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2

File
Superior
Demetrie
Proj.

Demetrie WASH
Project
FOR
Superior Oil Co.
Minerals Div.

Remarks: Bear

E

E

E

W

E

E

E

E

E



ORIGINAL COPR. 1916 BY C. PARKER

LEFAX PHILADELPHIA 7, PA., MADE IN U.S.A.

LINE	A	T	D.	A.		
			F.	H.		
			R.	P.		
Sta.	F.S.	B.S.	STAD.	✓	DIST	HA
			INT.	X		
Sec. C. 3/18 14/19	A-5	Fence LINE	5.00	4°	500	0
	T.P. 1		9.20	1°	920	0
T.P. 1	A-10	13/18 14/19	0.82	7°	82	0
	A-15	"	5.80	3 1/2°	580	0
	T.P. 2		7.30	3°	730	0
T.P. 2	A-20		3.5	4°	350	0
	A-25 (T.P. 3)		8.5	1/2°	850	0
A-25	T.P. 4	Fence LINE	6.25	4°	625	0
T.P. 4	A-30	set by chain			125	180°
	A-35		3.75	0°	375	0
	T.P. 5	✓	6.10	3°	610	0
T.P. 5	A-40	CLAIM CORNER	2.65	5°	265	0
	T.P. 6		5.20	4°	520	0
		T.P. 6 also on trail rd. bearing along ridge				
TP 6	A 45	TP 6 A-40	2.55	2°	255	0
	TP 7		4.00	3°	400	0
			1.45			
TP 7	TP 8	TP 6	1.80	3°	180	0
			3.25			
TP 8	A 50	TP 7	1.75		1.75	0
	TP 9		2.60		260	0
	Middle of Twin Buttes Rd					

1

280
85
195

330
50

280

Bene

E

W
E

LINE A

2/7/64

H	H
DIST	Δ
TR. & REG. U.S. PAT. OFF.	

STA F.S. BS. SI. $\frac{V}{A}$
 85' TP 9 Sec Core A50 Chained In $\frac{1817}{19120}$

\swarrow T.P. 36 (corrected - see Line "X" Notes)

~~$\frac{1718}{19120}$~~ TP 10 TP 9 2.80 2° 280

TP 10 Δ_{2500} ~~$\frac{1718}{19120}$~~ 2.20 0° 220

Δ_{2500} Δ_{210} TP 10 5.00 0° 500

Δ_{210} EAST SIDE OF Trail Rd Br. NW
 Δ_{210} TP 13 ~~Δ_{215}~~ 5.75 3° 575
 Lucero CLAIM Post 320' 10' No. of LINE
 CLAIM Post 40' NORTH OF TP 13

TP 13 Δ_{215} Δ_{210} .75 2° 75

TP 13 TP 14 Δ_{210} 3.80 2° 380

TP 14 Δ_{20} TP 13 .45 1° 45

TP 14 Δ_{25} TP 13 5.45 3° 545

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BEARING

CLAIM Post 500' So $\frac{13}{19} \frac{18}{19}$ SOUTH

T T

S

CLAIM Post N32E 42' Z19-25 S

N
S

Z19-40 75' South of Trail Road & GATE
40' EAST of N-S FENCE LINE
Power Line 9' West of STA
ON A N5°W BEARING
TRAIL IS ON A S65°E BEARING

Z19-45 N35E 90' to a CLAIM Cor.

TP17 DIRECTLY UNDER POWER LINE

TP18 48' EAST OF FENCE LINE S

Z30-5 So. Edge of Rd. No Edge
of ROAD FARM FENCE LINE
NW-SE LINE S

Sec 19 LINE Z

2-10-64

STA	FS	BS	ST.I.	Δ			TE. MK. REG. U.S. PAT. OFF. DIST
13/18 24/19	90°	Along Fence					
Z19-5		Chained					
Z19-10			10.0	1°	1000'	90°	
Z19-10	Z19-15	13/18 14/19	5.0	3°	500'		
Z19-15	Z19-20	Z19-10	5.05	6°	500'		
	Z19-25		10.00	2°	1000'		
Z19-25	TP 15	13/18 24/19	6.50	9°	630		
	TP 16		9.20	6°	910		
	Z19-30				130		
	Z19-35				90'		
TP16	Z19-40	Z19-25	5.90	2°	590'		
Z19-40	Z19-45	Z19-25	5.00	0°	500'		
	TP.17		6.30	0°	630'		
TP 17	Z19-50	Z19-25	3.70	2°	370'		
	24/19 25/30		6.50	1°	650'		
	TP 18		8.70	1°	870'		
TP18	Z30-5	Z19-25	2.80	5°	2.80		
	TP 19		7.40	2°	740		
TP 19	Z30-10	Z30-5	Chained		In		

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BEAR

S

S

CLAIM POST 145' EAST OF E
A₂ 25 F 18' NORTH OF STADIA
LINE "Lucero SE 84 SW 81
NE 85 NW 80
CASIRAGHI & HENDERSON E

E

E

2-10-64

LINE Z

STA	F.S.	B.S.	ST. I.	V Δ	DIST	Δ
			5.40			
TP19	Z30-15	Z30-5	5.60	10°	540'	0
	Z30-20		10.50	6°	1040'	
TP 20		Z30-20	4.30	10°	417	417
	Z30-25	Chained In			83	
Q Cor	Z5/30		2.25	6°	2.23	

LINE A

Δ ₂ 25	TP21	TP14	2.40	10°	240'	0
TP21	Δ ₂ 30	Δ ₂ 25	2.60	0°	260'	0
Δ ₂ 30	TP22	TP21	2.00	10°	200	0
TP22	Δ ₂ 35	TP23	3.00	0°	300	+12' HEAVY BRUSH
TP23	Δ ₂ 40	Δ ₂ 35	4.88	10°	488'	0
Δ ₂ 40	Δ ₂ 45	TP23	5.00	20°	500'	0
	Δ ₂ 50		10.00		1000'	
Δ ₂ 50	+	Δ ₂ 40	2.80	10°	280'	0

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755
170

685

162
280

442

BEARING

N

ROAD 50' NORTH OF Y17-5
ROAD BEARING S45E

N



N

N

CLAIM POST 148' S60E
OF TP#26

S
N

84' SOUTH TO ROAD FROM TP#27
ROAD RUNS S 75 E
N 45 E 237' TO CLAIM COR

TR. MK. REG. U.S. PAT. OFF.
DST A

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STA	FS	BS	S/I	V	D	DIST	A
1718 19120	TP24	90°	Δ50	2.55	6°	253'	0
TP24	X17-5	1718 19120		2.50	6°	247'	0
X17-5	X17-10	1718 19120		5.00	10°	500'	0
	X17-15			10.00	10°	1000'	
X17-15	TP25	X17-5		3.30	3°	330'	0
TP25	X17-20	X17-5		1.70	3°	170'	0
	TP26			8.55	1°	855'	0
TP26	X17-25	X17-20		1.85	3°	185'	0
	X17-30	✓		3.15	4°	315'	0
	X17-35			8.15	1°	850'	0
X17-35	TP27	TP26		2.40	6°	238'	0
TP27	X17-40	X17-35		2.62	0°	262'	0
	X17-45			7.62	0°	762'	0
X17-45	TP28	TP27'		3.40	5°	338'	0
TP28	X17-50	TP27		1.62	10°	162'	
	718 1817			4.42	10°	440'	
Rock CAIRN	N 53° 14' W			1.00		100'	
Post	N 75° 43' E			2.20		220'	

USED POST AS ASSUMED
Section Cor

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BEARINGS

N 20° W

103' NORTH TO CLAIM COR FROM
OUR QUARTER COR X8 LINE

100' NORTH TO CLAIM COR FROM
X8-20 ✓

142' SOUTH TO CLAIM COR
FROM X8-15

QUARTER CORNER ^{29/28} FOUND S
IN FIELD AT END V29 LINE

S

S

S

S

* Angle changed to 90° 21'
BEARING N-S

Sta	F.S.	B.S.	ST.I.	Δ	DIST	Δ
718 1817	TP29	M-50	3.90	2°	390	0
718 1817	X8-5	Sec Cor EAST	5.00	2°	500	V2°W
X8-5	TP29	Sec Cor SOUTH	3.30	10	330	0

REMAINDER OF LINE X8 CHAINED

TP33	1716	2121	Δ_3	50
1716	2021	3.5	Δ_2	50

All Δ_3 's were Chained

LINE "V"
 TURNED 90° from CLAIM POST *
 1320' Due EAST.
 BEARING N01°30' W

LINE "V" WAS ALSO CHAINED

2021 2928	TP30	CLAIM POST	CHAINED	160' * 90°
--------------	------	------------	---------	------------

V29-5 - V29-25 1/4 QUARTER CORN 29/28

TP30	CLAIM POST	2021 2928	5.10	8°	1
------	------------	--------------	------	----	---

TP31	CLAIM POST	1200' Ch	6' EAST OF LINE	1314
------	------------	----------	-----------------	------

CLAIM POST

502°38'
 OF LINE

Drill Hole by $\frac{20}{21}$
SO 40 EA 81 ft from TP 30 $\frac{29}{28}$

Bearing

LINE "V" Chained

NORTH

$\frac{20}{21}$
 $\frac{29}{28}$

USED CLAIM COR 1320'
EAST TO TURN ANGLE
OF 90° 21' FOR A TRUE
N-S BEARING ON "V"
LINE

Tied INTO Q.C. 1½' Short N.

ROAD 42' SOUTH OF V29-25
BEARING N80W

QUARTER CORNER 20-21
SCRIBED ROCK LOCATED
IN FIELD. DISTANCE LONG
BY 5 ft. 11' EAST OF LINE
SWUNG IN LINE WITH Q.C. & S.C.
POSTS ALONG "V" AT 1320' INTERVALS

CLAIM POST 300' N OF S2V20-30

Fallen Post 30'S OF V20-40

LOCATED S. Cor $\frac{17}{20}$ $\frac{16}{27}$ IN
FIELD 219' EAST OF
TP#33 ON "Δ" LINE
Sec. Cor. Scribed Rock With
CAIRN, & Post

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STA FS BS S.I.

V
4

CLAIM
COR EAST
N-S LINE
FOR C. C.S.

90°21'

~~20/21~~
29/28

V20-5

V20-10

V20-15

V20-20

V20-25

TP 32

TP 32

V20-30

~~20/21~~
29/28

V20-30

V20-35

TP 32

V20-40



V20-40

V20-45

V20-35

V20-50

~~17/16~~
20/21

DISTANCE WAS 5' SHORT
ON LINE "V". from ~~20/21~~
29/28

~~17/16~~
20/21

V17-5

V20-50

V17-10 & 15*

V17-5

TP #34

~~17/16~~
20/21

CLAIM POST 250'S, 50' W of V17-15

TP 34

V17-20

V17-5

V17-25

QC

ROAD 30' So. of Qu. Cor 17-16
BEARING E-W TERMINATES ON TWIN
BUTTES ROAD APPROX 700' SOUTH
of Duval ROAD

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185

BEARING

N

Occupied Post IN ROCK
CAIRN AT $\frac{8}{17} \frac{9}{16}$, USED
ASSUMED SECTION
CORNER $\frac{7}{18} \frac{8}{17}$ AS B.S. FOR
Angle. N $144^{\circ} 16' 30''$ E AND
183 ft TO OUR LINE

N

POWER LINE BEARING S 50 E
AT STA 1843

STA 2155 BANNER
CLAIM MARKER 40' DUB
EAST

N

N

$\frac{17}{9} \frac{18}{20}$

RELOCATED 220 ft EAST OF
OLD LOCATION. OLD STAKE
REPLACED WITH TP #36
NEW $\frac{18}{19} \frac{17}{20}$ IN MIDDLE OF
WASH 60 ft WEST OF
TP #10.

S

TWIN BUTTES ROAD 330 ft SOUTH
OF $\frac{18}{19} \frac{17}{20}$

ROAD 800' SOUTH OF SEC COR
BEARING N-S

STA F.S. B.S. S.I. \checkmark

QC Cor 17-16 V17-30 V17-25 DISTANCE Chained

V17-35
V17-40
TP 35

TP35 V17-45 QC. 17-16

17-50
Sec Cor.
819
1716

POST IN CAIRN 718 819 1.85 6° 183 144° 16' 30"

POST IN CAIRN V8-5 718 18117

-10
-15
-20
25

90°

QUARTER CORNER 8-9

LINE "X"

1817 TP37 TP10 19120

90°

TP 37 X19-5 1817 19120

X19-10 Drill Hole 109ft EAST N 75E
X19-15 ROAD 60° SOUTH
TP 38

300'

TP38 19-20 TP37

~~2140 QUARTER CORNER~~

19-25

BEARING

SOUTH

CLAIM POST N40 W 50'
FROM TP 39

ROAD 67 ft SOUTH OF X19-40
BEARING S 75 E

STA X4162 - Drill Hole 40' S 85 W

STA X4647 Drill Hole N50W 36 ft

5160 ROAD BEARING S 50 E
CLAIM POST & Drill Hole N50W

X30-8 Drill Hole S 30 W 93 ft

LINE "X"

2-13-64

Sta F.S. B.S. St.I. Δ

TR. MK. REG. U.S. PAT. OFF.
DIST HA

TP38 X19-30 P37
TP39 Drill Hole 75' N85E

TP39 X19-35 TP38

X19-40

X19-45

X19-50

19120
30129

SECTION CORNER

X30-5

TP40

TP40 X30-10 X30-5

30-15

30-20

TP41

TP41 X30-25 TP39

X30-26 40 QUARTER CORNER 30-29

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Rebolutions & Adjustments

2-14-64
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All of our original stations in Section 18 Line "A" check. Did not move any except Sec. Cor $\frac{18+17}{19+20}$; which was moved 220 ft EAST for closure purposes. Section 19 is 5500 ft. long. Also, moved all stakes in sections 17 & 16 220 ft EAST EXCEPT TP'S, which were left as is.

QUARTER CORNER 16-21
Discovered in Field (Scribed Rock)
40 ft NORTH of line
DISTANCE GOOD within ± 5 ft.

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March 31, 1964

The Superior Oil Company
P. O. Box 12487
Tucson, Arizona

Attn: Mr. Al Stone

Dear Al,

Enclosed you will find: 1 original and 2 copies of report on the Induced Polarization survey, Demetrie Wash Area, Pima Mining District, Pima County, Arizona each containing:

6 Sectional Data Sheets in red tab map pocket for Lines U, V, W, X, Y and Z

4 Plan Contoured Maps in zipper map pocket,
Sheet 1 of 4: Percent Frequency Effect Inductive
Coupling corrected
" 2 of 4: Metallic Conduction Factor
" 3 of 4: Apparent Resistivity
" 4 of 4: Percent Frequency Effect - Uncorrected

Sepia and mylar reproducibles will follow under separate cover.

In looking at the contoured results, it should be realized that, in general, the highest contoured areas are not directly over the strongest subsurface zones. This is explained in more detail in the appendix to the text and is due basically to the fact that in order to obtain penetration it is necessary to have a large horizontal separation between sender and receiver.

The proposed drill sites were selected on the basis of our meager and inaccurate knowledge of previous drilling in the area and limited geology, along with a good

C
O
P
Y

Mr. Stone - March 31, 1964 - Page 2

ma idea of the sulfide distribution. The I.P. work gives a map of the sulfide distribution and by combining this with the resistivity data we end up with a rough idea of the gross geology.

Because of the large size of this sulfide zone, many more targets are available than we have selected. We have picked a few that we feel are good bets.

Definitely gravity and possibly more detailed magnetics and even more induced polarization could be of considerable help in further narrowing the target area, especially after comparing the geophysical data with some known drilling results.

Sincerely,

HEINRICHS GEOEXPLORATION CO.

Chris S. Ludwig

Chris S. Ludwig

CSL:cp

COPY

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INDUCED POLARIZATION SURVEY

**Demetrie Wash Area
Pima Mining District
Pima County, Arizona**

February - March 1964

**for
THE SUPERIOR OIL COMPANY
Minerals Division**

by

**HEINRICHS GEOEXPLORATION COMPANY
P. O. Box 5671 Tucson, Arizona**

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In Red Tab Map Pocket

6 Sectional Data Sheets - Lines U, V, W, X, Y,
and Z

In Zipper Map Pocket

4 Contour Plans:

Percent Frequency Effect Coupling Corrected

Metallic Conduction Factor

Apparent Resistivity

PFE Uncorrected

INTRODUCTION

At the request of The Superior Oil Company, Minerals Division, Heinrichs Geoexploration Company has conducted and completed induced polarization field work during the interval of February 10 to March 25, 1964 in the Demetrie Wash Area, Pima Mining District, Pima County, Arizona.

A total of fifteen spreads, making up six lines on a 1000 foot dipole spacing were run, giving 135,000 feet or 25.6 miles of line surveyed and 105,000 feet or 19.9 miles of subsurface data plot points. The data were taken on a dipole-dipole electrode configuration using the dual frequency technique.

In addition to the above spreads, four expanding dipole-dipole spreads were completed as a separate project; however, the results will be mentioned in this report.

The data are presented on sectional data sheets, one for each of the six lines. A plan map is included to show the line and spread locations and the surface projection of the interpretation. Plan overlays giving the third separation contoured results of resistivity, PFE, MCF and inductive coupling corrected PFE's are also included.

Personnel involved in this job were Mr. C. S. Ludwig, geophysicist in charge, F. F. Hanly, K. Hensen, R. Palmer, D. Anderson, M. Padilla technical field assistants. Mr. W. E. Heinrichs, Jr. and Mr. E. G. Heinrichs assisted in the final interpretation of results.

CONCLUSIONS AND RECOMMENDATIONS

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1. A definite zone of perhaps 1% to 5% average total sulfide by volume, was encountered. It trends N 65° W - S 65° E for at least 12,000 feet, is about 5,000 feet wide at the known western limit, narrowing to about 1,000 feet or less at the eastern end. The sulfide source width is of course less than the anomalous zone being about 3,000 feet wide to the west, narrowing to less than 1,000 feet to the east.

2. These sulfides appear right at or very near the bedrock-alluvium interface which is about 200 feet below surface on the western most line deepening to around 500 feet to the east. The north and south interfaces generally are fairly sharp and dip steeply away from the zone.

3. The grade of the sulfides appears quite uniform throughout the entire anomalous zone and does not show any marked improvement in depth or any significant enriched zone.

4. An interesting minor anomaly appears from about 2.5S to 8.5S on Line X that may indicate a concentration of sulfides at depth, (750 ft. +/- 250 feet below surface) not on the main anomalous trend. We therefore recommend an I. P. spread on 1,000 foot spacing be centered at 5.5S Line X and oriented N 70° W - S 70° E in order to better resolve a potential drilling target in this area. This particular orientation was chosen so as to keep the effects of the

main anomaly at a minimum to better isolate this minor anomaly.

5. If it is not chosen to run the I. P. line mentioned above in No. 4, a vertical drill hole based on the existing data should be placed at or near 6.0S Line X and be drilled to around 2,000 ft. in order to fully evaluate the economic potential.

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P
Y

6. As the western extremity of the main anomaly is completely open to west--apparently continuing in full strength--additional I. P. work in this area would be of considerable value in further delimiting this sulfide zone. Therefore, we recommend a north-south 1,000 foot dipole spread be centered at $\frac{1}{2}$ cor. Sec. 13/24 (about $\frac{1}{2}$ mile west of Line Z) if it is feasible to cross the Duval tailings pond in this area. If this is impractical, an alternate spread on the same spacing could be centered 800 feet south and 1,400 feet west of Sec. Cor. $\frac{13/18}{24/19}$, oriented N 70° E - S 70° W to avoid the tailings pond. Pending results, additional spreads even further west may be deemed important.

7. Drilling on the main anomalous trend and fringes should be limited to areas where the Bear Creek drilling was shallow and/or sparce. This gives several possibilities especially near Lines Y and Z. One would be 1,000 feet east of 1N, Line Z and another at 1,500 feet east of 1.5S, Line Z. Both holes should be drilled to around 2,000 feet.

8. The northern fringe noted on Lines X and Y would make good drilling targets. On Line X, a hole at 0 N/S drilled to

2,000 feet is recommended. On Line Y, the fringe could be tested at 2.5N by drilling to 2,000 feet.

9. The four expanders run in Section 8 and 18 north of the main anomaly were probably testing this area down to 2,500 feet below surface to which no sulfide mineralization above background was encountered.

10. Considering the large size and possible depth extent of this sulfide zone, and neglecting the areas already drilled, there is room for fifty or more 50,000,000 ton low grade ore bodies; therefore, to completely eliminate this occurrence as to economic significance would certainly require extensive drilling, or, at least some type of statistical approach short of saturation.

INTERPRETATION

Line U: No anomalism was encountered on this line except for effects that were due solely to inductive coupling interference resulting from the rather low resistivities especially on Spread 1.

Resistivities indicate a depth to bedrock of about 500 +/- 100 feet from 5.5N to the north end of the line. From 5.5N to the south, resistivity decrease indicates that either the alluvium deepens considerably or the rock type changes to one having little contrast with the alluvium--in which case no depth estimate can be made. At 3.5S to the south end of the line, another character change is present; the resistivities drop even further to a value most likely

due to a thick section of water saturated alluvium.

Line V: Strong metal factors and frequency effects appear especially on Spread 3. These effects are undoubtedly due to inductive coupling resulting from the quite low resistivities in what appears to be an alluvial trough from about 5.5S to 8.5S. Similar effects likely account for interest in the area nearby to the east, reportedly drilled by American Metal Climax. Upon correcting for these interfering effects, a minor anomaly remained apparently reflecting a sulfide source around 3S to 4S perhaps 500 Ft. +/- 100 ft. below surface. This zone is probably the easternmost extension of the large anomaly noted on the lines to the west and may actually only be a lateral effect due to the eastern nose of the main anomaly being several hundred feet west of this line.

From 0.5S to the north end of the line, resistivities indicate bedrock to be 500 ft. +/- 100 ft. below the surface. South of 0.5S the rock type changes or the alluvium deepens as was noticed on Line U. The probable alluvial basin from 5.5S to 8.5S was already mentioned in connection with the inductive coupling effects noted on this line. This basin is likely 750 to 1,000 feet deep with volcanics as the probable basement material.

Line W: Anomalous frequency effects and metallic conduction factors were found on this line from about 1.5S to 3.5S definitely due to sulfide mineralization. These effects are interpreted as due to a nearly vertical dipping dike-like zone of around 1,000 feet

in width and having a sub-outcrop 400 ft. +/- 100 feet below surface. The sulfide content is from 1.5 to 3 percent by volume showing no noticeable improvement with depth nor any significantly enriched zones.

Again, as on Lines U and V, inductive coupling effects were noticed, especially south of the anomaly because of reduced resistivities. The same rock types, structures and alluvial basin were encountered as on Line V but displaced 2,500 feet to the south indicating a northeast strike as opposed to the anomaly's northwesterly trend. Bedrock gradually rises to the north from the anomaly, being probably from 200 to 300 feet deep over most of Spread 2.

Line X: Again, anomalous frequency effects and metal factors were encountered. The strongest effects are from about 0.5 to 1.5S and moderate response 1,000 feet north and south of the strong zone. A weakly anomalous zone extends from 2.5S to 8.5S. The moderate to strongly anomalous zone is assuredly due to sulfides perhaps 2 to 3 percent by volume. This sulfide body is from 1,500 to 2,000 feet in width and buried 250 ft. +/- 100 ft. below surface. Again, as on Line W the zone is dike-like and has fairly steep dipping flanks; however, the sulfide mineralization may fringe out past the boundaries mentioned above. To the north, this fringe may be quite extensive--say out to 8.5S but more than likely, these fringing effects are due to a zone, perhaps discrete from the main

anomaly, several thousand feet in width and buried from 500 to 1,000 feet below surface somewhere between 3S and 8S. This lack of definite position is due to interfering effects from the main anomaly, greater depth of burial and inductive coupling complications.

Resistivities show the same rock types as on Lines U, V and W but again displaced about 2,500 feet south (relative to Line W).

C
O
P
Y
This line got only far enough south, however, to detect the very northern edge of the alluvial basin. To the north of the anomaly, bedrock rises to less than 250 feet below surface on Spread 2.

Line Y: Anomalous frequency effects and metallic conduction factors were again encountered reflecting definite sulfide concentration of from 2 to 3 percent average by volume, in a zone about 3,000 feet in width and buried 250 ft. +/- 100 ft. The south boundary of this zone is quite steep and sharp. No extension of the minor anomaly on Line X was detected. The north flank does have a fringe which may extend out to 3N.

Resistivity shows the depth to bedrock to be quite uniform north of the anomaly--staying less than 250 feet below surface. To the south, the same features as were noted on the lines to the east were found except the alluvial trough, probably because the line didn't get far enough south.

At 12N, a high resistivity material was noted; perhaps due to a limestone or quartzite. This material was not encountered elsewhere on this survey.

Line Z: This line, being only one spread, was not long enough to definitely define the limits of the anomalous zone. However, the strongest effects are from 0 N/S to at least 2.5N and are due to sulfides of 2 to 3 percent by volume. The south flank has a sulfide fringe perhaps 1,000 or 1,500 feet south of 0 N/S. The resistivities show a rock with high resistivity at about 750 feet below surface from about 0 N/S out, to the north end of the spread. This rock is probably granitic and is mineralized to the same degree as the more typical prevalent volcanic (?) host rock encountered on the other lines. The depth to top of sulfides and bedrock is from 150 to 250 feet below surface.

Respectfully submitted,

Chris S. Ludwig

Chris S. Ludwig
Geophysicist

Approved:

March 30, 1964
P. O. Box 5671
Tucson, Arizona

Walter E. Heinrichs, Jr.
President & General Manager

3/25/64

S.O.D. Spec.

2 x expanders or 4 single
expanders - 1 pair X'ed in N & S
areas (1 & 3?) not middle area (#2?).

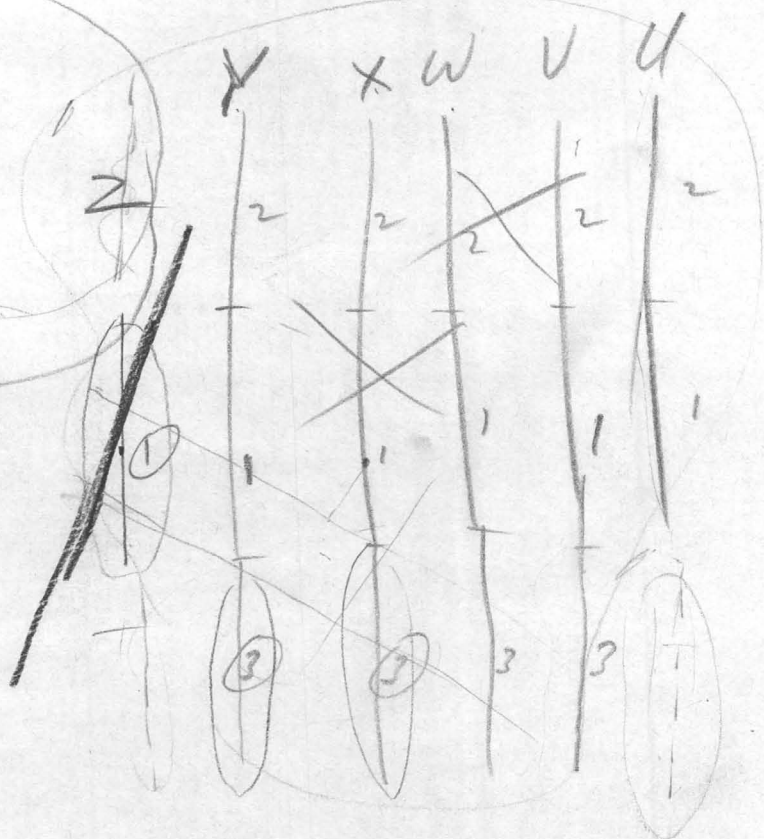
\$300⁰⁰ each or \$600⁰⁰/pair or \$1200⁰⁰ total.

NRN, E.G.H. & C.S.L.

"50D"

1^N

3/14/64



○ To be completed

Chris, Gorr
Walt, Keith

DETACH STATEMENT BEFORE DEPOSITING

NO RECEIPT NECESSARY

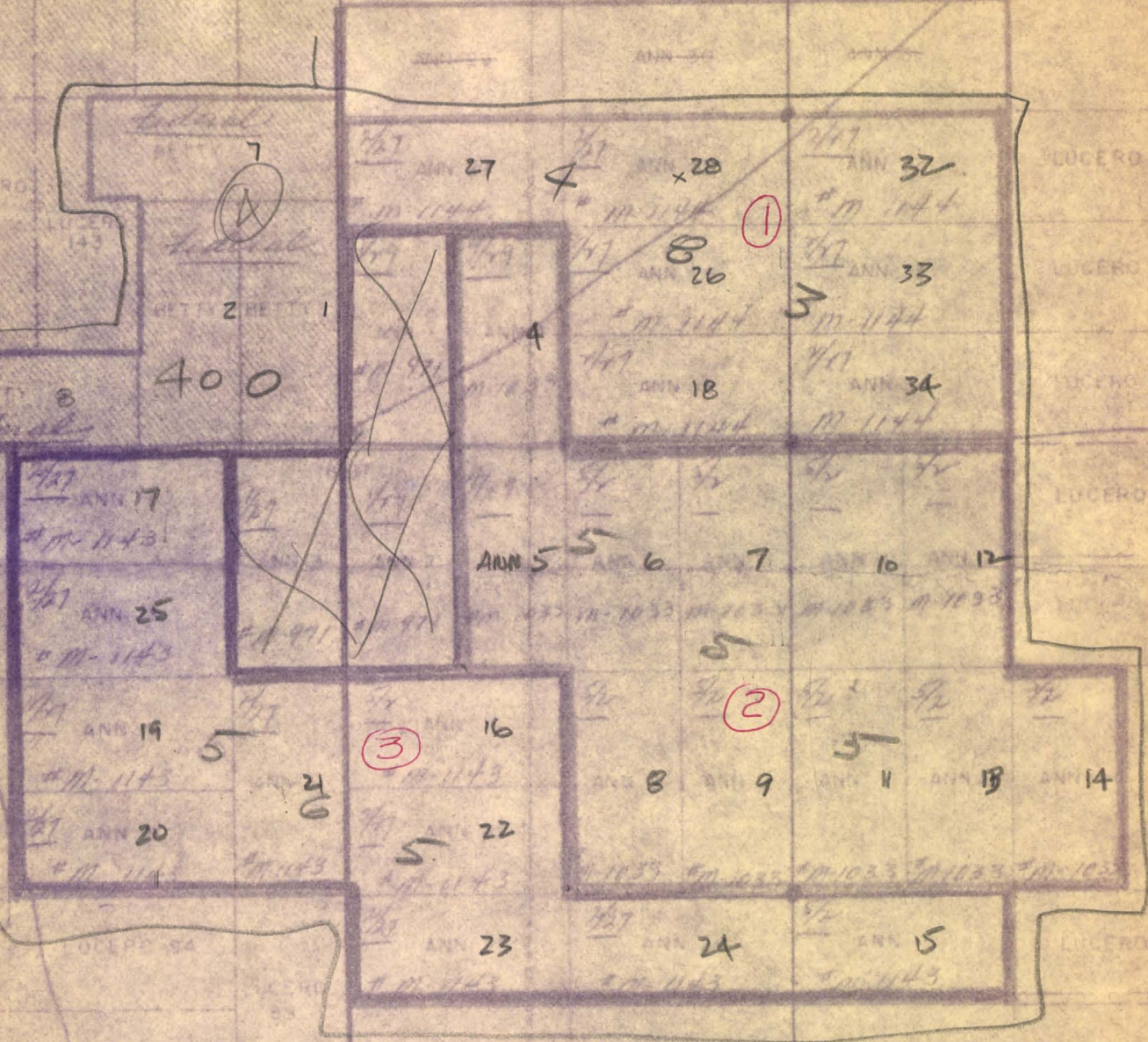
No. 7464

THE SUPERIOR OIL COMPANY
P. O. BOX 1521 - HOUSTON, TEXAS 77001

DO NOT CHANGE OR ALTER
THE ATTACHED CHECK IS IN PAYMENT OF THE FOLLOWING:

DESCRIPTION	VENDOR NUMBER	DATE OF INVOICE	AMOUNT OF INVOICE	DISCOUNT	NET AMOUNT
Services Rendered in Feb., 1964 <i>I.P. Demetrius</i>	37822	3-03-64	\$2,555.00		\$2,555.00





X NOT TO be considered

① PARCEL NO

SoD-Spec



Line 4

Line 3

Line 2

Line 1

ANN 15
ANN 24
ANN 28
ANN 33
ANN 43
ANN 44
ANN 45
ANN 47
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ANN 58
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ANN 91

15

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1603 - 3 Bads.

400

Fed.

2003

4200
4

2.
2.6
3.4
4
10
78
4
8.8

	Grav.	Mag.
Line 1	11 sta	
" 2	11 "	
" 3	11 "	
" 4	11 "	
"		

50 sta Grav.

44 sta

2000
2000
1000

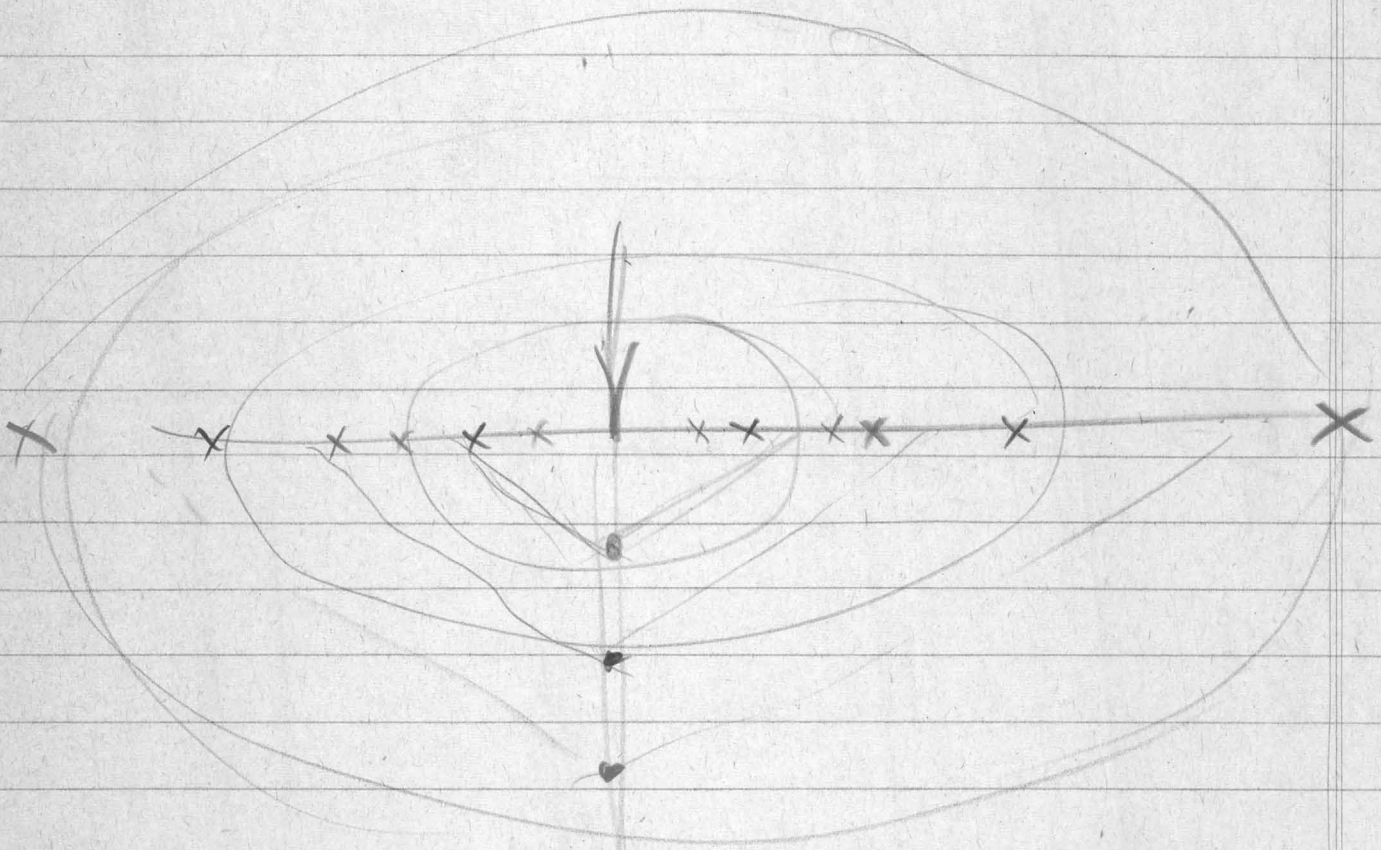
No less than 9 grav. sta, or at least

4 E.W. lines spaced about 1320' apart.

1/4 Min of 10 line miles magnetic's.

4200
400
600
1500
1500

4500
900



Geo Spec

Miss 42 Grav stae (att) (not level) - 840⁰⁰

" 10 line miles mag 500⁰⁰

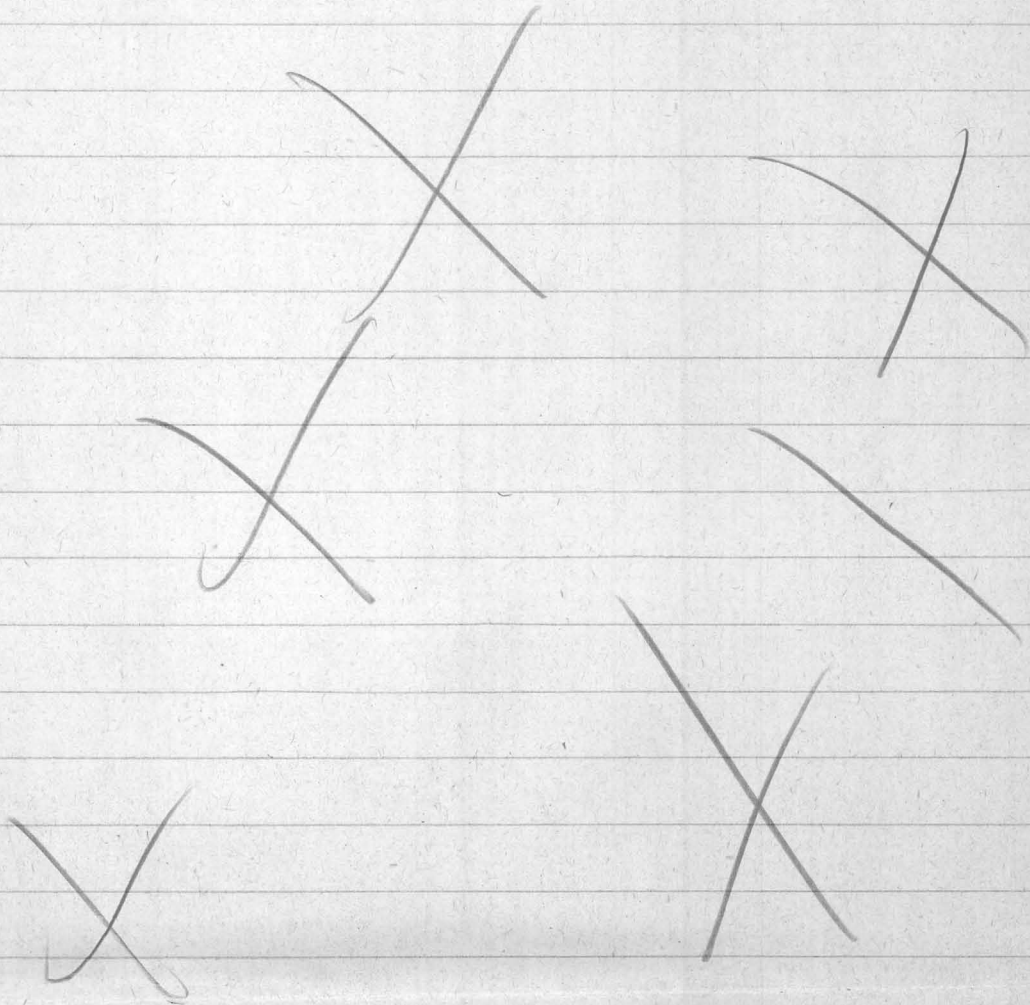
~~defending grav. contract:~~

~~would level 50^{gas} sta (4 1/2 miles +)~~
~~if contract too small~~ 250

3 Diplo epa. 6 or 2 one in
each area.

900⁰⁰

\$ 2490⁰⁰



Sod Spec.

Turn Key price 7665
15

#511⁰⁰ / Setup.
15

2555
511
7665

Walt.

~~115~~
~~1285~~
~~1495~~
~~2720~~
~~165~~
~~18~~
~~45~~
~~24~~
~~76~~

CREW EXPENSE STATEMENT
STATISTICAL REPORT

PROJECT: Demetrie

MONTH: Feb 1964

CLIENT: Superior

TYPE WORK: 1.P

AREA: Two Buttes

DATE	CREW	HOURS		VEHICLES	MILES	EXPENSES			PHONE	REMARKS
		MAN	CREW			MOTEL	MEALS	OTHER		
Sun.										
Mon.	CSL RP KH FEH	8 1/2 8 1/2 8 1/2 8 1/2		2 Cherry	80 80					
Tues.	CSL FEH KH DA RP	8 1/2 8 1/2 6 8 1/2		2 Cherry	80 80					
Wed.	CSL RP DA FEH KH	8 7 6 8 1/2 8 1/2		3 Cherry	80 70					
Thurs	CSL KH RP FEH DA	8 8 8 8 8		2 Cherry	80 75 80					
Fri.	CSL RP FEH	8 8 8		1 Cherry	70 70					
Sat.	FEH	3								
TOTAL:										

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

CREW EXPENSE STATEMENT
STATISTICAL REPORT

MONTH: FEB. 64

TYPE WORK: 1P

PROJECT: Demetria

CLIENT: Superior

AREA: Twinn Buttes

1 229-64-6

DATE	CREW	HOURS		VEHICLES	MILES	EXPENSES			PHONE	REMARKS
		MAN	CREW			MOTEL	MEALS	OTHER		
Sun.										
Mon.	CSL RP RH	9 1/2 9 1/2 10 1/2		Cherry 2	80 80					
Tues.	CSL RP RH	8 1/2 8 1/2 8 1/2		Cherry 2	80 80					
Wed.	CSL RP RH	9 1/2 9 1/2 9 1/2		Cherry 2	80 80					
Thurs	RH	8								computing
Fri.	CSL RP RH	9 1/2 9 1/2 9 1/2		Cherry 2	80 80					
Sat.										
TOTAL:										

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

$\frac{347}{724}$
 $\frac{24}{72}$
 $\frac{24}{70}$
 7 days

$\frac{4.2}{3/25}$
 days = 37 hrs.

$\frac{5}{185^{00}}$

3 days ^{man} 8 hrs = 1 - $\frac{125^{00}}{40^{00}}$ day

7 hrs 3421 = \$ $\frac{165^{00}}$

$\frac{100^{00}}{8}$ staff day = 12.50 staff hrs
 for 8 hrs day

charge at least $\frac{250^{00}}{1}$ for
 map & office work

$\frac{3165}{80}$
 $\frac{185}{85}$
 265

Super Surveying

PROJECT: Demetris

CREW EXPENSE STATEMENT
STATISTICAL REPORT

MONTH: FEB '64

CLIENT: Superior

TYPE WORK: Survey

AREA: Twila Buttes

125 + 3 amount
258-64-5

DATE	CREW	HOURS		VEHICLES	MILES	MOTEL	MEALS	EXPENSES		PHONE	REMARKS
		MAN	CREW					OTHER			
Sun.											
Mon.											
3											
Tues.											
4											
Wed.											
5											
Thurs											
6											
Fri.	EGH FEM DA RP	10 1/2 10 1/2 10 1/2 10 1/2	100 100 100 100		80			Checked at field Mammals #12252 5800 1196			125-
Sat.											
8											
TOTAL:					80			1196			125-

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

CREW EXPENSE STATEMENT
STATISTICAL REPORT

PROJECT: Dometrie

MONTH: Feb 44

CLIENT: Superior

TYPE WORK: Survey

AREA: Twin Buttes

228-64-5-

DATE	CREW	HOURS		VEHICLES	MILES	MOTEL	MEALS	EXPENSES		PHONE	REMARKS
		MAN	CREW					OTHER			
Sun.											
Mon.	EGH DA FEH	11 8.5 8.5	185	1	84			0.7 2.5 10.5			125-
Tues.	EGH DA FEH	10 9 1/2 9 1/2	123	1	85			5			125-
Wed.	EGH DA FEH	10 9 1/2 9 1/2	125	1	85			5			125-
Thurs	EGH DA FEH	10 1/2 9 1/2 9 1/2	125	1	84			5.5 3.75			125-
Fri.	FEH DA	8	100	1	70						
Sat.											
TOTAL:			5 sleep	50.00	40.80						

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

CREW EXPENSE STATEMENT
STATISTICAL REPORT

PROJECT: Demetris

CLIENT: The Superior Oil

AREA: Demetris

60.50 48.80

228-64-5

MONTH: Feb 64

TYPE WORK: Survey

DATE	CREW	HOURS		VEHICLES	MILES	MOTEL	EXPENSES		PHONE	REMARKS
		MAN	CREW				MEALS	OTHER		
Sun.										
Mon. 17	SIG DA	2	5					R-492		Drafting
Tues. 18	SIG	6								
Wed. 19	SIG	8								
Thurs 20	SIG	8								
Fri. 21	SIG	8								
Sat.										
TOTAL:										

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

February 25, 1964

STATEMENT

To: The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Re: Induced Polarization Survey, T 18 S, R 13 E, Pima
County, Arizona

Services:

1/3 completed, (Turnkey quote - \$7665.00)

1/3 billing: -----\$2555.00

February 25, 1964

STATEMENT

To: The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Re: Basic Horizontal Surface Control -- T 18 S, R 13 E,
Pima County, Arizona. Survey February 1964

Services:

5 field days @ \$125.00/day-----	\$625.00
1 field day (short) @ \$100.00/day-----	100.00
Compilation & drafting-----	150.00
Vehicles: 6 days @ \$10.00/day-----	60.00
488 miles @ \$0.10/mile-----	48.80
Survey stakes-----	11.96
TOTAL:-----	<u>\$995.76</u>

^{field}
 Survey - 5 days @ 125 = 625⁰⁰
 compilation & drafting I @ 100 → 100⁰⁰
~~drafting~~ 150⁰⁰
~~150~~

Vehicles + 60⁰⁰

Mileage = 48⁸⁰

Stakes =

\$ 108⁸⁰

11.96

\$ 995.76

I. P. Survey -

1/3 completed -
 (Turn-Key quote \$7665⁰⁰)

1/3 billing — \$2555⁰⁰

HEINRICH'S GEOEXPLORATION COMPANY
MINERAL ENGINEERING CONSULTANTS AND CONTRACTORS
GEOPHYSICAL, GEOLOGICAL AND ECONOMIC APPRAISALS
TUCSON, ARIZONA, 85703

WALTER E. HEINRICH, JR.
E. GROVER HEINRICH

AREA CODE 602
PHONES: 622-4202, 623-6541
806-808 WEST GRANT ROAD
MAIL: P. O. BOX 5671

February 14, 1964

Mr. R. C. Ward
Vice President
The Superior Oil Company
P. O. Box 1251
Houston 1, Texas

Subject: Induced Polarization
Geophysical Survey, Southwestern
Part of T.18S, R.13E, G&SRM
Pima County, Arizona

You desire us to conduct an induced polarization survey of the above area which has been laid out in a plan sketched on the U.S.G.S. Twin Buttes map.

Approximately twelve north-south lines, about one-half mile apart, totaling about 16.5 linear miles of survey, were defined by your personnel. Every effort will be made to run these lines as reasonably as shown on the map as is practical. Any necessary variations will be made only after appropriate discussion with your personnel. Actually, fifteen separate full 1,000 ft. dipole setups could cover over twenty-one (21) linear miles at some depth below the surface, which takes into account our best estimate considering your needs, desires, and anticipated field conditions

and problems.

We will furnish a five-man crew, two vehicles, and all equipment required to do fifteen dipole setups complete with report and interpretation, in three copies, for the sum of \$7,665.00

We will present the data on sectional data sheets but will use plan presentation also where it is thought to be technically worthwhile. Additional compilation which you may request will be at our rate of \$100.00 per staff-day plus incidental expense.

We agree to furnish a complete three-man crew and equipment at the fee rate of \$125.00 per day plus vehicle and direct or incidental expenses for an estimated four days required to lay out basic horizontal surface control. One east-west base line and every other north-south line will be surveyed, a sufficient number of section corners will be surveyed in order to tie this IP survey to the public land survey, and a map of the results will be prepared.

It is understood and agreed that we will perform all services hereunder as an independent contractor, and nothing herein contained shall be construed to be inconsistent with that relationship or status. In this regard we agree to carry workmen's compensation insurance and employer's liability

Mr. R. C. Ward

- 3 -

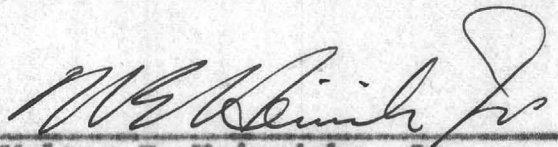
February 14, 1964

insurance in conformity with the laws of the State of Arizona and which are in force at that time, and further to indemnify and save Superior harmless from any and all loss of whatsoever nature, arising by virtue of our failure to carry such insurance or because of any damage to property, or injury to us or any of our agents, employees, or contractors engaged in the work being performed pursuant to this agreement. Upon request we agree to furnish Superior with certificates evidencing the afore-mentioned insurance coverage.

Your acknowledgement and agreement will be appreciated and may be indicated by executing this letter in the space provided and returning the extra copy to us.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

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

WEH: jh

ACCEPTED:
THE SUPERIOR OIL COMPANY

By: _____
Vice President

By: _____

Date: _____

DRAFT - 2/14/64

Mr. R. C. Ward
Vice President
The Superior Oil Company
P.O. Box 1521
Houston 1, Texas

Subject: Induced Polarization Geophysical
Survey, Southwestern Part of
T.18S, R.13E, ~~Pima Mining District~~, *G.S.R.14,*
Pima County, Arizona

You desire us to conduct an induced polarization survey
of the above area which has been laid out in a plan sketched on
the U.S.G.S. *Twin Buttes map.* ~~quadrangle of the area.~~

Approximately twelve north-south lines, about one-half
mile apart, totaling about 16.5 linear miles of survey, were
defined by your personnel. Every effort will be made to run these
lines as reasonably as *shown on the map as is* ~~is practical and desired.~~ Any necessary
variations will be made *only* after appropriate discussion with your
personnel. Actually, fifteen separate full 1000-foot dipole
setups could cover over twenty-one (21) linear miles at some depth
below the surface, which takes into account our best estimate
considering your needs, desires, and anticipated field conditions
and problems.

We will furnish a five-man crew, two vehicles, and all
equipment required to do fifteen dipole setups complete with report
and interpretation, in three copies, for the sum of \$7,665.00.

2 - draft - 2/14/64

We will present the data on sectional data sheets but will use plan presentation also where it is thought to be technically worthwhile. Additional compilation which you may request will be at our rate of \$100.00 per staff-day rate plus incidental expense.

We agree to furnish a complete three-man crew and equipment at the fee rate of \$125.00 per day plus vehicle and direct or incidental expenses for an estimated four days required to lay out ^cbasis horizontal surface control. One east-west base line and every other north-south line will be ^{surveyed, offset number 2} run, a ~~minimum~~ of section corners will be surveyed in order to tie this IP survey to the public land survey, and a map of the results will be prepared.

It is understood and agreed that we will perform all services hereunder as an independent contractor, and nothing herein contained shall be construed to be inconsistent with that relationship or status. In this regard we agree to carry workmen's compensation insurance and employer's liability/insurance in conformity with the laws of the ^{State of Arizona} ~~applicable state of states in which our~~ ~~services shall be performed~~ and which are in force at that time, and further to indemnify and save Superior harmless from any and all loss of whatsoever nature, arising by virtue of our failure to carry such insurance or because of any damage to property, or ~~injury~~ injury to us or any of our agents, employees, or contractors engaged in the work being performed pursuant to this

2 - 2/14/64

agreement. Upon request we agree to furnish Superior with certificates evidencing the afore-mentioned insurance coverage.

Your acknowledgement and agreement will be appreciated and may be indicated ~~in the space provided below~~ by executing this letter in the space provided and returning the extra copy to us.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

BY _____

ACCEPTED:

THE SUPERIOR OIL COMPANY

BY _____
Vice President

BY _____

DATE _____

Revised Version

February 14, 1964

Mr. R. C. Ward
Vice President
The Superior Oil Company
P. O. Box 1251
Houston 1, Texas

Subject: Induced Polarization
Geophysical Survey, Southwestern
Part of T.18S, R.13E, G&SRM
Pima County, Arizona

*see separate
file
for full
data on
this
project*

You desire us to conduct an induced polarization survey of the above area which has been laid out in a plan sketched on the U.S.G.S. Twin Buttes map.

Approximately twelve north-south lines, about one-half mile apart, totaling about 16.5 linear miles of survey, were defined by your personnel. Every effort will be made to run these lines as reasonably as shown on the map as is practical. Any necessary variations will be made only after appropriate discussion with your personnel. Actually, fifteen separate full 1,000 ft. dipole setups could cover over twenty-one (21) linear miles at some depth below the surface, which takes into account our best estimate considering your needs, desires, and anticipated field conditions

and problems.

We will furnish a five-man crew, two vehicles, and all equipment required to do fifteen dipole setups complete with report and interpretation, in three copies, for the sum of \$7,665.00

We will present the data on sectional data sheets but will use plan presentation also where it is thought to be technically worthwhile. Additional compilation which you may request will be at our rate of \$100.00 per staff-day plus incidental expense.

We agree to furnish a complete three-man crew and equipment at the fee rate of \$125.00 per day plus vehicle and direct or incidental expenses for an estimated four days required to lay out basic horizontal surface control. One east-west base line and every other north-south line will be surveyed, a sufficient number of section corners will be surveyed in order to tie this IP survey to the public land survey, and a map of the results will be prepared.


It is understood and agreed that we will perform all services hereunder as an independent contractor, and nothing herein contained shall be construed to be inconsistent with that relationship or status. In this regard we agree to carry workmen's compensation insurance and employer's liability

insurance in conformity with the laws of the State of Arizona and which are in force at that time, and further to indemnify and save Superior harmless from any and all loss of whatsoever nature, arising by virtue of our failure to carry such insurance or because of any damage to property, or injury to us or any of our agents, employees, or contractors engaged in the work being performed pursuant to this agreement. Upon request we agree to furnish Superior with certificates evidencing the afore-mentioned insurance coverage.

Your acknowledgement and agreement will be appreciated and may be indicated by executing this letter in the space provided and returning the extra copy to us.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

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

WEH:jh

ACCEPTED:
 THE SUPERIOR OIL COMPANY

By: _____
 Vice President

By: _____

Date: _____

The Superior Oil Company
Minerals Division
6528 E. 22nd Street
Tucson, Arizona

Attn: Mr. Al Stone

February 12, 1964

Has been revised

Re: Induced Polarization
Geophysical Survey
Vicinity of SW part of
T18S, R13E, Pima Mining
District, Pima County
Arizona

Gentlemen:

This will further our letter of 23 January 1964 and confirm our understanding resulting from conference with your Mr. Al Stone at our office on 6 February 1964.

You desire us to furnish all personnel and equipment required and do fifteen 1,000 ft. dipole setups at \$7,665.00, complete with report and interpretation in three copies but without any magnetics or tied and plotted self potential data. A nominal minimum five man crew and two vehicles will be used.

Standard method of presentation of I. P. results is on sectional data sheets; however, there can also be use for plan presentation. Although such was not included in our \$7,665.00 quote for fifteen setups and report, we will furnish it to the extent we feel technically worthwhile, at no extra charge. Otherwise, additional compilation requested will be at our \$100.00 per staff day rate plus direct incidental expenses.

Approximately twelve lines were laid out in a plan sketch on the U.S.G.S. quad of the area, running generally North-South and about 1/2 mile apart near the respective edges and centers of sections involved totalling about 16.5 miles of desired coverage. Every effort will be made to run these lines as reasonably as is practical and desired. Any necessary variations will be left to our technical discretion and/or appropriate discussion with your personnel. Actually fifteen separate-full 1,000 ft. dipole setups

could cover over 21 lineal miles at some depth below the surface, which takes into account our best estimate considering your needs, desires and anticipated field conditions and problems.

Regarding horizontal survey control, we agree to furnish a complete three man crew and equipment at the fee rate of \$125.00 per day, plus vehicle and direct and incidental expenses for an estimated four days required to lay out basic line control, one E-W base line and every other N-S line, related picking up a minimum of section corners, unique marking for appropriate identification from prior work in the area, and map of results.

The survey work actually started on February 7, 1964 and the I. P. work on February 10, 1964. Other than as modified herein, our previous related and referred to correspondence will apply.

Your acknowledgement and agreement will be appreciated and may be indicated by executing and returning the extra copy as furnished and provided below.

Sincerely yours,

HEINRICHS GEOEXPLORATION CO.

Walter E. Heinrichs, Jr.
President & General Manager

WEH:jh

Encl: 2 extra cc.

Accepted: (Date) _____

THE SUPERIOR OIL COMPANY

By: _____

Title: _____

HEINRICHS GEOEXPLORATION COMPANY
MINERAL ENGINEERING CONSULTANTS AND CONTRACTORS
GEOPHYSICAL, GEOLOGICAL AND ECONOMIC APPRAISALS
TUCSON, ARIZONA, 85703

WALTER E. HEINRICHS, JR.
E. GROVER HEINRICHS

AREA CODE 602
PHONES: 622-4202, 623-6541
806-808 WEST GRANT ROAD
MAIL: P. O. BOX 5671

The Superior Oil Company
Minerals Division
6528 E. 22nd Street
Tucson, Arizona

February 12, 1964

Attn: Mr. Al Stone

Re: Induced Polarization
Geophysical Survey
Vicinity of SW part of
T18S, R13E, Pima Mining
District, Pima County
Arizona

Gentlemen:

This will further our letter of 23 January 1964 and confirm our understanding resulting from conference with your Mr. Al Stone at our office on 6 February 1964.

You desire us to furnish all personnel and equipment required and do fifteen 1,000 ft. dipole setups at \$7,669.00, complete with report and interpretation in three copies but without any magnetics or tied and plotted self potential data. A nominal minimum five man crew and two vehicles will be used.

Standard method of presentation of I. P. results is on sectional data sheets; however, there can also be use for plan presentation. Although such was not included in our \$7,669.00 quote for fifteen setups and report, we will furnish it to the extent we feel technically worthwhile, at no extra charge. Otherwise, additional compilation requested will be at our \$100.00 per staff day rate plus direct incidental expenses.

Approximately twelve lines were laid out in a plan sketch on the U.S.G.S. quad of the area, running generally North-South and about 1/2 mile apart near the respective edges and centers of sections involved totalling about 16.5 miles of desired coverage. Every effort will be made to run these lines as reasonably as is practical and desired. Any necessary variations will be left to our technical discretion and/or appropriate discussion with your personnel. Actually fifteen separate-full 1,000 ft. dipole setups

could cover over 21 lineal miles at some depth below the surface, which takes into account our best estimate considering your needs, desires and anticipated field conditions and problems.


Regarding horizontal survey control, we agree to furnish a complete three man crew and equipment at the fee rate of \$125.00 per day, plus vehicle and direct and incidental expenses for an estimated four days required to lay out basic line control, one E-W base line and every other N-S line, related picking up a minimum of section corners, unique marking for appropriate identification from prior work in the area, and map of results.

The survey work actually started on February 7, 1964 and the I. P. work on February 10, 1964. Other than as modified herein, our previous related and referred to correspondence will apply.

Your acknowledgement and agreement will be appreciated and may be indicated by executing and returning the extra copy as furnished and provided below.

Sincerely yours,

HEINRICHS GEOEXPLORATION CO.



Walter E. Heinrichs, Jr.
President & General Manager

WEH: jh

Encl: 2 extra cc.

Accepted: (Date) _____

THE SUPERIOR OIL COMPANY

By: _____

Title: _____

5280
2640
7920

3500

2/6/64

Superior: Al Stone, Groves, Chris
& Walt.

Demetri Wash area (F)

include what to allow for
no of Report copies of Data
etc??

1. 15 setups
(a) 1000' Scale
2. contour presentation
of I.P. data
3. S.P. data
4. Surveying \$125/day
Horizontal crew
about 3-4 days
5. Stakes marked with
white tip
Locate section corners
if ident.

January 23, 1964

The Superior Oil Company
Minerals Division
6528 East 22nd Street
Tucson, Arizona.

Attn: Mr. Al Stone

Re: Induced Polarization Geo-
physical Survey, Vicinity of
SW part of T18S, R13E, Pima
Mining District, Pima County,
Arizona.

Gentlemen:

Confirming our conversation at your office this past Monday, we are at this time prepared to immediately furnish up to a 5 man I.P. crew, and complete equipment to cover the estimated 16.6 profile miles proposed - complete with report.

In reviewing our experience in the area, and appropos our discussion, we believe such work is justified toward your objective of further appraising the ground - at least on a preliminary basis pending early reconnaissance results. We consider it worthwhile in this area and also recommend, at least initially, that magnetic and S.P. data be reconnoitered simultaneously on the I.P stations or lesser intervals-all to be contingent on technical discretion in the field.

Aerial magnetics may or may not be useful in detail to an extent dependent on the data resolution over this area. Gravity could be helpful and not exceedingly costly. A minimum expenditure of about \$3000.00 of coverage would be required to determine potential usefulness.

For I.P. only: \$5160.00 for ten 1000'-a setups, or a \$7665.00 for fifteen 1000'-a setups, depending on the degree of comprehension desired and the exact technical definition of a profile mile used. (see our notes on "Basis of I.P. method" previously submitted.) Thus costs could be considerably less than \$250.00 per profile mile on a routine 1000'-a dipole-dipole basis. Reconnaissance magnetics and S.P. would add 5% each, or 10% for both to each of the above two schedules.

Our equivalent daily rate for a 5 man crew, including a technician and a geophysicist in the field, is \$350.00 per operating day, plus 2 or 3 vehicles at \$10.00 per day, plus 10¢ per mile per vehicle, compilation at \$100.00 per Tucson Staff day and direct incidental expenses for an estimated 10 to 15 field days and equivalent office days or approximately four weeks total from notice to proceed to report submitted. If you wish, you may furnish one or two vehicles and personnel, then the above would be reduced \$50.00/man operating day, down to the technician and geophysicist and I.P. equipment at \$200.00 per operating day.

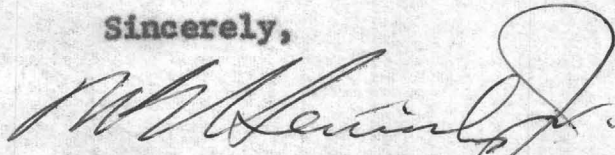
The Superior Oil Company would assume all liability for our trespass that they requested, but we would do our best to avoid or minimize this factor, as is usually possible.

Our insurance coverage, billing data, etc., are covered in a previous letter to Mr. Ralph Wilpolt, dated 15 July 1963 at Denver.

^{prior} Availability and scheduling of course is subject to committment.

Your acceptance of this letter may be indicated by executing and returning the extra copy furnished as provided below.

Sincerely,



Walter E. Heinrichs, Jr.

Accepted: _____
date

The Superior Oil Company

By: _____

Title: _____

Our equivalent daily rate for a 5 man crew, including a technician and a geophysicist in the field, is \$350.00 per operating day, plus 2 or 3 vehicles at \$10.00 per day, plus 10¢ per mile per vehicle, compilation at \$100.00 per Tucson Staff day and direct incidental expenses for an estimated 10 to 15 field days and equivalent office days or approximately four weeks total from notice to proceed to report submitted. If you wish, you may furnish one or two vehicles and personnel, then the above would be reduced \$50.00/man operating day, down to the technician and geophysicist and I.P. equipment at \$200.00 per operating day.

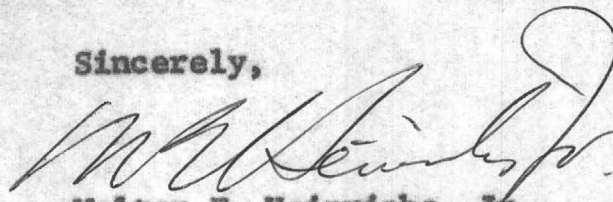
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Sincerely,


Walter E. Heinrichs, Jr.

Accepted: _____
date

The Superior Oil Company

By: _____

Title: _____

January 23, 1964

The Superior Oil Company
Minerals Division
6528 East 22nd Street
Tucson, Arizona.

Attn: Mr. Al Stone

Re: Induced Polarization Geo-
physical Survey, Vicinity of
SW part of T18S, R13E, Pima
Mining District, Pima County,
Arizona.

Gentlemen:

Confirming our conversation at your office this past Monday, we are at this time prepared to immediately furnish up to a 5 man I.P. crew, and complete equipment to cover the estimated 16.6 profile miles proposed - complete with report.

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File Superior
Demetrie

Received from Heinrichs Geoexploration Co. three copies of
IP report~~x~~ on Demetrie Wash Area.

THE SUPERIOR OIL COMPANY
J. Westerdahl
Jeretta Westerdahl

\$ 4/29/64

Bud Wadsey

called
r: See 24

Superior

Tentative Comm. H. Act.
18-19

Sec 24

185 12 E.

4/21/64

PM.

W. B. W.

Superior Denture

4/22/64

Woolsey, see 24 matter

talked to Wilpelt, he was curious

re: exact legal status of degree "exclusive rights
to inspect" vs nominal, ^{temporary} crossing & entry by
a 3rd party, and will get a legal opinion.

I asked him to let us know - he
said he would.

Also will have Al call re Jimina -
San Xavier (Cattle Picher) ground map to
see and maybe to compile - I said \$50⁰⁰ ±
drafting time to go.

W.

DETACH STATEMENT BEFORE DEPOSITING

NO RECEIPT NECESSARY

No. 8236

THE SUPERIOR OIL COMPAN
P. O. BOX 1521 - HOUSTON, TEXAS 77001

DO NOT CHANGE OR ALTER
THE ATTACHED CHECK IS IN PAYMENT OF THE FOLLOWING:

DESCRIPTION	VENDOR NUMBER	DATE OF INVOICE	AMOUNT OF INVOICE	DISCOUNT	NET AMOUNT
Services and Expenses	37822	4-09-64	\$1,200.00		
Services and Expenses			<u>1,500.00</u>		
3-17-64 thru 4-08-64			\$2,700.00		\$2,700.00



CREW EXPENSE STATEMENT
STATISTICAL REPORT

PROJECT: Demetrie
 CLIENT: The Superior Oil
 AREA: _____

MONTH: March 1964
 TYPE WORK: 1P

DATE	CREW	HOURS		VEHICLES	MILES	MOTEL	EXPENSES		PHONE	REMARKS
		MAN	CREW				MEALS	OTHER		
Mon. 9	CSL DA RP FFH	8 8 8 8		Cherry 1	70 80					
Tues. 10	CSL SIG DA RP KH FFH	8 5 8 8 8 8		Cherry 1	70 75					T-NEH, EGY CSL (3-6) 2410 " " " (3-9) "
Wed. 11	CSL DA RP KH FFH MP	8 8 8 8 8 8		Cherry 1	70					Special (230-64-7) 1200
Thurs. 12	CSL SIG RP DA FFH MP KH	8 8 8 8 8 8 8		Cherry 1	70 70					
Fri. 13	CSL FFH RP DA KH MP DB	8 7 7 6 1/2 6 1/2 6 1/2 4 (DB)		1	70					
Sat. 14	DB	3								
Sun. 15										

PROJECT: Demetrix - Ex

CREW EXPENSE STATEMENT
STATISTICAL REPORT

MONTH: _____

CLIENT: The Superior

230-64-7

TYPE WORK: LP

AREA: _____

DATE	CREW	HOURS		VEHICLES		EXPENSES			PHONE	REMARKS
		MAN	CREW		MILES	MOTEL	MEALS	OTHER		
Sun.										
Mon.	DB	1								
Tues.										
Wed.	CSK	3								
Thurs	CSK	8								
Fri.	CSK DB	4 3								
Sat.	DB	3								
TOTAL:										

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

CREW EXPENSE STATEMENT
STATISTICAL REPORT

PROJECT: Demetris

CLIENT: The Superior

AREA: Trinidad Buttes

MONTH: March

TYPE WORK: 1 P

Extra charge

DATE	CREW	HOURS		VEHICLES		EXPENSES			PHONE	REMARKS
		MAN	CREW	MILES	MOTEL	MEALS	OTHER			
Mon. 30	CSM DB	4 8 1/2						Major 53.96		
Tues. 31	CSM	4								
Wed. Apr 1	DB	4								
Thurs 2	DB	3 1/2								
Fril.										
Sat.										
TOTAL:										

CREW EXPENSE STATEMENT
STATISTICAL REPORT

7065

MONTH: March 1964

TYPE WORK: LD

PROJECT: Perpetria

CLIENT: The Superior

AREA: Two Buttes

DATE	CREW	HOURS		VEHICLES	MILES	EXPENSES			PHONE	REMARKS
		MAN	CREW			MOTEL	MEALS	OTHER		
Mon.	CSL FEH MP TH	8 8 1/2 8 8								<i>Date reduction</i>
Tues.	FEH MP RP CSL TH	5 1/2 5 1/2 2 8 8		1	70					<i>e</i> <i>D-P</i>
Wed.	EGH CSL FEH MP TH	9 8 6.5 7 9								<i>D</i> <i>D-P</i>
Thurs	DB CSL	3 1/2 8								<i>D</i> <i>P</i>
Fri.	CSL DB	8 8 1/2								<i>P</i> <i>D</i>
Sat.										
TOTAL:										

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

CREW EXPENSE STATEMENT
STATISTICAL REPORT

PROJECT: Beneficial

CLIENT: The Superior

AREA: _____

MONTH: March '64

TYPE WORK: _____

DATE	CREW	HOURS		VEHICLES	MILES	EXPENSES			PHONE	REMARKS
		MAN	CREW			MOTEL	MEALS	OTHER		
Sun.										
Mon.	CSL DB SIG	8 4 2								c b
Tues.	FEH MP DB KH SIG	8 3 3 7 1/2		1	80					b
Wed.	YH MP FEH DB	9 8 8 3		1	80					b
Thurs	MP FEH SIG KH	9 1/2 9 1/2 9		1	80					
Fri.	FEH KH MP	9 8 1/2		1	80					
Sat.	DB	1								
TOTAL:										

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

LONG DISTANCE PHONE CALL REPORT

Request of Mr. EGH

Date 2/27/64

Number Called 271-4900

Time Requested _____ A. M.
P. M.

Individual State Office (Car-Dept.)

Exchange St. Louis Number 271-4900

KIND OF SERVICE DESIRED

Station to Station

Person to Person

Firm _____

Time Called _____ A. M.
P. M.

Street Address _____

Time Connected _____ A. M.
P. M.

City St. Louis State _____

Time Off _____ A. M.
P. M.

Remarks: _____

Minutes Elapsed Time _____

Mr. Ryan

CHARGES: \$ _____

mine & leasing div.

Phone Company Verification of Charge Given by _____

Prim

Switchboard Operator's Notations _____

3.675

Company Business Charge to Superior A/C No. _____

Personal Call _____

Signed _____

Switchboard Operator

PROJECT: _____

CREW EXPENSE STATEMENT 1964
 STATISTICAL REPORT

MONTH: March

CLIENT: The Superior

TYPE WORK: _____

AREA: _____

DATE	CREW	HOURS		VEHICLES	MILES	MOTEL	EXPENSES		PHONE	REMARKS
		MAN	CREW				MEALS	OTHER		
Sun. 5-6 8	WEM	1	1/2							
10	"	1/2								
Mon. 11	"	1/2								
Tues. 28	"	5 1/2					27 -	4.38		
Mar. 29	WEM	3	2							
Wed. 30	"	2								
2-12 13	"	2	1							
Thurs 14 18	"	1/2	1/2							
3-12	"	1/2								
Fr. 16	"	1/2								
Sat.										
TOTAL:										

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

CREW EXPENSE STATEMENT
STATISTICAL REPORT

PROJECT: Bemeter
 CLIENT: The Superior Oil
 AREA: _____

MONTH: March 1964
 TYPE WORK: 1P

DATE	CREW	HOURS		VEHICLES	MILES	EXPENSES			PHONE	REMARKS
		MAN	CREW			MOTEL	MEALS	OTHER		
Sun.										
1										
Mon.	CSL RP DA FFH	8 8 8 8	4	1	75					
2	KH									
Tues.	CSL S16	5								
3										
Wed.	CSL	8								
4										
Thurs	CSL DA RP KH	11 11 11 11		Chovy 1	70					
5										
Fri.	CSL KH DA RP	9 1/2 11 10 9 1/2		Chovy	70					
6										
Sat.										
7										
TOTAL:										

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

PROJECT: Demetris

CREW EXPENSE STATEMENT
STATISTICAL REPORT

MONTH: Feb 1964

CLIENT: Superior

TYPE WORK: L.P.

AREA: Twin Buttes

DATE	CREW	HOURS		VEHICLES	MILES	EXPENSES			PHONE	REMARKS
		MAN	CREW			MOTEL	MEALS	OTHER		
Sun.										
Mon. 24	CSL KH RP FEH	10 8 8 8		Cherry '	70 70 70					2 offices
Tues. 25	CSL KH DA RP	8 9 9 8		Cherry	70					
Wed. 26	CSL DA KH	8 9 8		Cherry '	70					
Thurs 27	CSL DA RP FEH	8 8 8 8		Cherry '	70 70					
Fri. 28	CSL FEH DA RP	8 8 8 8		'	70					camp
Sat.										
TOTAL:										

HEINRICHS GEOEXPLORATION COMPANY, P. O. BOX 5671, TUCSON, ARIZONA

April 10, 1964

The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Gentlemen:

Re: Request for added I. P. Coverage
Demetrie Wash Area, Pima District
Pima County, Arizona

Per conversations with your Mr. Al Stone today, we propose to locate, lay out and run two 1000 ft. dipole I. P. setups covering 12,000' each of ground on the surface from end to end and providing 7,000' each of lineal surface data to some depth. The two spreads will be laid out, one in Secs 29 & 30 T 18 S, R 13 E and one in Sec. 24, T 18 S, R 12 E, approximately as shown in blue in our 30 March 1964 report and as discussed today, but a more exact proposed lay out will be recommended and discussed further for your final approval before proceeding in the field.

We propose the work to be completed, including a supplemental report of results and interpretation on or before 25 April 1964 at a turn-key price of \$1,150.00.

Your approval of the above proposal may be indicated by signing below and returning the enclosed carbon copy.

Very truly yours,

HEINRICHS GEOEXPLORATION CO.

WEH: jh
Encl: Extra cc.

Walter E. Heinrichs, Jr.
President & General Manager

Approved: _____

The Superior Oil Company

Al Stone: Superior.
2 extra lines. T. B.

4/10/64

east west line on So. end.

iron spread.

\$150⁰⁰ surveying

surveying.

\$2855⁰⁰

\$7665⁰⁰

\$400⁰⁰

2	511
15	7665
5	75
75	<u>168</u>
15	15
15	15

511 ⁰⁰ /setup	
15	
<hr/>	
2555	
5115	
7665	

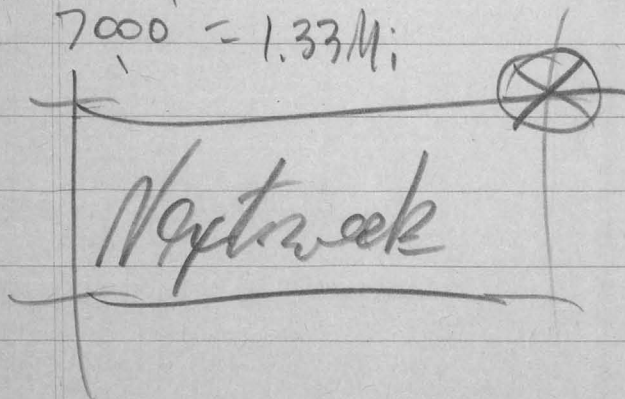
\$386⁰⁰/mile.

0.73/

\$511⁰⁰
7665

967
7000

7000' = 1.33 Mi



\$1150⁰⁰ total.

DETACH STATEMENT BEFORE DEPOSITING

NO RECEIPT NECESSARY

No. 7964

THE SUPERIOR OIL COMPAN
P. O. BOX 1521 - HOUSTON, TEXAS 77001DO NOT CHANGE OR ALTER
THE ATTACHED CHECK IS IN PAYMENT OF THE FOLLOWING:

DESCRIPTION	VENDOR NUMBER	DATE OF INVOICE	AMOUNT OF INVOICE	DISCOUNT	NET AMOUNT
Services rendered for March, 1964	37822	3-23-64	\$2,555.00		\$2,555.00



April 29, 1964

STATEMENT

To: The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Re: Supplemental I. P. Coverage, Demetrie Wash Area,
Pima Mining District, Pima County, Arizona. Lines 1A
and 2A April 20 thru 29, 1964

Services and Expenses:
(According to letter dated April 10, 1964)

Total: ----- \$1,150.00

C O R

April 10, 1964

The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Gentlemen:

Re: Request for added I. P. Coverage
Demetrie Wash Area, Pima District
Pima County, Arizona

Per conversations with your Mr. Al Stone today, we propose to locate, lay out and run two 1000 ft. dipole I. P. setups covering 12,000' each of ground on the surface from end to end and providing 7,000' each of lineal surface data to some depth. The two spreads will be laid out, one in Secs 29 & 30 T 18 S, R 13 E and one in Sec. 24, T 18 S, R 12 E, approximately as shown in blue in our 30 March 1964 report and as discussed today, but a more exact proposed lay out will be recommended and discussed further for your final approval before proceeding in the field.

We propose the work to be completed, including a supplemental report of results and interpretation on or before 25 April 1964 at a turn-key price of \$1,150.00.

Your approval of the above proposal may be indicated by signing below and returning the enclosed carbon copy.

Very truly yours,

HEINRICHS GEOEXPLORATION CO.

WEH:jh
Encl: Extra cc.

Walter E. Heinrichs, Jr.
President & General Manager

Approved: _____

The Superior Oil Company

April 9, 1964

STATEMENT

To: The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Re: Induced Polarization (Expanders) Demetrie Wash Area
Pima Mining District, Pima County, Arizona
March 10 - 13 April 1 thru 6, 1964

Services & Expenses:

Four Expanders @ \$300.00-----\$1,200.00

C
O
P
Y

April 1, 1964

S T A T E M E N T

To: The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Re: Induced Polarization Survey, T 18 S, R 13 E, Pima County,
Arizona. February 16 - March 31, 1964

Services: Total Contract

Billed March 3, 1964-----	\$2,555.00
" " 23, " -----	\$2,555.00
" April 1, 1964-----	<u>\$2,555.00</u>
	\$7,665.00

Expenses: Mylar transparencies(Client request)----- 53.96
\$7,718.96

Paid March 18, 1964----- 2,555.00

Due:-----\$5,163.96

C

O

P

Y

March 23, 1964

S T A T E M E N T

To: Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Re: Induced Polarization Survey, T 18 S, R 13 E, Pima
County, Arizona. Began Feb. 10, 1964 -- still in
progress.

Services:

(Partial Billing --- \$2555.00, dated March 3, 1964,
paid March 18, 1964)

Second one-third billing-----\$2555.00
(Period March 3 to March 23, 1964)

Final billing to be submitted with report.

C
O
P
Y

March 3, 1964

CORRECTED STATEMENT

To: The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

Re: Induced Polarization Survey, T 18 S, R 13 E, Pima County
Arizona. Began Feb. 10 -- still in progress.

Services: (Partial Billing)-----\$2555.00

COPY

March 3, 1964

CORRECTED STATEMENT

To: The Superior Oil Company
Minerals Division
P. O. Box 12487
Tucson, Arizona

OK.

Re: Basic Horizontal Surface Control -- T 18 S, R 13 E,
Pima County, Arizona Survey
Began Feb. 7, completed Feb. 25, 1964

Services:

5 field days @ \$125.00/day-----	\$625.00
1 field day (short) @ \$100.00/day-----	100.00
Compilation & Drafting-----	150.00
Vehicles: 6 days @ \$10.00/day-----	60.00
488 miles @ \$0.10/mile-----	48.80
Survey stakes-----	11.96
TOTAL-----	<u>\$995.76</u>

HEINRICHS GEOEXPLORATION COMPANY
MINERAL ENGINEERING CONSULTANTS AND CONTRACTORS
GEOPHYSICAL, GEOLOGICAL AND ECONOMIC APPRAISALS
TUCSON, ARIZONA, 85703

WALTER E. HEINRICHS, JR.
E. GROVER HEINRICHS

AREA CODE 602
PHONES: 622-4202, 623-6541
806-808 WEST GRANT ROAD
MAIL: P. O. BOX 5671



February 14, 1964

Mr. R. C. Ward
Vice President
The Superior Oil Company
P. O. Box 1251
Houston 1, Texas

Subject: Induced Polarization
Geophysical Survey, Southwestern
Part of T.18S, R.13E, G&SRM
Pima County, Arizona

You desire us to conduct an induced polarization survey of the above area which has been laid out in a plan sketched on the U.S.G.S. Twin Buttes map.

Approximately twelve north-south lines, about one-half mile apart, totaling about 16.5 linear miles of survey, were defined by your personnel. Every effort will be made to run these lines as reasonably as shown on the map as is practical. Any necessary variations will be made only after appropriate discussion with your personnel. Actually, fifteen separate full 1,000 ft. dipole setups could cover over twenty-one (21) linear miles at some depth below the surface, which takes into account our best estimate considering your needs, desires, and anticipated field conditions

and problems.

We will furnish a five-man crew, two vehicles, and all equipment required to do fifteen dipole setups complete with report and interpretation, in three copies, for the sum of \$7,665.00

We will present the data on sectional data sheets but will use plan presentation also where it is thought to be technically worthwhile. Additional compilation which you may request will be at our rate of \$100.00 per staff-day plus incidental expense.

We agree to furnish a complete three-man crew and equipment at the fee rate of \$125.00 per day plus vehicle and direct or incidental expenses for an estimated four days required to lay out basic horizontal surface control. One east-west base line and every other north-south line will be surveyed, a sufficient number of section corners will be surveyed in order to tie this IP survey to the public land survey, and a map of the results will be prepared.

It is understood and agreed that we will perform all services hereunder as an independent contractor, and nothing herein contained shall be construed to be inconsistent with that relationship or status. In this regard we agree to carry workmen's compensation insurance and employer's liability

Mr. R. C. Ward

- 3 -

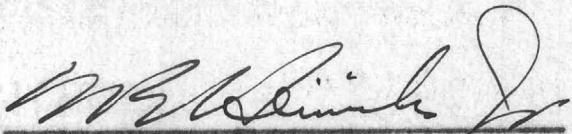
February 14, 1964

insurance in conformity with the laws of the State of Arizona and which are in force at that time, and further to indemnify and save Superior harmless from any and all loss of whatsoever nature, arising by virtue of our failure to carry such insurance or because of any damage to property, or injury to us or any of our agents, employees, or contractors engaged in the work being performed pursuant to this agreement. Upon request we agree to furnish Superior with certificates evidencing the afore-mentioned insurance coverage.

Your acknowledgement and agreement will be appreciated and may be indicated by executing this letter in the space provided and returning the extra copy to us.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

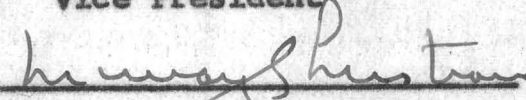
by: 
Walter E. Heinrichs, Jr.
President & General Manager

WEH:jh

ACCEPTED:
THE SUPERIOR OIL COMPANY

By: 
Vice President

Attest:

By: 
Secretary

Date: February 20, 1964

Superior 0,96

Att. Mr. Al Stone

1/22/64

Twin Buttes Mining District

Pima County, Ariz

Estimated about 16.6 profile miles

I.P. - 1000' dipole coverage evaluation

E.

7500' / setup.

$$16.6 \text{ Mi} = \frac{87,700'}{7500} = 11.7 \text{ setups}$$

use: 12-15 Setups

12 setups
 @ 12,000'/h = 144,000' = 27 Miles total surface.

1 Mi evaluate = 1.6 Miles ^{total} spread to evaluate 1 Mi

Profile

$$\frac{87,700'}{12,000'/\text{setup}} = 7.3 \text{ Setups, use 10 setups.}$$

\$	200 = 2	Men	1 gp	1 tech.
	250 = 3	"	"	1 helper
	300 = 4	"	"	2 "
	350 = 5	"	"	3 "



1 Veh - 10 \$/day + 10 \$/mile / vehicle - up to 3 Vehs

RT = 70 Mi
 $\frac{3}{21.0 \text{ Mi Day}}$
 30 15 days x 350 =
 $\frac{51}{15}$
 $\frac{255}{51}$
 $\frac{765}{765}$

15 Setups - (7500')
 Fee 5250
 Vehs 765
 Comp 1500
 Misc 150

 7665⁰⁰
 $\frac{350}{5250}$

(87,900')
 $\frac{3500}{510}$
 $\frac{1000}{150}$
 # 5160⁰⁰

10 setups
 = 22.7 Mi / ft
 = 250 \$ / ft
 @ 1 setup/day = 15 setups / ft
 = 34 miles of
 = \$225 / mi

3
3
16.6
500
\$ 8300.00

16.6 @ 250.00/mi = \$ 4150.00

600V - 5Amp.

3000 Watt

3KW.