahan's share shall be increased by 1/10th of 1% for each added $10,000. or part thereof of said maximum advances, except that in

no event shall the Lessors' share be less than 25%. (As an example, if Callahan's maximum advances aggregate $1,520,000., Callahan's share of cash gain thereafter shall be 55-2/10% and the Lessors' 44-8/10%.

(c) The Lessors' share provided for above shall be divided as follows: If Callahan's maximum advances for the purposes of this paragraph B.4 have been $3,000,000. or less, three-quarters of the Lessors' share shall be paid to Arizona and one-quarter to George A. Freeman and Dwight McClure. If Callahan's maximum advances for the purposes of this paragraph B. 4 shall be over $3,000,000., George A. Freeman and Dwight McClure shall receive 7-1/2% of the total cash gain as aforesaid, and the balance of the Lessors' share shall be paid to Arizona.

(d) In the event that Callahan makes any offer to Arizona and/or Continental to purchase any further share than the share to which Callahan is entitled under this paragraph B.4. Arizona and Continental agree to make available to Freeman and McClure the right to share in such offer in the proportion to which they are entitled to participate in the Lessors' share for the purposes of paragraph B. 4(c). In the event that Callahan's offer is made prior to the time that the provisions of paragraph B. 4 became operative, Freeman and McClure shall have the right to participate in one-quarter of such offer.

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12. The Lessors may cancel upon failure of Callahan to correct any breach of contract within thirty days of the Lessors calling attention to same.

20

13. To the extent permitted by law, all parties shall have full right to assignment of their rights under this agreement, but such assignment shall not relieve the assignor of any of its or his obligations hereunder.

14. The Lessors shall make available to Callahan all records, engineering data, etc. available.

15. In addition it is agreed that the said lease shall contain the following provision:

Moratorium on Operations - Callahan agreed to persecute with diligence the exploration, development and mining operations on such properties at all times, provided, however, that should the market price of copper (New York quotation) fall below thirty-two cents (32¢) per pount, Callahan may at its discretion suspend such operations until the restoration of market conditions deemed by Callahan to be favorable to resumed development, construction or operations; PROVIDED FURTHER that during said period of suspended development, construction or operations, Callahan shall continue to make all payments to the Papago Tribal Council, Treasure State, or other lessors, together with any and all other payments necessary to retain all rights in the properties as an operating entity.

C. It is understood that the Lessors are obligated to expend $5,600. on or before May 8, 1958, in exploration and development work upon the lands covered by Lease No. 14-20-450-729 referred to in paragraph (1) above; also, that the Lessors are obligated to perform prior to July 1, 1958 the annual assessment work of not less than $100. per claim upon the 19 unpatented mining claims referred to in paragraph (2) above. The Lessors agree to perform said work to the end that said contracts may be kept in full force and effect and title to said unpatented mining claims preserved, and Callahan is to reimburse the Lessors for one-half thereof. In the event, after the preliminary study herein provided for, Callahan shall elect to proceed with the further exploration and development of said property, it shall thereupon reimburse the Lessors for the remaining one-half of such expenditure. It is understood that Lessors ~~[illegible]~~ are obligated to pay $1,000. as camp site rental on May 9, 1958 to Papago Tribal Council under and by virtue of the agreement first recited herein and that they will pay the said sum and that Callahan will reimburse them for $500. of the said $1,000. in any event and will pay to them the remaining $500. if it elects to proceed with the further exploration and development of the property. All amounts so paid by Callahan shall be advances for the purposes of paragraphs B. 3 and B. 4 hereof.

2800
1450
4250

$950

500
1450

D. It is agreed that if, during the currency of said lease, Callahan, Continental or any Lessor shall acquire any additional property by public auction or otherwise, lying within the SE 1/4 of Township 10 South, Range 4 East; SW 1/4 of Township 10 South, Range 5 East; NE 1/4 of Township 11 South, Range 4 East; NW 1/4 of Township 11 South, Range 5 East. of Gila and Salt River Base and Meridian, any other party shall have the option of including such additional property in said lease. In such event, the cost of acquiring said additional property shall be paid by Callahan and be included in its recoverable expenditures for the purposes of paragraphs B. 3 and B. 4 hereof, while title to the property shall be placed in the name of Arizona. However, upon the termination of the lease, Arizona shall convey to Freeman and McClure and undivided interest in such property which is proportionate to the percentages in which the Lessors have been sharing profits under paragraph B. 4 hereof; or, in the event the provisions of paragraph B. 4 have not become operative, a one-quarter undivided interest. If, to the knowledge of Callahan any or all of the said property becomes available for purchase by sale by auction or otherwise and should Callahan be unwilling to purchase the same, Callahan will give to Arizona at least ten days' notice in writing prior to the date of any proposed sale by Auction or otherwise of its intention not to purchase the same.

It is agreed that in the event Callahan exercises its option to take a lease upon the properties first hereinbefore recited, a formal lease embodying the general terms of this letter and the usual provisions customarily included in such leases, shall be prepared and executed by the parties.

E. AND WHEREAS Arizona has heretofore expended monies in metallurgical research and developments looking towards the operation of the properties concerned herein, to wit the segregation processes, and it is anticipated that Callahn will pursue these investigations and expend monies therein, it is agreed that in the event of Callahan's securing any patent rights arising from the pursuit of this segregation process then in that event all royalties and benefits whatsoever accruing to Callahan therefrom shall be divided between Callahan and Arizona in the proportions and in the method set forth in paragraph B. 4 hereof, with Arizona considered for this purpose as the sole Lessor.

F. To the extent not changed or altered by the terms of this agreement, all of the provisions of the agreement of June 15, 1956, between George A. Freeman, Dwight McClure and Arizona, and allamendments thereto, shall remain in full force and effect.

Very truly yours,

CALLAHAN MINING CORPORATION

Joseph T. Hall
President

Approved and accepted this 15 day of May, 1958
TRANSCONTINENTAL RESOURCES LIMITED

By /s/ J. D. Mason
James D. Mason, President

Agreed to this ~~15~~ 19th day of May, 1958

/s/ George A. Freeman
George A. Freeman

Agreed to this 19th day of May, 1958

/s/ Dwight McClure
Dwight McClure

Agreed to this 15 day of May, 1958
TRANSARIZONA RESOURCES INC.

By /s/ J. D. Mason

CALLAHAN MINING CORPORATION

RECEIVED MAY 19 1958

100 PARK AVENUE - NEW YORK 17, N. Y.
TELEPHONE OREGON 9-1300

OFFICE OF THE PRESIDENT

May 16, 1958

Mr. Walter E. Heinrichs, Jr.
Minerals Exploration Company
P. O. Box 5671
Tucson, Arizona

Dear Walt:

We are very happy to learn from your letter of May 13th that your further study of a Transarizona situation indicates that you may be able to make significant contribution to our program.

We should know towards the end of the month definitely whether or not Shattuck Denn has decided to participate with us in this venture. For your information, I enclose copy of the letter agreement which Mason advises me has been signed in Vancouver and is proceeding for signature by McClure in Tucson or Phoenix. We, of course, will execute a copy when it reaches here signed by the others.

Art Baker is planning to arrive in Tucson or Casa Grande on about June 1st to undertake active direction of the four month examination program. If Shattuck Denn is joining us, I trust that Dan Kentro or someone else from their organization will be on the ground with him at the outset as the program is laid out. I would hope that they might meet with you so that we could have a clear idea of what the overall picture was and what contribution Minerals Exploration Company would be making to it.

It does not seem to me that we can reach final agreement as to the degree of your participation until that time. In general, I think we all have in mind a program which would cost in the neighborhood of $25,000 including a few scout drill holes to follow up the geophysical and geological work. This sum would also include the advances required under the letter agreement to cover assessment work and similar charges. It was my thought that if Minerals Exploration Company contributed the geophysical portion of the job, and perhaps some office facilities, they might gain the right to participate in subsequent portions of the agreement up to ten or fifteen percent or so.

It would be my feeling that any participant who decided to drop out at the end of the 120 days would have no further interest in the venture if any of the others carried forward. Those who carried forward at the end of 120 days would presumably enter into a formal agreement governing their relationship and participation in the future.

Mr. Philip D. Wilson, a Vice President of Callahan, is presently in New Mexico and will probably be coming to Tucson towards the middle or end of next week or a little later. I shall ask him to drop in on you to acquaint himself with your organization and also perhaps have a look at the Lake Shore property. You may feel perfectly free to talk over your ideas of a working relationship with him.

Following up the discussions we had with Mr. Edwards and with you, I hope that this project proves one where we can come to know each other better. I am hopeful that opportunities for mutual benefit will develop as we go forward.

With best wishes.

Sincerely,

Joseph T. Hall

JTH:aim

CALLAHAN MINING CORPORATION
100 Park Avenue
New York 17, N. Y.

May 9, 1958

Transcontinental Resources Limited
1158 Melville Street
Vancouver 5, Canada

Attention: Mr. James D. Mason, President

Dear Sirs:

This letter is written in confirmation of our conversation at Tucson, Arizona, April 15, 1958. If it correctly states your understanding of our agreement and if insofar as it relates to your agreement with Messrs. George A. Freeman and Dwight McClure it correctly sets forth that agreement, you and Messrs. George A. Freeman and Dwight McClure are requested to endorse your approval on the copy handed you herewith, and return it to us. As Transarizona Resources Inc. is a wholly owned subsidiary of your Company and holds title to or owns interests in the properties mentioned herein (except as hereinafter set forth), that Corporation is requested to execute these presents if the terms hereof are satisfactory to it.

For the purpose of this letter, we will refer to your Company as Continental and our Company as Callahan, and to Transarizona Resources Inc. as Arizona.

The properties and the contracts to which this letter relates are:

(1) A Mining Lease - Tribal Indian Lands, designated as number 14-20-450-729 dated May 9, 1956, between the Papago Council, Lessor, and Dwight McClure and George A. Freeman, Lessees, as modified by an agreement between those parties dated July 12, 1957, relating to certain lands in Sections 23, 24, 25, 26 and 36, in Township 10 South, Range 4 East, Gila and Salt River Base Meridian.

(2) An Option to Lease and Purchase dated November 26, 1956 between Theodore P. Drake and Caroline L. Drake, his wife, Lessors, and Arizona, Lessee, relating to the Assurance, Confidence and Prosperity patented lode mining claims, designated as Mineral Survey numbers 1488, 1489, and 1904; also 19 unpatented lode mining claims designated as Confidence No. 1 through Confidence No. 19 inclusive, all located in the Casa Grande Mining District, Pinal County, Arizona, as amended by agreement between the parties dated June 21, 1957, extending the

period in which reduced minimum monthly payments are acceptable to May 26, 1958. An agreement modifying the terms of the said option favorable to Arizona has been negotiated and will be executed shortly and a copy will be sent to Callahan.

(3) Lease and Option Agreement dated November 14, 1955 between Treasure State Mining Company, a Montana corporation, Lessor, and George A. Freeman and Dwight McClure, a partnership, Lessees, and relating to the Arizona Copper Bell and Isabella patented lode mining claims situated in Casa Grande Mining District, Pinal County, Arizona, as extended and amended by agreement between the parties dated May4, 1956, and as further amended by agreement of the parties dated July 8, 1957, extending the period in which reduced minimum monthly payments are acceptable to May 10, 1958.

(4) Agreement dated April 4, 1956 between the Papago Indian Tribe of Sells, Arizona, Lessor, and George A. Freeman, E. G. Frawley and Dwight McClure, Lessees, relating to the right to drill for water and to use water upon certain Indian lands therein described.

Pursuant to an agreement dated June 15, 1956, George A. Freeman and Dwight McClure assigned to Arizona an undivided 85% interest in the aforesaid Treasure State Mining Company Lease and Option Agreement, as extended; and, subject to the approval of the Secretary of the Interior or his authorized representative, an undivided 85% interest in the lease and agreements referred to in paragraphs (1) and (4) above.

True copies of the agreements referred to in paragraphs (1) (2) (3) and (4) are attached hereto.

A. Continental and Arizona hereby represent to Callahan that all commitments under the leases and agreements referred to in paragraphs (1) (2) (3) and (4) above have been met to date and that presently none of said leases and agreements are in default.

Arizona, George A. Freeman and Dwight McClure hereby grant to Callahan the exclusive right for 120 days from June 1, 1958 to make a study and survey of the properties covered by the aforesaid leases and agreements by whatever method or methods Callahan shall determine. During said 120 days or so much thereof as Callahan shall require for such study and survey, Callahan shall pay all monthly minimum payments required to maintain said leases and agreements in good standing and shall expend not less than $15,000 in such study and survey.

B. If, within the said 120 days after making such study and survey, Callahan shall in writing, delivered to Arizona, elect to proceed with the further exploration and development of said properties, George A. Freeman, Dwight McClure

and Arizona (herein called the Lessors) hereby agree to grant to Callahan a lease on their respective interests in such properties (subject, to the extent necessary, to the approval of the Secretary of the Interior or his authorized representative), which lease shall embody the following terms and conditions:

1. The term of said lease shall be 60 years with the right of Callahan to terminate at any time after sixty days' notice in writing to Arizona and upon full performance of all commitments to date of termination. Upon termination, Callahan shall have no interest in the properties, except as provided in paragraph B. 11 hereof.

2. For the period of the lease, Callahan will advance monies for all current property taxes, and payments required under property agreements, perform assessment work, keep the agreements referred to in paragraphs (1) (2) (3) and (4) above in good order and maintain property status without cost to the Lessor and will not suffer (or impose) any lien or charge to be imposed thereon.

3. Callahan shall advance all monies required in its sole judgment for exploration, development, equipment and operation of the properties, such expenditures (including expenditures for maintenance of property status) to aggregate not less than $75,000 in the year ending June 30, 1959, nor less than $200,000 by June 30, 1960, nor less than $350,000 by December 31, 1961; provided that Continental or Arizona shall have the right and option to advance its share of all funds necessary for operating requirements (to a maximum of $500,000) and in that event such funds for operating requirements shall not be deemed to be an advance by Callahan for the purposes of computing percentages under paragraph B 4 hereof.

4. Callahan shall retain (or to the extent appropriate, remit to the other parties making advances under paragraph B. 3 hereof) the proceeds of all products produced and sold until such time as total receipts shall equal total advances and expenditures during the term of the lease at the property on a cash basis; thereafter all cash gain after development and operating costs (before depreciation, depletion and income taxes) in excess of a working capital reserve of $500,000. shall be divided:

(a) 50% to the Lessors and 50% to Callahan if Callahan's maximum advances shall at such time have been $1,000,000. or less; and

(b) Callahan's share shall be increased by 1/10th of 1% for each added $10,000. or part thereof of said maximum advances, except that in no event shall the Lessors' share be less than 25%. (As an example, if Callahan's maximum advances aggregate $1,520,000., Callahan's share of cash gain thereafter shall be 55-2/10% and the Lessors' 44-8/10%.

(c) The Lessors' share provided for above shall be divided as follows: If Callahan's maximum advances for the purposes of this paragraph B. 4 have been $3,000,000. or less, three-quarters of the Lessors' share shall be paid to Arizona and one-quarter to George A. Freeman and Dwight McClure. If Callahan's maximum advances for the purposes of this paragraph B. 4 shall be over $3,000,000., George A. Freeman and Dwight McClure shall receive 7-1/2% of the total cash gain as aforesaid, and the balance of the Lessors' share shall be paid to Arizona.

(d) In the event that Callahan makes any offer to Arizona and/or Continental to purchase any further share than the share to which Callahan is entitled under this paragraph B. 4, Arizona and Continental agree to make available to Freeman and McClure the right to share in such offer in the proportion to which they are entitled to participate in the Lessors' share for the purposes of paragraph B. 4 (c). In the event that Callahan's offer is made prior to the time that the provisions of paragraph B. 4 became operative, Freeman and McClure shall have the right to participate in one-quarter of such offer.

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5. Overhead and administrative expenses, i.e. those not incurred by Callahan personnel in the State of Arizona devoting full time to the project charged to the project, shall not exceed $1,000. per month prior to production nor $2,500. per month thereafter.

6. Any losses from development and operations are to be recovered from subsequent cash gains before further profit sharing.

7. Upon termination of lease Callahan will turn over all maps, surveys, operating statements, etc. to Arizona. Lessors.

8. Arizona Lessors to have full access to records, accounts and engineering data including maps and drill hole logs and all metallurgical data excluding data on segregation process.

9. Statements of account will be furnished by Callahan quarterly and payments of profits made quarterly.

10. Usual protective clauses on insurance, good mining practices, protection from liens, conformity with law, force majeure, etc. will be included in the formal lease.

11. Subject to the rights of Treasure State Mining Company and the Papago Indian Tribe pursuant to underlying agreements, Callahan shall retain ownership of all the equipment, supplies and buildings placed on any of the properties until such time as its advances have been recovered

in full; and upon termination of the lease prior to such time, Callahan may remove within sixty days thereafter all such equipment, supplies and buildings as it may have placed on any of the properties, except that Arizona shall have the option for sixty days after such termination of the lease to purchase from Callahan, free of encumbrance, all or any of such equipment, supplies and buildings at the depreciated value of Callahan's interest therein to be determined on an equitable basis, such option to be exercised by notice in writing to Callahan within the time aforesaid. In the event of any dispute arising about the depreciated value aforesaid, the same shall be settled by arbitration under the laws of the State of Arizona. If termination of the lease occurs after Callahan's advances have been recovered in full, the interest of Callahan and the Lessors respectively in such equipment, supplies and buildings, as well as any working capital reserve, shall be the percentages to which they are entitled under paragraph B. 4 hereof.

Lessors

12. The Lessors may cancel upon failure of Callahan to correct any breach of contract within thirty days of the Lessors calling attention to same. 20

13. To the extent permitted by law, all parties shall have full right of assignment of their rights under this agreement, but such assignment shall not relieve the assigner of any of its or his obligations hereunder.

14. The Lessors shall make available to Callahan all records, engineering data, etc. available.

15. In addition it is agreed that the said lease shall contain the following provision:

Moratorium on Operations - Callahan agreed to prosecute with diligence the exploration, development and mining operations on such properties at all times, provided, however, that should the market price of copper (New York quotation) fall below thirty-two cents (32¢) per pound, Callahan may at its discretion suspend such operations until the restoration of market conditions deemed by Callahan to be favorable to resumed development, construction or operations; PROVIDED FURTHER that during said period of suspended development, construction or operations, Callahan shall continue to make all payments to the Papago Tribal Council, Treasure State, or other lessors, together with any and all other payments necessary to retain all rights in the properties as an operating entity.

C. It is understood that the Lessors are obligated to expend $5,600. on or before May 8, 1958, in exploration and development work upon the lands covered by Lease No. 14-20-450-729 referred to in paragraph (1) above;

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1450
4250

also, that the Lessors are obligated to perform prior to July 1, 1958 the annual assessment work of not less than $100. per claim upon the 19 unpatented mining claims referred to in paragraph (2) above. The Lessors agree to perform said work to the end that said contracts may be kept in full force and effect and title to said unpatented mining claims preserved, and Callahan is to reimburse the Lessors for one-half thereof. In the event, after the preliminary study herein provided for, Callahan shall elect to proceed with the further exploration and development of said property, it shall thereupon reimburse the Lessors for the remaining one-half of such expenditure. It is understood that Lessors are obligated to pay $1,000. as camp site rental on May 9, 1958 to Papago Tribal Council under and by virtue of the agreement first recited herein and that they will pay the said sum and that Callahan will reimburse them for $500. of the said $1,000. in any event and will pay to them the remaining $500. if it elects to proceed with the further exploration and development of the property. All amounts so paid by Callahan shall be advances for the purposes of paragraphs B. 3 and B. 4 hereof.

$950

$500
1450

D. It is agreed that if, during the currency of said lease, Callahan, Continental or any Lessor shall acquire any additional property by public auction or otherwise, lying within the SE 1/4 of Township 10 South, Range 4 East; SW 1/4 of Township 10 South, Range 5 East; NE 1/4 of Township 11 South, Range 4 East; NW 1/4 of Township 11 South, Range 5 East, of Gila and Salt River Base and Meridian, any other party shall have the option of including such additional property in said lease. In such event, the cost of acquiring said additional property shall be paid by Callahan and be included in its recoverable expenditures for the purposes of paragraphs B. 3 and B. 4 hereof, while title to the property shall be placed in the name of Arizona. However, upon the termination of the lease, Arizona shall convey to Freeman and McClure an undivided interest in such property which is proportionate to the percentages in which the Lessors have been sharing profits under paragraph B. 4 hereof; or, in the event the provisions of paragraph B. 4 have not become operative, a one-quarter undivided interest. If, to the knowledge of Callahan any or all of the said property becomes available for purchase by sale by auction or otherwise and should Callahan be unwilling to purchase the same, Callahan will give to Arizona at least ten days' notice in writing prior to the date of any proposed sale by auction or otherwise of its intention not to purchase the same.

It is agreed that in the event Callahan exercises its option to take a lease upon the properties first hereinbefore recited, a formal lease embodying the general terms of this letter and the usual provisions customarily included in such leases, shall be prepared and executed by the parties.

E. AND WHEREAS Arizona has heretofore expended monies in metallurgical research and developments looking towards the operation of the properties concerned herein, to wit the segregation processes, and it is anticipated that Callahan will pursue these investigations and expend monies therein,

it is agreed that in the event of Callahan's securing any patent rights arising from the pursuit of this segregation process then in that event all royalties and benefits whatsoever accruing to Callahan therefrom shall be divided between Callahan and Arizona in the proportions and in the method set forth in paragraph B. 4 hereof, with Arizona considered for this purpose as the sole Lessor.

F. To the extent not changed or altered by the terms of this agreement, all of the provisions of the agreement of June 15, 1956 between George A. Freeman, Dwight McClure and Arizona, and all amendments thereto, shall remain in full force and effect.

Very truly yours,

CALLAHAN MINING CORPORATION

Joseph T. Hall
President

Approved and accepted this 15 day of May, 1958
TRANSCONTINENTAL RESOURCES LIMITED

By /s/ J. D. Mason
James D. Mason, President

Agreed to this ~~15~~ 19th day of May, 1958

/s/ George A. Freeman
George A. Freeman

Agreed to this 19th day of May, 1958

/s/ Dwight McClure
Dwight McClure

Agreed to this 15 day of May, 1958
TRANSARIZONA RESOURCES INC.

By /s/ J. D. Mason

CALLAHAN MINING CORPORATION

RECEIVED MAY 19 1958

100 PARK AVENUE - NEW YORK 17, N. Y.
TELEPHONE ORegon 9-1300

OFFICE OF THE PRESIDENT

May 16, 1958

Mr. Walter E. Heinrichs, Jr.
Minerals Exploration Company
P. O. Box 5671
Tucson, Arizona

Dear Walt:

We are very happy to learn from your letter of May 13th that your further study of a Transarizona situation indicates that you may be able to make significant contribution to our program.

We should know towards the end of the month definitely whether or not Shattuck Denn has decided to participate with us in this venture. For your information, I enclose copy of the letter agreement which Mason advises me has been signed in Vancouver and is proceeding for signature by McClure in Tucson or Phoenix. We, of course, will execute a copy when it reaches here signed by the others.

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With best wishes.

Sincerely,

Joseph T. Hall

JTH:aim

CALLAHAN MINING CORPORATION
100 Park Avenue
New York 17, N.Y.

May 9, 1958

Transcontinental Resources Limited
1158 Melville Street
Vancouver 5, Canada

Attention: Mr. James D. Mason, President

Dear Sirs:

This letter is written in confirmation of our conversation at Tucson, Arizona, April 15, 1958. If it correctly states your understanding of our agreement and if insofar as it relates to your agreement with Messrs. George A. Freeman and Dwight McClure it correctly sets forth that agreement, you and Messrs. George A. Freeman and Dwight McClure are requested to endorse your approval on the copy handed you herewith, and return it to us. As Transarizona Resources Inc. is a wholly owned subsidiary of your Company and holds title to or owns interests in the properties mentioned herein (except as hereinafter set forth), that Corporation is requested to execute these presents if the terms hereof are satisfactory to it.

For the purpose of this letter, we will refer to your Company as Continental and our Company as Callahan, and to Transarizona Resources Inc. as Arizona.

The properties and the contracts to which this letter relates are:

(1) A Mining Lease - Tribal Indian Lands, designated as number 14-20-450-729 dated May 9, 1956, between the Papago Council, Lessor, and Dwight McClure and George A. Freeman, Lessees, as modified by an agreement between those parties dated July 12, 1957, related to certain lands in Sections 23, 24, 25, 26, and 36, in Township 10 South, Range 4 East, Gila and Salt River Base Meridian.

(2) An Option to Lease and Purchase dated November 26, 1956 between Theodore P. Drake and Caroline L. Drake, his wife, Lessors, and Arizona, Lessee, related to the Assurance, Confidence and Prosperity patented lode mining claims, designated as Mineral Survey numbers 1488, 1489 and 1904; also 19 unpatented lode mining claims designated as Confidence No. 1 through Confidence No. 19 inclusive, all located in the Casa Grande Mining District, Pinal County, Arizona, as amended by agreement between the parties dated June 21, 1957, extending the period in which reduced minimum monthly payments are acceptable to May 26, 1958. An agreement modifying the terms of the said option favorable to Arizona has been negotiated and will be executed shortly and a copy will be sent to Callahan.

(3) Lease and Option Agreement dated November 14, 1955, between Treasure State Mining Company, a Montana corporation, Lessor, and George A. Freeman and Dwight McClure, a partnership, Lessees, and relating to the Arizona Copper Bell and Isabella patented lode mining claims situated in Casa Grande Mining District, Pimal County, Arizona, as extended and amended by agreement between the parties dated May 4, 1956, and as further amended by agreement of the parties dated July 8, 1957, extending the period in which reduced minimum monthly payments are acceptable to May 10, 1958.

(4) Agreement dated April 4, 1956 between the Papago Indian Tribe of Sells, Arizona, Lessor, and George A. Freeman, E. G. Frawley and Dwight McClure, Lessees, relating to the right to drill for water and to use water upon certain Indian lands therein described.

Pursuant to an agreement dated June 15, 1956, George A. Freeman and

Dwight McClure assigned to Arizona an undivided 85% interest in the aforesaid Treasure State Mining Company Lease and Option Agreement, as extended; and, subject to the approval of the Secretary of the Interior or his authorized representative, an undivided 85% interest in the lease and agreements referred to in paragraphs (1) and (4) above.

True copies of the agreements referred to in paragraphs (1) (2) (3) and (4) are attached hereto.

A. Continental and Arizona hereby represent to Callahan that all committments under the leases and agreements referred to in paragraphs (1) (2) (3) and (4) above have been met to date and that presently none of said leases and agreements are in default.

Arizona, George A. Freeman and Dwight McClure hereby grant to Callahan the exclusive right for 120 days from June 1, 1958 to make a study and survey of the properties covered by the aforesaid leases and agreements by whatever method or methods Callahan shall determine. During the said 120 days or so much thereof as Callahan shall require for such study and survey, Callahan shall pay all monthly minimum payments required to maintain said leases and agreements in good standing and shall expend not less than $15,000 in such study and survey.

B. If, within the said 120 days after making such study and survey, Callahan shall in writing, delivered to Arizona, elect to proceed with the further exploration and development of said properties, George A. Freeman, Dwight McClure and Arizona (herein called the Lessors) hereby agree to grant to Callahan a lease on their respective interests in such properties (subject, to the extent necessary, to the approval of the Secretary of the Interior or his authorized representative), which lease shall embody the following terms and conditions:

1. The term of said lease shall be 60 years with the right of Callahan to terminate at any time after sixty days' notice in writing to Arizona and upon full performance of all committments to date of termination. Upon termination, Callahan shall have no interest in the properties, except as provided in paragraph B.11 hereof.

2. For the period of the lease, Callahan will advance monies for all current property taxes, and payments required under property agreements, perform assessment work, keep the agreements referred to in paragraphs (1) (2) (3) and (4) above in good order and maintain property status without cost to the Lessor and will not suffer (or impose) any lien or charge to be imposed thereon.

3. Callahan shall advance all monies required in its sole judgement for exploration, development, equipment and operation of the properties, such expenditures (including expenditures for maintenance of property status) to aggregate not less than $75,000 in the year ending June 30, 1959, nor less than $200,000 by June 30, 1960, nor less than $350,000 by December 31, 1961; provided that Continental or Arizona shall have the right and option to advance its share of all funds necessary for operating requirements (to a maximum of $500,000) and in that event such funds for operating requirements shall not be deemed to be an advance by Callahan for the purposes of computing percentages under paragraph B 4 hereof.

4. Callahan shall retain (or to the extent appropriate, remit to the other parties making advances under paragraph B, 3 hereof) the proceeds of all products produced and sold until such time as total receipts shall equal total advances and expenditures during the term of the lease at the property on a cash basis; thereafter all cash gain after development and operating costs (before depreciation, depletion and income taxes) in excess of a working capital reserve of $500,000 shall be divided:

(a) 50% to the Lessors and 50% to Callahan if Callahan's maximum advances shall at such time have been $1,000,000. or less; and

(b) Callahan's share shall be increased by 1/10th of 1% for each added $10,000. or part thereof of said maximum advances, except that in

no event shall the Lessors' share be less than 25%. (As an example, if Callahan's maximum advances aggregate $1,520,000., Callahan's share of cash gain thereafter shall be 55-2/10% and the Lessors' 44-8/10%.

(c) The Lessors' share provided for above shall be divided as follows: If Callahan's maximum advances for the purposes of this paragraph B.4 have been $3,000,000. or less, three-quarters of the Lessors' share shall be paid to Arizona and one-quarter to George A. Freeman and Dwight McClure. If Callahan's maximum advances for the purposes of this paragraph B. 4 shall be over $3,000,000., George A. Freeman and Dwight McClure shall receive 7-1/2% of the total cash gain as aforesaid, and the balance of the Lessors' share shall be paid to Arizona.

(d) In the event that Callahan makes any offer to Arizona and/or Continental to purchase any further share than the share to which Callahan is entitled under this paragraph B.4. Arizona and Continental agree to make available to Freeman and McClure the right to share in such offer in the proportion to which they are entitled to participate in the Lessors' share for the purposes of paragraph B. 4(c). In the event that Callahan's offer is made prior to the time that the provisions of paragraph B. 4 became operative, Freeman and McClure shall have the right to participate in one-quarter of such offer.

15 ~~8~~ 5. Overhead and administrative expenses, i.e. those not incurred by Callahan personnel in the State of Arizona devoting full time to the project charged to the project, shall not exceed $1,000. per month prior to production nor $2,500. per month thereafter.

6. Any losses from development and operations are to be recovered from subsequent cash gains before further profit sharing.

7. Upon termination of lease Callahan will turn over all maps, surveys, operating statements, etc. to Arizona.

8. Lessors Arizona to have full access to records, accounts and engineering data including maps and drill hole logs and all metallurgical data on segregation process. Lessors

9. Statements of account will be furnished by Callahan quarterly including data and payments of profits made quarterly.

10. Usual protective clauses on insurance, good mining practices, protection from liens, conformity with law, force majeure, etc. will be included in the formal lease.

11 11. Subject to the rights of Treasure State Mining Company and the Papago Indian Tribe pursuant to underlying agreements, Callahan shall retain ownership of all equipment, supplies and buildings placed on any of the properties until such time as its advances have been recovered in full; and upon termination of the lease prior to such time, Callahan may remove within sixty days thereafter all such equipment, supplies and buildings as it may have placed on any of the properties, except that Arizona shall have the option for sixty days after such termination of the Lessors lease to purchase from Callahan, free of encumbrance, all or any of such equipment, supplies and buildings at the depreciated value of Callahan's interest therein to be determined on an equitable basis, such option to be exercised by notice in writing to Callahan within the time aforesaid. In the event of any dispute arising about the depreciated value aforesaid, the same shall be settled by arbitration under the laws of the State of Arizona. If termination of the lease occurs after Callahan's advances have been recovered in full, the interest of Callahan and Lessors respectively in such equipment, supplies and buildings, as well as any working capital reserve, shall be the percentages to which they are entitled under paragraph B. 4 hereof.

12. The Lessors may cancel upon failure of Callahan to correct any breach of contract within thirty days of the Lessors calling attention to same.

20

13. To the extent permitted by law, all parties shall have full right to assignment of their rights under this agreement, but such assignment shall not relieve the assignor of any of its or his obligations hereunder.

14. The Lessors shall make available to Callahan all records, engineering data, etc. available.

15. In addition it is agreed that the said lease shall contain the following provision:

Moratorium on Operations - Callahan agreed to persecute with diligence the exploration, development and mining operations on such properties at all times, provided, however, that should the market price of copper (New York quotation) fall below thirty-two cents (32¢) per pount, Callahan may at its discretion suspend such operations until the restoration of market conditions deemed by Callahan to be favorable to resumed development, construction or operations; PROVIDED FURTHER that during said period of suspended development, construction or operations, Callahan shall continue to make all payments to the Papago Tribal Council, Treasure State, or other lessors, together with any and all other payments necessary to retain all rights in the properties as an operating entity.

C. It is understood that the Lessors are obligated to expend $5,600. on or before May 8, 1958, in exploration and development work upon the lands covered by Lease No. 14-20-450-729 referred to in paragraph (1) above; also, that the Lessors are obligated to perform prior to July 1, 1958 the annual assessment work of not less than $100. per claim upon the 19 unpatented mining claims referred to in paragraph (2) above. The Lessors agree to perform said work to the end that said contracts may be kept in full force and effect and title to said unpatented mining claims preserved, and Callahan is to reimburse the Lessors for one-half thereof. In the event, after the preliminary study herein provided for, Callahan shall elect to proceed with the further exploration and development of said property, it shall thereupon reimburse the Lessors for the remaining one-half of such expenditure. It is understood that Lessors ~~[illegible]~~ are obligated to pay $1,000. as camp site rental on May 9, 1958 to Papago Tribal Council under and by virtue of the agreement first recited herein and that they will pay the said sum and that Callahan will reimburse them for $500. of the said $1,000. in any event and will pay to them the remaining $500. if it elects to proceed with the further exploration and development of the property. All amounts so paid by Callahan shall be advances for the purposes of paragraphs B. 3 and B. 4 hereof.

2800
1450
4250

$950

500
1450

D. It is agreed that if, during the currency of said lease, Callahan, Continental or any Lessor shall acquire any additional property by public auction or otherwise, lying within the SE 1/4 of Township 10 South, Range 4 East; SW 1/4 of Township 10 South, Range 5 East; NE 1/4 of Township 11 South, Range 4 East; NW 1/4 of Township 11 South, Range 5 East. of Gila and Salt River Base and Meridian, any other party shall have the option of including such additional property in said lease. In such event, the cost of acquiring said additional property shall be paid by Callahan and be included in its recoverable expenditures for the purposes of paragraphs B. 3 and B. 4 hereof, while title to the property shall be placed in the name of Arizona. However, upon the termination of the lease, Arizona shall convey to Freeman and McClure and undivided interest in such property which is proportionate to the percentages in which the Lessors have been sharing profits under paragraph B. 4 hereof; or, in the event the provisions of paragraph B. 4 have not become operative, a one-quarter undivided interest. If, to the knowledge of Callahan any or all of the said property becomes available for purchase by sale by auction or otherwise and should Callahan be unwilling to purchase the same, Callahan will give to Arizona at least ten days' notice in writing prior to the date of any proposed sale by Auction or otherwise of its intention not to purchase the same.

It is agreed that in the event Callahan exercises its option to take a lease upon the properties first hereinbefore recited, a formal lease embodying the general terms of this letter and the usual provisions customarily included in such leases, shall be prepared and executed by the parties.

E. AND WHEREAS Arizona has heretofore expended monies in metallurgical research and developments looking towards the operation of the properties concerned herein, to wit the segregation processes, and it is anticipated that Callahn will pursue these investigations and expend monies therein, it is agreed that in the event of Callahan's securing any patent rights arising from the pursuit of this segregation process then in that event all royalties and benefits whatsoever accruing to Callahan therefrom shall be divided between Callahan and Arizona in the proportions and in the method set forth in paragraph B. 4 hereof, with Arizona considered for this purpose as the sole Lessor.

F. To the extent not changed or altered by the terms of this agreement, all of the provisions of the agreement of June 15, 1956, between George A. Freeman, Dwight McClure and Arizona, and all amendments thereto, shall remain in full force and effect.

Very truly yours,

CALLAHAN MINING CORPORATION

Joseph T. Hall
President

Approved and accepted this 15 day of May, 1958
TRANSCONTINENTAL RESOURCES LIMITED

By /s/ J. D. Mason
James D. Mason, President

Agreed to this ~~15~~ 19 day of May, 1958

/s/ George A. Freeman
George A. Freeman

Agreed to this 19th day of May, 1958

/s/ Dwight McClure
Dwight McClure

Agreed to this 15 day of May, 1958
TRANSARIZONA RESOURCES INC.

By /s/ J. D. Mason

CALLAHAN MINING CORPORATION

100 PARK AVENUE - NEW YORK 17, N. Y.
TELEPHONE OREGON 9-1300

OFFICE OF THE PRESIDENT

June 13, 1958

RECEIVED JUN 16 1958

Mr. Walter E. Heinrichs, Jr.
Minerals Exploration Company
P. O. Box 5671
Tucson, Arizona

Dear Walt:

It was with some disappointment that I learned first from Art and then from your letter of June 6th that it didn't seem appropriate for you to join with us on our Lake Shore venture. Of course, we had found it inadvisable to accept your offer of participation in the Courtland-Gleason job. I do hope that we'll have better luck on a third try for I continue to feel that there is reasonably good chance of mutual benefit from closer association, and that we can test this theory best by some joint ventures.

I imagine that you will be hearing about progress at Lake Shore from time to time through Art or George Freeman. We are certainly grateful for your recommendation of Mr. Rugg to handle the geophysical aspects of the job.

I gather that Roy Jensen will be looking in on you before too long and, we'll appreciate such help as you can give him.

I'm not just sure when I'll be out your way again, but I hope it isn't too long. Please give Mr. Edwards my regards when next you see him.

Sincerely,

Joseph T. Hall

JTH:aim
CC: A. Baker III
P. D. Wilson

COPY

F

Callahan

M. G. Edwards
2154 North Villa Heights Road
Pasadena 8, California
Sycamore 2-2398

May 24, 1958

Mr. Thomas Bardon, President
Shattuck Denn Mining Corporation
120 Broadway
New York 5, N.Y.

Dear Tom:

I was glad to receive your letter of May 16 in which you mentioned the Lake Shore Mine and your interest in it. As you know, Walt Heinrichs and I had two meetings with Joseph Hall in Tucson last month, primarily to try to interest Callahan Mining in taking over and continuing a project which Minerals Exploration had been conducting in the Courtland-Gleeson District.

Later Callahan proposed that we consider joining in an investigation of the Lake Shore Mine and this possibility is now being looked into. Should our participation appear to be mutually advantageous, my own feeling is that we should confine our contribution to applicable exploration, including geophysics and methods applied to the Mineral Hills area which resulted in Pima Mine, rather than to financial contribution. In return Minerals would receive an interest porportional to its monetary contribution in technical services. I assure you that it would be a pleasure for Minerals to be associated with companyies represented by Joe Hall and yourself if the prospect itself appears sufficiently attractive and is in line with the policies of our company.

I want to thank you also for sending me a copy of your annual report for 1957 which I always find of interest. I notice that Austin C. Jenner is no longer on your board.

I hope that we can get together for a good visit shortly. Meanwhile

My kindest regards

/s/ Guy

cc: Mr. Rubel
Mr. Heinrichs

COPY

From:
Shattuck Denn Mining Corporation
120 Broadway, New York 5, N.Y.
Thomas Bardon, President
May 16, 1958

Mr. M. G. Edwards
2154 North Villa Heights Road
Pasadena, California

Dear Guy:

It was with much interest and pleasure that I recently learned that the Minerals Exploration Company with which you are connected is considering taking a part in an investigation of the Lake Shore Mine in Arizona. That property was discussed at a recent meeting of the directors of Callahan Mining Company of which I am a director, representing the stock which Shattuck Denn owns in Vulcan Silver-Lead Corporation. The Lake Shore was originally called to Shattuck Denn's attention and Shattuck Denn asked Callahan if the latter would be interested in pursuing the matter. I discussed it with Mr. Joseph Hall and he tells me that Minerals Exploration is now considering doing the geophysical work at Lake Shore and otherwise taking an interest in the project.

I very much hope that the three companies can get together on a plan to continue the work in Arizona. I am leaving for Prescott shortly and will discuss a possible program with our people there. I also hope that the program will give me an opportunity of getting together sometime with you in Arizona and elsewhere, not only to talk about Lake Shore, but to renew our long personal friendship.

Yours most sincerely,

Tom

(Rec'd. May 28, 1958)

SHARPE MODEL A-3 MAGNETOMETER

GROUND AND AIRBORNE RECONNAISSANCE

Sharpe INSTRUMENTS LTD

6080 YONGE STREET

WILLOWDALE (TORONTO), CAN

YALE UNIVERSITY
DEPARTMENT OF GEOLOGY

BOX 2161, YALE STATION
NEW HAVEN, CONNECTICUT

May 13, 1958

Airmail

Mr. Walter Heinrich
Minerals Exploration
808 West Grant Road
Tucson, Arizona

Dear Mr. Heinrich,

Mr. Joseph Hall has told me of the very interesting visit that he recently had with you and the favorable impression that you and Minerals Exploration made upon him. As I have been trying to imitate the Pima discovery by attempting an exploration program of searching for hidden mineral deposits in pediment areas of the Great Basin for Pinnacle Exploration, Inc., I would be very appreciative if I could visit you in Tucson this coming summer and discuss with you some of the work which we have been doing. Possibly some time during July would be best for me, but I could call you from Salt Lake during the early part of July in order to pick a date satisfactory with you.

During a recent visit to Toronto, I was shown one of Sharpe's A-3 magnetometers, a photograph of which is enclosed. The instrument measures the vertical component of the magnetic field, has a sensitivity of at least ±5 gammas, and is very resistant to movements caused by vibrations as the buoyant magnet housing is immersed in a silicone fluid. The instrument can therefore be mounted on a moving vehicle, such as a jeep, aircraft or boat. I would be grateful if you would tell me what you think of the suitability of the instrument as a reconnaissance magnetometer which could be used in a fashion similar to your truck-mounted magnetometer. I realize that one might miss some anomalies of the order of a few hundred gammas with the A-3, but for some areas this would not be too disastrous. Price is $850 in Canada and about $950 in the U. S. Any thoughts that you may care to offer about this instrument would certainly be appreciated.

Under separate cover, I am sending you two reprints of mine pertaining to some studies of sulfur isotopic ratio variations which I hope you will find of some geologic interest.

Sincerely yours,

Mead LeRoy Jensen
Assistant Professor of Geology

MLJ:mb
cc: Mr. Philip D. Wilson
Mr. Joseph Hall

JOSEPH T. HALL

PRESIDENT
CALLAHAN ZINC-LEAD COMPANY, INC.

100 PARK AVENUE
NEW YORK 17, N.Y.

after this "cash gain" split

$< 1 \times 10^6 = 50-50$

$10,000 over above = 1/10 % increase interest to Call

to Max of 75-25

$ 5600 to Papago by 8th May

1900 assessment by 30 June.

1000 camp site rental

NEW - Ann Depreciation - 52.50

120 day option June 1 Sept 25 ± 60 yr. Option

$75000 1st yr. from oct ~~1st~~

200 000 1st 2 yrs.

350,00 3 years. proceeds to fully reimburse Collaborators.

When even + $500,000 capital (working)

600/mo rental.

F -
Callahan
Zinc Leaf

Art Baker
10210 W Colfax
Lakewood, Colo.
BEmont 3-6541

Pat this is Art Baker's Mailing Address & Ph. # in Denver.

Please stick this in the file or directory where we can recover it readily. Thanks,

Norm.

Pat

Calahan 40% of Vulcan
(will be cancelled)

83% Voted in favor of Merger.

File Folder —
"Callahan Zinc Lead Co."

4/15/58

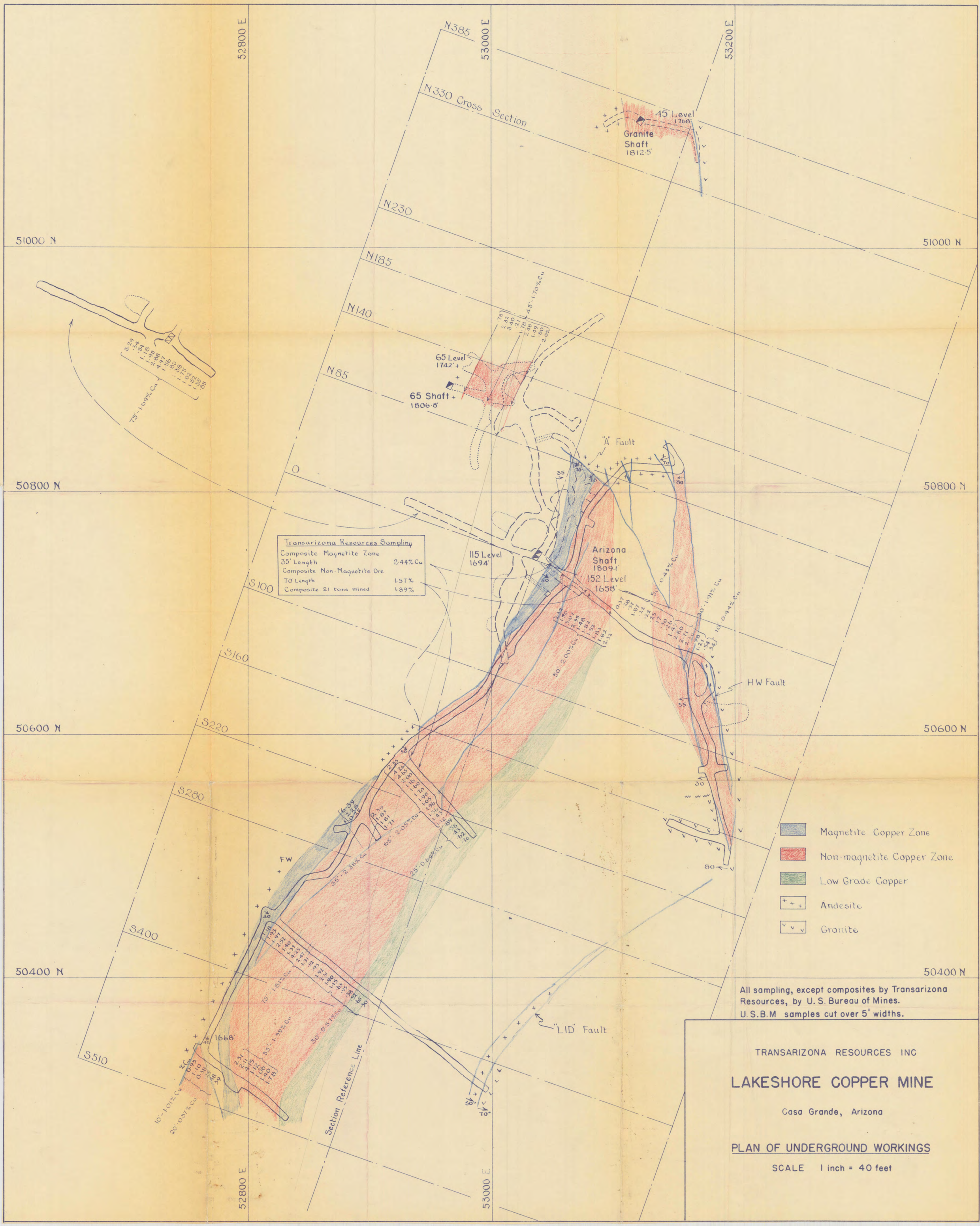
Call to Dave Mazer

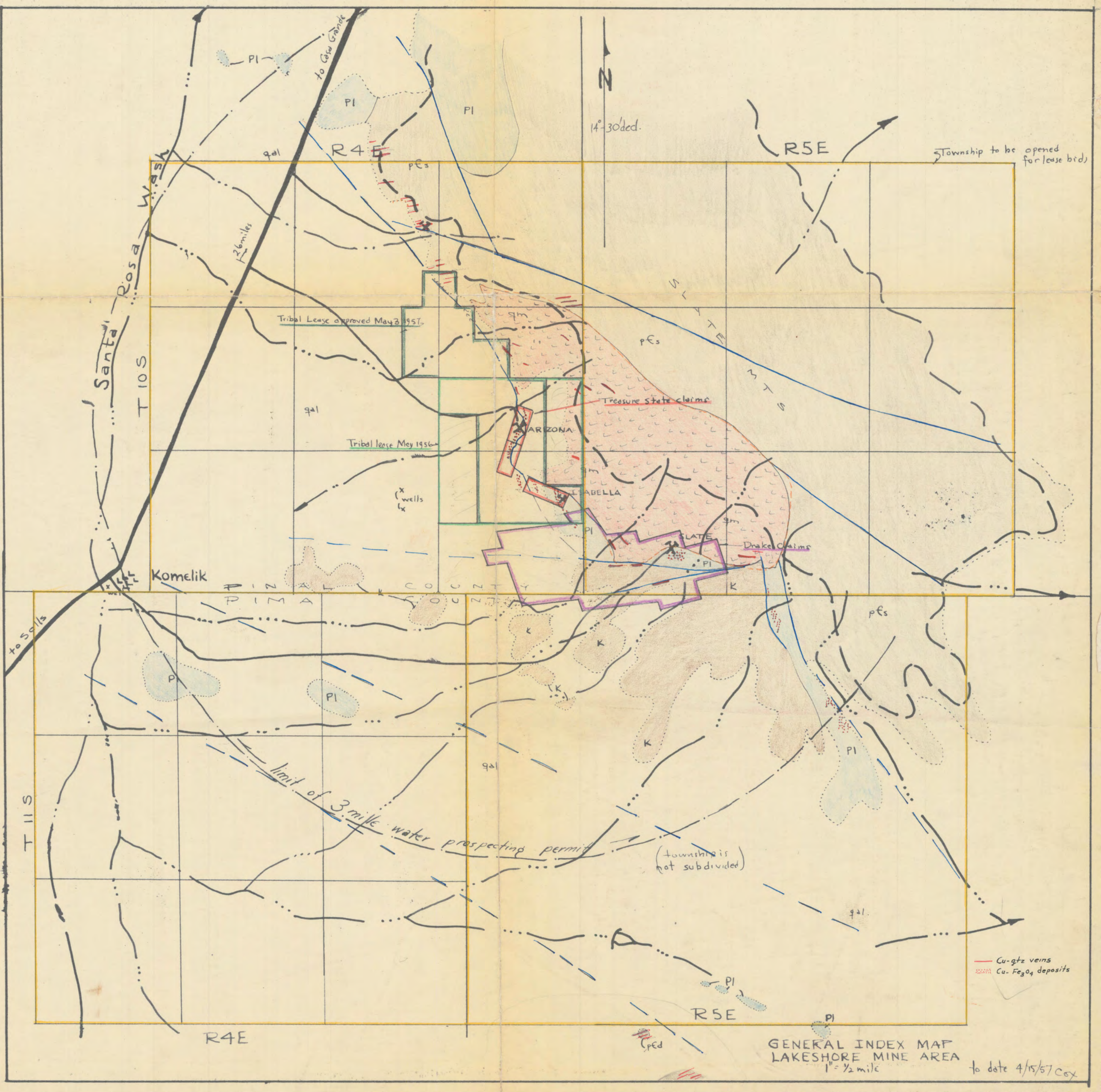
Re: Joe Hirshhorn etc. Joe Hall Callahan Zinc Lead

Mitchell-20590 Office

Wekiva Co. - Fl - 2-3900
New Hyde Park N.Y. - Nassau Hempstead 516+216+
Larkin Co. - Astoria - 4-0808

Peter Boggs of Garden City, L.I. N.Y.	
Bob Searls,	Vermont Min 300 Park Ave.
Jim Boyd,	Kennecott " ?
Jack Chandler,	Am. Metal-Climax


52800 E
53000 E
53200 E
N385
N330 Cross Section
N230
N185
N140
N85
0
S100
S160
S220
S280
S400
S510
51000 N
50800 N
50600 N
50400 N
45 Level
1768'
Granite Shaft
1812.5'
65 Level
1742'+
65 Shaft +
1806.8'
"A" Fault
115 Level
1694'
Arizona Shaft
1809.1'
152 Level
1658'
H W Fault
FW
1668'
"LID" Fault
Section Reference Line
Transarizona Resources Sampling
Composite Magnetite Zone
35' Length 2.44% Cu
Composite Non-Magnetite Ore
70' Length 1.57%
Composite 21 tons mined 1.89%
Magnetite Copper Zone
Non-magnetite Copper Zone
Low Grade Copper
Andesite
Granite
All sampling, except composites by Transarizona Resources, by U. S. Bureau of Mines.
U.S.B.M samples cut over 5' widths.
TRANSARIZONA RESOURCES INC
LAKESHORE COPPER MINE
Casa Grande, Arizona
PLAN OF UNDERGROUND WORKINGS
SCALE 1 inch = 40 feet



N
14°-30' dec.
R4E
R5E
Township to be opened for lease bids
Santa Rosa Wash
to Casa Grande
26 miles
T 10 S
T 11 S
Tribal Lease approved May 3 1957
Tribal lease May 1956
Treasure State claims
Drake Claims
ARIZONA
ISABELLA
SLATE
SLATE MTS
wells
Komelik
PINAL COUNTY
PIMA COUNTY
to Sells
limit of 3 mile water prospecting permit
(township is not subdivided)
qal
pЄs
qm
Pl
K
pЄd
Cu-qtz veins
Cu-Fe3O4 deposits
GENERAL INDEX MAP
LAKESHORE MINE AREA
1" = 1/2 mile
to date 4/15/57 Cox

Flexhose 8¢ '55 6¢ '56

4½-¼ Callahan Merger. Shore for Sherte

61% Vulcan Silver ½ Lead - [illegible] State.

3 3/4 -

spec on Various Min exploration ventures.

9 mos 71% up. 7¢ vs 4¢

6 June 1958

F

Mr. Joseph T. Hall, President
Callahan Mining Corporation
100 Park Avenue
New York 17, New York

Dear Joe:

I trust by now you have heard from Art Baker regarding our final negative decision to join with you in the Lakeshore venture. This was made Tuesday morning, the same day that Art called. I tried to call you that afternoon, but you had already left for Mass. Art said he would continue to try to reach you so you would be informed as soon as possible.

For your information, it was decided that the opportunity for Minerals Exploration Company was not sufficiently attractive within line of our current policies, and consistent with other prior existing opportunities and committments. A specific added difficulty, for instance, was our prior and possibly conflicting interests regarding other portions of the Papago Reservation. Also the problem or inadvisability of being able to do broad or blanket MoMag coverage without actually having a lease from the Indians. Even with an exclusive prospecting permit, such an investment could be entirely lost and, conceivably, the information used by others - thus establishing a relative disadvantage in the bidding. This possibility would seriously detract from the best chance for significant contribution on our part.

Sorry we were unable to get together as I was looking forward to the pleasure of working with you and Shattuck Denn, with whom the joint venture idea had been mentioned previously once or twice, but without any follow through. Since you plan to continue working here in the southwest, I am sure other opportunities may arise, with maybe better luck next time. In order to possibly get the electromagnetic work Mr. Wilson desires, I have referred Art Baker to Al Rugg who may be able to help locally. In the meantime, I hope we will keep in touch, and best wishes to you and Shattuck Denn.

Sincerely,

Walter E. Heinrichs, Jr.
Manager

WEH/pr

bcc: A. C. Rubel
M. G. Edwards

6 June 1958

Mr. Phillip D. Wilson, Vice-President
Callahan Mining Corporation
100 Park Avenue
New York 17, New York

Dear Mr. Wilson:

Returned herewith are the following three items which you loaned to us during your visit in our office on 28 May 1958:

1. Seven page letter from Callahan to Transcontinental Resources, Ltd., Attn: Mr. James D. Mason, dated 9 May 1958.
2. Ten page report on Transarizona Resources property (Lakeshore Mine) by Arthur Baker III, examination made 5-3-58 to 4-17-58.
3. Blueline print, one, colored composite general geology plan map, scale 400' to 1" of the Lakeshore Mine, dated 18 June 1957.

As you may have already heard, it has been decided that we will not be able to join in this venture with you and Shattuck Denn. I was looking forward to the pleasure of working with you all, particularly yourself and Art Baker. Inasmuch as we both will undoubtedly continue operations here in the southwest, maybe next time will work out differently, meanwhile, every best wish.

Sincerely yours,

Walter E. Heinrichs, Jr.
Manager

WEH/pr
Enclosures

No. 1276818

RECEIPT FOR CERTIFIED MAIL—~~10¢~~ 20

SENT TO Phillip D. Wilson Callahan Mining Corp.	POSTMARK OR DATE
STREET AND NO. 100 Park Avenue	6-6-58
CITY AND STATE New York 17, New York	

If you want a return receipt, check which

- [X] ~~1¢~~ shows to whom and when delivered .10
- [ ] ~~2¢~~ shows to whom, when, and address ~~where~~ delivered .35

If you want restricted delivery, check here

- [ ] ~~2¢~~ fee 50

POD Form 3800
July 1955

Replaces previous editions of this form which MAY be used.

6 June 1958

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Walter E. Heinrichs, Jr.
Manager

WEH/pr
Enclosures

Callahan

28 May 1958

Dr. M. G. Edwards
2154 N. Villa Heights Road
Pasadena 8, California

Dear Guy:

Thanks for your note of 10 May 1958 and also the copies of letters from Tom Barden, President of Shattuck Denn Mining Corp., to you and your reply.

Today, Norm and I had a discussion in our office with Mr. Phillip D. Wilson, Geologist and Vice-President of Callahan Zinc-Lead. I was rather favorably impressed with Wilson and his apparent technical competence. He was with Calumet & Arizona at Bisbee for some time after 1911 and claims close acquaintanceship with Ira Joralemon, the late Harry Lavender, etc. He also spent some time at Ajo during the earlier days.

He is, of course, quite anxious to finalize plans, as he realizes their 120-day option period will pass very quickly. We have gone over a tentative program involving initially mostly EM work to precede drilling in the presently partially explored area already covered by magnetometer, and likely some concurrent resistivity and self-potential work, followed later on by extended MoMag coverage, etc. The latter will depend upon the situation with the Indians at the time in regard to the proposed one-quater township exploration leases which will probably be issued on a bid basis, thus throwing some doubt on the prudence of doing MoMag work in the areas not presently controlled by Callahan.

I anticipate such work to take approximately one month, making our investment of the order of $10,000 to $15,000. You will note from the attached copy of letter from Joe Hall, they (I presume this means Callahan and Shattuck Denn together) are thinking in terms of an initial program in the neighborhood of $25,000. Thus, during the initial phase, our contribution might represent approximately one-third of the expenditure for which we "might gain the right to participate in subsequent portions of the agreement up to ten or fifteen percent or so". What has not been determined is what minimum permanent, or over-riding, interest we would have in lieu of a direct ten or fifteen percent participating interest. In previous conversations, Joe Hall inferred this might be of the order of two to three percent.

At Wilson's behest, I am writing to determine our decision and, if agreeable, the degree of our acceptable participation. He is also requesting Joe Hall to submit an early suggestion in this regard to us in order to possibly expedite matters. I agree

with you that, theoretically, this is the type of thing we could possibly back into, but am not certain that we should. The prospect has potential, but our interest might be very small.

Enclosed for additional consideration is a copy of the Callahan agreement in which we would be participating.

Next week we will have more results on the New Mexico MoMag reconnaissance work, from which I just returned. Right now am leaving for an overnight trip to look over new developments on Mike Clark's ranch.

Hastily,

Walter E. Heinrichs, Jr.
Manager

WEH/pr
Enclosures
cc: A. C. Rubel w/encls.

Callahan

28 May 1958

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Hastily,

Walter E. Heinrichs, Jr.
Manager

WEH/pr
Enclosures
cc: A. C. Rubel w/encls.

20 May 1958

Dr. Mead L. Jensen,
Assistant Professor of Geology
Department of Geology
Yale University
Box 2161, Yale Station
New Haven, Connecticut

Dear Dr. Jensen:

In acknowledgement of your letter of 13 May 1958, I would be most happy to have you call in Tucson sometime this coming summer, possibly during July. Inasmuch as I never know, very far ahead, when or where I might be, please let me know as far in advance as convenient when your plans are definitely formulated. As you suggest, calling from Salt Lake might be best. It is possible I may have to be out of town sometime between July 18 and August 11, but I am not sure.

Regarding the Sharpe A-3 magnetometer, I have had no direct experience, nor have I heard any comments one way or the other. In general, however, I do know that Sharpe equipment is quite reliable. Personally, I would be very careful of the stated sensitivity of plus or minus 50 gammas, because, somehow, it seems everyone's gamma is not the same even though theoretically they should be. In my experience, the best proof is an actual field test. As you say, missing anomalies in the order of a few hundred gammas may occasionally not be too disastrous, however, in many cases I am afraid it would. Another disadvantage is in recording separate readings rather than a continuous record. Other than these factors, I am sure the instrument undoubtedly has a definite and important role for specific applications, but as usual, would not be a cure-all for any broad range of problems or uses.

Thanks for the two reprints. I have not yet had an opportunity to read these, but am looking forward to it. I reciprocate by enclosing two reprints of mine.

Sincerely,

Walter E. Heinrichs, Jr.
Manager

WEH/pr
Enc: 2
cc: J. Hall F

COPPER

TRANSARIZONA RESOURCES PROPERTY
(LAKESHORE MINE)

ARIZONA
PINAL COUNTY
CASA GRANDE DISTRICT
SLATE MOUNTAINS

Property and Ownership: Principal owner of the property is Transarizona Resources, Inc., a subsidiary of Transcontinental Resources, Ltd., the main offices of which are in Vancouver, B.C. Manager for Transarizona is:

George A. Freeman, 917 E. Fort Lowell Road, Tucson, Arizona, Phone MAin 3-6821
Minority owners is a partnership: Freeman & McClure, 3424 N. Central Ave., Phoenix, Arizona.

Three parcels of land make up the Transarizona property: two groups of mining claims held by option, and a lease on Indian reservation land granted by the Papago tribe.(See accompanying General Index map) The parcels are:

Treasure State Group: three patented claims, Arizona, Copper Belle and Isabella (all patent survey No. 023260), owned by the Treasure State Mining Co., a Montana corporation.

Slate Group, also known as Drake Group: three patented claims, Confidence, Assurance and Prosperity (patent survey Nos. 1489, 1904, 1488 respectively) and nineteen unpatented claims, Confidence Nos. 1-19, recorded in Pinal County Docket Book 122, pp. 449-467. These claims are owned by Theodore Drake, Coolidge, Arizona.

Ten year lease on 580 acres of Papago Indian Land, the lease being held by Freeman & McClure for Transarizona; the lease can be assigned at any time, subject to the approval of the Secretary of the Interior.

Transarizona also has a permit to prospect for and use water on all lands within a three-mile radius of the Lakeshore Mine.

Most of the reservation district in which the property lies has been opened for non-exclusive prospecting, but the township surrounding the property has been withheld from this opening, and within a few months exclusive prospecting rights on it will be offered for bid. In a sense this township is a party of the property, sine whoever holds the Transarizona ground will have a slight edge over others in evaluationg the potential of the Township.

Terms: Part of the property was assembled by the Freeman & McClure partnership. The underlying agreement between the partnership and Treasure State calls for a purchase price of $400,000 if paid out of royalties and $300,000 if paid in cash, with a sliding scale royalty of 7-1/2% of net smelter returns when copper is below 38 cents per pound, 10% at 39-47 cents and 12-1/2% at 48 cents or higher. Originally agreed upon minimum royalties of $1000 per month have been reduced to $500 per month until June or July, 1958, and the period of this meduction might be extended. The Indian lease is for a period of ten years, and calls for a 10% royalty on net smelter returns, with annual rentals totalling about $1500 and minimum annual expenditure of $5600 for exploration. The lease may be renewed every ten years, with royalty payments and other provisions subject to review at each renewal.

These two properties were turned over to Transarizona, with Freeman & McClure retaining 15% of net profits before taxes and depletion, and an option on 15% of the stock of any company organized to operate the properties. In addition, Freeman & McClure receive a 10% interest in any properties acquired on or within five miles of the Papago reservation.

The Slate group was acquired by Transarizona directly, with a purchase price of $154,000 to be paid by a 10% royalty on net smelter returns. Minimum royalty was originally established at $250 per month, but was reduced to $100 per month until June, 1958, and the period of the reduction might be extended. Freeman & McClure acquired a 10% interest in this property through the terms of their agreement with Transarizona.

For terms on which Transarizona is willing to dispose of the property, see letter of agreement between Callahan Zinc-Lead Co., Inc. and Transarizona Resources, Inc.

Location and Access: The property lies in Pinal County, Arizona, in Sections 23, 24, 25, 26, and 36, T10S, R4E, Section 31, T10S, R5E, and Sections 5 and 6, T11S,R5E, G&SRB&M. The Slate Group forms the southern end of the property, and the Indian lease the northern part, with the Treasure State claims lying within the area of the Indian lease. The entire property lies on nearly level ground just west of the south end of the Slate Mountains.

The property is reached from Casa Grande by 26 miles of county highway, of which 7 miles are paved and the remainder is scheduled to be paved in the next few years. A two mile dirt road, passable for cars, reaches the property from the pavement, and a similar road traverses the length of the property. Road building presents no problems, as only a little scraping or hand work is necessary to build roads to any part of the property, except to cross occasional draws, any of which can be crossed with half and hour's bulldozer work.

Elevation of the property is about 1800'. Vegetation consists of greasewood, various cacti and other desert growths. Rainfall is low, probably about 10" per year, and snows are unknown. There are probably occasional light frosts during the winter.

The nearest towns are Casa Grande and Sells, both of which are farming towns and can supply abundant labor but not trained miners. The Papago reservation can also supply unlimited unskilled labor. The area is in the Arizona copper producing province, however, and reasonably close to both Phoenix and Tucson, so skilled labor of any kind can no doubt be obtained without difficulty.

Previous Work: The Lakeshore Mine on the Arizona claims was originally located in 1880, and worked intermittently until 1929, shipping at various time a few hundreds of tons of copper ore. The mine consists of a 235' shaft with a total of about 2000' of drifts and crosscuts, mostly on the 152' level, plus two other shallow shafts with short workings off them. During the 1940's the U.S. Bureau of Mines sampled the workings and drilled 5 churn drill holes; this work is decribed in USBM Report of Investigations 4706.

On the Slate Group two shafts 100' or more deep were sunk many years ago, but are not accessible now; from the appearance of the dumps, no ore was shipped from these. During World War II several hundreds tons of ore was shipped from small pits near the shafts.

Transarizona acquired the properties in 1955 or 1956 and since that time claims to have spent a total of about $280,000 on the property. Much of this money was spent working on a metallurgical process designed to recover the copper from the oxidized high-lime ore at the Lakeshore Mine. A process called the segregation process, consisting of roasting the crushed ore with salt and coke to reduce the copper oxides and silicates to metallic copper which is then floated, was worked out. According to D. M. Kentro of Shattuck Denn, the process has merit. In addition, Transarizona drilled about 100 dry rotary drill holes, mostly in the immediate vicinity of the Lakeshore, Mine, blocking out the orebody there. Wisser & Cox, a firm of consultants, mapped the geology of the property for Transarizona, and Transarizona personnel and contractors made a magnetometer survey of the entire property. Copies of Wisser & Cox's geologic map and the magnetometer map accompany the present report.

Shattuck Denn made an examination of the property in late 1957 and reports by D. M. Kentro and the consulting firm of Still & Still were available to the present writer. According to Still & Still's calculations, the Lakeshore Mine orebody contains 1,500,000 tons of ore averaging 1.58% Cu that can be mined by open pit methods. Kentro estimates that a 1000 ton per day plant to treat this ore would cost $1,500,000 to $2,000,000, and that operating costs including amortization would be about $6 per ton; at 27¢ per pound for copper, the operation would just about break even. He concludes that the property has good potential, and that there is a possibility of finding enough additional ore to make a mill worthwhile.

The present writer has assumed that Still & Still's calculations of the Lakeshore orebody and Kentro's conclusions as to its economic possibilities are correct. The present examination was directed solely toward the possibility of finding more orebodies on the property, preferably sulfide orebodies that could be milled by conventional processes.

Geology: The main body of the Slate Mountains is composed of pre-Cambrian schists, with, at the north ends, a fairly extensive area of Paleozoic sediments. On the southwest side of the range, near the south end, is a stock of quartz monzonite with some two square miles surface area. Paleozoic sediments and Cretaceous (?) volcanics are in contact with the stock on its south and west sides, but all of the visible contacts are faults. On preliminary maps by the USGS Ground Water Division, the stock is shown as being pre-Cambrian (quartz monzonite), but this seems unlikely inasmuch as the Paleozoic sediments are locally contact metamorphosed close to the stock. It is probable that the stock is of late Cretaceous age, or possibly early Tertiary.

The sediments consist of at least 300' of quartzite overlain by at least 300' of limestone. There is some question as to whether these sediments are pre-Cambrian, being part of the Troy and Mescal formations, or whether they are Cambrian, parts of the Bolsa and Abrigo formations. The exposed thickness of limestone is greater than that found anywhere else for the Mescal formation, as Still & Still point out, and the character of the rock is much like that of the Abrigo in other districts, so it is probable that these are Cambrian rocks. The sediments locally contain dikes and sills as much as 30' wide of diabase; Wisser & Cox's mapping shows diabase in the volcanics as well.

The volcanics are predominantly andesite, flows and breccias, with, in most places, abundant fragments of volcanic rocks unlike the matrix. Wisser & Cox identify most of the volcanic outcrops as agglomerate. Bedding or flow structures are recognizable in many places. Just south of the Slate group, at coordinates N44000, E56200, is a small outcrop of hornblende granite, quite unlike the main quartz monzonite stock, apparently intruding the volcanics.

Outcrops are limited, as the property lies on a pediment, most of which has a cover of a few feet or more of Quaternary alluvium. Sediments are exposed intermittently only in a zone a few hundred feet wide along the edge of the stock, but volcanics are exposed more widely in the southern part of the property.

The structure of the area is only little known. According to Wisser & Cox's General Index Map, the dominant features of the regional structure are a series of north-west striking faults, probably with very large displacements. On the property itself, two major faults are known. One of these, herein called the Lakeshore Fault, is a reverse fault through the Lakeshore Mine, striking N20°E and dipping about 50°E. It raises sediments and schists on its east side against volcanics on its west side. The Lakeshore orebody lies along this fault. ~~The volcanics on~~ The other major fault is the Slate Fault, a normal fault striking due east and dipping about 60°S, which separates Paleozoic sediments on the north from volcanics on the south. These two faults bound a triangular area within which sediments, schists and quartz monzonite lie at or very close to the surface. West of the Lakeshore Fault, volcanics extend down to a depth of at least 500' in the immediate vicinity of the Mine(USBM drilling), while south of the Slate Fault only volcanics are exposed at the surface. Magnetometer work suggests that the volcanics may extend no deeper than 200'or 300' south of the Slate fault, as there are some pronounced magnetic highs, presumably related to magnetite deposits in sediments, in this area.

In the Lakeshore Mine area there are a number of lesser faults also. The most important of these is the Lid Fault, a northeast striking, flatly southeast dipping thrust fault of unknown displacement; it thrusts quartz monzonite over the schist east of the orebody and perhaps over the orebody itself. It is probably post-mineral. From the difference in the structures at the Lakeshore Mine and those farther south, there is some possibility that the Lid Fault has a displacement of 2000' or more with most of the

bedrock exposures on the property being on the upper block of the thrust. The other faults at the Lakeshore have less than 200' displacement and strike northwest and dip southwest.

There are two types of ore in the sediments; magnetite replacements of impure limestone, with small amounts of copper and few contact metamorphic silicates, and higher grade copper mineralization associated with abundant silicates but no magnetite. In addition, there are scattered small showings of copper mineralization in quartz monzonite.

The magnetite mineralization is well exposed on the Isabella claim, where a bed or group of beds perhaps 20' thick at the contact between limestone and quartzite contains abundant magnetite. There is no evidence of strong shearing here: the magnetite was apparently localized simply by the presence of favorable beds, without any structural aid. Judging by the limited exposures and the evidence of the magnetometer map, the contact, which strikes south-southeast, carries strong magnetite, at least intermittently for a distance of 3000' or more south of the Isabella exposures (the line of magnetic highs extending from N 48,400, E54,200 to N45,500, E55,500 on the magnetic contour plan). Several dry rotary drill holes were drilled on the Isabella showing by a company preceding Transarizona; the logs of these holes are not available, but the cuttings are stacked beside the holes. All of the holes reached strong magnetite mineralization at depths of about 150', which is the expected depth considering the dip of the beds and the locations of the holes. Most of the cuttings from the magnetite zone in these holes contain several percent of pyrite with very sparse identifiable chalcopyrite; a sample taken from one pile of cutting, presumably representing 10' of hole, assayed 0.48% Cu (sampled by ABIII). Freeman reports that cuttings from another hole, one showing some oxidation in the magnetite zone, contains 3% to 4% Cu as native copper. On the surface most of the magnetite zone shows very little or no copper, except for a short length where two or three minor cross-faults offset the zone a few feet; here old time shallow workings explore relatively strong copper staining. The conclusion drawn from the Isabella showings is that magnetite mineralization, possibly with very low grade copper, is localized by bedding features (perhaps favorable beds plus bedding faulting), while stronger copper mineralization is localized within the magnetite zone by cross-faulting. It seems probably that there was a time difference between the deposition of the magnetite and the deposition of most of the copper.

The Lakeshore Mine, where 1,500,000 tons of 1.58% Cu are are blocked out, lies a couple of thousand north of the Isabella showing. The orebody is tabular mass striking N20°E and dipping about 50°E, 1500' long and averaging 50' wide, with a dip length of as much as 300'. Some of the ore contains a very large porportion of magnetite, particularly along the footwall, and Transarizona estimates that the entire orebody averages about 15% iron as magnetite. Much of the ore, however, contains little or no magnetite, according to Transarizona's drill logs and sections. All of the copper is present as chrysacolla or copper oxides and carbonates. The host rock of the ore is altered limestone and quartzite, with andesite on the footwall and schist on the hangingwall. The orebody lies along the Lakeshore Fault, and shearing is intense. At the bedrock surface, the schist-quartz monzonite contact lies 50 to 200' east of the ore outcrop and, dipping west, intersects the orebody at depth. The orebody partly ends against the quartz monzonite, but the sheared quartz monzonite contact against schist and andesite locally contains some copper mineralization.

Still & Still point out that the Lakeshore andesite -ore (sediments) relation is such that the contact between them must be overturned, and that the cutting off of the ore zone by the quartz monzonite is unusual for the district - in general, the bedding and structures along the west side of the stock dip away from the stock. This means that in the more ordinary case, the ore zone can be expected to persist in depth. The Isabella exposures suggest that the Lakeshore orebody is still more unusual; that the ore zone is actually a thin fault block of sediments made up of the

contact of quartzite and limestone that carries magnetite at Isabella, with in this instance schist faulted in against one side and andesite faulted in against the other. To carry the analogy a little farther, the relatively strong copper mineralization at the Lakeshore is essentially unrelated to the magnetite; instead, it is localized by the strong shearing of the pre-existing magnetite.

A few exploratory holes have been drilled on magnetometer highs between the Lakeshore and Isabella exposures, in an area where alluvium covers all geology. These holes (Nos. 213-219) penetrated varying thicknesses of limestone, and reached magnetite carrying about 0.5% Cu, all the copper being in oxide minerals. This is presumably mineralization like that at the Isabella, magnetite that has not had copper added.

The magnetometer map shows numerous magnetic anomalies besides those that can be definitely related to geologic features. One such is a pair of anomalies lying along a line 1000' east of the Isabella limestone-quartzite contact line; these anomalies lie close to the contact between quartzite and quartz monzonite and this contact may have localized magnetite bodies. On the Slate group in general are a number of anomalies, some of them south of the Slate Fault, which suggests that sediments lie at not more than 300' depth here; it is assumed that there are no magnetite deposits in the volcanics, since none have been found yet. One anomaly on the Slate group, that at N46,000 E 57,000, lies over an exposure of quartz monzonite that is somewhat more strongly mineralized with copper than the bulk of the intrusion.

North of coordinate N 52000 is a large area in which magnetic anomalies are numerous and large. Reconnaissance work shows that in this area certain beds of the alluvium contain relatively high percentages of magnetite- 5% or more over thicknesses of 10' and more. The magnetite is present in sizes from sand-grain size up to 2' diameter boulders. No copper mineral is visible in any of it. It seems very probable that the anomalies in this area are caused by the alluvial magnetite, and have no relation to bedrock geology.

The copper mineralization not associated with magnetite, exposed in the pits on the Slate group (at coordinates N 46000, E 58400 and N46000, E 59100) is, like the magnetite ore, entirely oxidized, and with the small exposures its localization is uncertain. There are indications, however, that most of the ore lies in a number of rather thin favorable beds close to their intersections with steep east to northeast striking strong shear zones. Contact metamorphism is much more widespread than mineralization. The limestone here may be considerably higher in the stratigraphic section than the limestone exposed at the Isabella; no quartzite beds are exposed, though there is some quartzite breccia along the south edge of the area. The bedding in this area, like the structure at the Lakeshore Mine, dips toward the quartz monzonite contact, but there is a fault block of schist between the two.

Minor silicified fractures are common in the quartz monzonite along the edges of the stock, and in places these fractures contain spots and limited films of copper stain. An isolated mass of quartz monzonite just west of the Slate pit area (at coordinates N46000, E57000) contains more than usual of these mineralized fractures, and also contains in places small spots of copper oxides disseminated through the host rock. There is no alteration of the quartz monzonite, and little iron-staining; this is not at all a porphyry copper, simply an area where there is a trifle more copper than elsewhere. A possbily significant feature is that here the fractures are only silicified, while elsewhere they are both silicified and somewhat epidotized.

<u>Ore Potential</u>: There is clear evidence that there were two stages of mineralization on the Transarizona property, and that the stages were separated by a time interval, probably not a large one. The early stage resulted in the formation of magnetite bodies with small amounts of pyrite and still smaller amounts of chalcopyrite; magnetite bodies in general assay about 0.5% Cu. The later stage was one of copper mineralization without formation of magnetite. The geologic features localizing the two stages of mineralization were not necessarily the same. At least some of magnetite

deposits were localized by favorable beds, as at the Isabella and the Lakeshore Mine, though other features, possibly faults, may have localized the magnetite causing some of the magnetic anomalies. The copper mineralization, on the other hand, was localized by shears, as at the Lakeshore Mine and the Slate pits. From the Isabella showings, one may suspect that the intensity of copper mineralization is directly related to the intensity of shearing. In some cases, as at the Lakeshore, mineralization of both stages was superimposed, producing an orebody with high magnetite and high copper values. In other cases, magnetite and copper were deposited separately, as at the Isabella, where a magnetite body was formed, and the Slate pits where copper ore was deposited.

This independence of magnetite and copper mineralization means that magnetic anomalies are not all guides to copper ore, though they may be of limited assistance. It is unlikely that the magnetite and copper are entirely unrelated, simply because they occur within the same district; more likely they represent only slightly different times in the mineralization sequence. This conclusion is suported by the general presence of a little copper with the magnetite. This being the case, any channelway that permitted deposition of magnetite could have stayed open long enough to permit copper deposition as well, so there is hope that at least some of the numerous magnetic anomalies will contain copper ore.

Since all of the known copper ore is associated with shearing, shear zones represent the best targets for exploration; if magnetite is associated with the shear zones, that improves the quality of the target. The Slate Fault and other east-west shear zones near it offer good targets in view of the Slate pit mineralization. The intersections of these shear zones with the Isabella limestone-quartzite contact offer perhaps the best targets.

There is a good chance that more orebodies like the Lakeshore can be found on the property; these may be smaller than the Lakeshore, however, as the magnetite zone - shear zone interesections that are inferred would be smaller. The potential for non-magnetic copper sulfide orebodies cannot be estimated, for lack of any evidence at all as to whether or not any are present, or their size or grade. Since copper mineralization is present, however, and favorable structures (shears) and rocks (Abrigo limestone) are known, there is at least a fair chance that copper orebodies can be found. In the southern part of the property, the sulfide mineralization at the Isabella and water standing at shallow depths in old shafts on the Slate group indicate that oxidation does not extend to excessive depths.

The most favorable part of the property is the triangle of known favorable ground between the Lakeshore and Slate Faults and the quartz monzonite stock. The area south of the Slate Fault might also be favorable, since the magnetometer work indicates that sediments lie at shallow depth. West of the Lakeshore Fault it is highly probable that andesite extends to depths beyond those to which geophysical techniques can probe. The north end of the property has numerous magnetic anomalies, but there is evidence that these are caused by alluvial magnetite; this area can probably be lumped in with the other areas west of the Lakeshore Fault as unfavorable.

The township that is to be opened for exclusive prospecting rights has largely unknown potential. This area is made up of the SW nine sections of T 10 S, R 5 E, the SE nine sections of T 10 S, R 4 E, the NE nine sections of T 11 S, R 4 E, and the NW nine sections of T 11 S, R 5 E. The northern two groups of sections have little potential, as the existing Transarizona property covers most of the favorable ground within them. The extent of favorable ground in the southern two groups of sections is probably large, but mostly covered by alluvium and volcanics; geophysical work will be necessary to evaluate it.

Recommendations: A tentative agreement has already been reached between Transarizona and Callahan, calling for a four month option, to be followed by a sliding-scale division of net profits if the option is taken up and the property brought into production. It has been estimated that the minimum cost of disproving the property with geophysical and geological work will

be about $15,000. The potential of the property is worth this much work.

Before the option begins, Transarizona is going to do $7,500 worth of drilling to satisfy assessment work requirements on the unpatented claims and the Indian lease. It has been tentatively agreed between Freeman and Baker that this drilling should include: (1) deepening of one of the holes between the Lakeshore and Isabella, originally stopped in magnetite when the water table was reached; (2) a hole west of the Isabella showings, to reach the magnetite zone at 500' or so depth; (3) a hole somewhere south of the Slate Fault to test the depth of the volcanics in this structural block; and (4) if enough footage is available, a hole on one of the magnetic anomalies at the north end of the property to see whether magnetite, or at least favorable rocks, underlie this ground. The first two of these are most important to Transarizona, the last two to Callahan.

The further exploration most vitally needed by the property is geophysical work. The existing magnetometer survey appears to have been competently done, and need not be repeated. Transarizona has, in addition to the magnetometer map, graphs along each magnetometer traverse; a restudy of these by whoever does the new geophysical work would be worthwhile. For new geophysical work, electromagnetic techniques would probably be most effective, with perhaps some resistivity and/or self-potential surveys to follow as checks. The triangle of favorable ground between the Lakeshore and Slate Faults should be covered with quite close traverses; the less favorable ground south of the Slate Fault may need less thorough coverage, depending on whether Transarizona drills in this area and what the results are. The ground west of the Lakeshore Fault needs only a few widely-spaced traverses to be sure we are not missing something.

The existing geological maps of the property, on scales of 1"= 200' and 1" = 400', by Wisser & Cox, are adequate for an overall picture of the property, but these maps were made using as a base the transit lines run for the magnetometer traverses, and no topography is shown and only the gross outlines of the geology were mapped. More accurate and detailed work with a plane table needs to be done, particularly on the belt of exposed sediments several hundred feet wide surrounding the southwest edge of the stock. This work can be done concurrently with the geophysical work; the field work for both jobs should take about two months. When the geological mapping is well along, half a dozen strategically placed bulldozer cuts would be very valuable.

Theoretically, no exploration work is supposed to be done on the township surrounding the property that is to be opened for exclusive prospecting. The county is isolated, however, and some reconnaissance geology and a few magnetometer traverses could be done on it without much danger of trouble. If a mobile magnetometer is available, a couple of days field work with that would probably be emough; a week's reconnaissance should cover the geology fairly well.

Summary and Conclusions: On the Transarizona property, magnetite and copper mineralization occur in Paleozoic sediments around the southwest edge of a quartz monzonite stock. There was a slight difference in the time of deposition of the two kinds of mineralization, and the presence of magnetite is not necessarily an indication of the presence of copper and vice versa. One known geologic feature localizing magnetite mineralization is the sedimentary contact between quartzite and limestone; there are no doubt other features that have localized magnetite. The magnetite is generally accompanied by sub-economic copper, averaging about 0.5% Cu. Higher grade copper mineralization is localized by shears; where these shears coincide with magnetite orebodies, magnetite-copper orebodies, such as the Lakeshore orebody, can be expected, but elsewhere copper orebodies without magnetite exist, though no large ones are known yet. Thus, magnetic anomalies are not necessarily guides to copper ore, though they have some significance in that they do indicate magnetite mineralization, and copper mineralization may have followed the same channelway in any given instance.

The best prospecting ground on the property is a triangular block with an

area of about one-half square mile in which favorable rocks (sediments) are known to lie at the surface or under a thin cover of alluvium. This block is bounded on the south and west by faults and on the northeast by the main body of the quartz monzonite stock. West of the favorable block, unfavorable Cretaceous volcanics extend to depths beyond the range of geophysical techniques. South of the favorable block, magnetometer work indicates that sediments may lie at not excessive depths, beneath a cover of volcanics.

The property has good chances of containing more orebodies similar to the 1,500,000 ton 1.58% Cu Lakeshore orebody, but these orebodies are likely to be smaller than the Lakeshore orebody because of the nature of the structural loci. On the basis of the presence of favorable structures and rocks, there is a fair chance that orebodies of better copper grade, perhaps without magnetite, may be found. In the southern part of the district, sulfides should extend to within one or two hundred feet of the surface.

A tentative agreement has been reached between Transarizona and Callahan, calling for a four month option period to allow for preliminary exploration, to be followed by a profit-sharing setup if the property is brought into production. Estimated cost to disprove the property is $15,000, which the potential of the property is worth. Before any drilling, the property needs further geophysical work, probably electromagnetic, and more detailed geologic mapping of at least the block of favorable ground.

During the period of the option the surrounding township will probably be offered for competitive bidding for exclusive prospecting rights. At the moment, it appears that the existing Transarizona property contains all of the favorable ground in the northern half of the township. In the southern half of the township there are extensive areas of favorable sediments, largely covered by alluvium; this part should be reconnoitered geologically and geophysically.

/s/ Arthur Baker III
Arthur Baker III

Property examined 4-3-58 - 4-17-58
14 days

ABIII:lf

COPPER

TRANSARIZONA RESOURCES PROPERTY
(LAKESHORE MINE)

ARIZONA
PINAL COUNTY
CASA GRANDE DISTRICT
SLATE MOUNTAINS

Property and Ownership: Principal owner of the property is Transarizona Resources, Inc., a subsidiary of Transcontinental Resources, Ltd., the main offices of which are in Vancouver, B.C. Manager for Transarizona is:

George A. Freeman, 917 E. Fort Lowell Road, Tucson, Arizona, Phone MAin 3-6821
Minority owners is a partnership: Freeman & McClure, 3424 N. Central Ave., Phoenix, Arizona.

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Transarizona also has a permit to prospect for and use water on all lands within a three-mile radius of the Lakeshore Mine.

Most of the reservation district in which the property lies has been opened for non-exclusive prospecting, but the township surrounding the property has been withheld from this opening, and within a few months exclusive prospecting rights on it will be offered for bid. In a sense this township is a party of the property, sine whoever holds the Transarizona ground will have a slight edge over others in evaluationg the potential of the Township.

Terms: Part of the property was assembled by the Freeman & McClure partnership. The underlying agreement between the partnership and Treasure State calls for a purchase price of $400,000 if paid out of royalties and $300,000 if paid in cash, with a sliding scale royalty of 7-1/2% of net smelter returns when copper is below 38 cents per pound, 10% at 39-47 cents and 12-1/2% at 48 cents or higher. Originally agreed upon minimum royalties of $1000 per month have been reduced to $500 per month until June or July, 1958, and the period of this meduction might be extended. The Indian lease is for a period of ten years, and calls for a 10% royalty on net smelter returns, with annual rentals totalling about $1500 and minimum annual expenditure of $5600 for exploration. The lease may be renewed every ten years, with royalty payments and other provisions subject to review at each renewal.

These two properties were turned over to Transarizona, with Freeman & McClure retaining 15% of net profits before taxes and depletion, and an option on 15% of the stock of any company organized to operate the properties. In addition, Freeman & McClure receive a 10% interest in any properties acquired on or within five miles of the Papago reservation.

The Slate group was acquired by Transarizona directly, with a purchase price of $154,000 to be paid by a 10% royalty on net smelter returns. Minimum royalty was originally established at $250 per month, but was reduced to $100 per month until June, 1958, and the period of the reduction might be extended. Freeman & McClure acquired a 10% interest in this property through the terms of their agreement with Transarizona.

For terms on which Transarizona is willing to dispose of the property, see letter of agreement between Callahan Zinc-Lead Co., Inc. and Transarizona Resources, Inc.

Location and Access: The property lies in Pinal County, Arizona, in Sections 23, 24, 25, 26, and 36, T10S, R4E, Section 31, T10S, R5E, and Sections 5 and 6, T11S,R5E, G&SRB&M. The Slate Group forms the southern end of the property, and the Indian lease the northern part, with the Treasure State claims lying within the area of the Indian lease. The entire property lies on nearly level ground just west of the south end of the Slate Mountains.

The property is reached from Casa Grande by 26 miles of county highway, of which 7 miles are paved and the remainder is scheduled to be paved in the next few years. A two mile dirt road, passable for cars, reaches the property from the pavement, and a similar road traverses the length of the property. Road building presents no problems, as only a little scraping or hand work is necessary to build roads to any part of the property, except to cross occasional draws, any of which can be crossed with half and hour's bulldozer work.

Elevation of the property is about 1800'. Vegetation consists of greasewood, various cacti and other desert growths. Rainfall is low, probably about 10" per year, and snows are unknown. There are probably occasional light frosts during the winter.

The nearest towns are Casa Grande and Sells, both of which are farming towns and can supply abundant labor but not trained miners. The Papago reservation can also supply unlimited unskilled labor. The area is in the Arizona copper producing province, however, and reasonably close to both Phoenix and Tucson, so skilled labor of any kind can no doubt be obtained without difficulty.

Previous Work: The Lakeshore Mine on the Arizona claims was originally located in 1880, and worked intermittently until 1929, shipping at various time a few hundreds of tons of copper ore. The mine consists of a 235' shaft with a total of about 2000' of drifts and crosscuts, mostly on the 152' level, plus two other shallow shafts with short workings off them. During the 1940's the U.S. Bureau of Mines sampled the workings and drilled 5 churn drill holes; this work is decribed in USBM Report of Investigations 4706.

On the Slate Group two shafts 100' or more deep were sunk many years ago, but are not accessible now; from the appearance of the dumps, no ore was shipped from these. During World War II several hundreds tons of ore was shipped from small pits near the shafts.

Transarizona acquired the properties in 1955 or 1956 and since that time claims to have spent a total of about $280,000 on the property. Much of this money was spent working on a metallurgical process designed to recover the copper from the oxidized high-lime ore at the Lakeshore Mine. A process called the segregation process, consisting of roasting the crushed ore with salt and coke to reduce the copper oxides and silicates to metallic copper which is then floated, was worked out. According to D. M. Kentro of Shattuck Denn, the process has merit. In addition, Transarizona drilled about 100 dry rotary drill holes, mostly in the immediate vicinity of the Lakeshore, Mine, blocking out the orebody there. Wisser & Cox, a firm of consultants, mapped the geology of the property for Transarizona, and Transarizona personnel and contractors made a magnetometer survey of the entire property. Copies of Wisser & Cox's geologic map and the magnetometer map accompany the present report.

Shattuck Denn made an examination of the property in late 1957 and reports by D. M. Kentro and the consulting firm of Still & Still were available to the present writer. According to Still & Still's calculations, the Lakeshore Mine orebody contains 1,500,000 tons of ore averaging 1.58% Cu that can be mined by open pit methods. Kentro estimates that a 1000 ton per day plant to treat this ore would cost $1,500,000 to $2,000,000, and that operating costs including amortization would be about $6 per ton; at 27¢ per pound for copper, the operation would just about break even. He concludes that the property has good potential, and that there is a possibility of finding enough additional ore to make a mill worthwhile.

The present writer has assumed that Still & Still's calculations of the Lakeshore orebody and Kentro's conclusions as to its economic possibilities are correct. The present examination was directed solely toward the possibility of finding more orebodies on the property, preferably sulfide orebodies that could be milled by conventional ppocesses.

Geology: The main body of the Slate Mountains is composed of pre-Cambrian schists, with, at the north end, a fairly extensive area of Paleozoic sediments. On the southwest side of the range, near the south end, is a stock of quartz monzonite with some two square miles surface area. Paleozoic sediments and Cretaceous (?) volcanics are in contact with the stock on its south and west sides, but all of the visible contacts are faults. On preliminary maps by the USGS Ground Water Division, the stock is shown as being pre-Cambrian (quartz monzonite), but this seems unlikely inasmuch as the Paleozoic sediments are locally contact metamorphosed close to the stock. It is probable that the stock is of late Cretaceous age, or possibly early Tertiary.

The sediments consist of at least 300' of quartzite overlain by at least 300' of limestone. There is some question as to whether these sediments are pre-Cambrian, being part of the Troy and Mescal formations, or whether they are Cambrian, parts of the Bolsa and Abrigo formations. The exposed thickness of limestone is greater than that found anywhere else for the Mescal formation, as Still & Still point out, and the character of the rock is much like that of the Abrigo in other districts, so it is probable that these are Cambrian rocks. The sediments locally contain dikes and sills as much as 30' wide of diabase; Wisser & Cox's mapping shows diabase in the volcanics as well.

The volcanics are predominantly andesite, flows and breccias, with, in most places, abundant fragments of volcanic rocks unlike the matrix. Wisser & Cox identify most of the volcanic outcrops as agglomerate. Bedding or flow structures are recognizable in many places. Just south of the Slate group, at coordinates N44000, E56200, is a small outcrop of hornblende granite, quite unlike the main quartz monzonite stock, apparently intruding the volcanics.

Outcrops are limited, as the property lies on a pediment, most of which has a cover of a few feet or more of Quaternary alluvium. Sediments are exposed intermittently only in a zone a few hundred feet wide along the edge of the stock, but volcanics are exposed more widely in the southern part of the property.

The structure of the area is only little known. According to Wisser & Cox's General Index Map, the dominant features of the regional structure are a series of north-west striking faults, probably with very large displacements. On the property itself, two major faults are known. One of these, herein called the Lakeshore Fault, is a reverse fault through the Lakeshore Mine, striking N20°E and dipping about 50°E. It raises sediments and schists on its east side against volcanics on its west side. The Lakeshore orebody lies along this fault. ~~The other major fault~~ The other major fault is the Slate Fault, a normal fault striking due east and dipping about 60°S, which separates Paleozoic sediments on the north from volcanics on the south. These two faults bound a triangular area within which sediments, schists and quartz monzonite lie at or very close to the surface. West of the Lakeshore Fault, volcanics extend down to a depth of at least 500' in the immediate vicinity of the Mine(USBM drilling), while south of the Slate Fault only volcanics are exposed at the surface. Magnetometer work suggests that the volcanics may extend no deeper than 200'or 300' south of the Slate fault, as there are some pronounced magnetic highs, presumably related to magnetite deposits in sediments, in this area.

In the Lakeshore Mine area there are a number of lesser faults also. The most important of these is the Lid Fault, a northeast striking, flatly southeast dipping thrust fault of unknown displacement; it thrusts quartz monzonite over the schist east of the orebody and perhaps over the orebody itself. It is probably post-mineral. From the difference in the structures at the Lakeshore Mine and those farther south, there is some possibility that the Lid Fault has a displacement of 2000' or more with most of the

bedrock exposures on the property being on the upper block of the thrust. The other faults at the Lakeshore have less than 200' displacement and strike northwest and dip southwest.

There are two types of ore in the sediments; magnetite replacements of impure limestone, with small amounts of copper and few contact metamorphic silicates, and higher grade copper mineralization associated with abundant silicates but no magnetite. In addition, there are scattered small showings of copper mineralization in quartz monzonite.

The magnetite mineralization is well exposed on the Isabella claim, where a bed or group of beds perhaps 20' thick at the contact between limestone and quartzite contains abundant magnetite. There is no evidence of strong shearing here: the magnetite was apparently localized simply by the presence of favorable beds, without any structural aid. Judging by the limited exposures and the evidence of the magnetometer map, the contact, which strikes south-southeast, carries strong magnetite, at least intermittently for a distance of 3000' or more south of the Isabella exposures (the line of magnetic highs extending from N 48,400, E54,200 to N45,500, E55,500 on the magnetic contour plan). Several dry rotary drill holes were drilled on the Isabella showing by a company preceding Transarizona; the logs of these holes are not available, but the cuttings are stacked beside the holes. All of the holes reached strong magnetite mineralization at depths of about 150', which is the expected depth considering the dip of the beds and the locations of the holes. Most of the cuttings from the magnetite zone in these holes contain several percent of pyrite with very sparse identifiable chalcopyrite; a sample taken from one pile of cutting, presumably representing 10' of hole, assayed 0.48% Cu (sampled by ABIII). Freeman reports that cuttings from another hole, one showing some oxidation in the magnetite zone, contains 3% to 4% Cu as native copper. On the surface most of the magnetite zone shows very little or no copper, except for a short length where two or three minor cross-faults offset the zone a few feet; here old time shallow workings explore relatively strong copper staining. The conclusion drawn from the Isabella showings is that magnetite mineralization, possibly with very low grade copper, is localized by bedding features (perhaps favorable beds plus bedding faulting), while stronger copper mineralization is localized within the magnetite zone by cross-faulting. It seems probably that there was a time difference between the deposition of the magnetite and the deposition of most of the copper.

The Lakeshore Mine, where 1,500,000 tons of 1.58% Cu are are blocked out, lies a couple of thougand north of the Isabella showing. The orebody is tabular mass striking N20°E and dipping about 50°E, 1500' long and averaging 50' wide, with a dip length of as much as 300'. Some of the ore contains a very large porportion of magnetite, particularly along the footwall, and Transarizona estimates that the entire orebody averages about 15% iron as magnetite. Much of the ore, however, contains little or no magnetite, according to Transarizona's drill logs and sections. All of the copper is present as chrysacolla or copper oxides and carbonates. The host rock of the ore is altered limestone and quartzite, with andesite on the footwall and schist on the hangingwall. The orebody lies along the Lakeshore Fault, and shearing is intense. At the bedrock surface, the schist-quartz monzonite contact lies 50 to 200' east of the ore outcrop and, dipping west, intersects the orebody at depth. The orebody partly ends against the quartz monzonite, but the sheared quartz monzonite contact against schist and andesite locally contains some copper mineralization.

Still & Still point out that the Lakeshore andesite -ore (sediments) relation is such that the contact between them must be overturned, and that the cutting off of the ore zone by the quartz monzonite is unusual for the district - in general, the bedding and structures along the west side of the stock dip away from the stock. This means that in the more ordinary case, the ore zone can be expected to persist in depth. The Isabella exposures suggest that the Lakeshore orebody is still more unusual; that the ore zone is actually a thin fault block of sediments made up of the

contact of quartzite and limestone that carries magnetite at Isabella, with in this instance schist faulted in against one side and andesite faulted in against the other. To carry the analogy a little farther, the relatively strong copper mineralization at the Lakeshore is essentially unrelated to the magnetite; instead, it is localized by the strong shearing of the pre-existing magnetite.

A few exploratory holes have been drilled on magnetometer highs between the Lakeshore and Isabella exposures, in an area where alluvium covers all geology. These holes (Nos. 213-219) penetrated varying thicknesses of limestone, and reached magnetite carrying about 0.5% Cu, all the copper being in oxide minerals. This is presumably mineralization like that at the Isabella, magnetite that has not had copper added.

The magnetometer map shows numerous magnetic anomalies besides those that can be definitely related to geologic features. One such is a pair of anomalies lying along a line 1000' east of the Isabella limestone-quartzite contact line; these anomalies lie close to the contact between quartzite and quartz monzonite and this contact may have localized magnetite bodies. On the Slate group in general are a number of anomalies, some of them south of the Slate Fault, which suggests that sediments lie at not more than 300' depth here; it is assumed that there are no magnetite deposits in the volcanics, since none have been found yet. One anomaly on the Slate group, that at N46,000 E 57,000, lies over an exposure of quartz monzonite that is somewhat more strongly mineralized with copper than the bulk of the intrusion.

North of coordinate N 52000 is a large area in which magnetic anomalies are numerous and large. Reconnaissance work shows that in this area certain beds of the alluvium contain relatively high percentages of magnetite- 5% or more over thicknesses of 10' and more. The magnetite is present in sizes from sand-grain size up to 2' diameter boulders. No copper mineral is visible in any of it. It seems very probable that the anomalies in this area are caused by the alluvial magnetite, and have no relation to bedrock geology.

The copper mineralization not associated with magnetite, exposed in the pits on the Slate group (at coordinates N 46000, E 58400 and N46000, E 59100) is, like the magnetite ore, entirely oxidized, and with the small exposures its localization is uncertain. There are indications, however, that most of the ore lies in a number of rather thin favorable beds close to their intersections with steep east to northeast striking strong shear zones. Contact metamorphism is much more widespread than mineralization. The limestone here may be considerably higher in the stratigraphic section than the limestone exposed at the Isabella; no quartzite beds are exposed, though there is some quartzite breccia along the south edge of the area. The bedding in this area, like the structure at the Lakeshore Mine, dips toward the quartz monzonite contact, but there is a fault block of schist between the two.

Minor silicified fractures are common in the quartz monzonite along the edges of the stock, and in places these fractures contain spots and limited films of copper stain. An isolated mass of quartz monzonite just west of the Slate pit area (at coordinates N46000, E57000) contains more than usual of these mineralized fractures, and also contains in places small spots of copper oxides disseminated through the host rock. There is no alteration of the quartz monzonite, and little iron-staining; this is not at all a porphyry copper, simply an area where there is a trifle more copper than elsewhere. A possbily significant feature is that here the fractures are only silicified, while elsewhere they are both silicified and somewhat epidotized.

<u>Ore Potential</u>: There is clear evidence that there were two stages of mineralization on the Transarizona property, and that the stages were separated by a time interval, probably not a large one. The early stage resulted in the formation of magnetite bodies with small amounts of pyrite and still smaller amounts of chalcopyrite; magnetite bodies in general assay about 0.5% Cu. The later stage was one of copper mineralization without formation of magnetite. The geologic features localizing the two stages of mineralization were not necessarily the same. At least some of magnetite

deposits were localized by favorable beds, as at the Isabella and the Lakeshore Mine, though other features, possibly faults, may have localized the magnetite causing some of the magnetic anomalies. The copper mineralization, on the other hand, was localized by shears, as at the Lakeshore Mine and the Slate pits. From the Isabella showings, one may suspect that the intensity of copper mineralization is directly related to the intensity of shearing. In some cases, as at the Lakeshore, mineralization of both stages was superimposed, producing an orebody with high magnetite and high copper values. In other cases, magnetite and copper were deposited separately, as at the Isabella, where a magnetite body was formed, and the Slate pits where copper ore was deposited.

This independence of magnetite and copper mineralization means that magnetic anomalies are not all guides to copper ore, though they may be of limited assistance. It is unlikely that the magnetite and copper are entirely unrelated, simply because they occur within the same district; more likely they represent only slightly different times in the mineralization sequence. This conclusion is suported by the general presence of a little copper with the magnetite. This being the case, any channelway that permitted deposition of magnetite could have stayed open long enough to permit copper deposition as well, so there is hope that at least some of the numerous magnetic anomalies will contain copper ore.

Since all of the known copper ore is associated with shearing, shear zones represent the best targets for exploration; if magnetite is associated with the shear zones, that improves the quality of the target. The Slate Fault and other east-west shear zones near it offer good targets in view of the Slate pit mineralization. The intersections of these shear zones with the Isabella limestone-quartzite contact offer perhaps the best targets.

There is a good chance that more orebodies like the Lakeshore can be found on the property; these may be smaller than the Lakeshore, however, as the magnetite zone - shear zone interesections that are inferred would be smaller. The potential for non-magnetic copper sulfide orebodies cannot be estimated, for lack of any evidence at all as to whether or not any are present, or their size or grade. Since copper mineralization is present, however, and favorable structures (shears) and rocks (Abrigo limestone) are known, there is at least a fair chance that copper orebodies can be found. In the southern part of the property, the sulfide mineralization at the Isabella and water standing at shallow depths in old shafts on the Slate group indicate that oxidation does not extend to excessive depths.

The most favorable part of the property is the triangle of known favorable ground between the Lakeshore and Slate Faults and the quartz monzonite stock. The area south of the Slate Fault might also be favorable, since the magnetometer work indicates that sediments lie at shallow depth. West of the Lakeshore Fault it is highly probable that andesite extends to depths beyond those to which geophysical techniques can probe. The north end of the property has numerous magnetic anomalies, but there is evidence that these are caused by alluvial magnetite; this area can probably be lumped in with the other areas west of the Lakeshore Fault as unfavorable.

The township that is to be opened for exclusive prospecting rights has largely unknown potential. This area is made up of the SW nine sections of T 10 S, R 5 E, the SE nine sections of T 10 S, R 4 E, the NE nine sections of T 11 S, R 4 E, and the NW nine sections of T 11 S, R 5 E. The northern two groups of sections have little potential, as the existing Transarizona property covers most of the favorable ground within them. The extent of favorable ground in the southern two groups of sections is probably large, but mostly covered by alluvium and volcanics; geophysical work will be necessary to evaluate it.

Recommendations: A tentative agreement has already been reached between Transarizona and Callahan, calling for a four month option, to be followed by a sliding-scale division of net profits if the option is taken up and the property brought into production. It has been estimated that the minimum cost of disproving the property with geophysical and geological work will

be about $15,000. The potential of the property is worth this much work.

Before the option begins, Transarizona is going to do $7,500 worth of drilling to satisfy assessment work requirements on the unpatented claims and the Indian lease. It has been tentatively agreed between Freeman and Baker that this drilling should include: (1) deepening of one of the holes between the Lakeshore and Isabella, originally stopped in magnetite when the water table was reached; (2) a hole west of the Isabella showings, to reach the magnetite zone at 500' or so depth; (3) a hole somewhere south of the Slate Fault to test the depth of the volcanics in this structural block; and (4) if enough footage is available, a hole on one of the magnetic anomalies at the north end of the property to see whether magnetite, or at least favorable rocks, underlie this ground. The first two of these are most important to Transarizona, the last two to Callahan.

The further exploration most vitally needed by the property is geophysical work. The existing magnetometer survey appears to have been competently done, and need not be repeated. Transarizona has, in addition to the magnetometer map, graphs along each magnetometer traverse; a restudy of these by whoever does the new geophysical work would be worthwhile. For new geophysical work, electromagnetic techniques would probably be most effective, with perhaps some resistivity and/or self-potential surveys to follow as checks. The triangle of favorable ground between the Lakeshore and Slate Faults should be covered with quite close traverses; the less favorable ground south of the Slate Fault may need less thorough coverage, depending on whether Transarizona drills in this area and what the results are. The ground west of the Lakeshore Fault needs only a few widely-spaced traverses to be sure we are not missing something.

The existing geological maps of the property, on scales of 1"= 200' and 1" = 400', by Wisser & Cox, are adequate for an overall picture of the property, but these maps were made using as a base the transit lines run for the magnetometer traverses, and no topography is shown and only the gross outlines of the geology were mapped. More accurate and detailed work with a plane table needs to be done, particularly on the belt of exposed sediments several hundred feet wide surrounding the southwest edge of the stock. This work can be done concurrently with the geophysical work; the field work for both jobs should take about two months. When the geological mapping is well along, half a dozen strategically placed bulldozer cuts would be very valuable.

Theoretically, no exploration work is supposed to be done on the township surrounding the property that is to be opened for exclusive prospecting. The county is isolated, however, and some reconnaissance geology and a few magnetometer traverses could be done on it without much danger of trouble. If a mobile magnetometer is available, a couple of days field work with that would probably be emough; a week's reconnaissance should cover the geology fairly well.

Summary and Conclusions: On the Transarizona property, magnetite and copper mineralization occur in Paleozoic sediments around the southwest edge of a quartz monzonite stock. There was a slight difference in the time of deposition of the two kinds of mineralization, and the presence of magnetite is not necessarily an indication of the presence of copper and vice versa. One known geologic feature localizing magnetite mineralization is the sedimentary contact between quartzite and limestone; there are no doubt other features that have localized magnetite. The magnetite is generally accompanied by sub-economic copper, averaging about 0.5% Cu. Higher grade copper mineralization is localized by shears; where these shears coincide with magnetite orebodies, magnetite-copper orebodies, such as the Lakeshore orebody, can be expected, but elsewhere copper orebodies without magnetite exist, though no large ones are known yet. Thus, magnetic anomalies are not necessarily guides to copper ore, though they have some significance in that they do indicate magnetite mineralization, and copper mineralization may have followed the same channelway in any given instance.

The best prospecting ground on the property is a triangular block with an

area of about one-half square mile in which favorable rocks (sediments) are known to lie at the surface or under a thin cover of alluvium. This block is bounded on the south and west by faults and on the northeast by the main body of the quartz monzonite stock. West of the favorable block, unfavorable Cretaceous volcanics extend to depths beyond the range of geophysical techniques. South of the favorable block, magnetometer work indicates that sediments may lie at not excessive depths, beneath a cover of volcanics.

The property has good chances of containing more orebodies similar to the 1,500,000 ton 1.58% Cu Lakeshore orebody, but these orebodies are likely to be smaller than the Lakeshore orebody because of the nature of the structural loci. On the basis of the presence of favorable structures and rocks, there is a fair chance that orebodies of better copper grade, perhaps without magnetite, may be found. In the southern part of the district, sulfides should extend to within one or two hundred feet of the surface.

A tentative agreement has been reached between Transarizona and Callahan, calling for a four month option period to allow for preliminary exploration, to be followed by a profit-sharing setup if the property is brought into production. Estimated cost to disprove the property is $15,000, which the potential of the property is worth. Before any drilling, the property needs further geophysical work, probably electromagnetic, and more detailed geologic mapping of at least the block of favorable ground.

During the period of the option the surrounding township will probably be offered for competitive bidding for exclusive prospecting rights. At the moment, it appears that the existing Transarizona property contains all of the favorable ground in the northern half of the township. In the southern half of the township there are extensive areas of favorable sediments, largely covered by alluvium; this part should be reconnoitered geologically and geophysically.

/s/ Arthur Baker III
Arthur Baker III

Property examined 4-3-58 - 4-17-58
14 days

ABIII:lf

Walt

F

13 May 1958

Dr. M. G. Edwards
2154 N. Villa Heights Road
Pasadena 8, California

Re: Joint venture - Callahan Zinc-Lead and Shattuck-Denn.

Dear Guy:

Many thanks for your note of 10 May 1958.

Examination of the Transarizona Lake Shore property and the Wisser-Cox report has been made. A summary is as follows:

1. Newest large production is Silver Bell, about 22 miles ESE across bolson valley.
2. Rest of the area, production has been small or marginal, but numerous shows exist in every direction, including Vekol Mountains 13 miles across valley W-NW.
3. Most of production from the whole area has been oxidized copper and silver, or low grade gold, often associated with considerable limonite or hematite, occasionally considerable silica and sometimes garnet and magnetite, usually as limestone replacements, fracture-fissures or igneous contacts. Sulfides are present only around the deeper workings (below 200-300 feet), which are rare. Vekols have produced some sulfide Cu, Zn and Pb.
4. Lake Shore area proper appears to be schist and/or sediments (much eroded and covered) flanking a large ridge of granite or quartz monzonite. In some places the meta-sediments appear to be pendants between andesite and granite.
5. No good contacts were seen, but relationships suggest post-mineral faulting to me.
6. Terrain factors and magnetite associations are adequate for a fair McMag application, especially since both lateral and depth problems are indicated.
7. S.P. and E.M. methods would require testing over known deposition to determine response and applicability.
8. Further consideration with Callahn is recommended, contingent on determing exact terms available. This is being explored as per attached letter copy to Joe Hall.

Regards,

Walter E. Heinrichs, Jr.
Manager

WEH/pr
Enc: 1
cc: A. C. Rubel

Walt

13 May 1958

Mr. Joseph T. Hall, President
Callahan Zinc-Lead Company, Inc.
100 Park Avenue
New York 17, New York

Re: Joint venture - Transarizona Lake Shore property.

Dear Joe:

We examined the Lake Shore area last week, and there is a possibility we could contribute significantly to the proposed program.

Naturally, our ultimate decision to join your effort will depend on a detailed determination of final arrangements along the lines of our last luncheon discussion on 21 April at Tucson, wherein we contribute personell and/or equipment, etc., but no cash money, with a participation in profits, if any, and an option for a larger working interest, if desired.

Let us know current status of developments. We will need approximately three weeks notice after final agreements to get really underway with any field work.

With best wishes and regards,

Sincerely,

Walter E. Heinrichs, Jr.
Manager

WEH/pr
bcc: M. G. Edwards
A. C. Rubel