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# GEOPHYSICAL ELECTRICAL RESISTIVITY SURVEY

# FOR SULFUR EXPLORATION PURPOSES

# SCOTT RANCH AREA, CULBERSON COUNTY, TEXAS

For

Cities Service Minerals Corporation

September 1968

By

Heinrichs Geoexploration Company
P. O. Box 5671 Tucson, Arizona 85703
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## INTRODUCTION

At the request of Mr. Donald P. Moore of Cities Service Minerals Corporation, Houston, Texas, Heinrichs Geoexploration Company of Tucson, Arizona, conducted and completed a test electrical resistivity geophysical survey for sulfur exploration in the Scott Ranch Area, Culberson County, Texas. This area is about eight miles east of the Rounsaville Area which was surveyed electrically by us in several phases; February 1968 and May through August 1968. The first phase work at Rounsaville was run to develop a routine system for the district for detecting potential sulfur bearing porous zones and the same system was used in the nearby Scott Ranch Area. The new work covered in this report was done in the interim July 22 to August 8, 1968.

A total of 17 lines were surveyed, all on a 600 foot dipole spacing. All but Line 30, which has two spreads, are single spread lines. The total surface coverage is therefore 23.9 miles of which 14.3 miles is subsurface plotted data.

The line orientation is east-west except for Line 16 which is North-south and Line 32 which is N13E-S13W. For details of line location with respect to the land net and claims, see the plan map.

The resistivity measurements were obtained with the collinear dipole-dipole electrode configuration, which on a spacing between dipoles of 600 foot increments and with 600 foot dipoles, typically gives resolvable penetration within the zone from about 150 feet to 900 feet below surface. A sending frequency of 3.0 Hz was utilized in obtaining the apparent resistivity. The data are plotted with the standard dipole-dipole convention; at the intersection of 45° diagonals projected downwards from the centers of the sending and receiving dipoles.

Data are presented on sectional data sheets, one for each line, showing the apparent resistivity contoured logarithmically in section. The horizontal position and approximate extent of interpreted anomalous resistivity lows are indicated on the sectional data as heavy lines. Question mark indicates extent of anomaly is indefinite. A Resistivity Survey Location and Interpretation Plan showing the line locations and surface projected resistivity lows and interpretation is also attached.

The purpose of this survey was to electrically outline possible porous zones that may have been suitable sites for sulfur mineralization. Based on the Rounsaville survey and subsequent drilling, the porous zones are apparent resistivity lows.

Heinrichs personnel involved in the field work were D. Anderson, geophysical crew chief, A. Silva, C. Dahlberg, B. Gaul and R. Cornelius, technical assistants and wire layout crew. Report, compilation and interpretation by Chtis S. Ludwig, senior geophysicist, with the assistance of the Geoex staff.

We wish here to thank again Mr. J. Walton and Mr. R. Harris for their assistance to the field crew on access and line location problems and also to Mr. Donald Moore for his assistance with project details.

## CONCLUSIONS AND RECOMMENDATIONS

As in the Rounsaville Area, this area shows several semi-parallel resistivity low trends with a northwest to north-northwest trend. The absolute resistivity level, however, tends to be lower than that at Rounsaville. This is likely because of the collapse conglomerate that apparently covers much of the Scott Ranch Area and is a good electrical conductor and also perhaps a good sulfur host.

The low resistivity trends are perhaps due to fault or joint controlled zones of increased porosity in the conglomerate. If the lows are associated with the underlying anhydrite or dolomite, then they more likely result from solution channels probably controlled by faulting or jointing. Most of the lows appear to have a relatively limited depth extent and lie mostly within 600 or so feet of the surface.

In plan, the low trends should be considered as a schematic representation of the interpretive probable line to line correlation of the apparent resistivity lows. Hopefully, these low trends are the most likely zones within which to find sulfur.

Drill holes have been recommended in various lows to test a variety of types of anomalism and general locations. All of these holes should be vertical and drilled to at least 600 feet.

A drill hole is recommended on Line 16 at 16N to test a rather broad and good depth extent low. This low is quite near Duval's sulfur discovery just to the west

in Section 10 making it of further interest.

On Line 17 a drill hole is suggested near 3W to evaluate a limited depth extent moderately strong low.

On Line 19 a definite, fairly strong low of moderate depth extent is recommended for drilling near 3W. This low is within 1,500 feet of the low already mentioned on Line 16 and they may be related to each other.

Line 21 shows a pronounced resistivity low near center having good depth extent and is somewhat more narrow than usual. A hole at 0 E/W should sample this zone. This low trend extends further northeast through the northeast corner of Section 20. It is understood that a shallow oil showing was encountered, likely within this low zone, about 1,100 feet southwest of the northeast corner of Section 20 and therefore, near Line 22. It is not known what significance this oil show may have with regards to sulfur, but this low projects into Duval's Section 10 making it of some interest. Also, the resistivity low is stronger on Line 21 than on Line 22 perhaps giving added interest to the Line 21 anomalism.

Lines 23, 24 and 25 show the lowest resistivity seen on any of the lines including this and the Rounsaville Area. Also, the trends of these strong lows may project into Duval's Section 10 making them of further interest. A hole at 8W, Line 24 is recommended to test the lowest resistivity encountered and is in a rather broad fair depth extent zone. A hole at 18W, Line 25 will sample a parallel strong low trend of very good depth extent.

A drill hole at 0 E/W, Line 28 will test a complex fairly strong but narrow low zone.

Line 30 shows a fairly strong and broad low between Spreads 1 and 2 that can be sampled by a drill hole near 21E. This low has fair depth extent. Line 31 shows a sharp strong low of good depth extent near 18W and is recommended for drilling. This sharp low is apparently on a north-south or even west-northwest trend rather than the usual northeast trend.

Additional drilling can be guided by the results of this preliminary testing and inspection of the plan map low trends for extensions down strike.

It is suggested that if we can be kept closely informed of the results of this drilling we can continually upgrade the interpretation and perhaps evolve more definitive and direct detection of the sulfur deposition. If the initial drilling proves economically encouraging, more detailed and/or extended coverage may be justified in the district.

A mutually convenient meeting is recommended after or during this initial drilling to better correlate the geologic, drilling, and electrical results.

## INTERPRETATION

Line 16

The resistivity shows a general decrease to the north and an increase with depth. There are several anomalously low zones, however, one near 16N that is 1,000 feet or so wide and also a minor low of unknown extent to the south near 24S.

The low near 16N is quite strong and shows good depth extent, the source likely starting within 300 feet of the surface and extending to 600 or so feet below surface.

Line 17

This line shows a relatively complex apparent resistivity pattern but indicates a general increase with depth and several anomalous low zones. The strongest low is near 3W and is classified as moderately strong and with good depth extent. The other low is near 12E and indicates a relatively limited depth extent. The resistivity along the line also shows a minor increase towards the east.

Line 18

Shows the typical increase in resistivity with depth and several anomalous low areas near 3E, 9W and 24W. The 24W low is the strongest of the three and shows good depth extent, however, its western boundary is not seen in the data.

Line 19

This line shows a relatively complexly shaped apparent resistivity pattern. In general, though, the resistivity again shows an increase with depth. Resistivity lows are noted near 12W, 3W and 18E with the low near 3W being the most pronounced and best depth extent anomaly on the line. The 18E low has not been terminated to the east.

Line 20

Line 20 has several significant resistivity lows; one near 9W which correlates well with a low noted near the south end of Line 16. This low appears to have good depth extent on Line 20. On Line 16, however, the low was not completely crossed and therefore, not completely defined. Another minor low is noted near 18E with an unknown extent to the east.

Line 21

At the center of the spread, there is a rather strong low noted with good depth persistance and possibly connecting at depth with a minor low noted near 18W. The line intgeneral, increases in apparent resistivity with depth.

Line 22

The majority of this line shows rather uniform resistivities. There is a minor low near 3W and another near 20E but of indeterminate extent to the east. The west end of the spread does show a minor increase in resistivity with depth.

Line 23

This line along with Lines 24 and 25 shows the lowest absolute apparent resistivities encountered on the project. This could be due to several causes; more porosity and/or more concentrated electrolyte in the permeating water. In either case, this general very low zone should be sampled. The lowest lows on the line are near 12W and 3E and have fair depth extent although the absolute resistivity continues anomalously low to the limit of penetration on the west half of the line. East of about 18E, the resistivity is more typically high.

Line 24

As mentioned above, this line is anomalously low in absolute resistivity level. A relatively broad low near 8W is the lowest seen on the project. Another strong low is noted near 24W and having an indeterminate western boundary. As on Line 23, this low resistivity persists with depth, particularly on the west half of the line. Another fairly strong low is seen near 18E again with an indeterminate lateral extent due to lack of coverage; its depth extent is good, however.

Line 25

This line shows a very strong depth persistant low near 18W, likely related to the strong low zone seen on the west end of Line 24. Another minor low is noted near 6E having poor depth extent. The resistivity on this line shows less persistance of the extremely low resistivity with depth compared to Lines 23 and 24.

Line 26

A sharp, pronounced low is noted near 27E and shows good depth persistance. A broad low is seen near 8E of

fair depth extent. There is a high resistivity near surface zone near 9W below which an apparent resistivity low is noted. This buried low may be caused by a rather deeply buried (500-600 feet) porous zone or may be caused solely by geometric effects of an array crossing a resistive body, but actually giving an "apparent" resistivity low effect.

Line 27

Relatively low resistivities are seen over the entire length of the line; not as low, though, as on the nearby Lines 23, 24 and 25. A broad anomalous low occurs between 3W and 15E with limited depth extent. A very minor low is seen near 24W. The gross resistivity picture shows a general increase with depth.

Line 28

Line 28 has a rather complicated resistivity pattern. West of about 18W the resistivity is quite high. There is a low of questionable significance near 15W and a definite fairly strong low near 0 E/W of fair depth extent. A pronounced resistivity high is noted near 7E.

Line 30, (Spread 1 and 2)

A broad, good depth extent, rather strong low is noted between stations 15E and 27E. The pattern here is reminiscent of the general character of lows seen in the Rounsaville Area. Other relatively minor low zones are seen near 18W, 9W and 45E, all of fair depth extent. In general, the apparent resistivity shows a pronounced increase with depth.

Line 31,

A very strong narrow depth persistant low is seen near 18W in a fairly high resistivity background. Other lows of note are seen near 9E and 21E with fair depth extent. There is the usual increased resistivity with depth over most of the spreads

Line 32

One broad fair depth extent low is observed between stations 9 SW and 6 NE. This large width is likely due to the spread having been run approximately down the strike of the lows seen on the east halfes (Line 30 and 31). This broad low, in plan, suggest an interconnection between the two eastern lows noted on Lines 30 and 31, however, it may simply be due to the lateral side penetration of Line 32 into these two sub-parallel lows. Again, there is a general increase in apparent resistivity with depth.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig

Chris S. Ludwig
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APPROVED:

Walter E. Heinrichs, Jr.
President & General Manager

September 18, 1968
Tucson, Arizona

# GEOPHYSICAL ELECTRICAL RESISTIVITY SURVEY FOR SULFUR EXPLORATION PURPOSES ROUNSAVILLE AREA, CULBERSON COUNTY, TEXAS

For

Cities Service Minerals Corporation

August 1968 (Phase II)

By

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| Resistivity Survey Location and Interpretation Plan | |

## INTRODUCTION

At the request of Mr. Donald P. Moore of Cities Service Minerals Corporation, Houston, Texas, Heinrichs Geoexploration Company of Tucson, Arizona, conducted and completed the second phase of a test electrical survey for sulfur exploration purposes, initiated in February 1968, in the Rounsaville Area, Culberson County, Texas. This new work was run during the interim May 16 through August 19, 1968.

All the new coverage was surveyed on a 600 foot dipole spacing and multiples thereof, which was determined to be a reasonable optimum compromise between depth of penetration, resolution and coverage per unit time, based on the February test. The line separation was one-half mile except for Lines 1, 3, 4, 5 and 9 which are separated one-fourth mile. All lines are oriented east-west and run down the claim end lines except for Line 8 which was run north-south down claim side lines. See the attached plan for details.

A total of 40.2 line miles of 600 foot dipole surface coverage was obtained on 14 lines (2 through 15) with both phases of which 32.6 line miles are subsurface plotted data. This amounts to 33.7 line miles of new surface coverage of which 27.8 line miles are new subsurface coverage.

The resistivity measurements were obtained with the collinear dipole-dipole electrode configuration (somewhat similar to the old "Eltran" system) which on a 600 foot dipole spacing typically gives resolvable penetration within the zone from about 150 feet to 900 feet below surface. A sending frequency of 3.0 hz was utilized in obtaining the apparent resistivity. The data are plotted with the standard dipole-dipole convention; at the intersection of $45^{o}$ diagonals projected downwards from the centers of the sending and receiving dipoles.

Data are presented on sectional data sheets, one for each line, showing the apparent resistivity contoured in section, logarithmically. A Resistivity Survey Location and Interpretation Plan showing the line locations relative to the claims and land net plus showing the surface projected resistivity lows and interpretation is also attached. All of the data taken on a 600 foot dipole spacing during both phases of this survey have been presented in the sections for the sake of completeness. The 1,000 foot dipole spaced lines taken on the first phase work have been shown only on the plan.

The purpose of this survey was to electrically outline possible porous zones that may have been suitable sites for sulfur mineralization. Based on the first phase test and subsequent drilling, the porous zones are apparent resistivity lows.

Heinrichs personnel involved in the field work were R. Fedelchak and D. Anderson, geophysical crew chiefs, A. Silva, C. Dahlberg, B. Gaul and R. Cornelius, technical assistants and wire layout crew. Report, compilation and interpretation by Chris S. Ludwig, senior geophysicist, with the assistance of the Geoex staff.

We wish to express our thanks to Mr. J. Walton and Mr. R. Harris for their assistance to the field crew and also to Mr. Donald Moore for his assistance with project details.

## CONCLUSIONS AND RECOMMENDATIONS

Numerous resistivity lows were seen and show a pronounced northeast-southwest trend. These lows are generally much narrower than their length. Possibly they are caused by fault or joint controlled solution channels or zones of increased porosity.

Most of these lows appear to be due to a source having a limited depth extent and many of the lows are near surface features (completely within 600 feet of the surface). Near surface cavernous zones as have been seen in some of the drilling would be a likely cause of many of these lows.

The interpretation plan shows the interpreted trend bands of these lows based on line to line probable correlations. In general, these bands are zones of relative low apparent resistivity relative to their immediate area. Therefore, there may be areas between the low zones that are lower in absolute resistivity than a low zone on another portion of the map. Hopefully, this interpretation will depict the most important zones structurally and the areas most likely to contain economic sulfur.

Drill hole locations have been suggested to give a representative sampling of the more conductive areas in the more interesting bands of low resistivity. If an interesting sulfur intersection is obtained, the plan map can be used to guide further drilling along strike. All the recommended holes should be vertical and be drilled to at least 600 feet.

A hole at 36W Line 3 is suggested to test a narrow, strong resistivity low perhaps relating to a fracture zone in an area of possibly complicated structure based on the complexity of the pattern.

On Line 4 at 33E, a drill hole was recommended on the first phase work and was later drilled (CT-2) showing a cavernous zone with traces of sulfur. This low and the same low on Lines 3 and 9 is perhaps the most pronounced and strongest low seen in the Rounsaville Area. If this initial intersection is considered to be of interest, then perhaps additional drilling along strike, particularly on Lines 3 and 9, should be considered.

On Line 5, holes are recommended at 21E, 105E, and 138E. The location at 21E will test a moderately strong low that appears to be within about 400 feet of the surface. The site at 105E will sample a broad and relatively deep (but within 600 feet of the surface) low of moderate strength. The 138E site was previously recommended on July 16, 1968 as an interim drill site chosen to be the best target in Pinon 28. However, the resistivity low near 138E is strong enough to be a recommended target even when considering it in relation to the entire area.

A hole is suggested at 72E Line 7 to test a moderately strong low in the north part of the survey area and in an area of fairly complex electrical structure.

On Line 8, a drill hole is recommended near 3S to sample a strong, apparently quite shallow low. This low correlates with a low seen near 48E, Line 9 and is the probable southwest extension of the major low seen and drilled further northeast in Carol 4 (CT-1) Cedar 25 (CT-1 and 1A) and Mesquite 26.

A hole is suggested at 21E, Line 9 that will explore a narrow, strong resistivity low with good depth extent. This low may be a lobe of the major low zone mentioned in the above paragraph.

In the south portion of the area, a drill hole is recommended at 62E on Line 10 that will sample a moderately low resistivity zone likely resulting from a narrow conductive

source. On Line 13, a drill site is indicated at 6W to test a complexly shaped resistivity low that is quite low in a relative sense. The southeast fringe of this low may have already been tested by CT-1 in section June 15. Likewise, drilling is recommended near 12E Line 14 to explore a very low zone that is likely caused by a rather broad (2,000 feet) source, relatively shallow (within 400 feet of the surface).

Line 15 and to a lesser degree Lines 12, 13 and 14, show a lower resistivity in general, on an absolute basis, compared to the rest of the lines to the northwest. This may be suggestive of a facies change to the southeast, but of unknown significance with respect to sulfur deposition. A test hole at 21E, Line 15 will sample a portion of this more conductive region that shows good depth extent and high conductivity. This hole should perhaps go somewhat deeper than 600 feet to obtain a representative section in this anomalous part of the surveyed area.

It is recommended that if we are kept closely informed of the drill results we can materially upgrade the interpretation and provide you with maximum utilization of the geophysical data. It is possible that with more correlation information between the sulfur occurrences and electrical results that the areas of interest could be more definitively resolved and narrowed down even further and/or more ground covered faster.

Consideration should be given to confer at our mutual convenience for purposes of discussing various details of this program and to better correlate the geological and geophysical results.

If the drilling results prove economically encouraging, detailed electrical coverage may be helpful in positioning follow-up drilling. Also, there may be other similar districts or extensions of this district where this resistivity system could locate additional sulfur bodies.

## INTERPRETATION

Line 2, Spreads 2, 3, 4, 5, 6 and 7

West of about 210W the resistivity is quite high and shows no significant relative lows. Near 207W, a minor ill-defined low is seen but is almost lost in the limbs of the stronger low near 195W. These two lows are likely due to shallow conductive bodies lying within 400 feet of the surface and being about 600 feet in width or less.

East of 195W, the surface resistivity is generally quite low and increasing markedly with depth. There are several areas lower than average indicated on the section, with the zones near stations 126W, 111W and 81W and east of 54W being most important. The low near 81W is however, apparently due to a rather broad conductor (between 600 and 1,200 feet wide) and possibly has improved depth extent (in excess of 600 feet depth) but still coming to within 400 feet of the surface. The low east of 54W has good depth extent and a somewhat indeterminate width, but probably terminates near 30W based on the first phase work 1,000 foot dipole Spread 1 of Line 2.

There is an apparent resistivity low at depth near 60W that has a pattern suggestive of a high resistivity zone between one and two dipoles in width centered near 60W. This low apparent resistivity effect over a narrow high resistivity zone is a normal peculiarity of the dipole-dipole electrode array in the conventional mode of application which we use.

Line 3, Spreads 1, 2, 3 and 4

Very high resistivity is seen west of about 42W suggestive of a very nonporous tight rock. Just east of these high resistivities is a sharp low near 36W that shows a pattern

suggestive of a narrow tabular, steeply dipping conductive zone rather than the usual depth limited conductive zones seen elsewhere. This could be caused by a steeply dipping fracture zone.

Much of the remainder of the line shows a low near surface resistivity increasing with depth. Several anomalously low areas were seen near 6W, 51E and 99E. The lows near 6W and 51E have been previously discussed in the February report. The low near 6W has been tested by Carol CT-1 which intersected a porous zone from about 400 feet to 700 feet below surface. The low near 51E along with the southwest extension of the low on Lines 4 and 9 is perhaps the strongest low seen on the project and must be related to a major but narrow (less than 1,200 feet) conductive zone of good depth extent. The low near 99E is also fairly strong, broad, and of good depth. Its eastern boundary was not crossed by the plotted data and therefore is indefinite.

Line 4, Spreads 1 and 2

This line has been discussed before in the first phase work. The very strong low between 27E and 39E was recommended for drilling in that report. The subsequent drilling did show a porous zone containing traces of sulfur. This low, as mentioned with Line 3, is perhaps the strongest seen on the survey and therefore, the drilling results in this low, at least structurally, can be used to assess the other lows as to their geological significance. Of course, the strength of the low may have little or nothing to do with degree of sulfur mineralization.

The rest of this line is relatively high in resistivity and shows the typical increase with depth.

Line 5, Spread 1, 2, 3, 4 and 5

Spreads 1 and 2 were completed in the first phase work and show generally low near surface resistivities with several

extra low zones near 3E and 21E. The low centered near 3E has been tested to some degree by CT-1 and 1A and shown to be a porous zone. The probable associated low near 21E has not been tested and is stronger than the 3E low although with less apparent depth extent.

West of Spread 1, the resistivity becomes considerably higher and again showing a pronounced increase with depth. Several very minor relative lows are seen near 44W and 26W.

East of Spread 1 the resistivity is relatively low and shows several anomalously low areas. A broad, good depth extent anomaly is centered near 68E and is the weaker northeast extension of the very strong low seen on Lines 3, 4 and 9. A moderately strong broad low is seen near 105E showing fair depth extent. East of 135E is a strong low of unknown extent to the east, but apparently having good depth extent.

Line 6, Spreads 1, 2 and 3

For the most part, this line shows rather high resistivity increasing with depth. There are several lows of note; one near 69E and another near 9W with indeterminate extent to the west. Very minor lows are seen near 57E and 3E. A pattern typical of a narrow near surface high resistivity zone is noticed near 93E.

Line 7, Spreads 1, 2 and 3

This line is directly north of Line 6 but shows considerably more complexity in the resistivity patterns. Moderate lows show near 72E and 45E with the low near 72E being stronger and of better depth extent than the low near 45E. Other minor lows are seen near 15W, 21E and 96E. A zone of unusually high resistivity appears at depth below and east of the 96E low. This high resistivity more than likely represents an exceptionally tight rock at depth.

Line 8, Spreads 1, 2, 3, 4 and 5

Line 8 was oriented north-south to determine if any significant features had been missed by the other east-west lines. No significant differences were seen on this north-south line and, in fact, it shows good correlation and similar patterns to the east-west lines, as would be expected since it still crosses the main conductors at about 45°.

A strong low with limited depth extent is seen near 3S and correlates with a similar low near 48E on Line 9.

Another fairly strong low is noted near 33N correlating with a low near 6W, Line 3.

A near surface narrow high resistivity zone is seen near 15N between the above two lows.

Other lows are seen near 51N, 75N and 134N with the low near 75N being the strongest of the three and correlating with a minor low near 142W Line 2.

With the exception of the low near 3S, these lows are all quite shallow and of limited depth extent.

Line 9, Spreads 1, 2, 3, 4 and 5

Rather low near surface resistivities are seen from about 18E to 102E increasing with depth. Between 87E and 102E is a very strong good depth extent low correlating with strong lows to the northeast on Lines 3 and 4 as already discussed. This low is somewhat broader than seen on Lines 3 and 4, however, but equivalently strong. Another important low is seen near 21E likely caused by a narrow conductive source of good depth extent. Minor relative lows are noted near 46E and 75E.

Outside of this broad general low, the resistivity is quite variable, particularly to the east. A fairly strong low is seen near 135E with minor lows near 165E and 180E. To the west, a sharp low likely resulting from a narrow steeply dipping tabular body is noted near 18W. This low is similar to and perhaps related to a low near 36W,Line 3.

Line 10, Spreads 1 and 2

Relatively high resistivities are seen on most of the line and with the typical increase with depth. A fairly strong low is noted near 62E. Not enough data is available to the east for a definite determination of its width but it appears to be only one dipole or less in width. A sharp low is noted near 0 E/W perhaps due to a steep easterly dipping narrow conductive tabular body. A minor low appears near 33E within a broad near surface low area.

Line 11, Spread 1

Again, mostly high resistivities increasing with depth are seen. There is a moderate strength and good depth extent low east of 24E and a minor low near 4E.

Line 12, Spread 1

This line is considerably lower in resistivity than Line 11 to the northwest. However, it still shows the typical increase in resistivity with depth. Apparently, this line along with Lines 13, 14, and 15, are in a different more porous rock type or facies change or at least in an area of more saline ground water. A probably narrow, anomalously low area is noted near 9E showing fair depth extent and a shallow source.

Line 13, Spread 1

As Line 12, Line 13 is relatively low in absolute resistivity, however, showing a much more complex pattern of resistivity. Lows are noted near 24W, 6W, and 12E, all of about the same strength and having good depth extent.

Line 14, Spreads 1 and 2

Again, generally low resistivities are seen with the lowest zones appearing near 14W, 42E and 58E and with a strong broad low between 6E and 27E. The broad low is strongest near 12E but has limited depth extent compared to the rest of the low to the east.

Line 15, Spreads 1 and 2

This line is very similar to Line 14 and shows its strongest lows between 12E and 24E, between 30E and 42E, and near 54E. A very broad low zone is seen from 6E to at least as far west as 21W. The low between 12E and 24E shows the best depth extent on this line, but may also suboutcrop rather deep (400 to 600 feet).

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig
Senior Geophysicist

APPROVED:

Walter E. Heinrichs, Jr.
President & General Manager

Registered Professional Engineer (Mining) CERTIFICATE EXPIRES WALTER E. HEINRICHS, JR. DEC. 31, 19[illegible] ARIZONA, U.S.A.

August 28, 1968
Tucson, Arizona

January 23, 1969

Mr. Donald P. Moore
Cities Service Minerals Corp.
800 Main Building
Houston, Texas 77002

Re: Rounsaville and Scotts Ranch
Area Resistivity Data Review

Dear Don,

Following our telephone conversation of 10 January 1969 we have prepared no finalized drawings based on new interpretation and will submit no formal report covering the data review. The reason this was suggested is that although a sizeable amount of time and effort was spent compiling and studying the new drill hole logs and the resistivity data, no really new concept to assist in locating sulphur zones was developed.

This letter, the enclosed pencil work maps, and abstracted well logs presented on our resistivity plots will comprize a letter report of the assignment.

Three ideas were checked with particular care:

1. Correlation of resistivity derived structure to topographic features visible on the aerial mosaics.

2. Correlation of drill logs to the resisitivity plots.

3. Two contour plans were developed for the Rounsaville Area based on the n=1 and n=2 apparent resisitivity data.

Very definite correlation to drainage is noted, especially in the Rounsaville Area. The most striking topographic - resistivity correlation may be the drainage running northeasterly through Longhorn 3 correlating very closely to a very sharp resistivity low. Based only on the four lines running through Sections June 15, Opal 7, and Ruby 8, we see a generally low resistivity belt bearing NE which has very definite internal NE structures also corresponding to the drainage pattern. An area marked with yellow pencil on the mosaic outlines the area of visible good agreement of topography and low apparent resistivity in the Rounsaville Area. The northeast trending drainage of the Scott Ranch Area is likely reflected in the resisitivity data, however, the areas covered are not contiguous and therefore it is difficult to positivity identify a particular resistive feature with the drainage.

There are many east trending structures visible on the NW gradrant of the mosaic of the Rounsaville Area which appear to be soil color change or minor topographic lineations. Two of these more prominant features enter the area covered by the apparent resistivity map about mid Sandra 5 and Coral 4 and may continue on into Longhorn 3 and Mary Beth 2 as east-west drainages. This feature is in some way related to the high resistivity zone at the west end of Line 4. No such feature is observed in the Scott Ranch Area, either from the resistivity data or the photographs.

Drill log correlation to the resistivity data indicates little or no positive relation of sulphur bearing rocks to either high or low resistivity material. The drill logs indicate that most of the low resistivity features that have been drilled are caused by gypsum or shale in the upper part of the drill hole. Note that these lows are not necessarily causing the structural trends noted on the mosaic. Positive correlations of resistivity lows to brecciated areas can not be made at this time because there was little geophysical work done over well brecciated areas, based on the drill logs.

It is most reasonable to assume that the breccias will be low resistivity rocks because of their increased porosity and that sulphur deposited in them would not usually change their resistivity. If all voids were filled and sealed then a high resisitivity material would result but this seems unlikely to be the case.

The accompanying Rounsaville Area contour maps are the result of compiling all the n=1 data in plan form on one sheet and the n=2 data on another. It was hoped that this procedure would result in an alternate concept of resistivity

derived structural control for sulphur deposits. Unfortunately nothing fundamentally new is noted except the area of generally lower resistivity outlined in green on the n=2 map. Because there are apparently no drill holes in this area we would suggest at least two new drill holes; one in the middle of Section 25 and one in Section 26.

The above comments summarize our thinking to date except for non-geophysical considerations such as the possible "plumbing" effects of the visible east-west structures. Could it be that sulphur bearing fluids are transported along east-west fractures to the low hills trending north-south through photo 6179-1/-14 where these fractures seem to end, perhaps depositing sulphur some three or four miles east of the Rounsaville Area proper.

Should you ever require any part of this review to be presented in finalized form we would need the work maps, mosaics, and drill logs once more. We will of course be pleased to do this or confer with you at any time.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

Paul A. Head
GEOphysicist

PAH/rc

Enclosure

March 27, 1974

Mr. Owen Kingman, Vice President
Cities Service Minerals Corporation
621 Kearns Bldg.
Salt Lake City, Utah 84101

Dear Owen:

Your kind note of 25 March 1974 regarding my "letter to Asta" published in THE PROFESSIONAL GEOLOGIST is most appreciated and timely. Just yesterday we were discussing Park City and of course you were mentioned.

My efforts on behalf of Corporate survivorability will likely prevent a personal quality of environment Skier's check of your area this season. However newlyweds, Fred and Mary are talking about a possible repeat visit about 7 to 10th April 1974 to the scene of their immediate post nuptial holidays in your neighborhood. They will again be carrying my proxy, with firm instructions to at least give you and Margaret a call. Perhaps this time, such extra-curricular non-skiing matters, etc. will also receive the attention they ordinarily deserve.

Warmest regards,

Cordially,

Walter E. Heinrichs, Jr.

WEH:jh

1+1CC

CITIES SERVICE MINERALS CORPORATION
621 KEARNS BUILDING
SALT LAKE CITY, UTAH 84101

OWEN KINGMAN
VICE-PRESIDENT

TEL. (801) 355-1756

March 25, 1974

GEOEX
Cable: GEOEX

RECD MAR 27 1974 RECD

BOX 5964 TUCSON, ARIZONA 85703
Phone: (AREA 602) 623-0578

Mr. Walter Heinrichs, Jr.
Geoex
P. O. Box 5964
Tucson, Arizona 85703

Dear Walt:

I want to express my appreciation of your letter to Mr. Asta, published in the recent Professional Geologist. It was well-organized and well-phrased. Your efforts in behalf of rationality are commendable.

Earlier this year you alluded to a possible visit to check the quality of our environment from a skier's point of view. You had better hurry as Spring is on its way to Park City.

Sincerely,

Dear Owen: Your kind note of 25 March 1974 regarding my "Letter to Asta" published in The Professional Geologist is most appreciated - and timely! Just yesterday we were discussing Park City and of course you mentioned.

My efforts on behalf of Corporate survivability will likely prevent a personal inquiry of environment skiers check of your area this season. However, Fred and Mary are talking about a possible repeat of

approx 7-10 April '74

visit to the scene of their immediate post nuptial holidays in your neighborhood. They will again be carrying my proxy, with firm instructions to give you and Margaret a call. Perhaps this time, such extracurricular matters as ski-ing etc., will also receive the attention they ordinarily deserve.

Regards,

Cordially,

HEINRICHS GEOEXPLORATION COMPANY

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

February 27, 1970

Tennessee Corporation
Miami Copper Company Division
P.O. Box 100
Miami, Arizona 85539

Attention: Mr. W.W. Simmons, Chief Geologist

Re: Present Exploration Procedure -
(Empire Mountain Area)

To date the production from the Empire Mountains has come from two areas: the Total Wreck Mine (Sec. 3) and from Hiltano Camp (Sec. 18, T. 18 S. R. 17 E.). The ore has been argentiferous lead mostly, with some molybdenum production reported.

Both areas are located on the same ridge, essentially as replacement deposits in Paleozoic limestones. Both areas contain strongly fracture controlled mineral deposits. These fractures are probably related to the emplacement of the Sycamore Stock. The mineralization may or may not be related to the stock, but apparently is.

The ridge on which the mines are located is arcuate and essentially a hogback that is annular to the stock. The stock has apparently intruded into Paleozoic and Cretaceous sediments and the intrusion has formed the hogback ridges on the east and south edges of the stock.

1. Because of the land position, active exploration at this time will be confined to and south and east of Total Wreck Ridge.

2. A regional geochemical sampling program on 1000 foot grid for Cu, ZN Ag and Mo will be begun as soon as possible.

This work will be continually supervised by a geologist in the field.

3. Several I.P. lines utilizing a 1000 foot dipole spacing will be placed across the Total Wreck Ridge. These lines will be situated to take advantage of terrain and access. The centers of the lines will be placed on the south-east side of the ridge and at approximately the 4700' elevation contour. This should give maximum penetration and resolution to determine if any sulfide bodies of appreciable extent exist. Further I.P. should await the geochemical sampling results.

The above work is recommended to best process and evaluate the economic potential of the area in the most economic manner.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

Donald B. Cooley
Geologist

DBC/re:

the Cretaceous (?) beds consist of a northern and southern series separated by a high angle fault. The northern series is made up of coarse gray to brown arkosic sandstone, greenish-gray shale, and occasional lenticular limestone beds which are extremely thin-bedded and either light gray or jet black and fetid. Lithologically these beds are similar to those which lie above the maroon shales on the eastern flank of the mountains and may be either their equivalent, or represent the beds now concealed beneath the alluvium of Cienega Wash valley.

The southern series of Cretaceous (?) beds west of the thrust is made up of thick boulder conglomerate alternating with felsic lava flows and tuffs. Their relationship to the other Cretaceous (?) strata is not known, but they are presumably younger than the arkosic sandstone and shale, because they contain numerous fragments of arkosic rocks which appear to be identical with those exposed to the north. This series may be in part as young as Tertiary in age.

The structural and stratigraphic relationships of the Cretaceous rocks between the Empire and Santa Rita Mountains are complex, and it has not yet been possible to establish a continuous sequence between these two ranges. Near the crest of the Santa Ritas, the maroon shale and limestone conglomerate series lies unconformably on the Paleozoic rocks and dips eastward, and an arkosic sandstone and shale series is present. The total thickness of Cretaceous rocks between the Santa Rita Mountains and the western margin of the Paleozoic section in the Empire thrust block may be about 18,000 feet, but the possibility of duplication by folding or faulting cannot be disregarded.

## INTRUSIVE ROCKS

The central part of the Empire Mountains is occupied by the Sycamore quartz-monzonite which extends for about two miles along the trend of the range as a roughly elliptical body less than one mile wide. On the western side of the mountains it is in contact with the Cretaceous (?) beds of the basement block; along the remainder of its border it rests against the Paleozoic rocks of the overthrust block. The quartz-monzonite is light gray and medium to coarse grained.

Small bodies of granodiorite, rhyolite porphyry, rhyolite, and diorite porphyry are exposed near the Sycamore stock, and small dikes of aplite, syenite, trachyte, rhyolite, diorite, andesite, and basalt occur throughout the Empire Mountains.

## STRUCTURE

The Empire Mountains are divided into two structural parts, a basement block of Cretaceous (?) rocks, in part folded into a series of broad anticlines and synclines with east-west axes, and in part dipping steeply to the east; and an overthrust block of Paleozoic and Cretaceous (?) strata which dip eastward at about 45 degrees. East-west and north-south faults have added to the structural complexity of the range.

### Basement Block

The basement block is exposed in and forms the foothills between the Empire and Santa Rita ranges. It is divided by a high-angle, northwest-southeast fault into two distinct parts. The northern part consists of Cretaceous (?) arkosic sandstones and shales, and the southern part consists of Cretaceous (?) boulder-conglomerate and volcanic flows and clastic rocks. The rocks of the northern series have been

folded into broad anticlines and synclines with east-west axes striking nearly at right angles to strata above the thrust. The amplitude of the folds is greater than 2,000 feet and the dip of the beds on the flanks range from 40 to 60 degrees. The conglomerate and volcanic strata of the southern series dip from 65 to 80 degrees to the east. Along a large part of its length the fault which separates the two series is occupied by a dike of rhyolite porphyry.

## Overthrust Block

The dominant structural feature of the Empire Mountains is a low-angle fault which crops out along the western edge of the mountains and appears to dip gently toward the southeast. Although the outcrop of the fault is covered largely by the alluvium, it is exposed southwest of the Andrada Ranch where Permian limestone rests on the folded Cretaceous (?) rocks of the northern series. To the south, where the fault is not exposed, Cretaceous (?) rocks are almost everywhere exposed on the west bank of Davidson Canyon, and, except in the vicinity of the Sycamore stock, Paleozoic rocks make up the east bank.

In the northernmost part of the range, imbricate thrust structure is strikingly developed. At the southwestern base of Pantano Hill, limestone beds rest on Cretaceous (?) maroon shale and limestone conglomerate. Near the crest of Pantano Hill, a basal Cretaceous (?) limestone conglomerate, 30 to 50 feet thick, rests on the eroded surface of the Scherrer formation. Above the conglomerate is a sliver of Martin limestone, replete with Atrypa reticularis, and Escabrosa limestone.

The main overthrust block of the Empire Mountains is broken by east-west faults which divide it into four segments. The large horizontal component of displacement on some of these faults (about 8,000 feet on the Andrada fault and 6,000 feet on the Pantano fault) and the fact that they cannot be traced into the Cretaceous rocks of the basement block to the west, strongly suggests tear-faults which formed during the period of overthrusting. Structure within the individual segments also suggests that the displacement along these faults is the result of horizontal rather than vertical movement. In the northern segment, the Paleozoic formations are domed, and imbricate structure is present; in the north central segment, the Paleozoic rocks have been folded into a symmetrical anticline whose roughly north-south axis plunges steeply to the south; in the south central segment, there is an asymmetrical anticline with steeper dips to the west than to the east; and the southern segment apparently has been rotated on the thrust plane so that the formations exposed just south of the Hilton fault strike east instead of north.

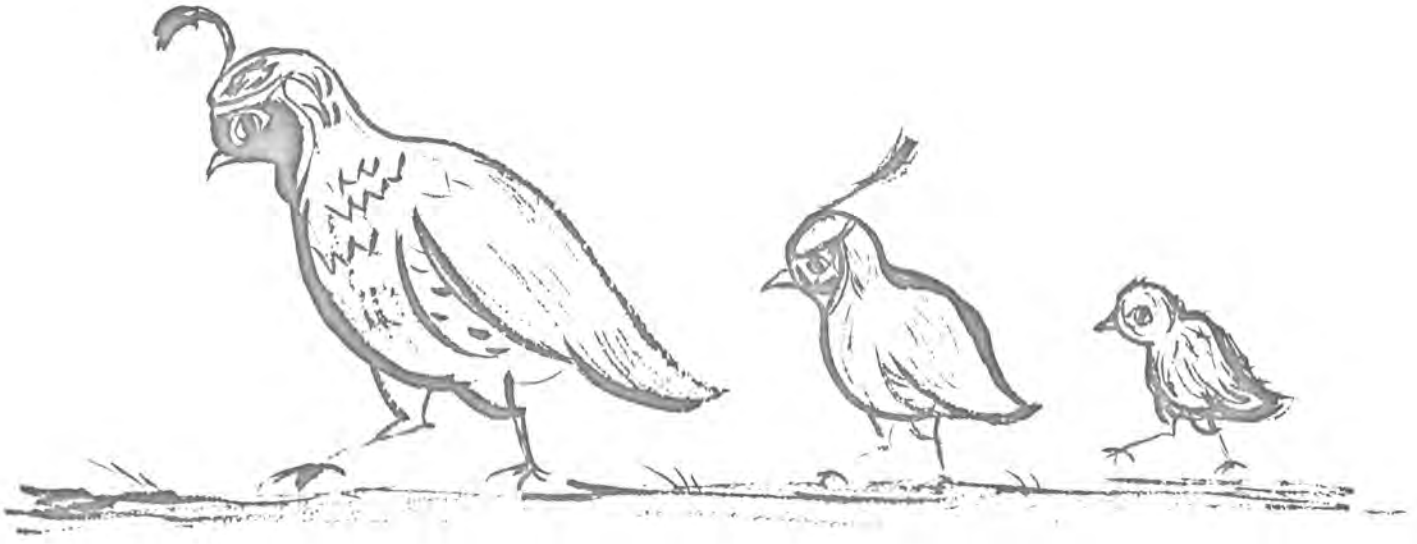
The direction of the thrust appears to have been from the southeast. The Cretaceous (?) rocks below the imbricate thrust plates wedge out in this direction. The asymmetrical anticline and syncline which involves the Abrigo and Martin formations adjacent to the Hilton fault dips 45 degrees southeast. South of the Andrada Ranch a fold in the same formations is sharply overturned to the north, and the Martin limestone has been moved northward along a low-angle fault over the crushed shaly beds of the Abrigo formation.

## Normal Faults

North-south normal faults in the Empire Mountains are inferred from displacements of formational contacts, but their outcrops are concealed by alluvium in most places. The amount of vertical displacement on these faults appears to have been moderate, amounting to only a few hundred feet at a maximum.

## Interpretation of Structure

Large-scale overthrusting in southeastern Arizona has been described in the Santa Rita and Empire Mountains by Schrader (1915) and Wilson, R. A. (1934), in the Tucson Mountains by Brown (1939), and in central Cochise County by Gilluly (1956). Thrust faults of considerable magnitude are also known to be present in the Rincon, Sierrita, and Huachuca Mountains. In the Empire Mountains, the intensity of thrusting and accompanying folding and shearing contrast with the comparatively small-scale normal faulting exhibited along their flanks. Although the Empire Mountains outwardly exhibit the typical form of Basin-and-Range tilted-blocks, the displacements along the normal faults appear to be too small to account for the structural relationships of the Empire Mountains to the adjoining Santa Rita and Whetstone ranges. The author concludes that the structural development of the Empire Mountains was controlled by regional compression.



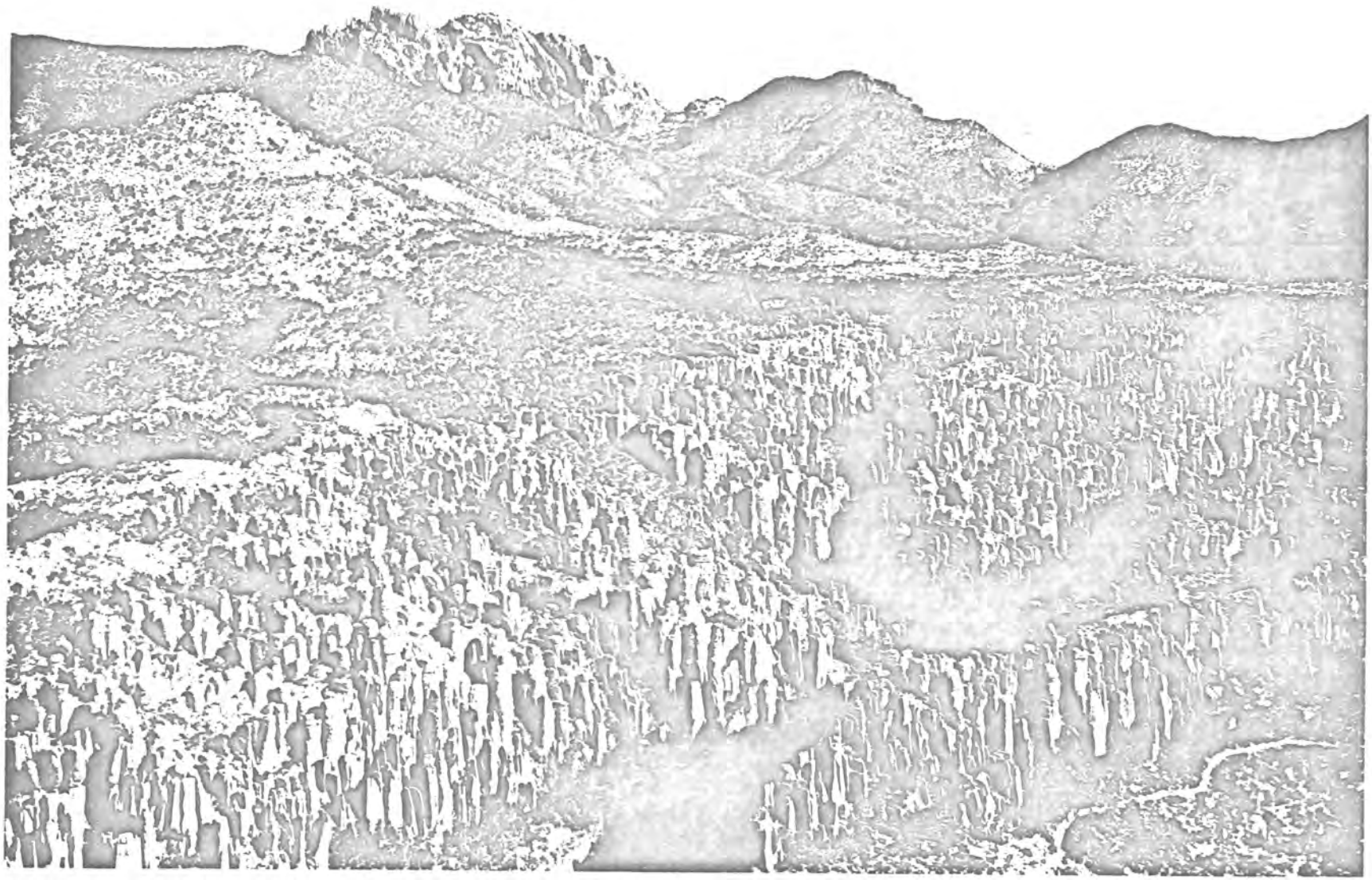


FIGURE 24. Cochise Head and Rhyolite Canyon, Chiricahua Mountains, Arizona, from southwest. Columns were eroded from welded tuffs of Rhyolite Canyon formation; Cochise Head is composed of Faraway Ranch formation; dark hills in middle distance are Precambrian, Paleozoic, Mesozoic, and probable Tertiary rocks in thrust complex. Conical peak on right is Sugarloaf Mountain, remnant of a thick rhyodacite flow. Photo by Tad Nichols.

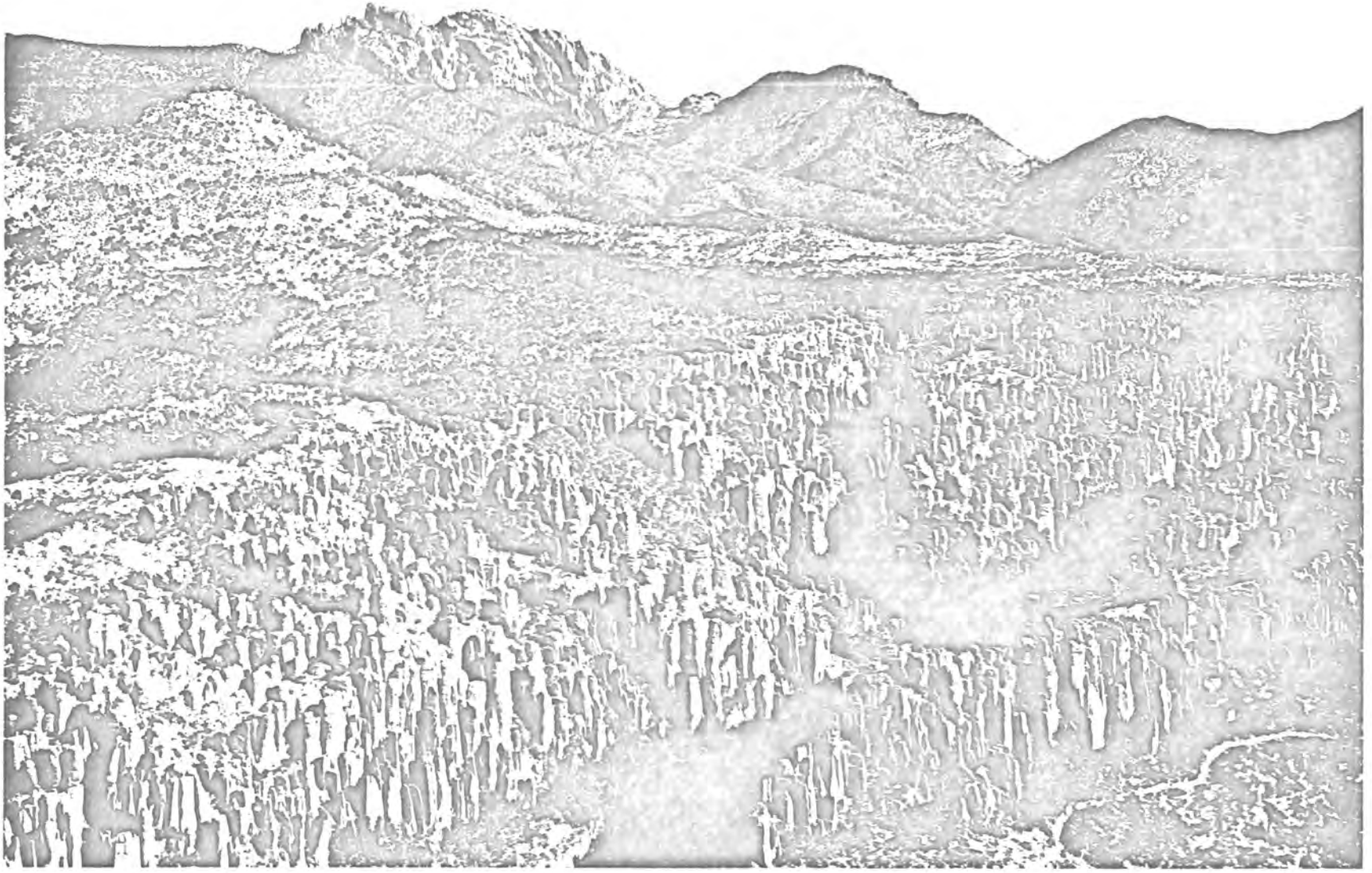


FIGURE 24. Cochise Head and Rhyolite Canyon, Chiricahua Mountains, Arizona, from southwest. Columns were eroded from welded tuffs of Rhyolite Canyon formation; Cochise Head is composed of Faraway Ranch formation; dark hills in middle distance are Precambrian, Paleozoic, Mesozoic, and probable Tertiary rocks in thrust complex. Conical peak on right is Sugarloaf Mountain, remnant of a thick rhyodacite flow. Photo by Tad Nichols.

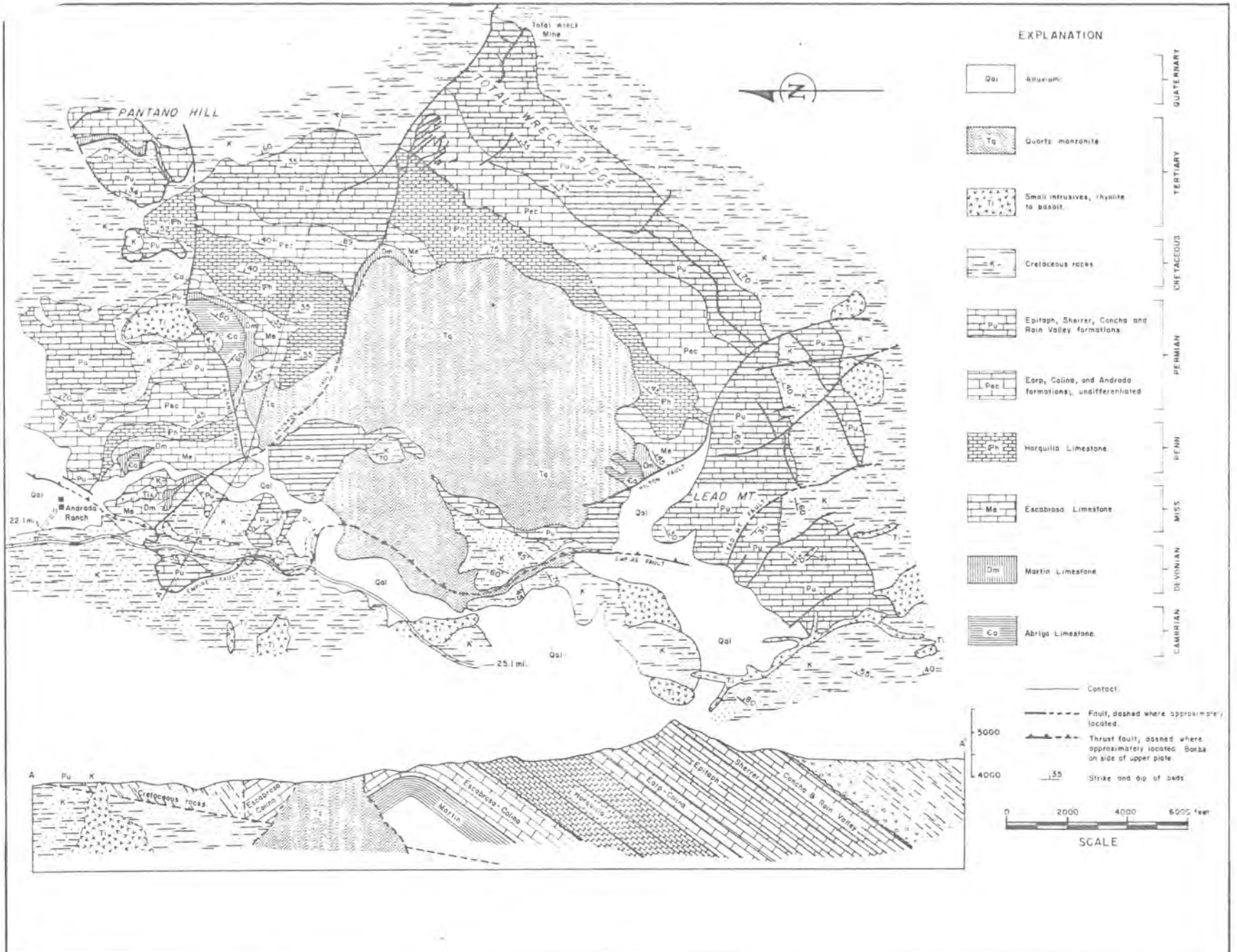



FIGURE 23. Generalized geologic map and cross section of the Empire Mountains, Cochise County, Arizona.

sparkling, sugary to coarsely crystalline marble. The thickness ranges from about 300 feet in the southern part to about 100 feet in the northern part of the range.

## Lower Mississippian Escabrosa Limestone

The Escabrosa limestone is exposed almost continuously throughout the length of the range, but is unusual in that it is not a cliff-former in this area. The Escabrosa consists of light gray to blue, fine-grained limestone beds one to two feet thick. Metamorphism has changed much of the formation to white, coarsely-crystalline marble; which closely resembles the marbleized limestone in the Martin, and makes difficult the separation of Mississippian and Devonian limestones where the Cladopora prolifica horizon is not present. The Escabrosa ranges in thickness from 200 to 600 feet, thickening from south to north.

## Pennsylvanian Horquilla Formation

A disconformity, marked in places by a thin bed of conglomerate separates the Horquilla from the underlying Escabrosa. The Horquilla generally consists of massive, blue-gray limestone alternating with soft calcareous shale. Individual beds are from 10 to 100 feet thick. Limestone beds are thicker than shale beds and stand out on weathered slopes, giving a coarsely banded appearance to the formation as a whole. In the northeastern part of the Empires, however, the lower part of the Horquilla formation consists of alternating limestone and quartzite beds, and shale predominates in the upper part. The limestone beds are one to three feet thick, fine grained, dark blue, and contain irregular chert inclusions. The quartzite beds are light gray or white on fresh surfaces and weather to buff.

Metamorphism has obliterated the bedding and blue-gray color of the limestone beds and changed the shale to hard, resistant, hornfels-like masses. The Horquilla is nearly 1,200 feet thick in the central part of the range but thins northward to approximately 500 feet.

## Pennsylvanian and Permian Andrada Formation

The Earp and Colina formations defined by Gilluly, Cooper, and Williams (1954), cannot be recognized in the Empire Mountains, and the term Andrada formation has been used by Wilson, E. D. (1951), Bryant (1955), and others for the undifferentiated equivalent beds. In the Empire Mountains the Andrada formation consists mainly of soft shale and marl, with some dense, dark blue-gray limestone from 10 to 200 feet thick, and, in the upper part, three beds of gypsum from 5 to 50 feet thick.

Many beds of the Andrada formation exhibit a complete change in lithologic character within a few hundred feet along strike. The formation as a whole is soft, and erosion has carved the main north-south wash from these unresistant beds.

Locally, metamorphism along intrusive contacts has converted part of the Andrada formation to a fissile, light gray, sericite schist which resembles the Precambrian Pinal schist. Where the formation lies at greater distances from intrusive bodies, the limestone has been marbleized, and the shale has been indurated or silicified to hornfels-like masses which closely resemble the metamorphosed Horquilla.

The Andrada formation ranges in thickness from 300 to 1,500 feet. It is thickest

in the central part of the range and thins to the north.

## Permian Epitaph, Scherrer, Concha, and "Rainvalley" Formations

The undifferentiated Epitaph, Scherrer, Concha, and "Rainvalley" formations, from 1,250 to 2,250 feet in thickness, are the most prominent rocks in the Empire Mountains. They form the crests of the highest ridges and their western slopes are usually sheer cliffs that are visible for miles. Although these formations, defined by Gilluly, Cooper, and Williams (1954), can be readily recognized, they have been mapped as a unit.

The Epitaph consists of a series of thick, massive, fetid limestone beds 90 to 300 feet thick and forms the prominent westward facing cliffs along the higher parts of the range. The Scherrer formation is made up of two gray, vitreous, orthoquartzite members separated by a massive, blue, dolomitic limestone which usually contains irregular masses of silicious material. The lower quartzite member ranges in thickness from 90 to nearly 800 feet; the middle dolomitic limestone member is from 30 to 150 feet thick; and the upper quartzite member is from 30 to 250 feet thick. The thicknesses are greater in the southern part of the range, but the great change over relatively short distances is believed to be due to unrecognized low angle thrust faulting. The Concha and "Rainvalley" formations make up an unbroken series of limestone beds above the Scherrer, and form the eastern slopes of the highest ridges. The Concha maintains a thickness of about 500 to 600 feet and consists of dark gray to blue limestone beds which are thick, massive, and fetid, and contain abundant chert nodules in many places. The "Rainvalley" consists of light gray dolomitic limestone which is thinner bedded than the Concha, and a few thin beds of brown to buff quartzite.

## Cretaceous (?) Beds

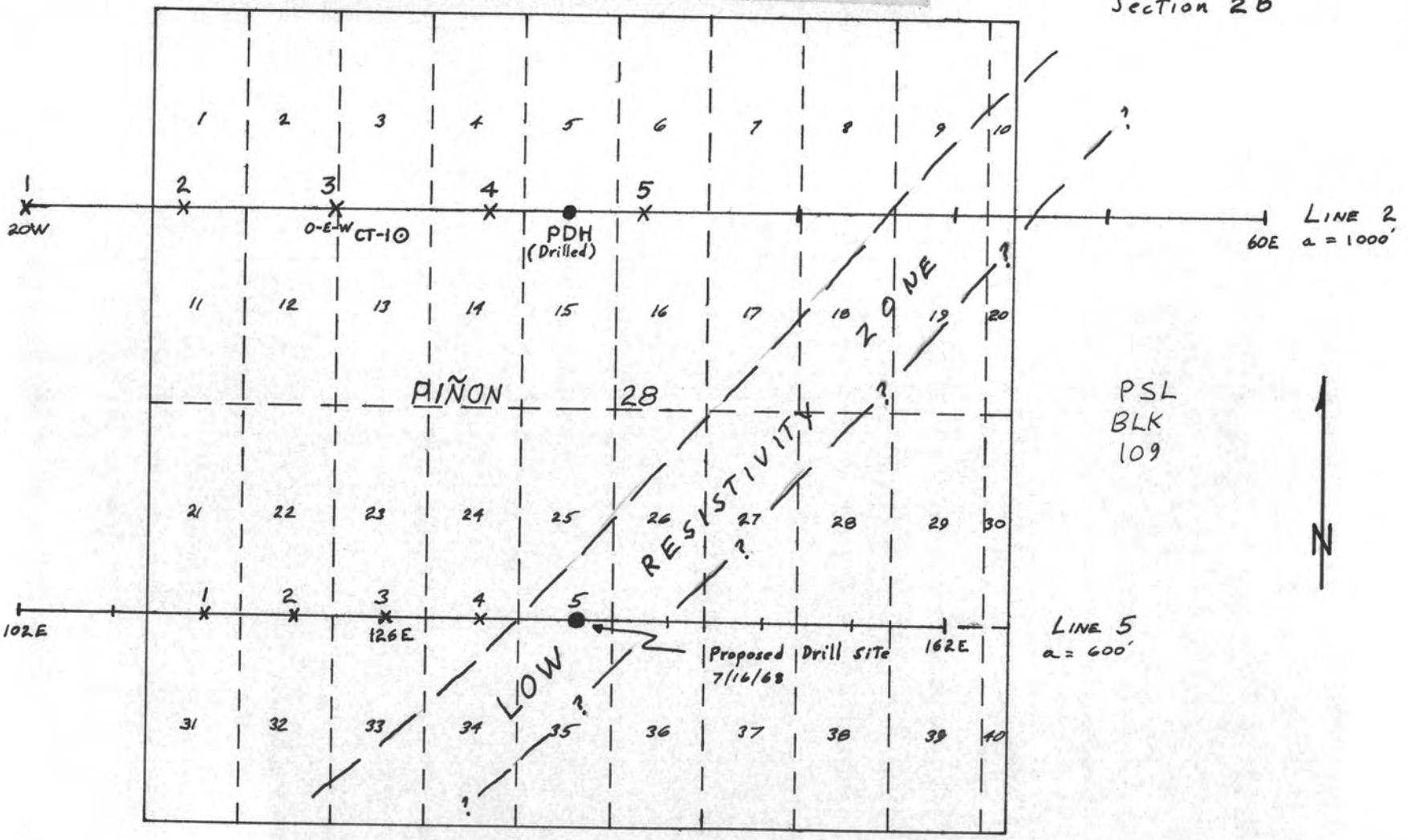
Cretaceous (?) rocks are divided into two major units, those on the east and those on the west sides of the thrust fault. The lack of fossils and marker beds prevents correlation across the thrust. The strata on the west side of the fault are further subdivided into a northern and southern series, separated by a high-angle fault. These strata are considered to be of probable Cretaceous age, because of their lithologic similarity to rocks in the Santa Rita Mountains (Schrader, 1915; Stoyanow, 1949).

On the east side of the Empire Mountains a series of conglomerate, shale, sandstone, and limestone beds lies unconformably upon a deeply eroded surface cut on Paleozoic rocks. The differences in dip between the Cretaceous (?) and Paleozoic strata are slight, but the differences in trend are clearly visible on aerial photographs. The lower part of the series consists predominantly of sandy maroon shale containing one or more beds of conglomerate composed of pebbles, cobbles, and boulders of Paleozoic limestone. In places conglomerate rests directly upon the eroded surface of the "Rainvalley" or older formations, and elsewhere the lowest bed of conglomerate lies upon 400 feet of maroon Cretaceous (?) shale. The maroon shale series grades upward into coarse gray arkosic sandstone and predominantly gray shale with occasional thin beds of limestone which are either extremely shaly or black and fetid. These Cretaceous (?) beds dip southeast from 20 to 30 degrees and are about 8,700 feet thick. The alluvium of Cienega Wash valley covers them to the east.

On the western side of the range, below the thrust plane of the Empire fault,

HEINRICHS
**GEOEXPLORATION COMPANY**
POST OFFICE BOX 5671, TUCSON, ARIZONA, 85703
Phone: 602/623-0578 Cable: GEOEX, Tucson
vancouver
sydney
geophysical engineers

# Sketch Plot of Proposed Drill site Section 28




Scale : 1" = 1000'
Culberson County, Texas
for
CITIES SERVICE MINERALS CORP.

7/16/68

December 10, 1969

Memorandum
From: Heinrichs GEOEXploration Company
To: Miami Copper Company

Re: Proposed Empire Mountains
Project - GEOEX Job 463-69
MIM - EM

The principle initial proposed area is centered about 25 miles southeast of Tucson. Interstate 10 is the approximate north boundary and Arizona Highway 83 the logical western boundary. Cienega Creek is a reasonable eastern boundary, at least for initial investigations. A total of about 3 townships is primarily involved in the initial investigation area, but this could eventually extend in a southeasterly direction beyond the Whetstone Mountains and the San Pedro River Valley.

Electric and natural gas supplies are available. Certain water supply is not identified, but it is believed to be reasonably available, that can be acquired and/or developed.

A Laramide intrusive into Paleozoic and Cretaceous sediments has introduced some known surface or very near surface mineralization into the area. The Total Wreck and Cuprite Mines are the most notable, but many smaller workings are present in the district. Rosemont is at the southwest corner of the proposed initial area of investigation.

To date we know of no comprehensive exploration program carried out in the area by anyone. Aerial magnetic anomalism in the area observed in results of U.S.G.S. flying, indicates a fairly large, more continuous intrusion than shows on surface geology maps.

A number of published articles and unpublished thesis, modern maps and photos of the area are available.

The land situation is not known in detail, but other than a few patented claims it is apparently relatively free and open at this time.

Initial Recommendations: (not necessarily in priority order and could be all or partially concurrent).

1. More completely evaluate area from available air mag data.
2. Compile a geologic map from thesis and available data.
3. Accumulate as much data on area as possible for evaluation.
4. Visit areas for quick check of map and overall feeling of the property.

After above is complete, an assessment of data and results to that time should be made to evaluate justification for further effort and planned approach to select targets for more detailed efforts.

Respectfully submitted,

HEINRICHS GEOEXPLORATION COMPANY

W. E. Heinrichs, Jr.
President & General Manager

Donald B. Cooley
Geophysicist
Geologist

md

# THE EMPIRE MOUNTAINS, PIMA COUNTY, ARIZONA

F. W. Galbraith
University of Arizona

## INTRODUCTION

The Empire Mountains occupy about 30 square miles in southeastern Pima County (fig. 48), and consist of two parallel ridges trending north-northeast. They are connected with the Santa Rita Mountains to the west by low rolling foothills and are separated from the Whetstone Mountains to the east by the broad floor of Cienaga Wash valley.

The Empire Mountains (fig. 23) are made up of marine limestone, shale, and quartzite of Cambrian, Devonian, Mississippian, Pennsylvanian, and Permian age, aggregating approximately 5,700 feet in thickness, and a series of Cretaceous (?) continental clastic deposits possibly 18,000 feet in thickness. The sedimentary rocks are intruded by stock-like bodies of quartz monzonite and granodiorite and by dikes ranging in composition from rhyolite to basalt.

The range has two structural parts - an underlying block of Cretaceous (?) rocks, and an overthrust block of Paleozoic and Cretaceous (?) rocks which is divided into four segments by northwesterly striking tear-faults. The thrust fault is exposed along the western edge of the mountains and dips to the east at a low angle. Within the overthrust block there are at least three separate imbricate thrust sheets. Domes, anticlines, and overturned folds have been formed in the Paleozoic rocks.

## STRATIGRAPHIC UNITS

### Bolsa (?) Quartzite

A small area of dense, glassy quartzite is exposed between the Pantano Hill stock and the Abrigo formation in the northern part of the range. Although the exposure is only a few feet in thickness, it is considered to be Bolsa quartzite because it is similar in appearance to typical Bolsa quartzite and lies conformably below the Abrigo formation.

### Upper Cambrian Abrigo Formation

The Abrigo formation consists of soft, light gray to blue layers of limestone, alternating with thin beds of green shale, light gray sandstone, and brown to black chert. Beds are generally from one-half to three inches thick, lenticular, and their exposures have a characteristic mottled appearance. In some places the top of the formation is marked by a 5 to 6 foot bed of pure white quartzite. Maximum exposed thickness is 750 feet.

### Upper Devonian Martin Limestone

The Martin limestone is composed of finely crystalline limestone, gray and moderately thick-bedded at the base, and thinner-bedded and less resistant to erosion toward the top. The top of the formation in the northern part of the range is marked by a horizon composed largely of Cladopora prolifica. In the southern part of the range a zone of soft, shaly beds has been interpreted as the top of the Devonian section. Metamorphism has transformed large masses of the lower limestones into

PSL Block 109

CHAPPERAL 19

RAVEN 18

SMOKEY 17

WINDY 24

CEDAR 25

MESQUITE 26

OAK 27

PINION 28

SANDRA 5

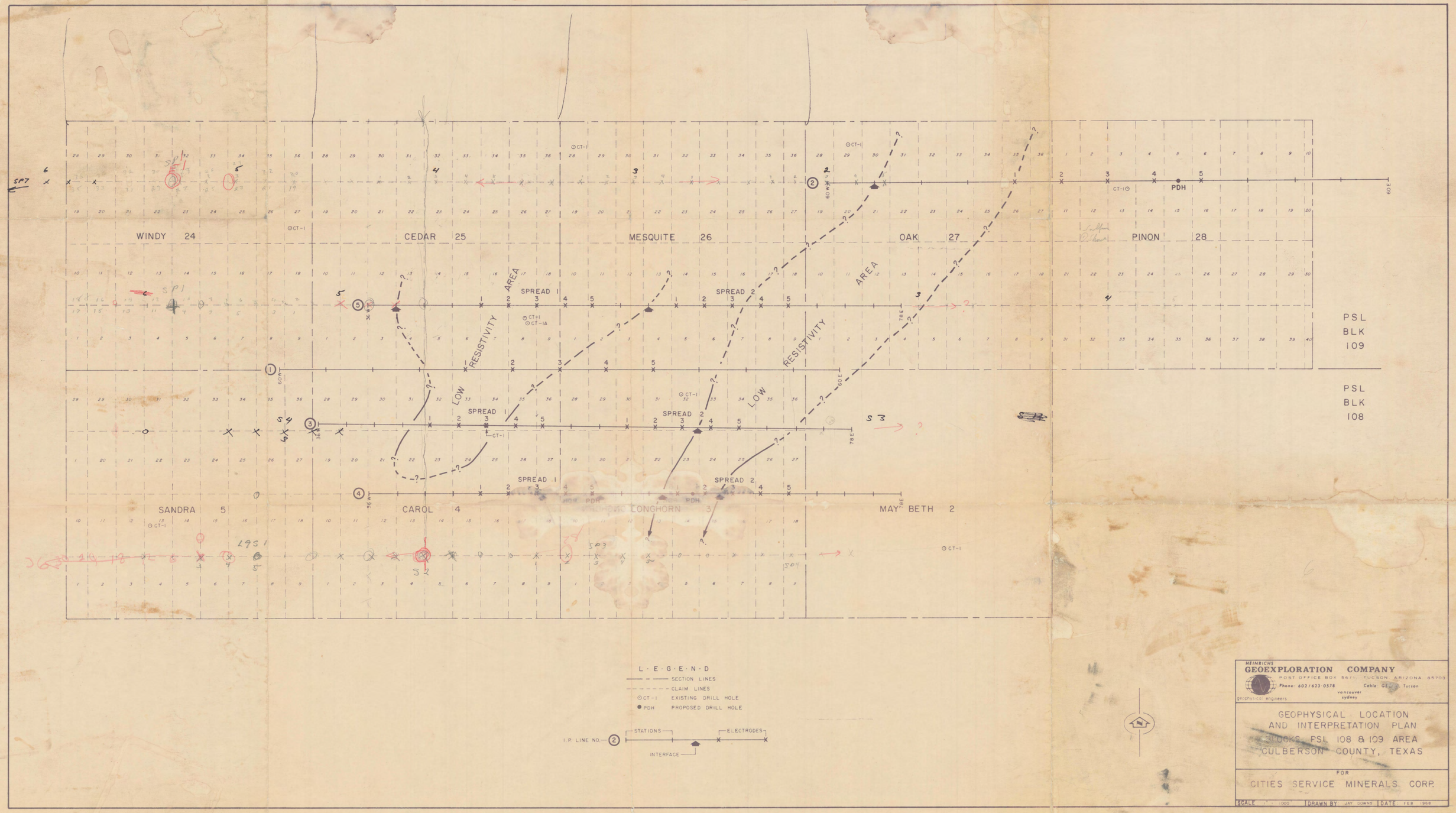
CAROL 4

LONGHORN 3

MAYBETH 2

NORTH

PSL Block 108

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geophysical engineers
vancouver sydney

GEOPHYSICAL LOCATION AND INTERPRETATION PLAN
BLOCKS PSL 108 & 109 AREA
CULBERSON COUNTY, TEXAS

FOR
CITIES SERVICE MINERALS CORP.

SCALE 1" = 1000' | DRAWN BY JAY DOWNS | DATE FEB 1968

EDDY COUNTY, NEW MEXICO

CULBERSON COUNTY, TEXAS

REEVES CO., TEXAS

EDDY COUNTY NEW MEX.

LOVING COUNTY, TEXAS

LOVING COUNTY

REEVES COUNTY

ORLA

RIVERTON

CR

EAST

PHILLIPS

GYLE PHILLIPS

Joes HOUSE

BRUSHY CANYON

CULBERSON COUNTY

REEVES COUNTY

JEFF DAVIS COUNTY

BORACHO

MONTGOMERY

T & P RR

PSL

UNIV LANDS

BLK 62 TWP 1

BLK 61 TWP 1

BLK 60 TWP 1

BLK 59 TWP 1

BLK 58 TWP 1

BLK 57 TWP 1

BLK 56 TWP 1

BLK 62 TWP 2

BLK 61 TWP 2

BLK 60 TWP 2

BLK 59 TWP 2

BLK 58 TWP 2

BLK 57 TWP 2

BLK 56 TWP 2

BLK 57 TWP 3

BLK 56 TWP 3

BLK C-20 TWP 3

BLK 55 TWP 3

BLK 115

BLK 114

BLK 113

BLK 112

BLK 111

BLK 110

BLK 109

BLK 108

BLK 107

BLK 104

BLK 103

BLK 101

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BLK 97

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BLK 55

BLK 56

BLK 59

BLK 58

BLK C-21

BLK 57

BLK C-17

BLK 70

BLK 71

BLK C-8

BLK C-11

BLK C-12

BLK C-13

BLK C-10

BLK 60 TWP 5

BLK 60 TWP 6

BLK 59 TWP 6

BLK 58 TWP 6

BLK 60 TWP 7

BLK 59 TWP 7

BLK 58 TWP 7

BLK 56 TWP 7

BLK 60 TWP 8

BLK 59 TWP 8

BLK 58 TWP 8

BLK 56 TWP 8

BLK 62 TWP 8

BLK 61 TWP 8

RIVERTON IRRIGATION BLK 1

1274
560
79.8

THE SURVEY AND WELL INFORMATION SHOWN ON THIS MAP HAS BEEN COMPILED FROM OFFICIAL RECORDS, ACTUAL SURVEYS, AND OTHER SOURCES DEEMED RELIABLE. HOWEVER, THE ACCURACY OF THIS INFORMATION IS NOT GUARANTEED.
MIDLAND MAP COMPANY

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CULBERSON, LOVING
REEVES & JEFF DAVIS
COUNTIES, TEXAS
COPYRIGHT 1961

# M-13

LATITUDE 31°00' TO 32°00'
LONGITUDE 103°45' TO 104°30'
SCALE 1" = 16,000'

February 27, 1970

Tennessee Corporation
Miami Copper Company Division
P.O. Box 100
Miami, Arizona 85539

Attention: Mr. W.W. Simmons, Chief Geologist

Re: Present Exploration Procedure -
(Empire Mountain Area)

To date the production from the Empire Mountains has come from two areas: the Total Wreck Mine (Sec. 3) and from Hiltano Camp (Sec. 18, T. 18 S. R. 17 E.). The ore has been argentiferous lead mostly, with some molybdenum production reported.

Both areas are located on the same ridge, essentially as replacement deposits in Paleozoic limestones. Both areas contain strongly fracture controlled mineral deposits. These fractures are probably related to the emplacement of the Sycamore Stock. The mineralization may or may not be related to the stock, but apparently is.

The ridge on which the mines are located is arcuate and essentially a hogback that is annular to the stock. The stock has apparently intruded into Paleozoic and Cretaceous sediments and the intrusion has formed the hogback ridges on the east and south edges of the stock.

1. Because of the land position, active exploration at this time will be confined to and south and east of Total Wreck Ridge.

2. A regional geochemical sampling program on 1000 foot grid for Cu, ZN Ag and Mo will be begun as soon as possible.

This work will be continually supervised by a geologist in the field.

3. Several I.P. lines utilizing a 1000 foot dipole spacing will be placed across the Total Wreck Ridge. These lines will be situated to take advantage of terrain and access. The centers of the lines will be placed on the south-east side of the ridge and at approximately the 4700' elevation contour. This should give maximum penetration and resolution to determine if any sulfide bodies of appreciable extent exist. Further I.P. should await the geochemical sampling results.

The above work is recommended to best process and evaluate the economic potential of the area in the most economic manner.

Very truly yours,

HEINRICHS GEOEXPLORATION COMPANY

Donald B. Cooley
Geologist

DBC/re:

DRAFT

February 17, 1970

MEMO:

To: Don Cobley

From: Carlos Aiken

Subject: Sumner Airmagnetic Map and Empire Mts.

The Area of the Empire Mts. included in that part of Dr. Sumner's map which involves the Empire Mts. was taken from the U.S.G.S. Open File report "Tombstone and Vicinity" Airmagnetic Map (uncorrected). Since Dr. Sumner digitized the contoured map and spliced that onto his own, the original U.S.G.S. map was examined also.

The susceptibilities of the volcanic intrusive and sedimentary rocks are unknown. Highs do seem to be related with intrusive (Laramide especially) rocks in the Empire, Whetstone, Dragoon and Santa Rita Mountains, as well as in the Tombstone Area. By virtue of the properties of intrusive rocks, their appearance as topographic highs is not unexpected. The very close relationship of magnetic intensity with topography in many cases suggests that the anomalies are at least partially affected by the parameters of the airmag survey; that is, constant flown altitude of 9000 feet barometric over topography which changes from 2000 feet (in the Empire Mts.) to over 6000 feet very suddenly.

Two circular magnetic highs exist over the Empire Mts. A 150-250 gamma anomaly is in the area of the highest elevations which are also intrusive rocks. The other anomaly is to the west in the Cerprite Mine area, and is slightly less intense. Laramide intrusives also crop out in this area. ~~This area It is probably~~ considered to be part of the Santa Ritas and not the Empire Mts. There is no topographic relationship in this case. (The volcanics do not appreciably effect the airmag. due to the attenuation with altitude ~~characteristics~~ of small dipoles (i.e. due to thin sheets). This characteristic seems to hold statewide.

The Empire Mt. highs appear as the northwest end of a northwesterly trending series of highs extending to Bisbee in the south. Most of these highs seem to be related to Laramide (pre-Laramide?) in the case of the Whetstone Mountains) intrusions. Since there is a northwest topographic trend in the basin and range area of southern Arizona, and ~~the~~ Laramide intrusions exist in most of the ranges as topographic highs, a northwest trend of highs is expected and not necessarily significant, even though the highs are somewhat associated with economic mineralization. The highs themselves are probably expressions of the limits of the intrusives.

Though no susceptibilities are known, the Empire Mt. anomaly can be considered to be partly topographic and partly lithologic. That the magnetic anomaly is probably not all topographic can be seen by the Cerprite Mine anomaly.

The extensive volcanics, relatively speaking, present in the Western Empires could make it difficult to interpret detailed magnetics in that area, if the volcanics are ~~mofic~~ mafic. To the east, detailed magnetics may aid at least in geologic mapping and perhaps in indicating mineral related anomalies. Taking the extent of the area into account and other characteristics, however, I do not recomment detailed airmag in the area at this stage ~~point~~. ~~It would be overkill~~.

Carlos Aiken

INVENTORY

OF

CITIES SERVICE MINERALS CORPORATION
CULBERSON COUNTY, TEXAS

C.S.M.C. Alice M-60549 Ct.#4
1200' fr. N. & 2340' fr. W.
Sec. 20, Blk. 111, P.S.L.

Atlas M-60547 Ct. #1
Sec. 11, Blk. 111, P.S.L.

DUVAL CORPORATION
State M-60547 Ct.#1
396' FSL & 515' FWL
Sec.11, Blk.111, PSL

Alice M-60549 Ct.#1
Sec.20, Blk.111, PSL

Atlas M-60547 Ct.#3
2810' FSL & 150' FWL
Sec.11, Blk.111, PSL

Alice M-60549 Ct.#2
1380' FSL & 2440' FEL
Sec.20, Blk.111, PSL

Alice M-60549 Ct.#3
1530' fr. So. & 920' fr. E.
Sec.20, Blk.111

Atlas M-60547 Ct.#2
3810' FSL & 150' FWL
Sec.11, Blk.111, PSL

Ham M-61336 Ct.#2-A
3810' fr. So. & 1906' fr. W.
(70' E. of #2)
Sec.24, Blk.113, PSL

Ham M-61336 Ct.#2
2905' fr. So. & 1836' fr. W.
Sec.24, Blk.113, PSL

Windy M-60909 Ct.#1
Sec.24, Blk.109, PSL

Velma M-60775 Ct.#4
Sec.1, Blk.108, PSL

Velma M-60775 Ct.#2
1320' fr. S. & 2100' fr. W.
Sec.1, Blk.108, PSL

Sue M-60799 Ct.#2
1800' FWL & 1343' FSL
Sec.8, Blk. 113, PSL

Ruby M-60992 Ct.#1
Sec.8, Blk.42, PSL

Ruby M-60992 Ct.#2
1320' fr. So. & 700' fr. E.
Sec.8, Blk.42, PSL

Pinon M-60980 Ct.#2
1330'F.N. & 2700' FWL
Sec.28, Blk.109, PSL

Longhorn M-60837 Ct.#3
Sec.3, Blk.108, PSL

Longhorn M-60837 Ct.#2
2640' FN & 2380' FEL
Sec.3, BLK.108, PSL

Windy M-60909 Ct.#4
318'FNL & 2200' FWL
Sec.24, Blk.109, PSL

Windy M-60909 Ct.#3
318'FNL & 1700' FWL
Sec.24, Blk.109, PSL

Windy M-60909 Ct.#2
318' FNL & 1700' FWL
Sec.24, Blk.109, PSL

Sue M-60799 Ct.#1
Sec. Blk.113,PSL

Smokey M-60966 Ct.#2
1311' FNL & 200' FWL
Sec.17, Blk.109, PSL

Smokey M-60996 Ct.#1
Sec.17, Blk.109, PSL

Sandra M-60900 Ct.#2
1681 FSL & 437'FEL
Sec.5, Blk.108, PSL

Scott 20 Ct.#1
700' FN & WL
Sec.20, Blk.45, PSL

Sal. M-60800
Sec.12, Blk.113, PSL

Sal. M-60800 Ct.#1
Sec.12, Blk.113, PSL

Raven M-60742 Ct.#2
1309' FNL & 2500' FWL
Sec.18, Blk.109, PSL

Raven M-60742 Ct.#1
Sec.18, Blk.109, PSL

Pinon M-60980 Ct.#5
2100' FNL & 1000' FWL
Sec.28, Blk.109, PSL

Pinon M-60980 Ct.#4
500' FNL & 100' FWL
Sec.28, Blk.109, PSL

Pinon M-60980 Ct.#3
1400' FSL & 2700' FEL
Sec.28, Blk.109, PSL

Pinon M-60980 Ct.#1
Sec.28, Blk.109, PSL

Opal M-60986 Ct.#2
1320' fr. N. & 200' fr. E.
Sec.7, Blk.42, PSL

Opal M-60986 Ct.#1
Sec.7, Blk.42, PSL

Oak M-60898 Ct.#2
1322' FSL & 500' FEL
Sec.27, Blk.109, PSL

Oak M-60898 Ct.#1
Sec.27, Blk.109, PSL

Mona Lisa M-60991 Ct.#2
1320' fr. N. & 2000' fr. W.
Sec.13, Blk.108, PSL

Mona Lisa M-60991 Ct.#1
Sec.13, Blk.108, PSL

Mewquite M-61001 Ct.#2
1318' FSL & 1600' FWL
Sec.26, Blk.109, PSL

Mesquite M-61011 Ct.#1
Sec.26, Blk.109, PSL

May Beth M-60840 Ct.#2
2400' FNL & 1800' FWL
Sec.2, BLK. 108, PSL

May Beth M-60840 Ct.#1
Sec.2, Blk.108, PSL

Luna M-60610 Ct.#2
Sec.22, Blk.109, PSL

Luna M-60610 Ct.#1
Sec.22, Blk.109, PSL

Longhorn M-60837 Ct.#4
Sec.3, Blk.108, PSL

Horseshoe M-60912 Ct.#3
800' FS & EL
Sec.14, Blk.113, PSL

Horseshoe M-60912 Ct.#2
Sec.14, Blk.113, PSL

Horseshoe M-60912 Ct.#1
Sec.14, Blk.113, PSL

Ham M-61336 Ct.#3
507' fr. S. & 1000' fr. W
Sec.24, Blk.113, PSL

Ham M-61336 Ct.#1
Sec.24, Blk.113, PSL

Jane M-60806 Ct.#2
1224' fr. S. & 300' fr. W
Sec.15, Blk.108, PEL

Jane M-60806 Ct.#1
3033' WL & 2317' SL
Sec.15, Blk.108, PSL

INVENTORY-cont.

CITIES SERVICE MINERALS CORPORATION

Jane M-60806 Ct.#1
Sec.15, Blk.108, PSL

Chaparrel M-60935 Ct.#3
200' fr. S. & 1000' fr. W.
Sec.19, Blk.109, PSL

Chaparrel M-60935 Ct.#2
1320' FSL & 1500' FEL
Sec.19, Blk.109, PSL

Chaparrel M-60935 Ct.#1
Sec. 19, Blk.109, PSL

Cedar M-60899 Ct.#2
1900' FNL & 2400' FWL
Sec.25, Blk.109, PSL

Cedar#1 M-60899 Ct.#1-A
Sec.25, Blk.109, PSL

Cedar M-60899 Ct.#1-A
Sec.25, Blk.109, PSL

Cedar M-60899 Ct.#1
Sec.25, Blk.109, PSL

Carol M-60897 Ct.#2
1253' FNL & 165' FWL
Sec.4, Blk.108, PSL

Carol M-60897 Ct.#1'
Sec.4, Blk.108, PSL

Buck M-60911 Ct.#2
800' FNL & 1200' FWL
Sec.23, Blk.111, PSL

Buck M-60911 Ct.#1
Sec.23, Blk.111, PSL

Blue Jay M-60612 Ct.#3
1307' NL & 674' WL of Sec.
Sec.23, Blk.109, PSL

Blue Jay M-60612 Ct.#2
Sec.23, Blk.109, PSL

Blue Jay M-60612 Ct.#1
Sec.23, Blk.109, PSL

Ann M-60801 Ct.#2
500' FEL & 1320' FSL
Sec.9, Blk.113, PSL

Ann M-60801 Ct.#1
Sec.9, Blk.113, PSL

Reference No. W4588B
425MD?
Hunt Oil Company
Rounasville #1
Wildcat PSL Surv.

Reference No. W9033D
2210MD
Sinclair Oil & Gas Company
Rupert Cox #1
Wildcat Sec.23, Blk.111, PSL

1 Scott 1-A Wildcat
Sec.19, Blk.113, PSL
400' FNL & 2734' FEL

2 Scott 1-A Wildcat
Sec.19, Blk.113, PSL
400' FNL & 2734' FEL

1 Pinon M-60980 Ct.#5
Core Test
2100' FNL & 1000' FWL
Sec.28, Blk.109, PSL

2 Pinon M-60980 Ct.#5
Core Test
2100' FNL & 1000' FWL
Sec.28, Blk.109, PSL

3 Pinon M-60980 Ct.#5
Core Test
1200' FNL & 1700' FWL
Sec.24, Blk.109, PSL

Windy M-60909 Ct.#3
Sulphur Test
318' FNL & 1700' FWL
Sec. 24, Blk.109, PSL

[redacted]

Ann M-60801 Ct.#2
Sulphur Test
1320' FS & 500' FEL
Sec.9, Blk.113, PSL

Ham #2-A
Sulphur Test
2905' FSL & 1906' FWL
Sec.24, Blk.113, PSL

Cedar M-60899 Ct.#2
Sulphur Test
1900' FNL & 2400' FWL
Sec.25, Blk.109, PSL

Ham M-61336 Ct.#3
Sulphur Test
507' FSL & 1000' FWL
Sec.24, Blk.113, PSL

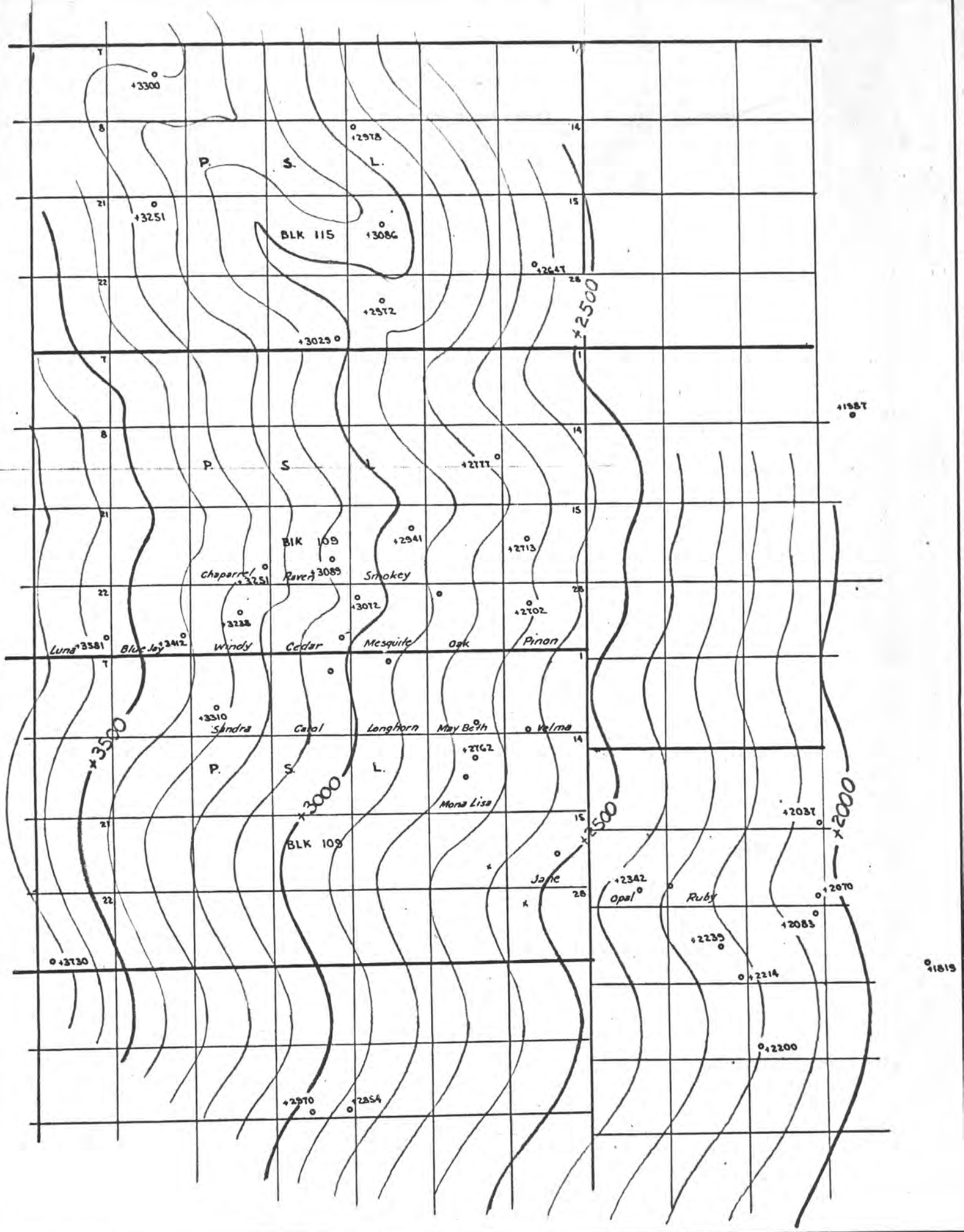
Longhorn M-60837 Ct.#2
1320' FSL & 1800' FWL
Sec.13, Blk. 108, PSL

Ruby M-60992 Ct.#2
Sulphur Test
1300' FSL & 700' FEL
Sec.8, Blk. 111, PSL

[redacted] Alice M-60549 Ct.#3
Sulphur Test
1530' FSL & 920 FEL
Sec.20, Blk.111, PSL

Geologic Atlas of Texas
Index Map
Van Horn-El Paso Sheet
328-G

Martin Water Laborties
October 30, 1967

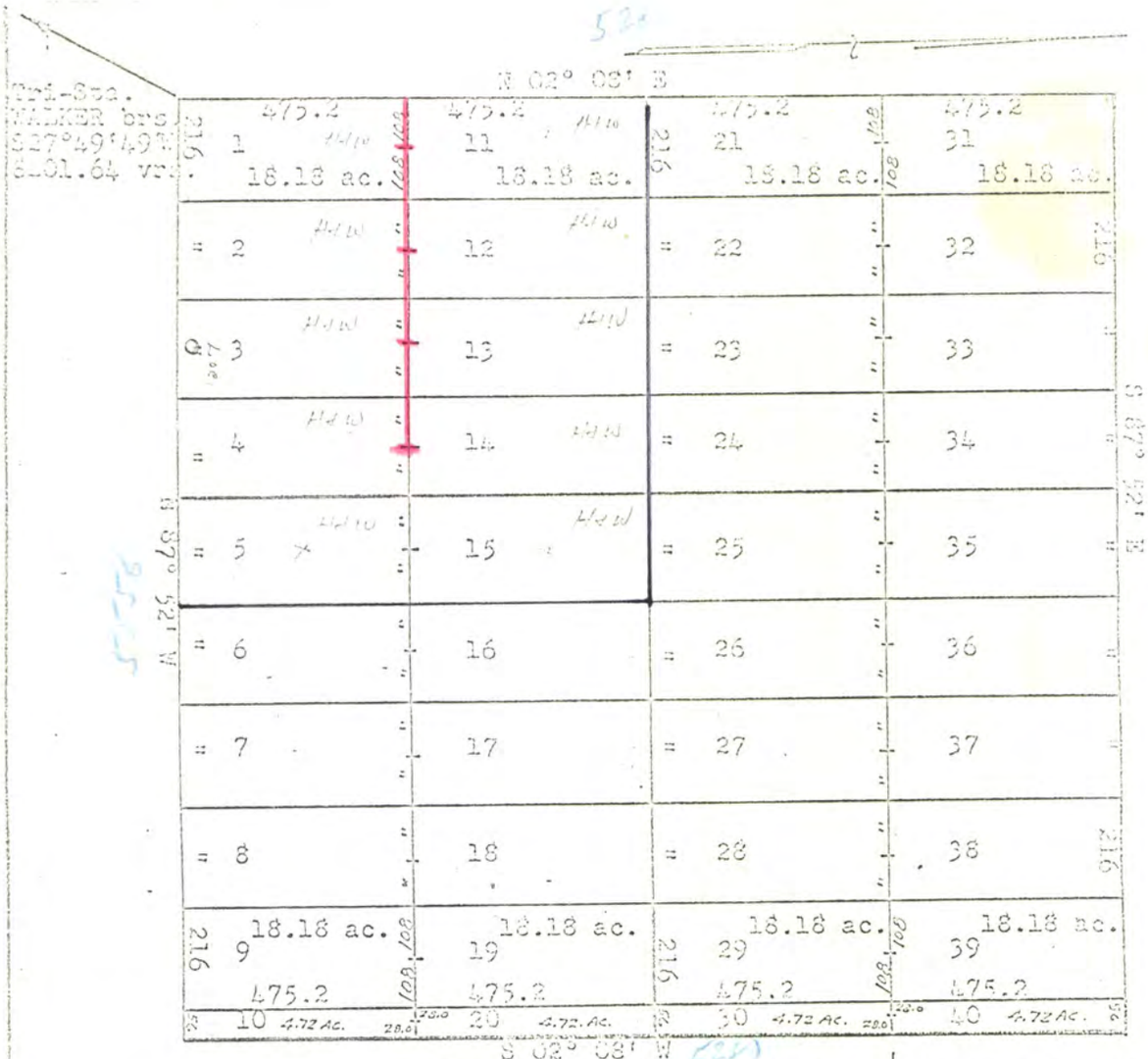



# Culberson Co., Texas

## Contoured Top Lamar Ls.

## Contour Interval 100'

E.P. Wheeldon 2/8/68




Bearings Based on Lambert
Grid Central Zone of Texas

Notices Posted

PLAT OF VELMA CLAIMS - M-60775
SEC. 1, BLK. 108, PUBLIC SCHOOL LAND
CULBERSON COUNTY, TEXAS
SCALE: 1"= 300 vrs.
DATE: Aug. 1-6, 1966

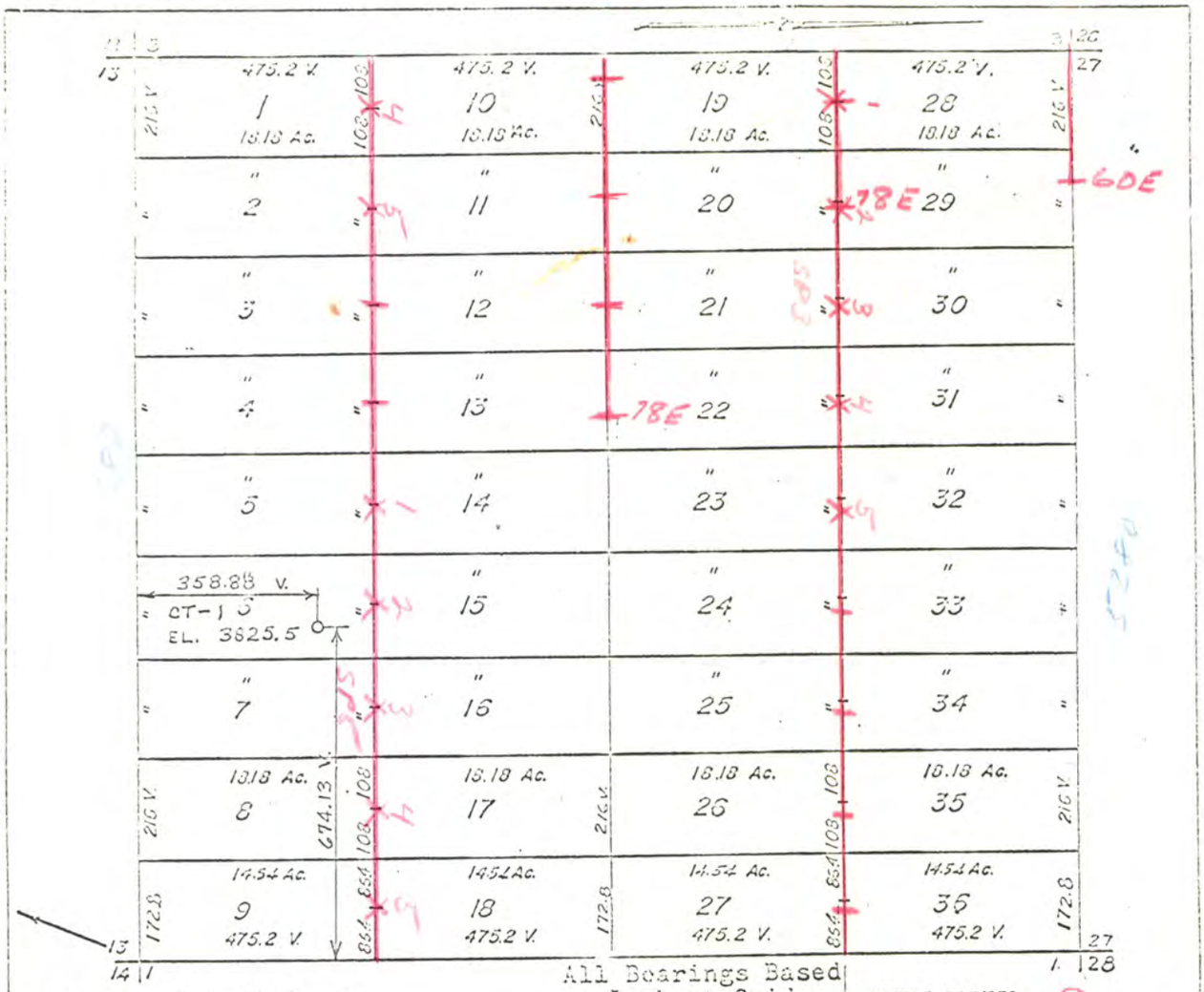
SURVEYED BY _____
Licensed State Land Surveyor

Recorded in Vol. _____
Pg. _____, Plat Records
Culberson County, Tex.
This 15 day of Aug., 1966.

Frances Walker
County Clerk

In Absence of a County Surveyor

By: _____
Deputy




Tri-Sta. WALKER Bears
S 27° 49' 49" W 8401.64 vrs.

All Bearings Based on Lambert Grid Central Zone of Texas

NOTICE POSTED

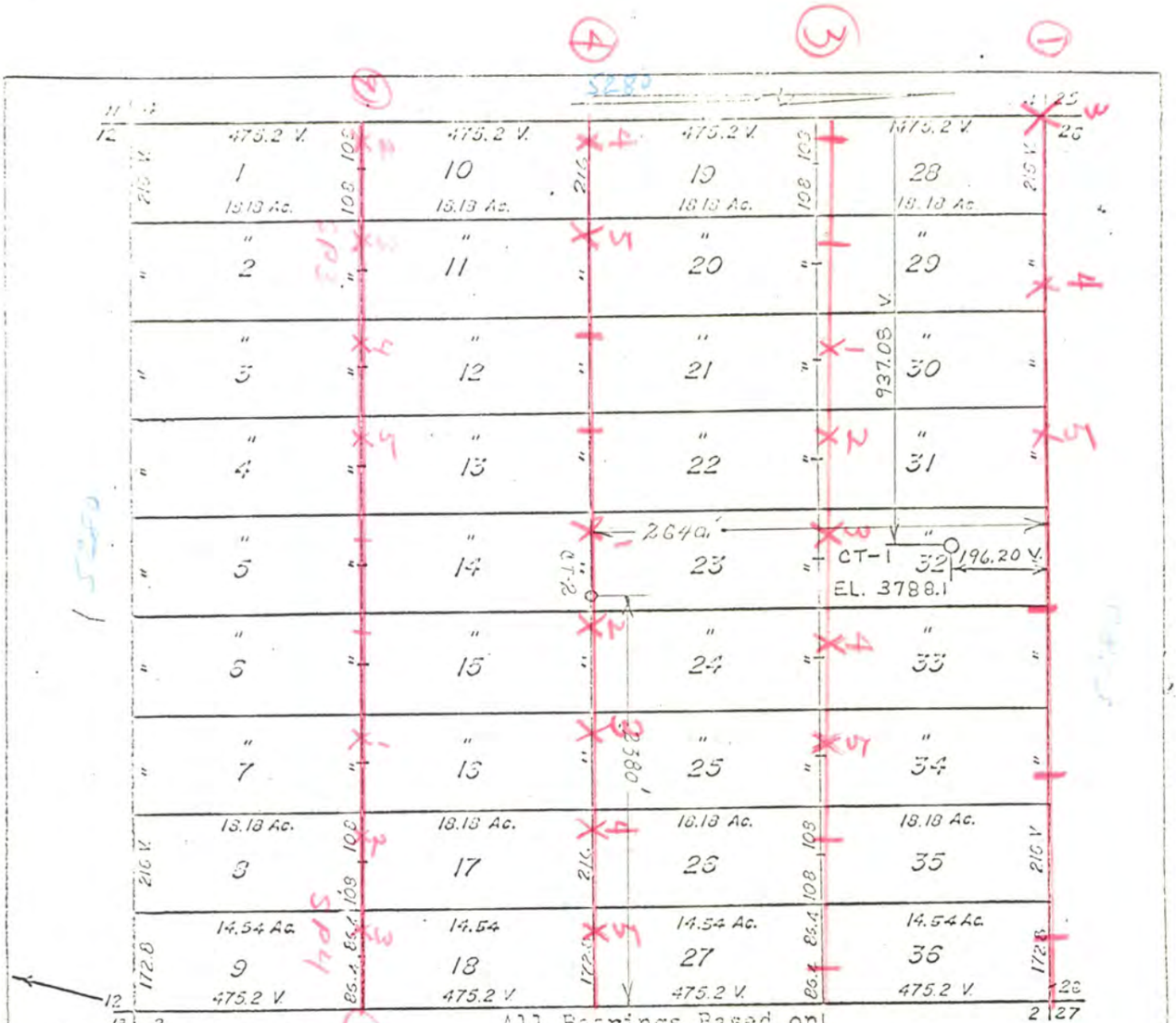
PLAT OF MAYBETH CLAIMS M-60840
SEC. 2, BLK. 108, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1"= 300 Vrs.
Date: June 27 - July 5, 1966
Surveyed By: Fred P. Armstrong

Recorded in Vol. ____, Pg. ____
PLAT Record Culberson County, Texas
This 15, day of Aug. 1966

Frances Walker
County Clerk
In Absence of a County Surveyor

Deputy

(2)




Tri-Sta. WALKER Bears
S 15° 05' 36" W 7768.60 vrs.

All Bearings Based on
Lambert Grid Central
Zone of Texas

Notice Posted

PLAT OF LONGHORN CLAIMS M-60837
SEC. 3, BLK. 108, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1"=300 Vrs.
Date: July 1 - 5, 1966

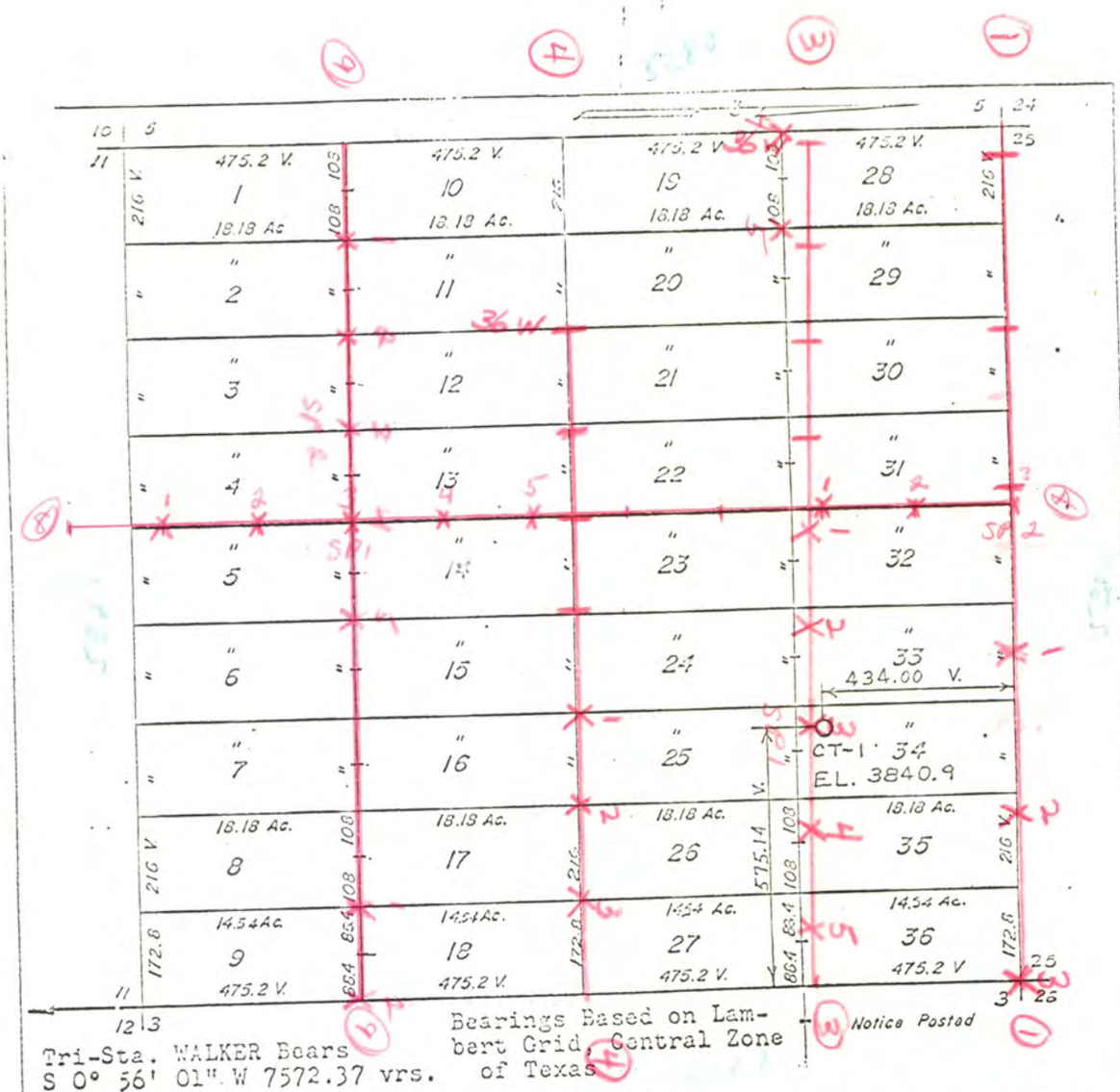
Surveyed By: Fred L. Armstrong
Licensed State Land Surveyor

Recorded in Vol. ____, Pg. ____
Plat Record Culberson County, Texas
This 15 day of Aug. 1966

Frances Walker
County Clerk
In Absence of a County Surveyor

Deputy

3




Tri-Sta. WALKER Bears
S 0° 56' 01" W 7572.37 vrs.

Bearings Based on Lambert Grid, Central Zone of Texas

PLAT OF CAROL CLAIMS M-60897
SEC. 4, BLK. 108, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1" = 300 Vrs.
Date: July 4 - 7, 1966

Surveyed By: Fred Armstrong
Licensed State Land Surveyor

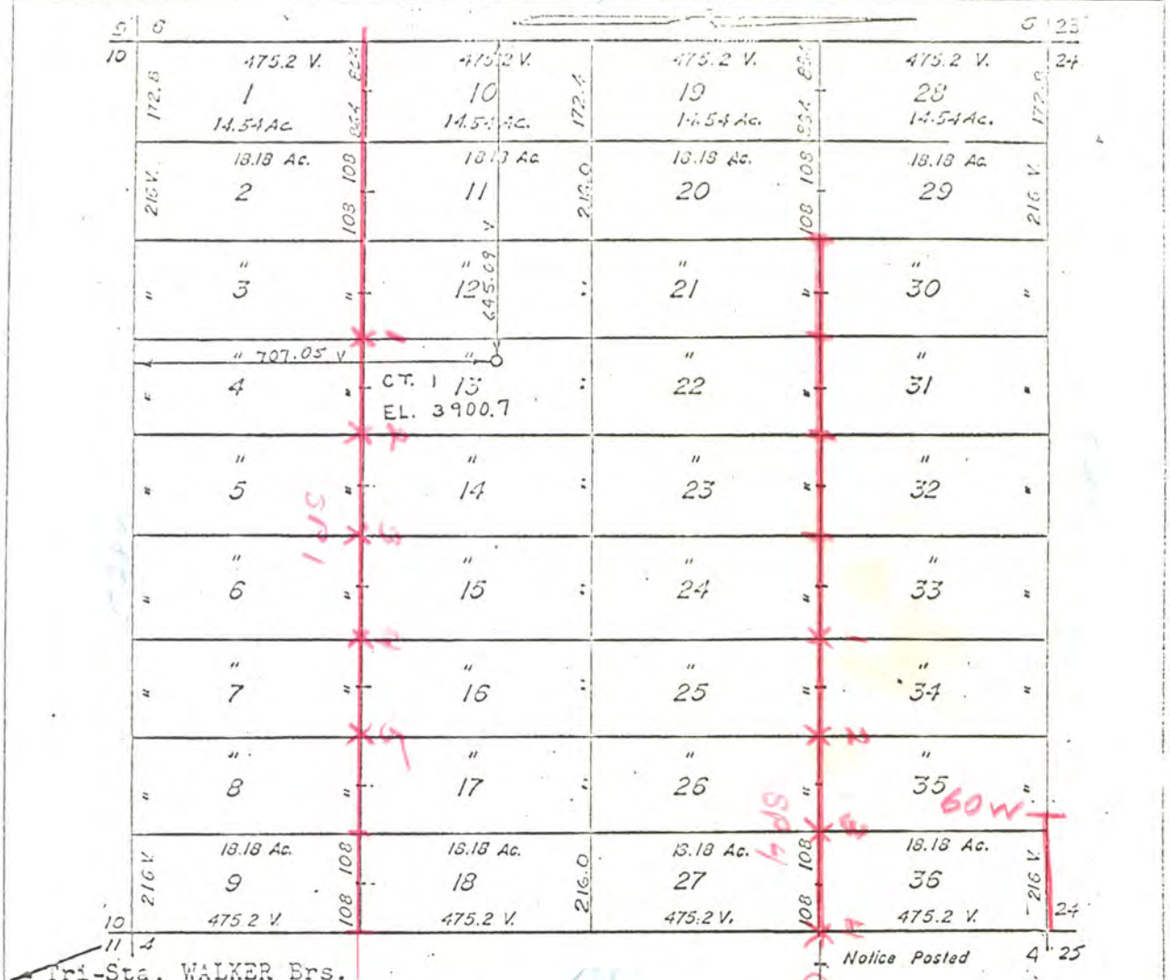
Recorded in Vol. ____ Pg. ____
Plat Record Culberson County, Texas
This 15 day of Aug. 1966

Frances Walker
County Clerk

In absence of a
County Surveyor

Deputy

4




Tri-Sta. WALKER Brs.
S 13°-05'-02" E 7845.8 vrs.

PLAT OF SANDRA CLAIMS M-60900
SEC. 5, BLK. 108, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1"=300 Vrs.
DAte: July 6 - 8, 1966
Surveyed By: Fred P. Armstrong
Licensed State Land Surveyor

Recorded in Vol. ___, Pg. ___
Plat Record Culberson County, Texas
This 15 day of Aug. 1966

Frances Walker
County Clerk
In Absence of a County Surveyor

Deputy

5

PLAT OF JANE CLAIMS M-60806

SEC. 15, BLK. 108, P.S.L. CULBERSON COUNTY, TEXAS

Scale: 1" = 300 Vrs.

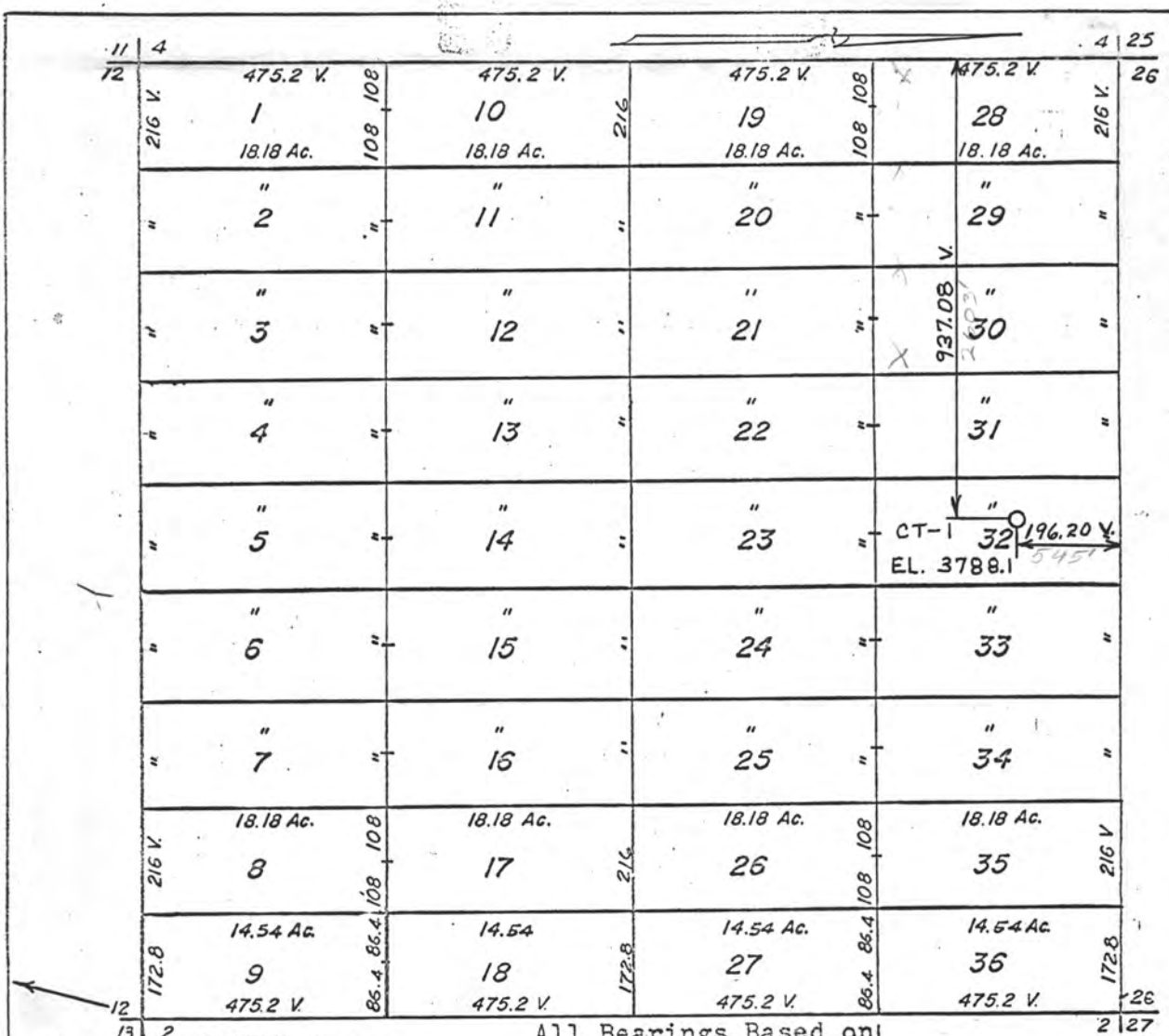
Date:

Surveyed By: [signature]
Licensed State Land Surveyor

Recorded in Vol. 4, Pg 5,
Plat Record Culberson County Texas
This 12 day of Aug 1966
[signature]
County Clerk

In absence of a County Surveyor
Mary Germany, Deputy

15




Tri-Sta. WALKER Bears
S 15° 05' 36" W 7768.60 vrs.

All Bearings Based on Lambert Grid Central Zone of Texas

Notice Posted

PLAT OF LONGHORN CLAIMS
SEC. 3, BLK. 108, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1" = 300 Vrs.
Date: July 1 - 5, 1966

Surveyed By: Fred L. Armstrong
Licensed State Land Surveyor

Recorded in Vol. ____, Pg. ____
Plat Record Culberson County, Texas
This 15 day of Aug. 1966

Frances Walker
County Clerk
In Absence of a County Surveyor

Deputy

Martin Water Laboratories

BOX 1468 MONAHANS, TEXAS WI 3-3234

RESULT OF WATER ANALYSES

LABORATORY NO. 1067108

TO: Mr. Jim Walton

P. O. Box 187, Midland, Texas

SAMPLE RECEIVED 10-27-67

RESULTS REPORTED 10-30-67

COMPANY City Service Minerals LEASE

FIELD OR POOL

SECTION BLOCK SURVEY COUNTY STATE

SOURCE OF SAMPLE AND DATE TAKEN:

NO. 1 Raw water - taken from Cedar CT-1. 10-27-67 Water depth 445 - 475

NO. 2

NO. 3

NO. 4

REMARKS:

## CHEMICAL AND PHYSICAL PROPERTIES

| | NO. 1 | NO. 2 | NO. 3 | NO. 4 |
|---|---|---|---|---|
| Specific Gravity at 60° F. | 1.0026 | | | |
| pH When Sampled | | | | |
| pH When Received | 7.0 | | | |
| Bicarbonate as $HCO_3$ | 429 | | | |
| Supersaturation as $CaCO_3$ | 48 | | | |
| Undersaturation as $CaCO_3$ | -- | | | |
| Total Hardness as $CaCO_3$ | 1,860 | | | |
| Calcium as Ca | 678 | | | |
| Magnesium as Mg | 40 | | | |
| Sodium and/or Potassium | 203 | | | |
| Sulfate as $SO_4$ | 1,771 | | | |
| Chloride as Cl | 77 | | | |
| Iron as Fe | 0.49 | | | |
| Barium as Ba | 0 | | | |
| Turbidity, Electric | 1.3 | | | |
| Color as Pt | 104 | | | |
| Dissolved Solids at 103° C. | | | | |
| Total Solids at 103° C. | | | | |
| Total Solids, Calculated | 3,198 | | | |
| Temperature °F. | | | | |
| Carbon Dioxide, Calculated | 70 | | | |
| Dissolved Oxygen, Winkler | | | | |
| Hydrogen Sulfide | 100 | | | |
| Resistivity, ohms/m at 60° F. | 5.10 | | | |
| Suspended Oil | | | | |
| ~~Filterable solids, mg/l~~ | ~~0.80~~ | | | |
| ~~Volume filtered, ml~~ | ~~500~~ | | | |

All Results Reported As Parts Per Million (mg/l)

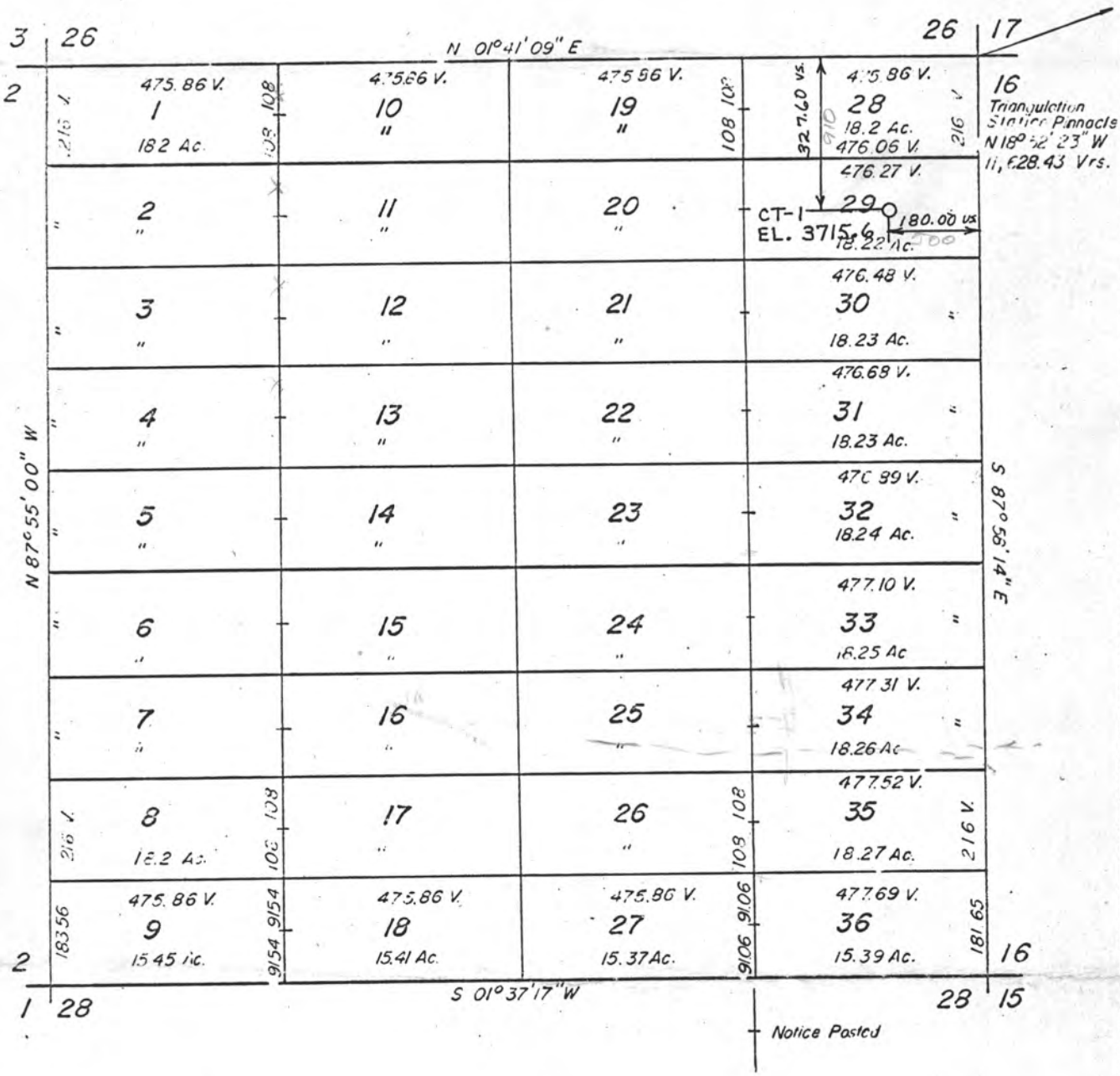
Additional Determinations And Remarks

| COMPOSITION OF SOLIDS | PER CENT | MG/L |
|---|---|---|
| Elemental Sulfur | 100.00% | 0.80 |

~~Letter of recommendation attached.~~

Form No. 3

BY W. Reagan White, B. S.




PLAT OF OAK CLAIMS

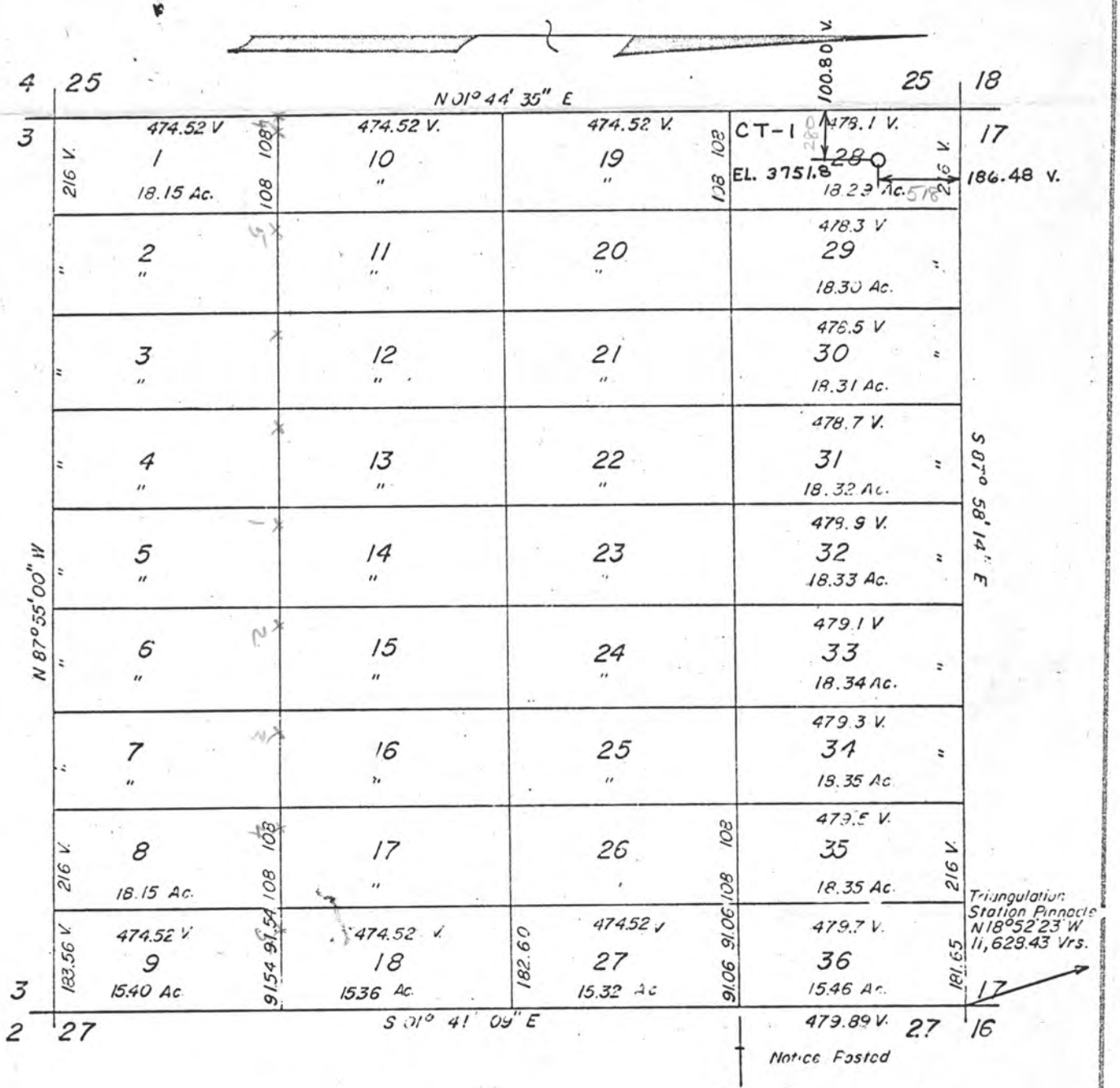
SEC. 27 BLK. 109, P.S.L. CULBERSON CO., TEXAS

Scale: 1" = 300 Varas

Date: June 10-20 1966

Surveyed By: Fred P. Armstrong
Licensed State Land Surveyor

Recorded in Vol. ____, Pg. ____
Plat Record Culberson County, Texas
This ____ day of ____ 1966




Recorded in Vol ____, Pg. ____
Plat Record Culberson County, Texas
This ____ day of ____ 1966

County Clerk

PLAT OF MESQUITE CLAIMS
SEC 26, BLK 109, PSL. CULBERSON CO., TEXAS
Scale: 1" = 300 Vrs.
Date: June [illegible] 1966
Surveyed By: Fred P. Armstrong
Licensed State Land Surveyor

1" = 300 feet

xxxxxxxxxx
New Box No. 5964

March 23, 1970

Dear Sir:

Heinrichs GEOEXploration Company has been contacted to conduct a regional mineral survey of the Empire Mountains and adjacent land. Our land status maps show that your land lies within our region of interest.

Our exploration program will cover a large area with limited access. For this reason we would greatly appreciate your permission to cross your land and use the roads thereon. We would like to assure you that all gates and fences will be left as they are found. We will not be littering the country in any way and will avoid watering tanks and feeders whenever possible. We would appreciate any comments if you note actions to the contrary by our personnel.

To avoid any technical problems we would request that you sign below if you approve.

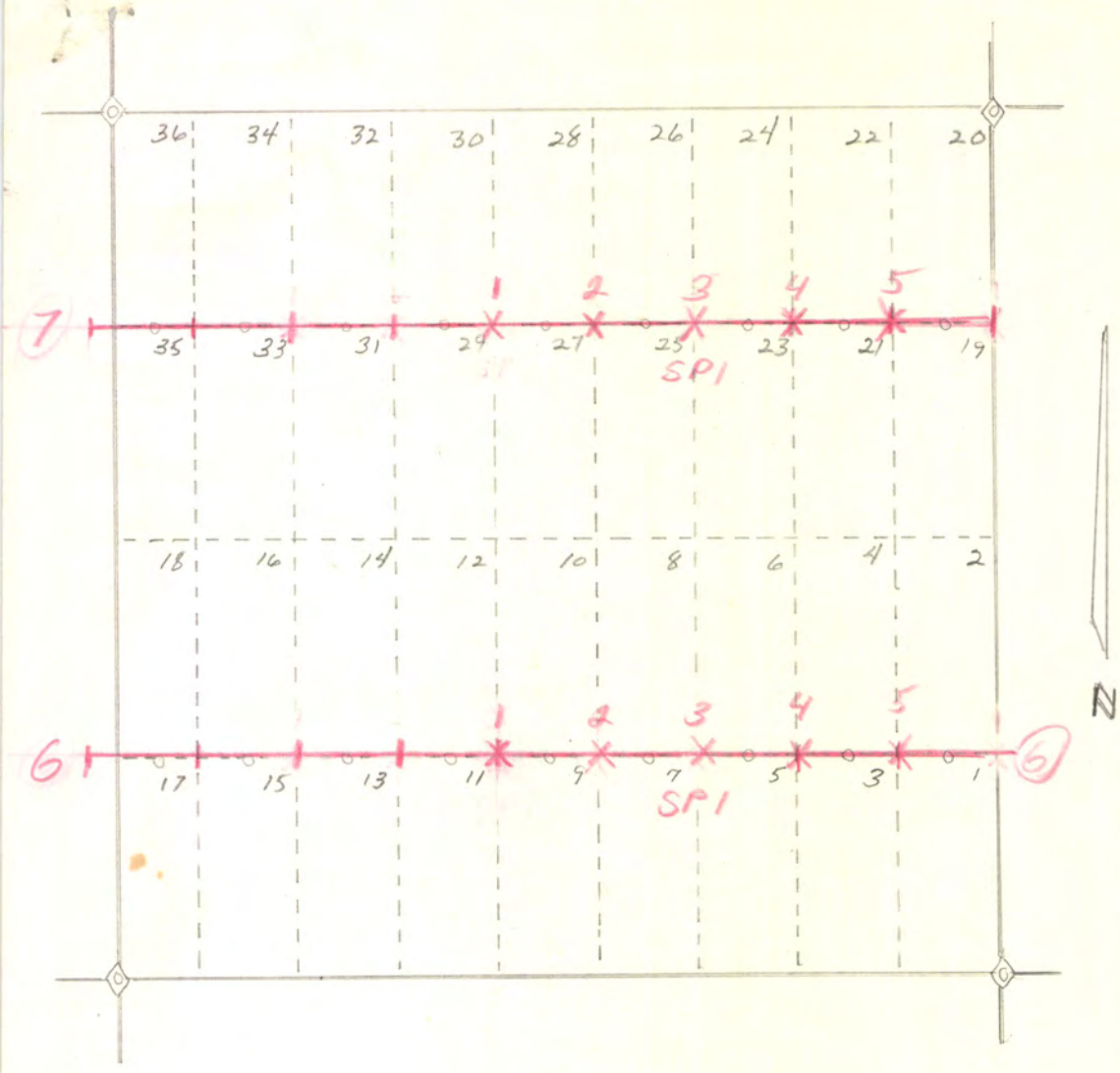
Thank you.

Sincerely,
HEINRICHS GEOEXPLORATION CO:

Walter E. Heinrichs, Jr.
President

Date:_____

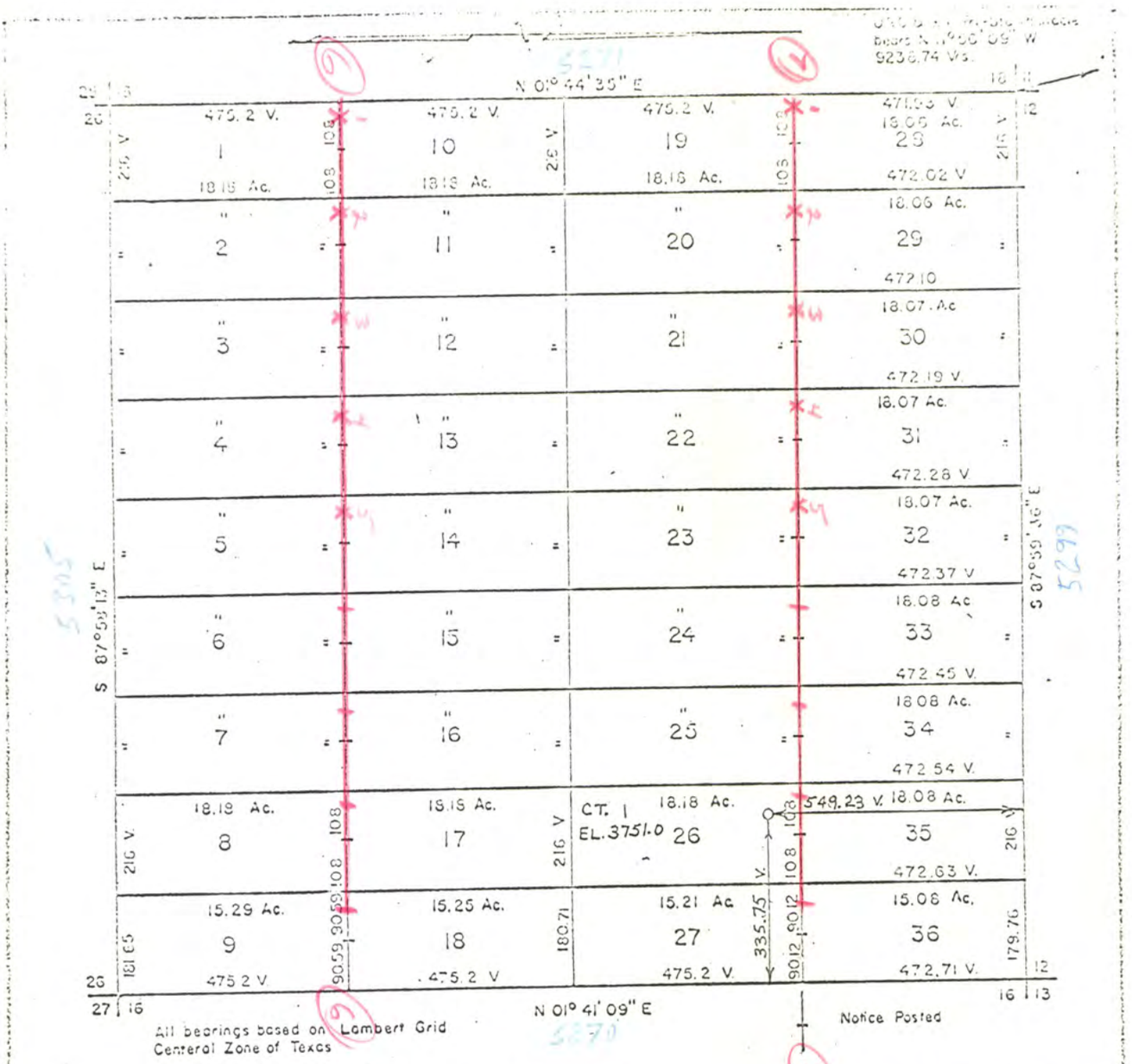
Signed By_____




PUBLIC SCHOOL LAND - 109
SECTION 19

19

L6 S1
L7 S1




PLAT OF SMOKEY CLAIMS M-60966
SEC. 17, BLK. 109, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1" = 300 Vrs.
Date: July 21 - 23 1966
Surveyed By: Jack S. Armstrong
Licensed State Land Surveyor

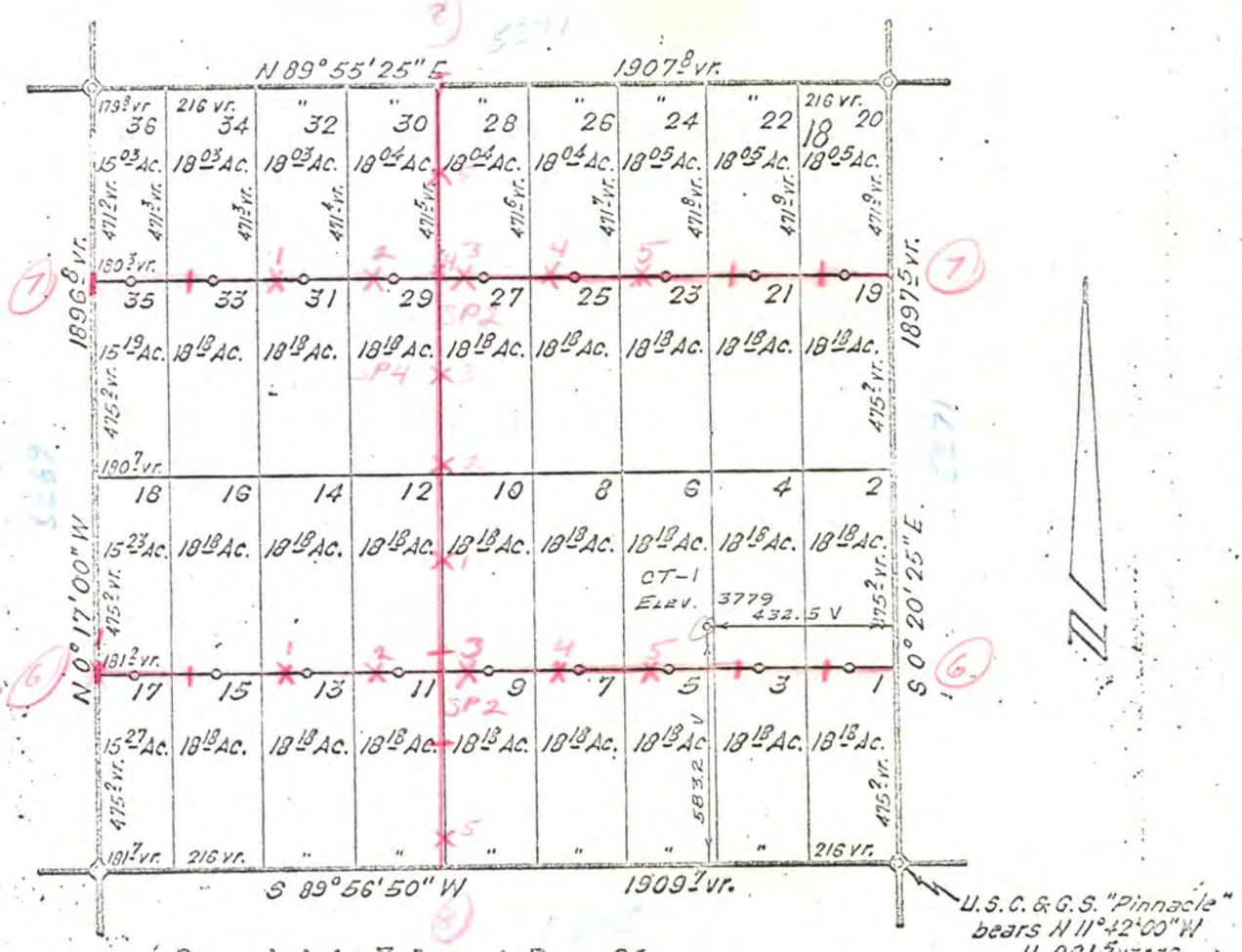
Recorded in Vol. ___ Pg. ___
Plat Record, Culberson Co Texas
This ___ day of ___ 1966

County Clerk

17

L 6 S 3
L 7 S 3

PUBLIC SCHOOL LAND
BLOCK 109




Recorded in Volume 4 Page 25 Plat Record Book, Culberson County Texas. This 14 day of October, 1966.

Frances Walker, County Clerk
In absence of a County Surveyor

By Mary Germany

o - 2"x2"x3½' Stake
+O - ⅜" R.R. in Stn. Md.

RAVEN - M-60742

I certify that the above plat was prepared from field notes of actual surveys made by me or under my supervision and that the same are true and correct to the best of my knowledge and belief.

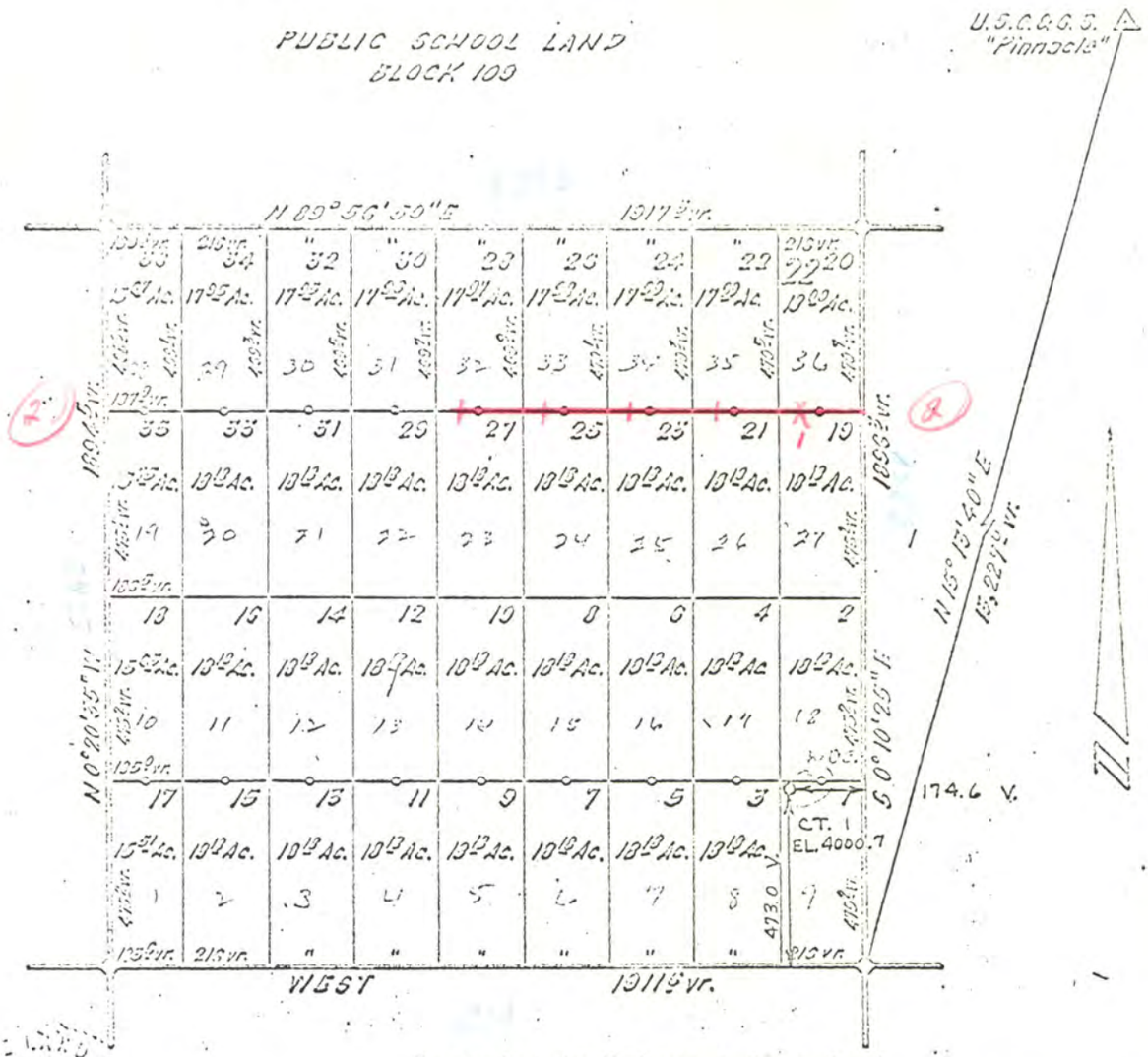
Clifford C. Cool
Registered Public Surveyor
Licensed State Land Surveyor

COOL & ASSOCS.

SURVEY PLAT
SINCLAIR OIL & GAS COMPANY
SECTION 18, BLOCK 109,
PUBLIC SCHOOL LAND,
CULBERSON COUNTY, TEXAS
Scale: 1" = 400 varas

PAGE 25

18 L7S2 L6S2




Recorded in Volume 4 Page 34
Plat Record Book, Culberson County, Texas
This the 12th day of November, 1966,

Frances Walker, County Clerk
In absence of a County Surveyor

By Mary Germany Deputy

o - 2"x2"x3½' Stake
o - ½" R.R. in Stn. Md.

I certify that the above plat was prepared from field notes of actual surveys made by me or under my supervision and that the same are true and correct to the best of my knowledge and belief.

[signature]
Registered Public Surveyor
Licensed State Land Surveyor

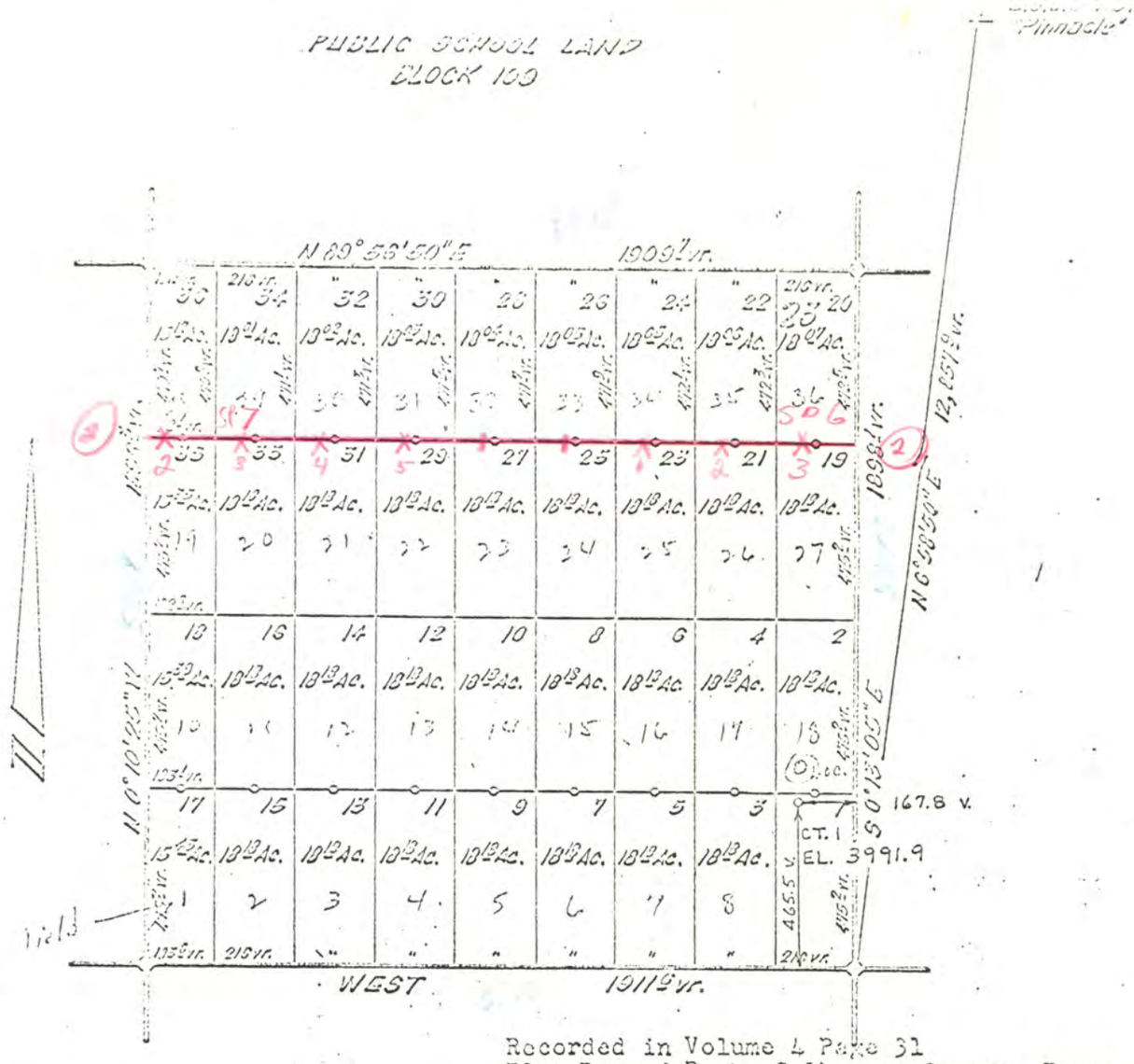
COOL & ASSOCS.

SURVEY PLAT
SINCLAIR OIL & GAS COMPANY
SECTION 22, BLOCK 109,
PUBLIC SCHOOL LAND,
CULBERSON COUNTY, TEXAS
Scale: 1" = 400 varas

LUNA Claims - M-6[illegible]
Hans All

22

L2 S7




Recorded in Volume 4 Page 31
Plat Record Book, Culberson County, Texas
This 4 day of November, 1966

Frances Walker, County Clerk
In absence of a County Surveyor

By Mary Germany Deputy

2" x 2" x 3½' Stake
⅝" R.R. in Stn. Md.

I certify that the above plat was prepared from field notes of actual surveys made by me or under my supervision and that the same are true and correct to the best of my knowledge and belief.

[signature]
Registered Public Surveyor
Licensed State Land Surveyor

COOL & ASSOCS.

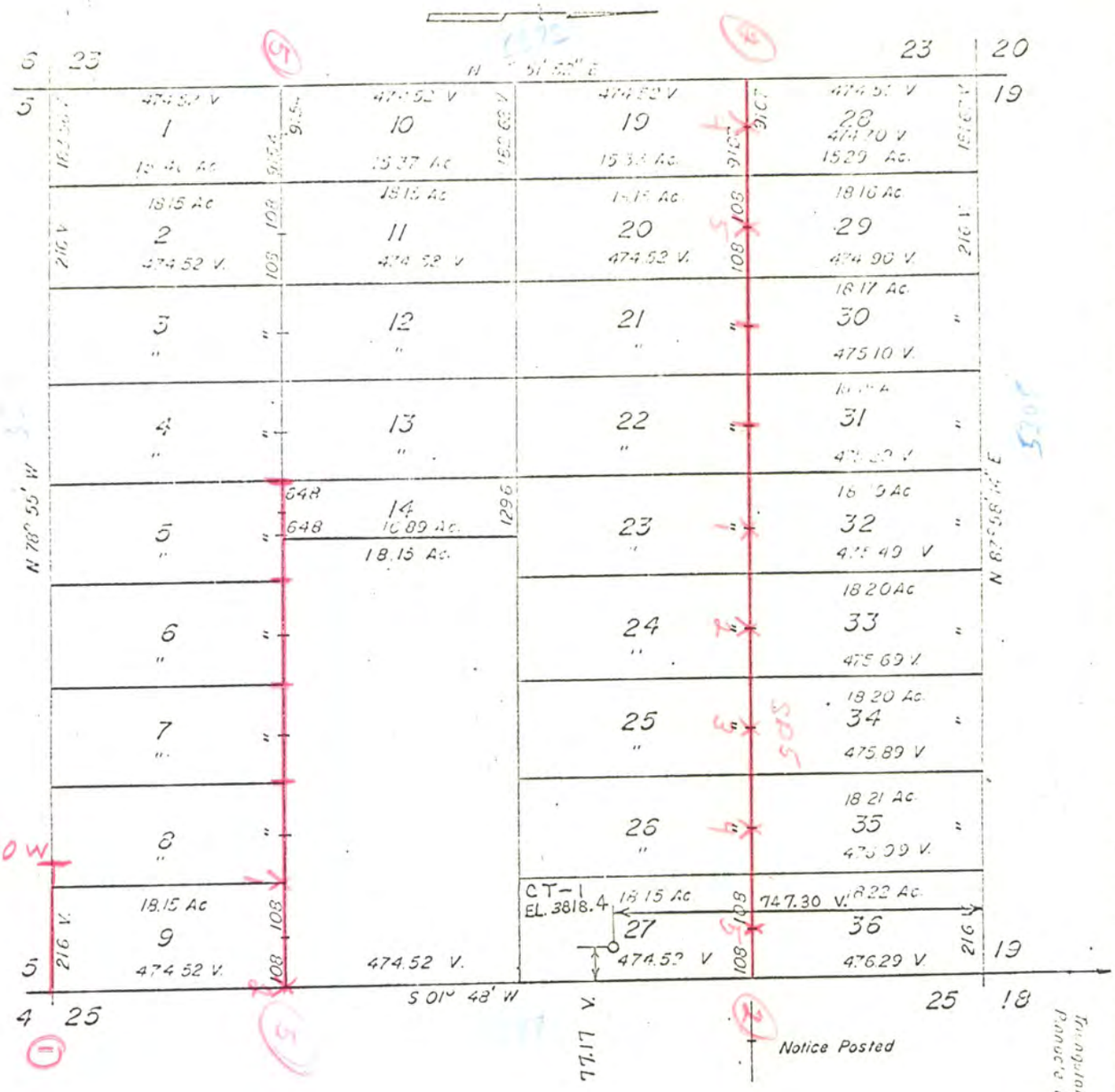
SURVEY PLAT
SINCLAIR OIL & GAS COMPANY
SECTION 25, BLOCK 109,
PUBLIC SCHOOL LAND,
CULBERSON COUNTY, TEXAS

Scale: 1" = 400 varas

Blue Jay Claims - M - 60612

23

L2 S687

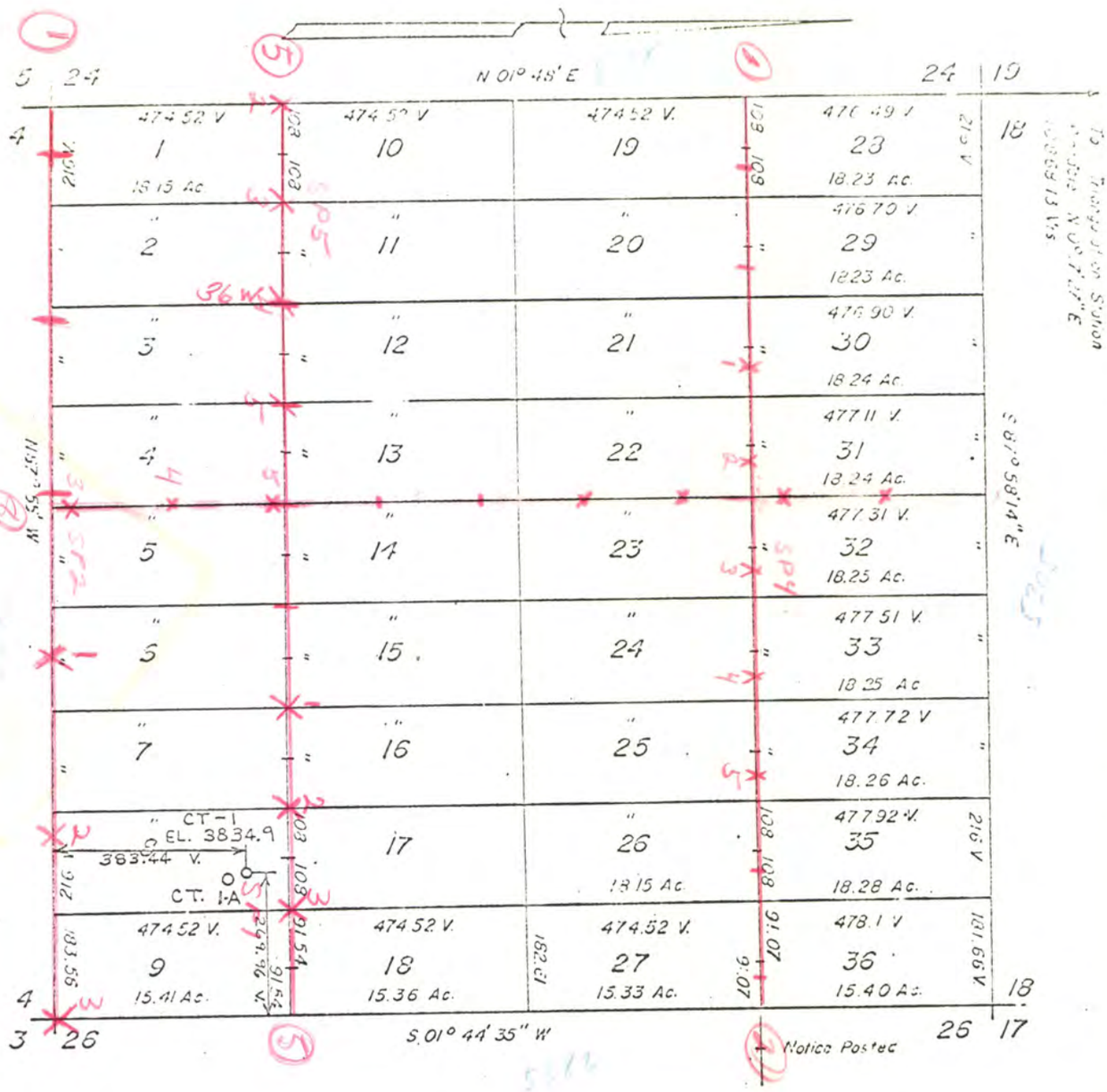



PLAT OF WINDY CLAIMS M-60909
SEC. 24, BLK, 109 P.S.L. CULBERSON CO., TEXAS
Scale: 1" = 300 Vrs.
Date: June 9-20 1966
Surveyed By: Fred P. Arnold
Licensed State Land Surveyor

Recorded in Vol. ..... Pg. .....
Plat Record Culberson County, Texas
This ..... day of ..... 1966

24

L2 S B 86
L6 S 5
L1




PLAT OF CEDAR CLAIMS M-60899

SEC 25, BLK. 109, P.S.L. CULBERSON CO., TEXAS

Scale: 1" = 300 Vrs.

Date: June 10-20, 1966

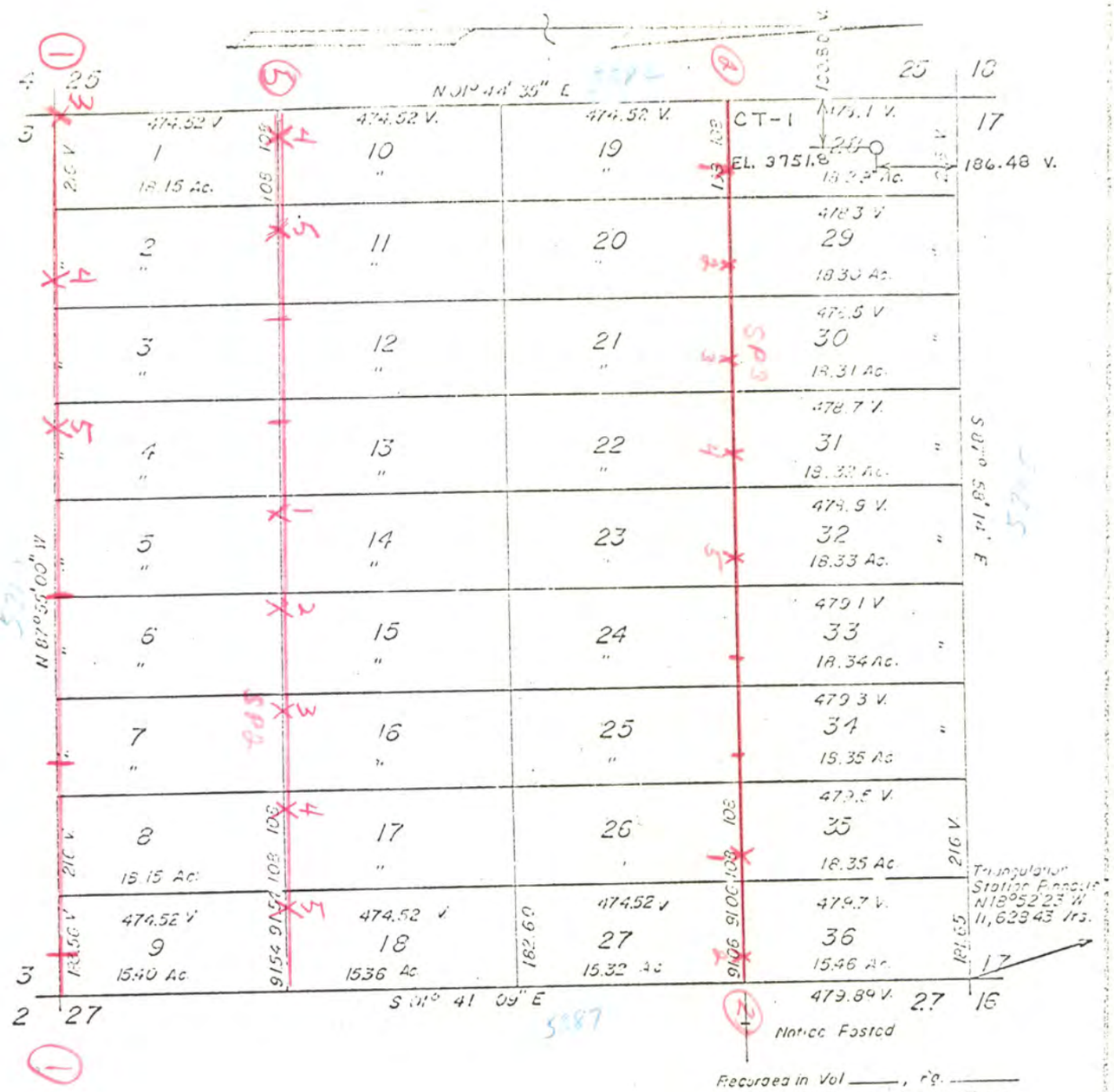
Surveyed By: Fred P. Armstrong

Licensed State Land Surveyor

Recorded in Vol. ____, Pg. ____
Plat Record Culberson County, Texas
This ____, day of ____ 1966

25

L2S4
L5S1&5



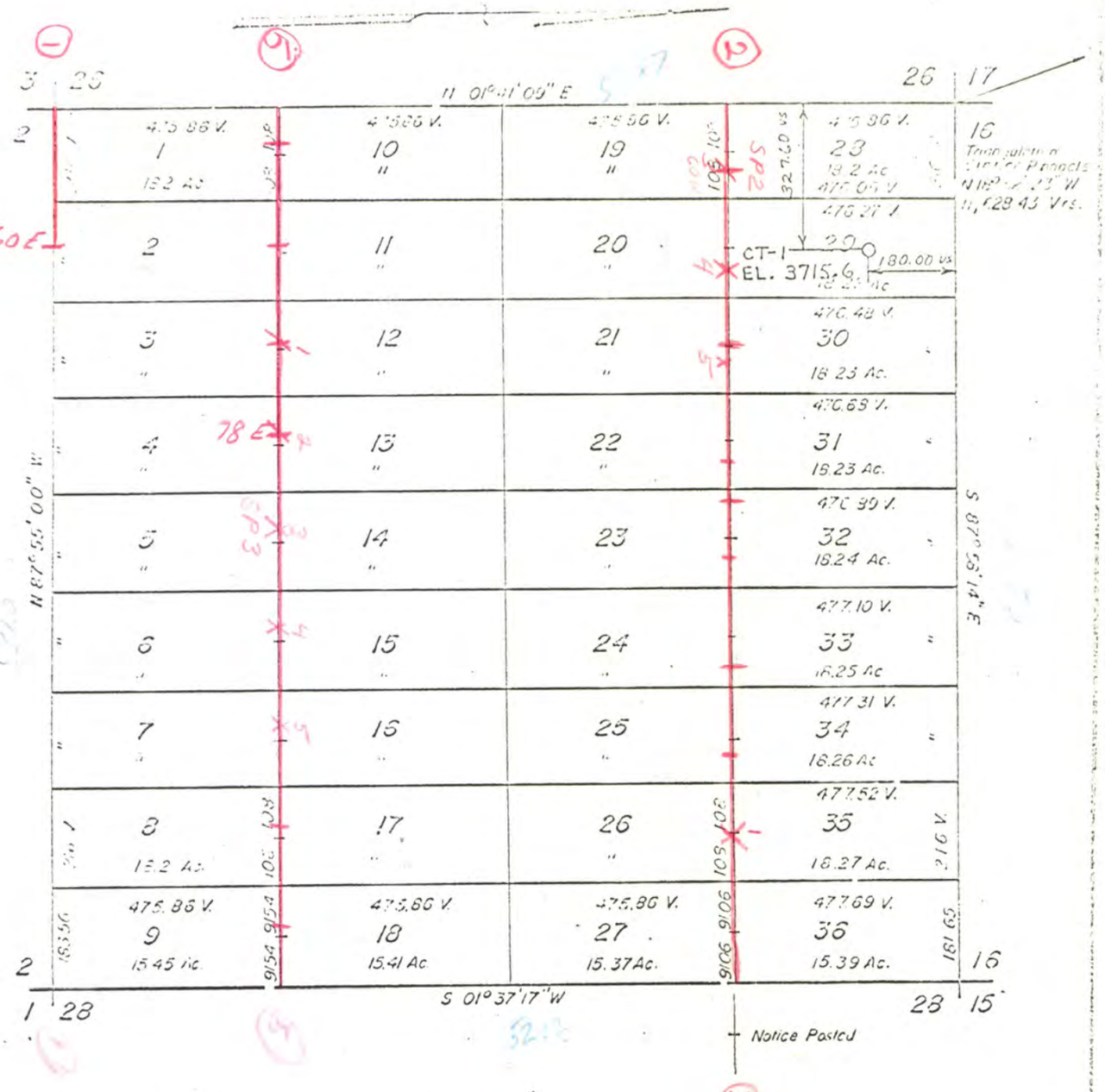

Recorded in Vol ____, Pg. ____
Plat Record Culberson County, Texas
This ____ day of ____ 1966

County Clerk

PLAT OF MESQUITE CLAIMS M-61011
SEC 26, BLK 109, PSL. CULBERSON CO., TEXAS
Scale: 1" = 300 Yrs
Date: June [illegible] 1966
Surveyed By: Fred P. Armstrong
Licensed State Land Surveyor

26

L2 S 3 & 2
L5 S 1 & 2
L1




PLAT OF OAK CLAIMS M-60898

SEC. 27 BLK. 109, P.S.L. CULBERSON CO., TEXAS

Scale: 1" = 300 Varas

Date: June 10-20 1966

Surveyed By: Fred P. Armstrong

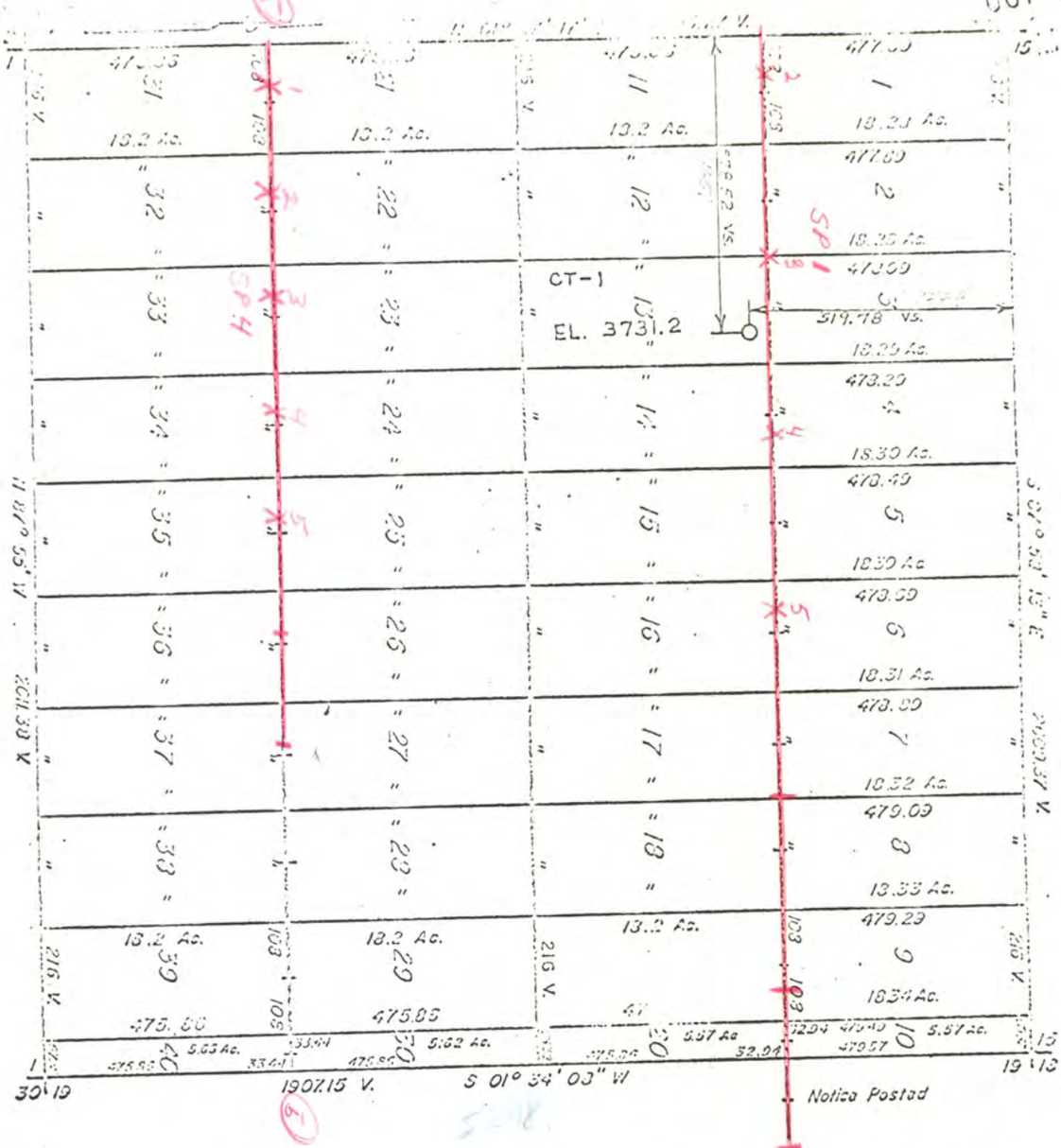
Licensed State Land Surveyor

Recorded in Vol. ____, Pg. ____
Plat Record Culberson County, Texas
This ____ day of ____ 1966

27

L 25 142
L 5 53
L 1

OCT 27 1966




PLAT OF PINON CLAIMS M-60980
SEC. 23, BLK. 109 PSL. CULBERSON CO., TEXAS
Scale: 1"=300 Vrs.
Date: June 1966

SURVEYED BY: Jack P. Abernathy
Licensed State Land Surveyor

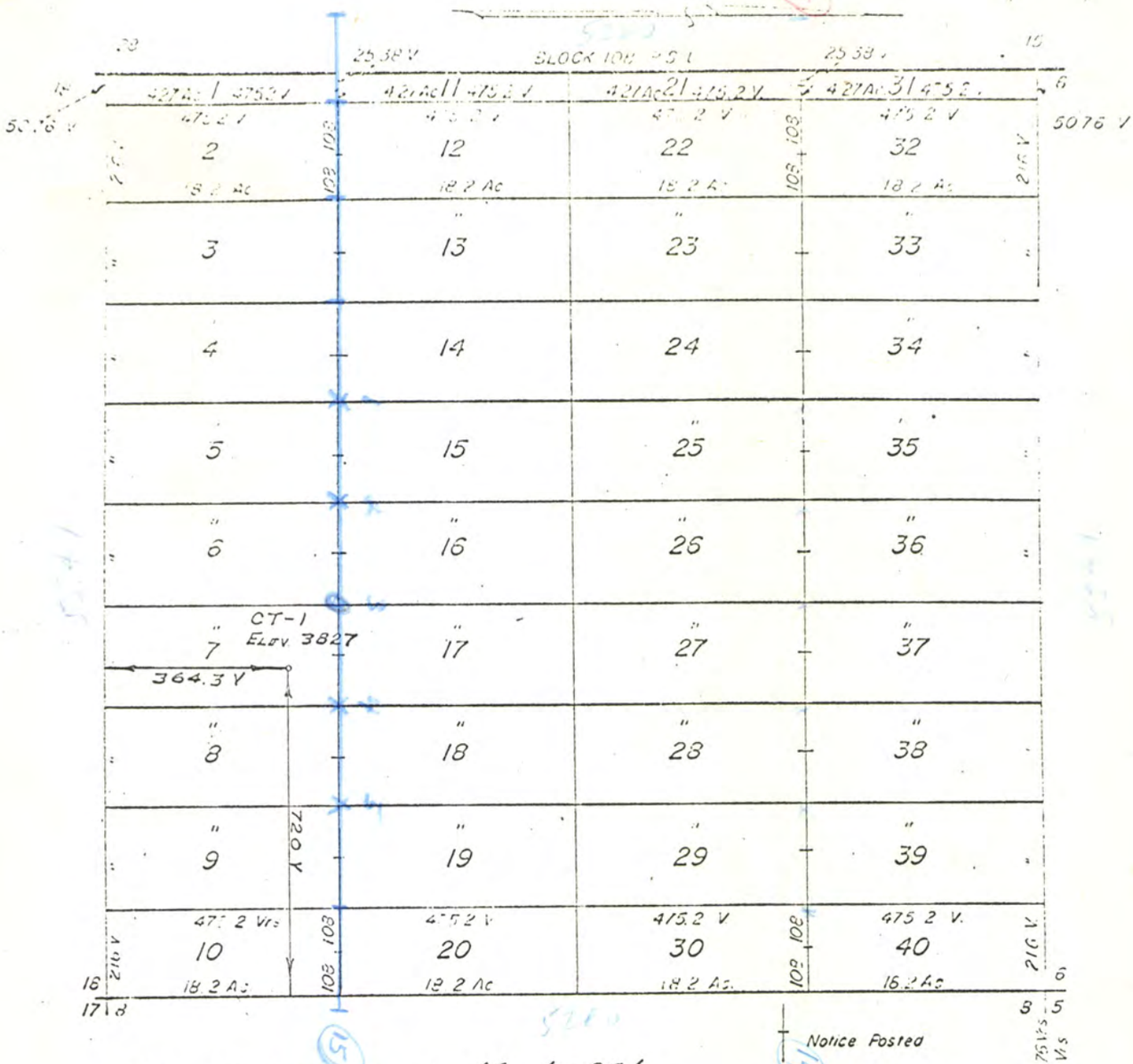
Recorded in Vol. 1 Pg. 25
Plat Record Culberson County, Texas
This 14 day of Oct 1966

COE

Frances Walker, County Clerk, Culberson County, Texas
In absence of a County Surveyor
By Mary Hammett
Deputy

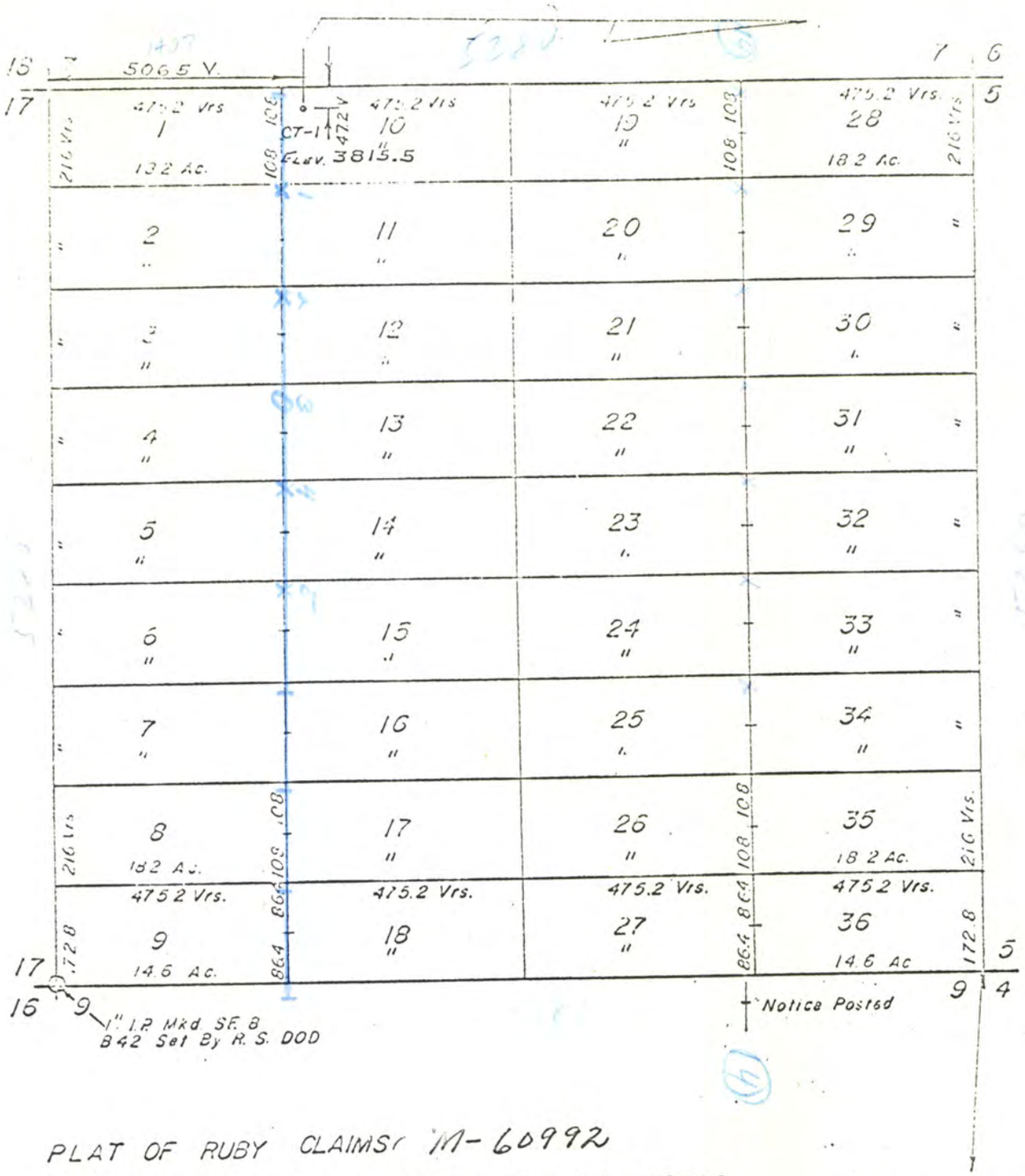
28

L 251
L 554




PLAT OF OPAL CLAIMS M-60986
SEC 7, BLK 42, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1" = 300 Vrs.
Surveyed: May 31 - June 2, 1966
Surveyed By: [signature]
Licensed State Land Surveyor

7




PLAT OF RUBY CLAIMS M-60992

SEC. 8 BLK 42, P.S.L. CULBERSON CO., TEXAS

Scale: 1" = 300 Varas

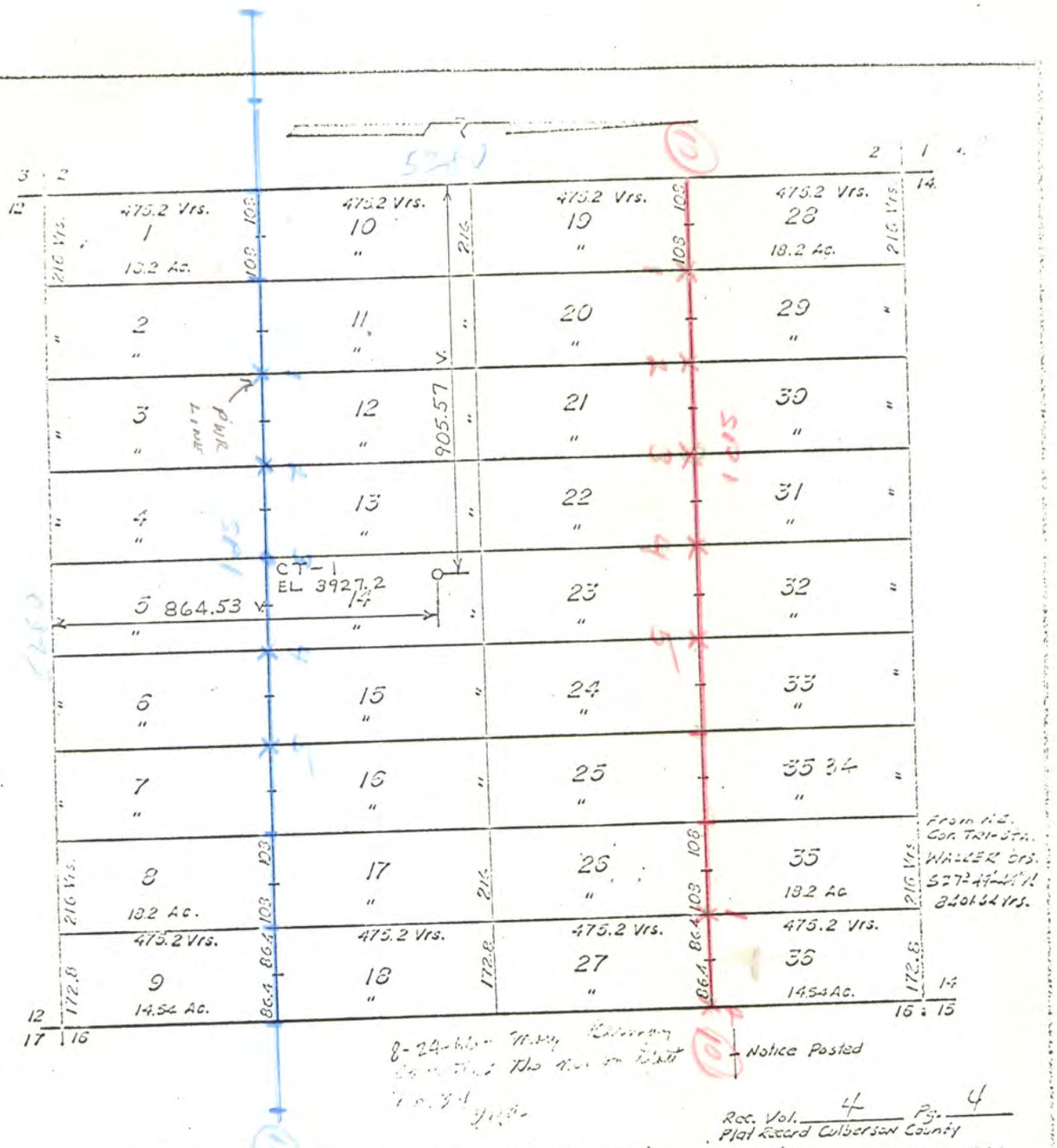
Date: May 25-28 1966

Surveyed By: [illegible]

Licensed State Land Surveyor

Windmill South 30.36 Vrs
East 462.96 Vrs.

(8)




Rec. Vol. 4 Pg. 4
Plat Record Culberson County
This 12 day of Aug 1966

PLAT OF MONALISA CLAIMS M-60991
SEC. 13 BLK. 108, P.S.L. CULBERSON CO., TEXAS
Scale: 1" = 300 Varas
Date: May 1966
Surveyed By: [signature]
Licensed State Land Surveyor

[signature]
County Clerk

In absence of a County Surveyor
Mary Germany, Deputy

13

PLAT OF NORMA CLAIMS - M-60753

SEC. 14, BLK. 108, P.S.L. CULBERSON COUNTY

Scale: 1" = 300 vrs.

Date: Aug. 1-6, 1966

Surveyed By: _____

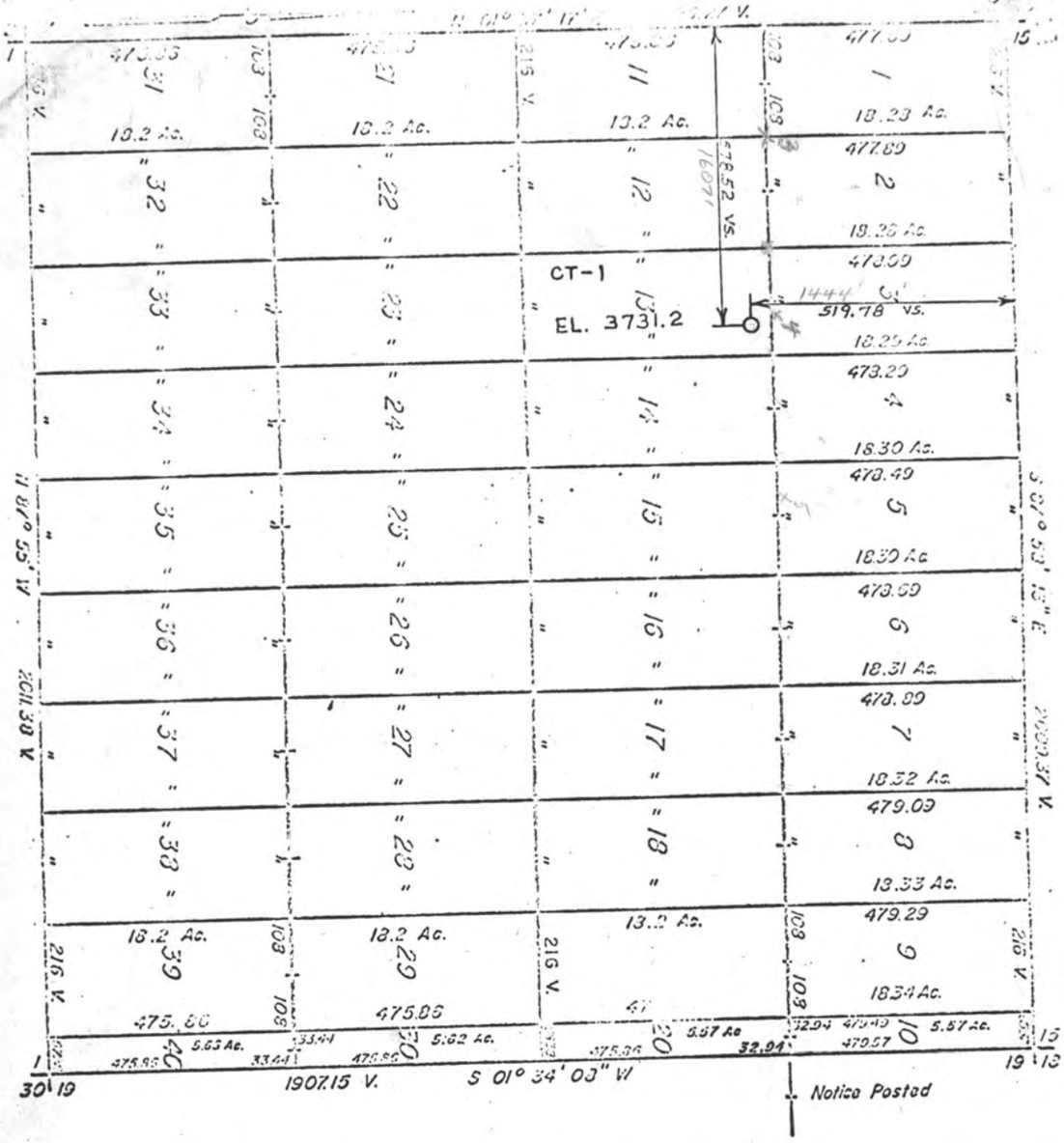
Lic. State Land Surveyor

Recorded Vol. ____ Pg. ____
Plat Record Culberson County
This ____ day of Aug. 1966.

_____
County Clerk

14

OCT 27 1966




PLAT OF PINON CLAIMS M-60980
SEC. 28, BLK. 109 P.S.L. CULBERSON CO., TEXAS
Scale: 1"=300 Vrs.
Date: June 1966

SURVEYED BY: Jack P. Abernathy
Licensed State Land Surveyor

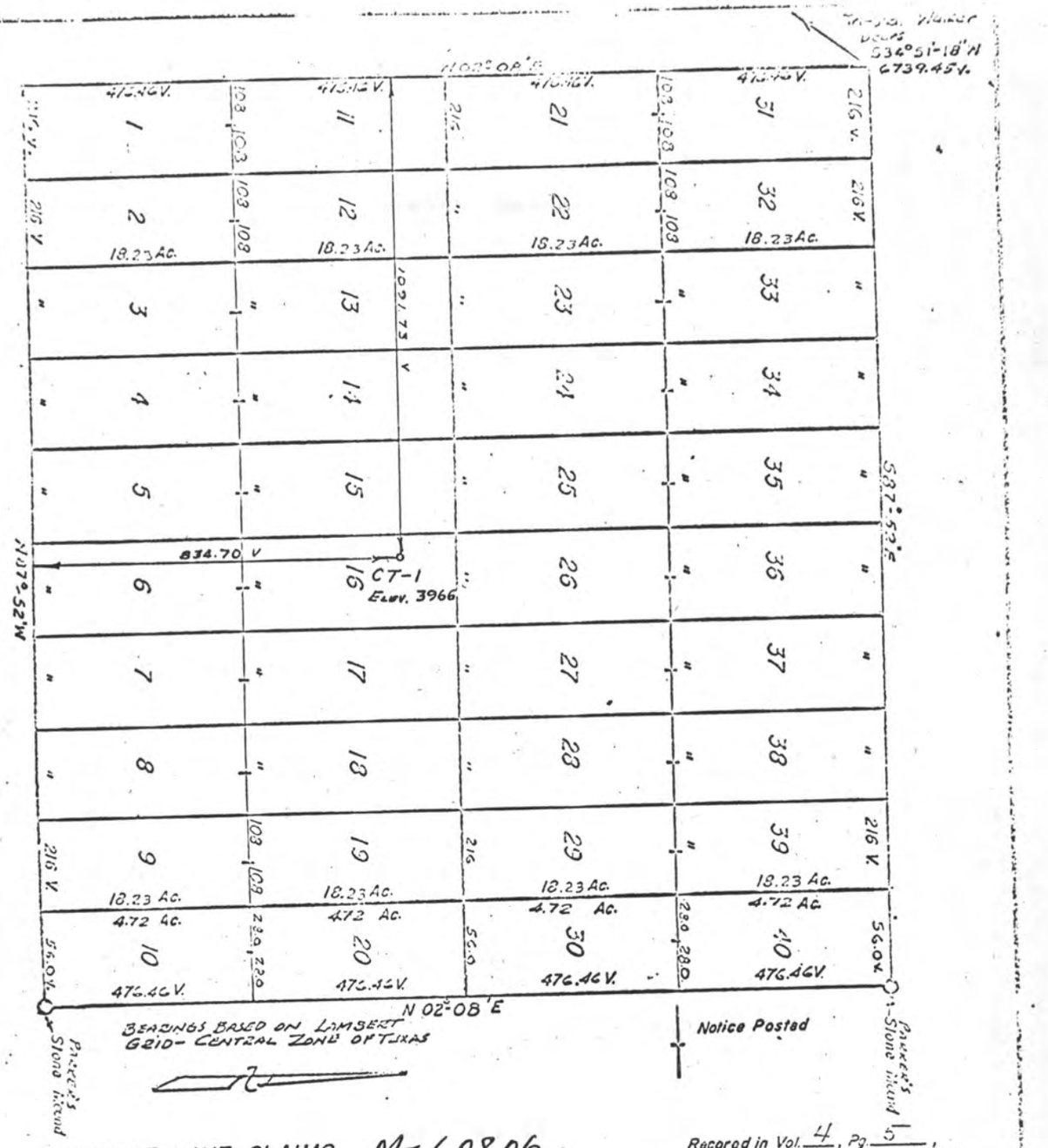
Recorded in Vol. 4 Pg. 25
Plat Record Culberson County, Texas
This 14 day of Oct 1966

Frances Walker, County Clerk, Culberson County, Texas

In absence of a County Surveyor

By Mary Hamman
Deputy

Oak 34 26 sec corner




PLAT OF JANE CLAIMS M-60806

SEC. 15, BLK. 108, P.S.L. CULBERSON COUNTY, TEXAS

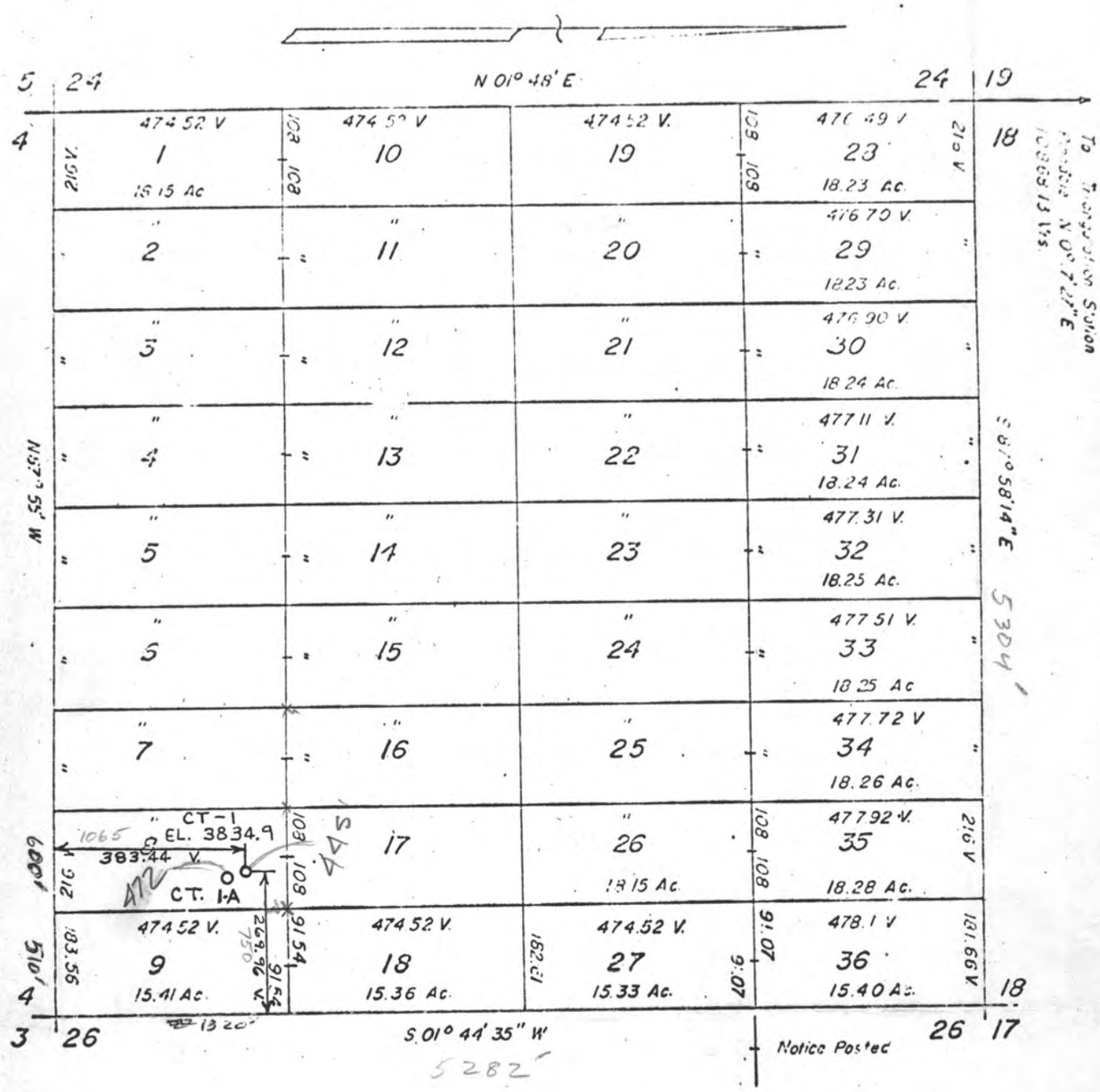
Scale: 1" = 300 Vrs.

Date:

Surveyed By: Fred S. Abercrombie
Licensed State Land Surveyor

Recorded in Vol. 4, Pg. 5
Plat Record Culberson County Texas
This 12 day of A.D. 1966
Frances Walker
County Clerk

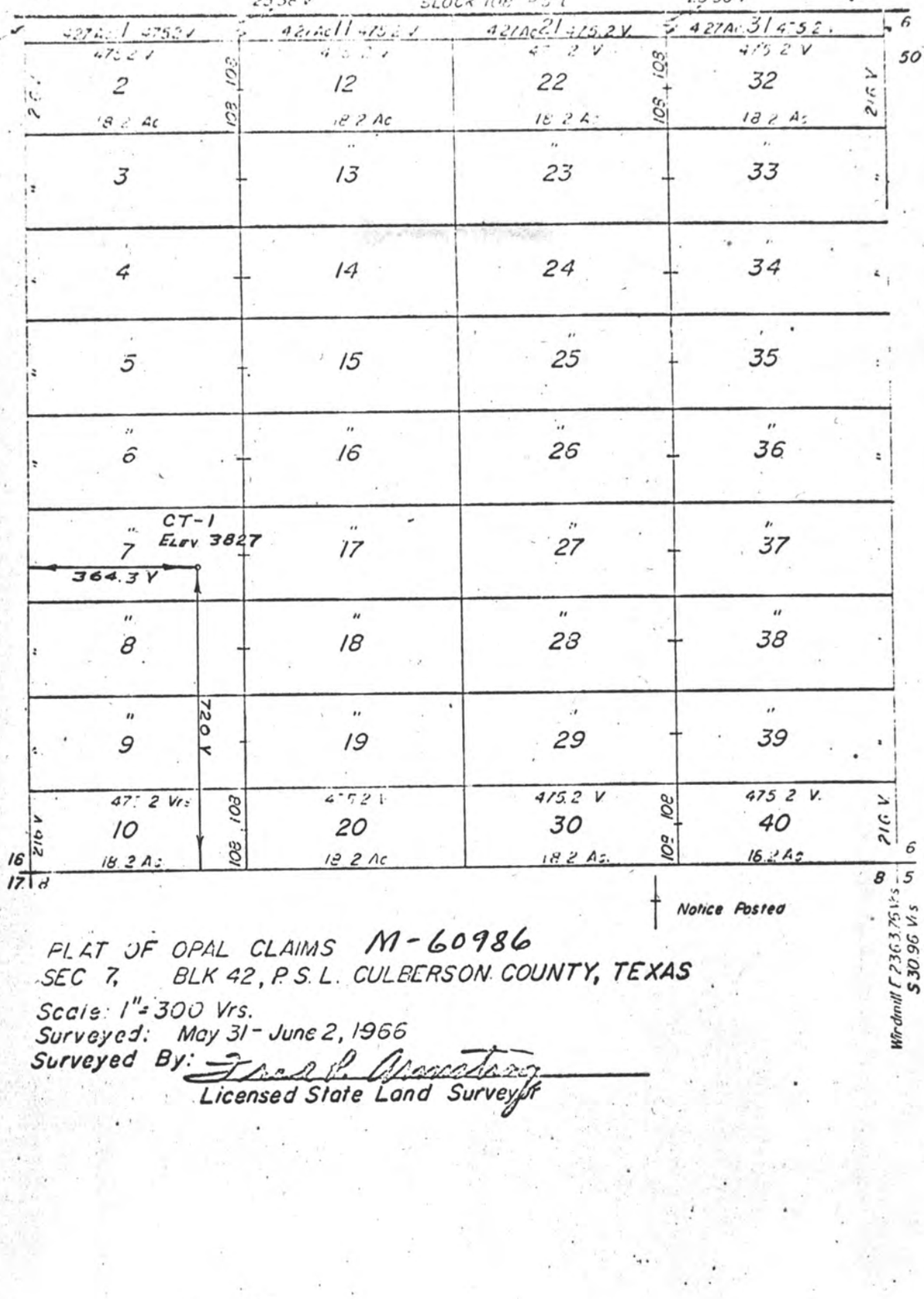
In absence of a County Surveyor
Mary Germany, Deputy



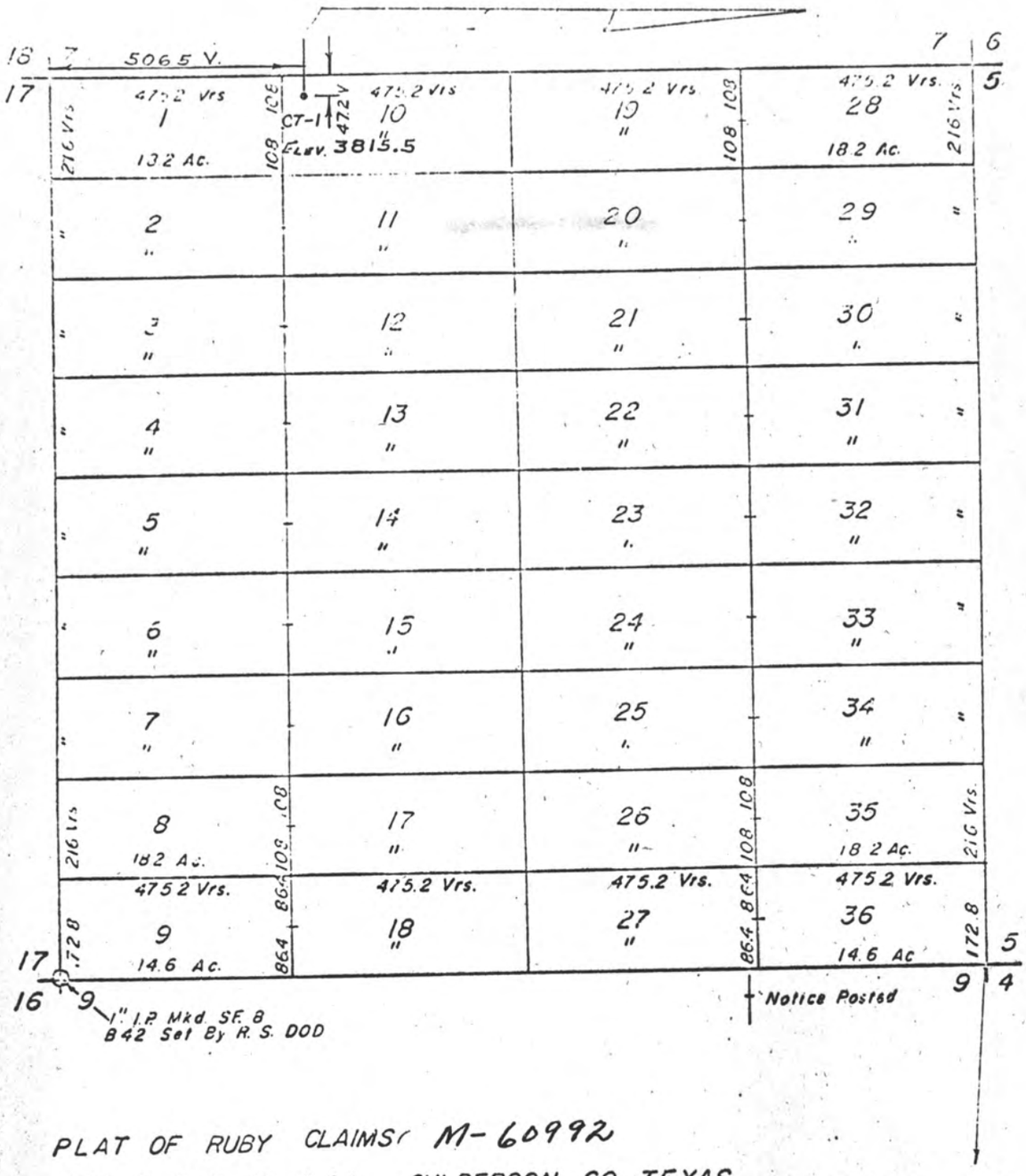

FLAT OF CEDAR CLAIMS M-60899
SEC 25, ELK. 109, P.S.L. CULBERSON CO., TEXAS
Scale: 1" = 300 Vrs. = 834'
Date: June 10-20, 1966
Surveyed By: Fred P. Armstrong
Licensed State Land Surveyor

Recorded in Vol. ____, Pg. ____
Plat Record Culberson County, Texas
This ____, day of ____ 1966

1 Vr = 2.77 ft
.36 Vr = 1 ft




PLAT OF OPAL CLAIMS M-60986
SEC 7, BLK 42, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1" = 300 Vrs.
Surveyed: May 31 - June 2, 1966
Surveyed By: Frank Gonzales
Licensed State Land Surveyor




PLAT OF RUBY CLAIMS M-60992

SEC. 8 BLK 42, P.S.L. CULBERSON CO., TEXAS

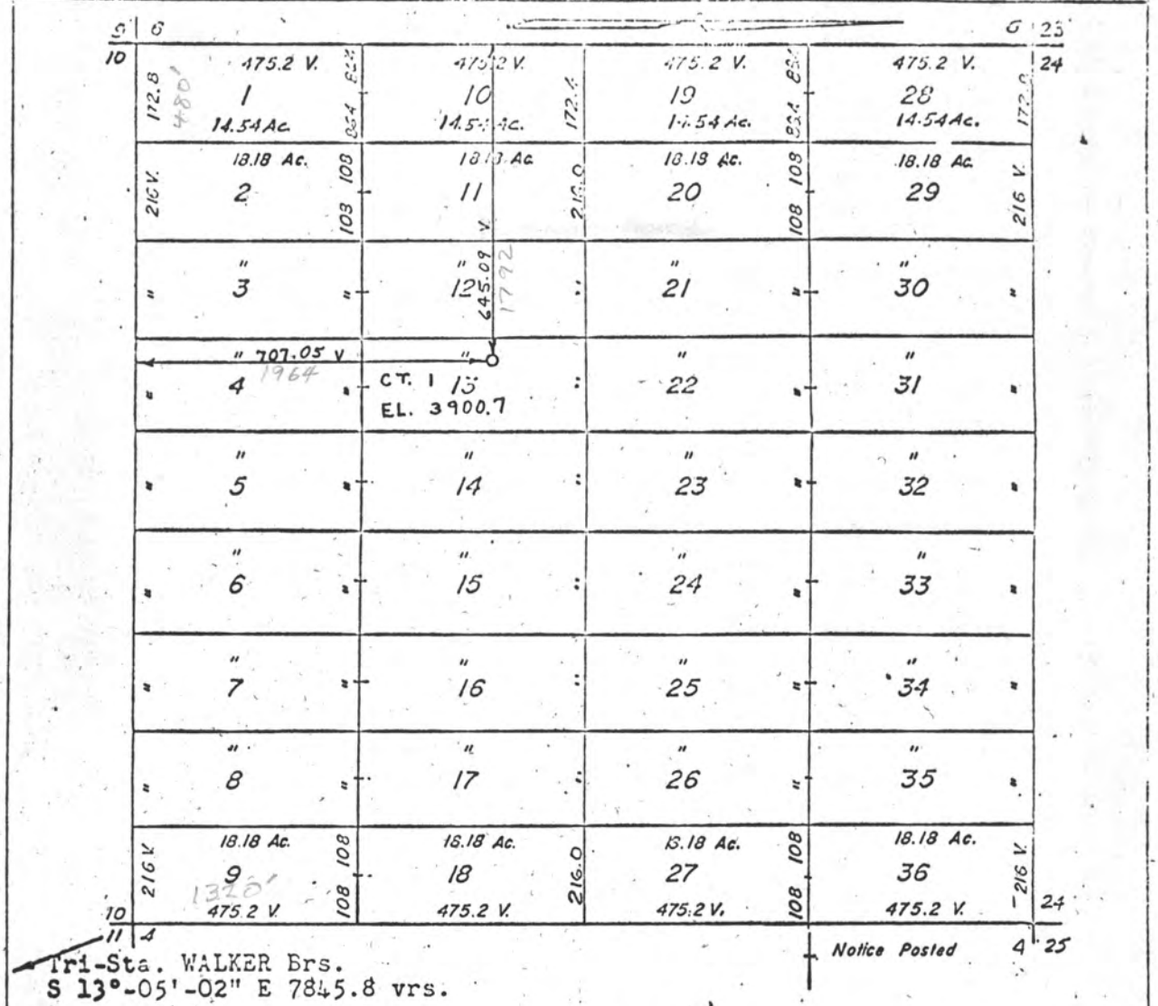
Scale: 1" = 300 Varas

Date: May 25-28 1966

Surveyed By: _____

Licensed State Land Surveyor

Windmill South 30.96 Vrs
East 462.96 Vrs.

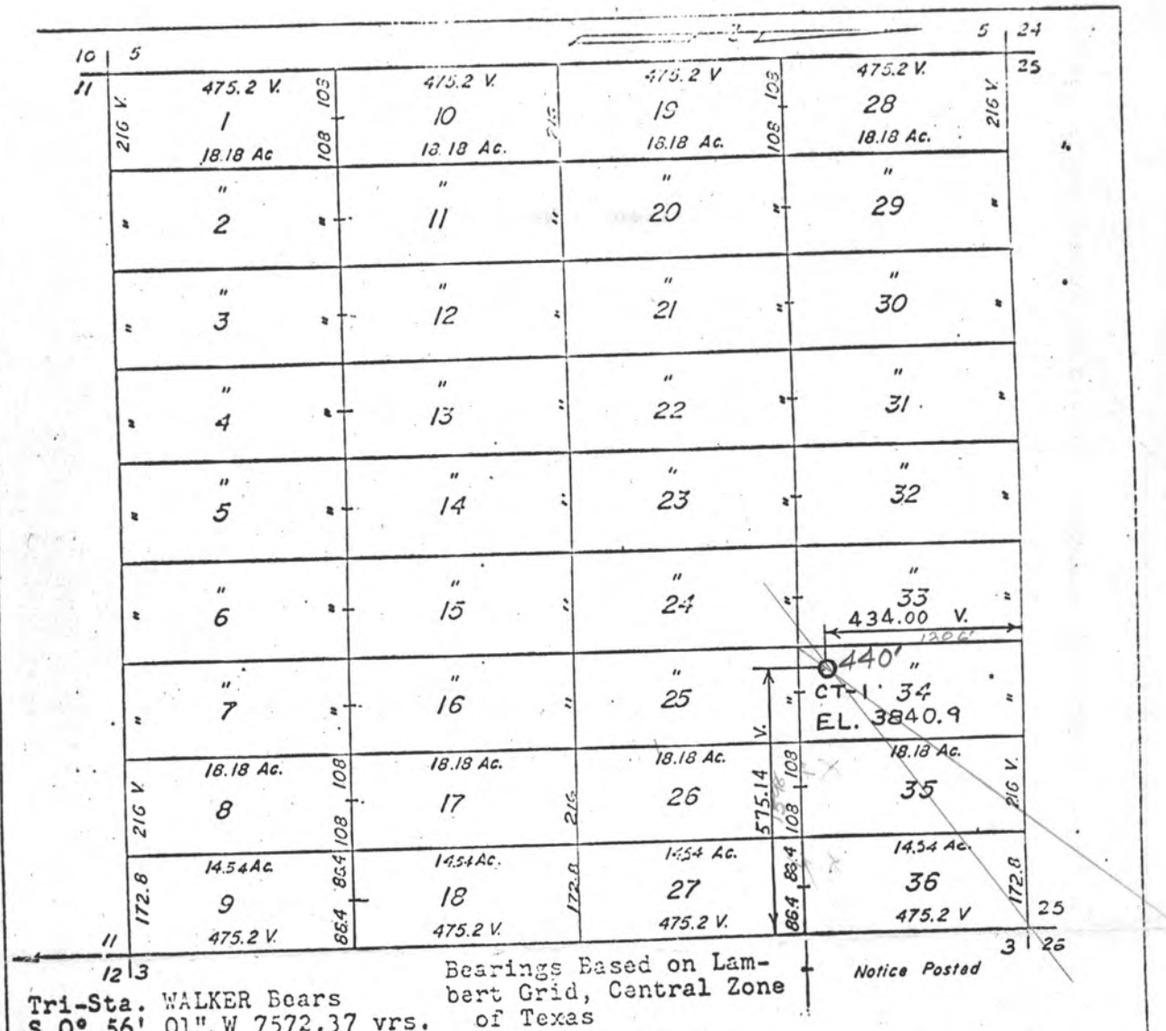



PLAT OF SANDRA CLAIMS M-60900
SEC. 5, BLK. 108, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1"=300 Vrs.
DAte: July 6 - 8, 1966
Surveyed By: Fred P. Armstrong
Licensed State Land Surveyor

Recorded in Vol.___, Pg.___
Plat Record Culberson County, Texas
This 15 day of Aug. 1966

Frances Walker
County Clerk
In Absence of a County Surveyor

Deputy




Bearings Based on Lambert Grid, Central Zone of Texas

Notice Posted

Tri-Sta. WALKER Bears S 0° 56' 01" W 7572.37 vrs.

PLAT OF CAROL CLAIMS M-60897
SEC. 4, BLK. 108, P.S.L. CULBERSON COUNTY, TEXAS
Scale: 1" = 300 Vrs.
Date: July 4 - 7, 1966

Surveyed By: Fred Armstrong
Licensed State Land Surveyor

Recorded in Vol. ____ Pg. ____
Plat Record Culberson County, Texas
This 15 day of Aug 1966

Frances Walker
County Clerk

In absence of a
County Surveyor

Deputy

Empire Project

Phase I

463

# EMPIRE PROJECT

## PHASE I

## PIMA COUNTY, ARIZONA

## FOR

## MIAMI COPPER OPERATIONS

## AUGUST, 1970

BY

Heinrichs Geoexploration Company
P.O. Box 5964, Tucson, Arizona 85703
Tel: 623-0578

# TABLE OF CONTENTS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General Location Map

Introduction and Summary---------- 1

Area Selection Criteria and Background---------- 1

Geochemical Survey

Summary---------- 3

Results, Interpretation and Recommendations- 3

Induced Polarization

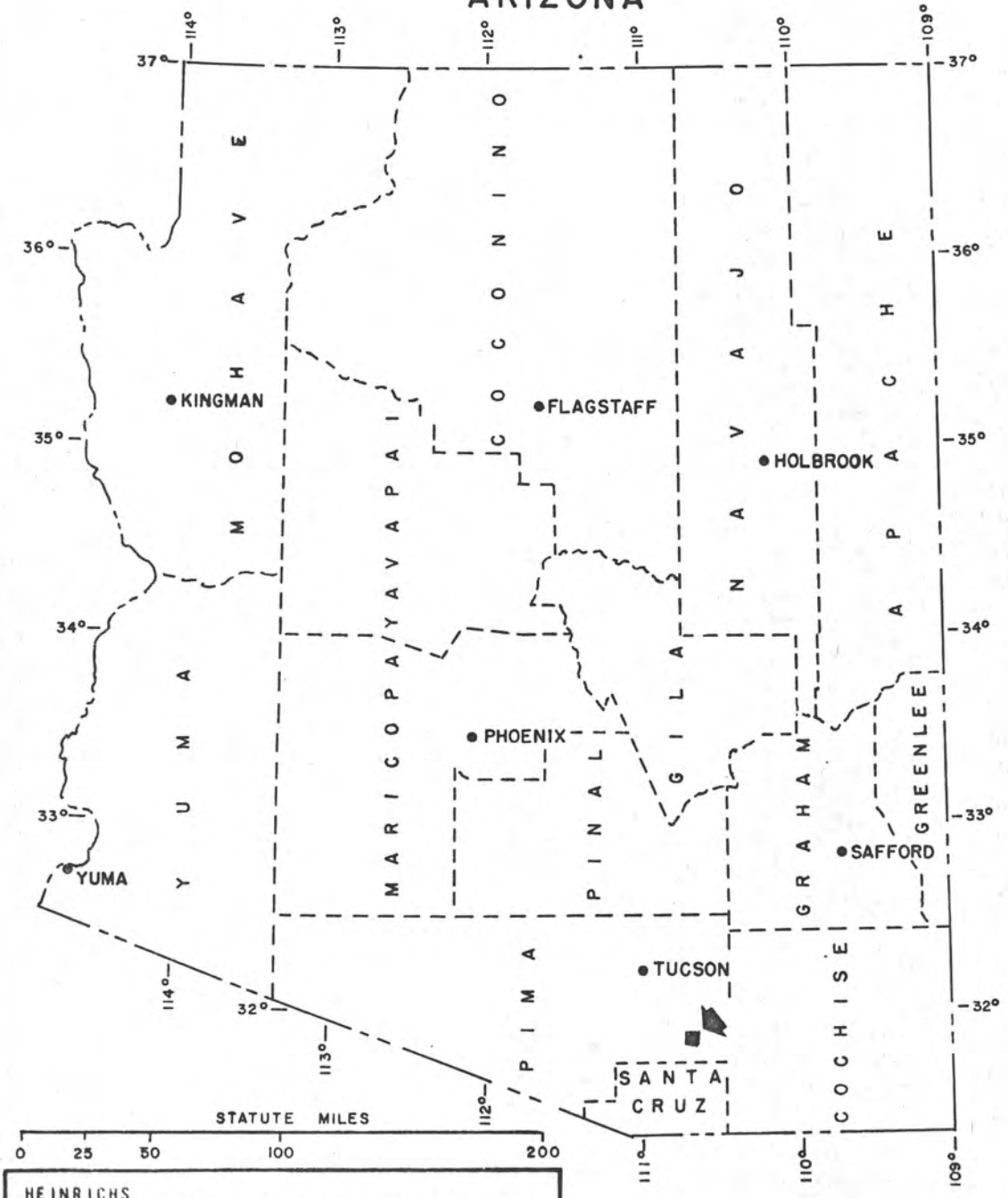
Results, Interpretation and Recommendations- 5

Bibliography

In Pocket (Total 6 Maps)

Composite Geologic Map
Geochemical Survey
Copper
Lead
Zinc
Molybdenum
Induced Polarization Location and Interpretation Plan

# GENERAL LOCATION
# of
# EMPIRE PROJECT – PHASE I
# for
# MIAMI COPPER OPERATIONS





HEINRICHS
**GEOEXPLORATION COMPANY**
GEOPHYSICAL ENGINEERS

AUSTRALIA
(SYDNEY)
39 Hume Street
Crows Nest, NSW
Phone: 439-1793

U.S.A.
Post Office Box 5964
Tucson, Arizona 85703
Phone: (602) 623-0578
Cable: GEOEX, Tucson

## INTRODUCTION AND SUMMARY

The Empire Project was selected for examination by GEOEX on the basis of favorable geologic conditions, available land and reasonable amenability to modern exploration techniques. The initial target area is south of the Empire Mountains proper and extends from Total Wreck Ridge on the north, a Paleozoic limestone outcrop, to several miles south and east into the Cretaceous shales and arkoses.

Semi-reconnaissance induced polarization, reconnaissance geochemical work and a literature survey of published and unpublished geologic maps subsequently compiled and amended by field work all with constant geologic supervision, has been the method of approaching the area for the preliminary Phase I examination. As results warrant, follow-up I.P. and a more detailed geologic investigation will constitute Phase II and hopefully, if justified, drilling will be Phase III.

## AREA SELECTION CRITERIA AND BACKGROUND

### Regional Setting

The Empire Mountains are located mostly in T. 18 S., R. 16 and 17 E., Pima County, Arizona. U.S. Highway 80 is six miles north of the area and constituted the northern boundary of initial investigation. Arizona Highway 83, a good paved road, is the western border. The project is in the central part of the U.S. Geological Survey Empire Mountains Arizona Quadrangle 15' map published 1958.

Geologically the Empire Mountains are a Laramide intrusion into Paleozoic and Creteceous sediments. Apparently the Empires are related to the northern end of the Santa Rita Mountains and some consider them to be part of the same group. Rosemont Camp is located a few miles to the west of the project area and some copper production has come from the north end of the Santa Ritas, primarily from the Cuprite and Pauline Mines. The Total Wreck Mine was a strong but small lead-silver and molybdenum producer and is a replacement deposit in Pennsylvanian-Permian limestones, probably fault controlled. Several miles to the southwest, the Hiltano Camp, still on Total Wreck Ridge, has several smaller, less rich, less well known mines similar to the Total Wreck.

The intrusive is known as the Sycamore Stock and has been dated as Laramide. The intrusive is a monzonite for the most part but varies in composition locally.

The Paleozoic rocks are limestones that dip rather steeply away from the intrusion. The Cretaceous rocks include conglomerates, shale and arkoses and also dip away from the intrusion but less steeply than the Paleozoic rocks.

An aeromagnetic high, as shown on the U.S. Geological Survey open file map by Andreasen, Mitchell and Tyson, 1964, is located on the northwest flank of the intrusive. This area shows strong sulfide mineralization and good I.P. anomalism has been reported. We are aware of a number of drill holes that show much pyrite but little copper. At this time the ground is unavailable and the land situation quite complex. The aerial magnetic anomalism seems to be related to the intrusion and not just a topographic effect and therefore is a positive factor in selecting a primary area of investigation.

The north end of the Empire Mountains has a very complex land situation. Much of the land is patented, some homesteads and a considerable number of individual homesites of varying acreage. In the area selected for Phase I, investigation in all areas of privately owned land, permission to enter upon the land was secured. Most owners signed a letter of permission, those who did not gave verbal permission.

The area selected for Phase I investigation has favorable geology, past production, available land and an aerial magnetic anomaly. The area seems to be quite amenable to modern exploration techniques. All available published and unpublished geology was compiled at 1" = 1000', field checked, modified and extended somewhat. A semi-detailed induced polarization survey was run approximately normal to the trend of Total Wreck Ridge and a geochemical survey for multiple elements was run south of Total Wreck Ridge. The area being processed is bounded on the north by the north side of Total Wreck Ridge, Cienega Wash on the east, Oak Tree Canyon on the south and by Arizona Highway 83 on the west. This area is completely within the boundaries of the U.S.G.S. Empire Mountains Arizona Quadrangle.

## GEOCHEMICAL SURVEY

### SUMMARY

A geochemical sampling program south and east of Total Wreck Ridge was run to select areas for more detailed geology and I.P. Because the deposits on Total Wreck Ridge are fracture controlled or related to dikes that appear to be fracture controlled, we felt that probably similar conditions exist below the Cretaceous cover. With the limestones as host rocks to concentrate the mineralization, leakage upward through the Cretaceous sediments could be possibly detected by the geochemical work. While we are not primarily looking for Total Wreck type of deposits, locating any that may exist will hopefully lead to the discovery of any larger "parent orebody".

The samples were collected on lines one thousand feet apart, with sample stations 500 feet apart along line. Samples were not taken in washes or on roads. D. Fischer, Staff Geologist, was in charge of sample collection and presentation. The samples were sifted to minus 80 mesh and analyzed for copper, molybdenum, lead and zinc. If the I.P. lines over the geochemical anomalies indicate the presence of sulfide mineralization some samples will also be analyzed for mercury.

### Results, Interpretation and Recommendations

1. The central portion of Section 1 and west into the eastern center of Section 2, T. 18 S., R. 17 E. shows good lead, zinc, copper and molybdenum correlation. The core of the geochemical anomaly apparently relates to the ENE topographic break in an outlying Paleozoic hill surrounded by Cretaceous shales containing some minor workings and prospects. Several lines of induced polarization coverage are planned to further test this area. The existing I.P. coverage here, Line 7, runs north-south roughly 600' east of section line 2/1 and was only slightly anomalous. Two lines to the east and one line to the west of this existing line all separated by 2000' and on 750' dipole spacings, should be run. If any interesting response is detected, shorter dipole coverage or extended coverage could then be considered.

2. The south half of Section 17 and minor portions of adjoining Sections 18, 19 and 20 all in T. 18 S., R. 17 E. show good lead, zinc, copper and molybdenum correlation. This anomaly is open to the north and northwest and seems to relate to an outlying Paleozoic outcrop with associated rhyolitic material. Some minor prospects and workings are present.

Existing I.P. lines 9, 10, 11 and 12 have crossed this anomalous geochemical zone and have shown no significant response. No more I.P. work is recommended at this time.

3. The Total Wreck Mine and an area just east thereof show spotty but sometimes strong lead, zinc and copper anomalism which is likely partially contaminated by the workings.

Existing I.P. lines 2 and 6 have crossed this area and are rather negative and therefore no more I.P. is recommended now.

4. In the vicinity of the NE corner of Section 22 in T. 18 S., R. 17 E. is a large coherent molybdenum high with good correlating copper and minor lead and zinc anomalism. This anomaly is apparently entirely within the Cretaceous shales. A 750' dipole spacing north-south I.P. line centered at the above section corner will further investigate this area. If anything interesting shows up, parallel lines about 2000' either side of the initial line are suggested. The north end of the second line recommended in No. 5 below will also help evaluate this anomaly.

5. Section 27 and the east part of Section 28, T. 18 S., R. 17 E. shows a broad complex lead, zinc and copper anomaly in alluvium just south of the Cretaceous shale-alluvium contact.

To further test this anomaly a north-south 1000' dipole I.P. line can be centered on the east-west road (which runs about 1000' south of the north section line of Section 27) about 1000' east of the west section line. A parallel line thereto also centered on the road about 3000' further east is also recommended.

6. A possibly significant molybdenum-copper anomaly with minor associated lead and zinc is noted near the south section line of Section 25, T. 18S., R. 16 E. and is within the Cretaceous shales.

A single 750' dipole I.P. line centered near the ¼ corner of the above section line angled about N. 65° W. would evaluate the target on a preliminary basis.

7. A broad open-ended (to the north and west) zinc anomaly with supporting copper and minor lead is noted in the

west halves of Sections 14 and 23, T. 18 S., R. 16 E. near Barrel Spring. This anomaly seems to be mainly within the Cretaceous shales.

An east-west 750' dipole I.P. line centered near the northwest corner of Section 23 would give sufficient preliminary information to evaluate the geochemistry.

8. Three low priority areas are mentioned here. If any encouragement is obtained with higher priority targets some or all of these three areas could be considered for I.P. follow-up:

(a) Zinc anomalies present in Sections 31 and 32 of T. 18 S., R. 17 E. and Sections 5 and 6 of T. 19 S., R. 17 E. All are in alluvium.

(b) Zinc with minor lead in Section 2, T. 19 S., R. 16 E. in alluvium.

(c) Copper, molybdenum and zinc anomalism in Section 33, T. 18 S., R. 17 E. in alluvium.

## INDUCED POLARIZATION

### Results, Interpretation and Recommendations

Lines 1 through 6 along the main Total Wreck Ridge show no obviously significant I.P. response. Line 2 centered near the pipeline and just north of the Total Wreck Mine shows very minor I.P. response of questionable significance just east of the center of the line. This may be caused by interference from the grounded fence and pipeline nearby or could be caused by minor mineralization related to the Total Wreck Mine. Line 3 shows minor questionable response east of 22.5 SE, correlating with the pipeline again but possibly valid. More work is considered on Line 3 to the east because of geologic interest.

Line 7 across the limestone outlier, 1½ miles east of the Total Wreck Mine, could have some possibly significant response mainly near station 18 N. As there is good geochemical anomalism in this general area, more work on parallel lines (two to the east and one to the west roughly 2000 feet apart) is recommended.

27 NW
22.5

Lines 8, 9 and 10 show a zone of perhaps the most significant response seen to date on the survey about ½ mile north of the Hiltano Camp. Line 9 shows the best response of these three lines and the anomaly is indicated as being centered near 22.5 NW and suggests a polarizable body lying mainly within 500 feet of the surface. Three parallel 300 foot dipole lines about 600 feet apart are recommended to further test this zone. One should be run along Line 9 centered at 24 NW and the other two on either side of this initial traverse. Line 8 shows a related but much deeper and broader appearing anomaly between stations 15 E and 15 W. Conceivably the Line 8 response could be a lateral effect from the near surface polarizer noted on Line 9. Line 10 shows two deep appearing complex anomalies again probably related to the Line 9 anomaly and centered near 13 NW and northwest of 30 NW. These zones are weaker than the response on Line 8 and less well defined. Line 9 also shows a minor questionable zone of I.P. response centered near 20 SE but with no obvious correlation on nearby lines.

Lines 11 and 12 were run to obtain coverage over a good geochemical anomaly about a mile southeast of the Hiltano Camp and show no anomalous I.P. effects.

All of the lines show considerable apparent resistivity variation mostly correlating with the Paleozoics and Cretaceous shales - the Paleozoics being very high in resistivity and the shales being moderately low.

A number of geochemical anomalies remain to be tested. A geologic investigation and the proposed induced polarization work should evaluate the possible potential of these sites. The additional work will be carried out as soon as possible.

Neenah Onionskin
25% COTTON FIBER

Respectfully submitted:
HEINRICHS GEOEXPLORATION COMPANY

D.B.C. by C.S.L.

Donald B. Cooley
Senior Geologist

Chris S. Ludwig

Chris S. Ludwig
Senior Geophysicist

Approved by:

Walter E. Heinrichs, Jr.
President

## SELECTED BIBLIOGRAPHY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Schrader, F.C., 1915, Mineral Deposits of the Santa Rita and Patagonia Mountains, Arizona. U.S. Geological Survey. Bull. 582.

# EMPIRE PROJECT

## PHASE I

## PIMA COUNTY, ARIZONA

## FOR

## MIAMI COPPER OPERATIONS

## AUGUST, 1970

BY

Heinrichs Geoexploration Company
P.O. Box 5964, Tucson, Arizona 85703
Tel: 623-0578

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Area Selection Criteria and Background---------- 1

Geochemical Survey

Summary---------- 3

Results, Interpretation and Recommendations- 3

Induced Polarization

Results, Interpretation and Recommendations- 5

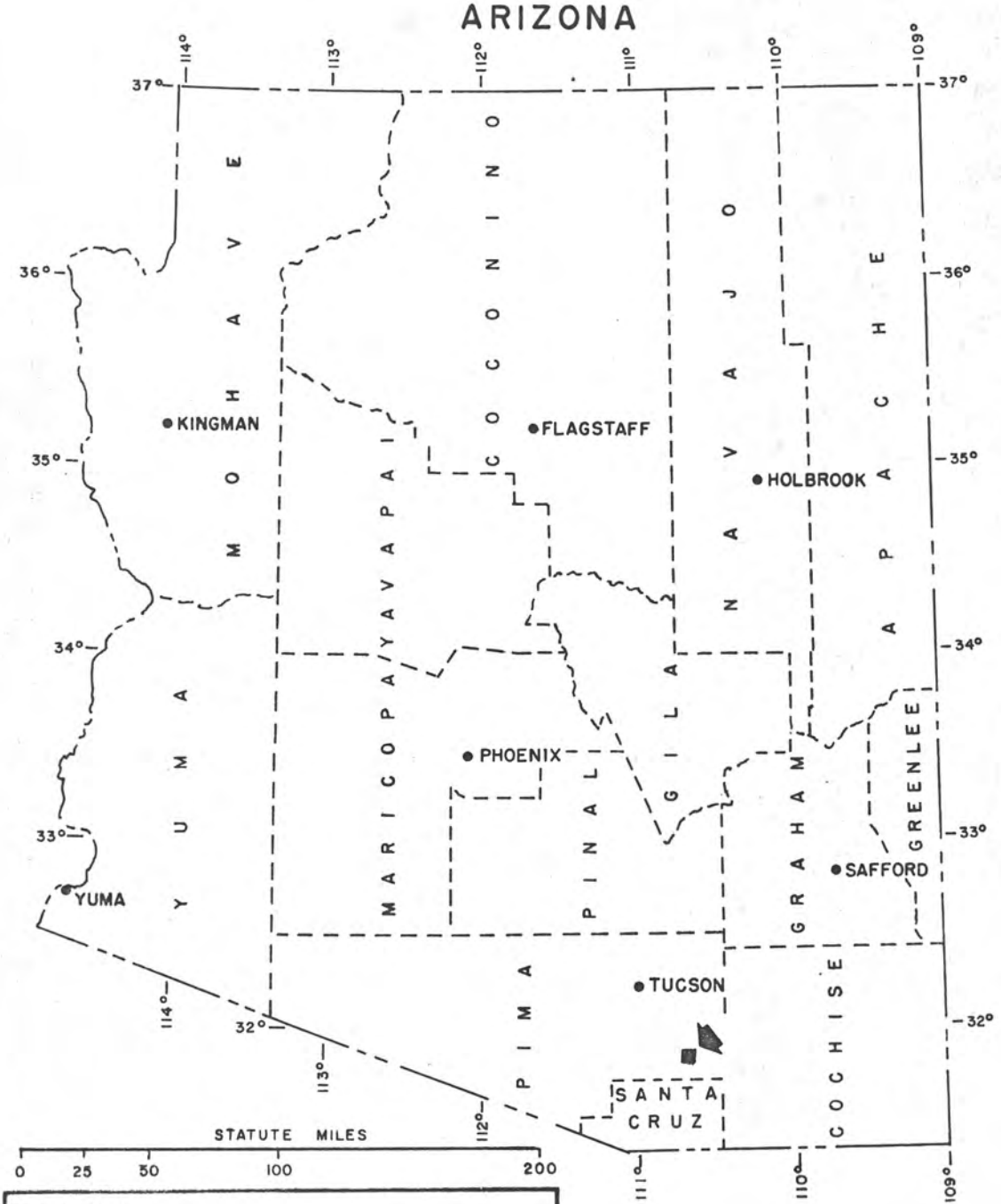
Bibliography

In Pocket (Total 6 Maps)

Composite Geologic Map
Geochemical Survey
Copper
Lead
Zinc
Molybdenum
Induced Polarization Location and Interpretation Plan

# GENERAL LOCATION
# of
# EMPIRE PROJECT – PHASE I
# for
# MIAMI COPPER OPERATIONS

## ARIZONA





HEINRICHS
**GEOEXPLORATION COMPANY**
GEOPHYSICAL ENGINEERS

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(SYDNEY)
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Crows Nest, NSW
Phone: 439-1793

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Tucson, Arizona 85703
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## INTRODUCTION AND SUMMARY

The Empire Project was selected for examination by GEOEX on the basis of favorable geologic conditions, available land and reasonable amenability to modern exploration techniques. The initial target area is south of the Empire Mountains proper and extends from Total Wreck Ridge on the north, a Paleozoic limestone outcrop, to several miles south and east into the Cretaceous shales and arkoses.

Semi-reconnaissance induced polarization, reconnaissance geochemical work and a literature survey of published and unpublished geologic maps subsequently compiled and amended by field work all with constant geologic supervision, has been the method of approaching the area for the preliminary Phase I examination. As results warrant, follow-up I.P. and a more detailed geologic investigation will constitute Phase II and hopefully, if justified, drilling will be Phase III.

## AREA SELECTION CRITERIA AND BACKGROUND

### Regional Setting

The Empire Mountains are located mostly in T. 18 S., R. 16 and 17 E., Pima County, Arizona. U.S. Highway 80 is six miles north of the area and constituted the northern boundary of initial investigation. Arizona Highway 83, a good paved road, is the western border. The project is in the central part of the U.S. Geological Survey Empire Mountains Arizona Quadrangle 15' map published 1958.

Geologically the Empire Mountains are a Laramide intrusion into Paleozoic and Creteceous sediments. Apparently the Empires are related to the northern end of the Santa Rita Mountains and some consider them to be part of the same group. Rosemont Camp is located a few miles to the west of the project area and some copper production has come from the north end of the Santa Ritas, primarily from the Cuprite and Pauline Mines. The Total Wreck Mine was a strong but small lead-silver and molybdenum producer and is a replacement deposit in Pennsylvanian-Permian limestones, probably fault controlled. Several miles to the southwest, the Hiltano Camp, still on Total Wreck Ridge, has several smaller, less rich, less well known mines similar to the Total Wreck.

The intrusive is known as the Sycamore Stock and has been dated as Laramide. The intrusive is a monzonite for the most part but varies in composition locally.

The Paleozoic rocks are limestones that dip rather steeply away from the intrusion. The Cretaceous rocks include conglomerates, shale and arkoses and also dip away from the intrusion but less steeply than the Paleozoic rocks.

An aeromagnetic high, as shown on the U.S. Geological Survey open file map by Andreasen, Mitchell and Tyson, 1964, is located on the northwest flank of the intrusive. This area shows strong sulfide mineralization and good I.P. anomalism has been reported. We are aware of a number of drill holes that show much pyrite but little copper. At this time the ground is unavailable and the land situation quite complex. The aerial magnetic anomalism seems to be related to the intrusion and not just a topographic effect and therefore is a positive factor in selecting a primary area of investigation.

The north end of the Empire Mountains has a very complex land situation. Much of the land is patented, some homesteads and a considerable number of individual homesites of varying acreage. In the area selected for Phase I, investigation in all areas of privately owned land, permission to enter upon the land was secured. Most owners signed a letter of permission, those who did not gave verbal permission.

The area selected for Phase I investigation has favorable geology, past production, available land and an aerial magnetic anomaly. The area seems to be quite amenable to modern exploration techniques. All available published and unpublished geology was compiled at 1" = 1000', field checked, modified and extended somewhat. A semi-detailed induced polarization survey was run approximately normal to the trend of Total Wreck Ridge and a geochemical survey for multiple elements was run south of Total Wreck Ridge. The area being processed is bounded on the north by the north side of Total Wreck Ridge, Cienega Wash on the east, Oak Tree Canyon on the south and by Arizona Highway 83 on the west. This area is completely within the boundaries of the U.S.G.S. Empire Mountains Arizona Quadrangle.

## GEOCHEMICAL SURVEY

### SUMMARY

A geochemical sampling program south and east of Total Wreck Ridge was run to select areas for more detailed geology and I.P. Because the deposits on Total Wreck Ridge are fracture controlled or related to dikes that appear to be fracture controlled, we felt that probably similar conditions exist below the Cretaceous cover. With the limestones as host rocks to concentrate the mineralization, leakage upward through the Cretaceous sediments could be possibly detected by the geochemical work. While we are not primarily looking for Total Wreck type of deposits, locating any that may exist will hopefully lead to the discovery of any larger "parent orebody".

The samples were collected on lines one thousand feet apart, with sample stations 500 feet apart along line. Samples were not taken in washes or on roads. D. Fischer, Staff Geologist, was in charge of sample collection and presentation. The samples were sifted to minus 80 mesh and analyzed for copper, molybdenum, lead and zinc. If the I.P. lines over the geochemical anomalies indicate the presence of sulfide mineralization some samples will also be analyzed for mercury.

### Results, Interpretation and Recommendations

1. The central portion of Section 1 and west into the eastern center of Section 2, T. 18 S., R. 17 E. shows good lead, zinc, copper and molybdenum correlation. The core of the geochemical anomaly apparently relates to the ENE topographic break in an outlying Paleozoic hill surrounded by Cretaceous shales containing some minor workings and prospects. Several lines of induced polarization coverage are planned to further test this area. The existing I.P. coverage here, Line 7, runs north-south roughly 600' east of section line 2/1 and was only slightly anomalous. Two lines to the east and one line to the west of this existing line all separated by 2000' and on 750' dipole spacings, should be run. If any interesting response is detected, shorter dipole coverage or extended coverage could then be considered.

2. The south half of Section 17 and minor portions of adjoining Sections 18, 19 and 20 all in T. 18 S., R. 17 E. show good lead, zinc, copper and molybdenum correlation. This anomaly is open to the north and northwest and seems to relate to an outlying Paleozoic outcrop with associated rhyolitic material. Some minor prospects and workings are present.

Existing I.P. lines 9, 10, 11 and 12 have crossed this anomalous geochemical zone and have shown no significant response. No more I.P. work is recommended at this time.

3. The Total Wreck Mine and an area just east thereof show spotty but sometimes strong lead, zinc and copper anomalism which is likely partially contaminated by the workings.

Existing I.P. lines 2 and 6 have crossed this area and are rather negative and therefore no more I.P. is recommended now.

4. In the vicinity of the NE corner of Section 22 in T. 18 S., R. 17 E. is a large coherent molybdenum high with good correlating copper and minor lead and zinc anomalism. This anomaly is apparently entirely within the Cretaceous shales. A 750' dipole spacing north-south I.P. line centered at the above section corner will further investigate this area. If anything interesting shows up, parallel lines about 2000' either side of the initial line are suggested. The north end of the second line recommended in No. 5 below will also help evaluate this anomaly.

5. Section 27 and the east part of Section 28, T. 18 S., R. 17 E. shows a broad complex lead, zinc and copper anomaly in alluvium just south of the Cretaceous shale-alluvium contact.

To further test this anomaly a north-south 1000' dipole I.P. line can be centered on the east-west road (which runs about 1000' south of the north section line of Section 27) about 1000' east of the west section line. A parallel line thereto also centered on the road about 3000' further east is also recommended.

6. A possibly significant molybdenum-copper anomaly with minor associated lead and zinc is noted near the south section line of Section 25, T. 18S., R. 16 E. and is within the Cretaceous shales.

A single 750' dipole I.P. line centered near the ¼ corner of the above section line angled about N. 65° W. would evaluate the target on a preliminary basis.

7. A broad open-ended (to the north and west) zinc anomaly with supporting copper and minor lead is noted in the

west halves of Sections 14 and 23, T. 18 S., R. 16 E. near Barrel Spring. This anomaly seems to be mainly within the Cretaceous shales.

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Respectfully submitted:
HEINRICHS GEOEXPLORATION COMPANY

D. B. C. by C. S. L.

Donald B. Cooley
Senior Geologist

Chris S. Ludwig

Chris S. Ludwig
Senior Geophysicist

Approved by:

Walter E. Heinrichs, Jr.
President

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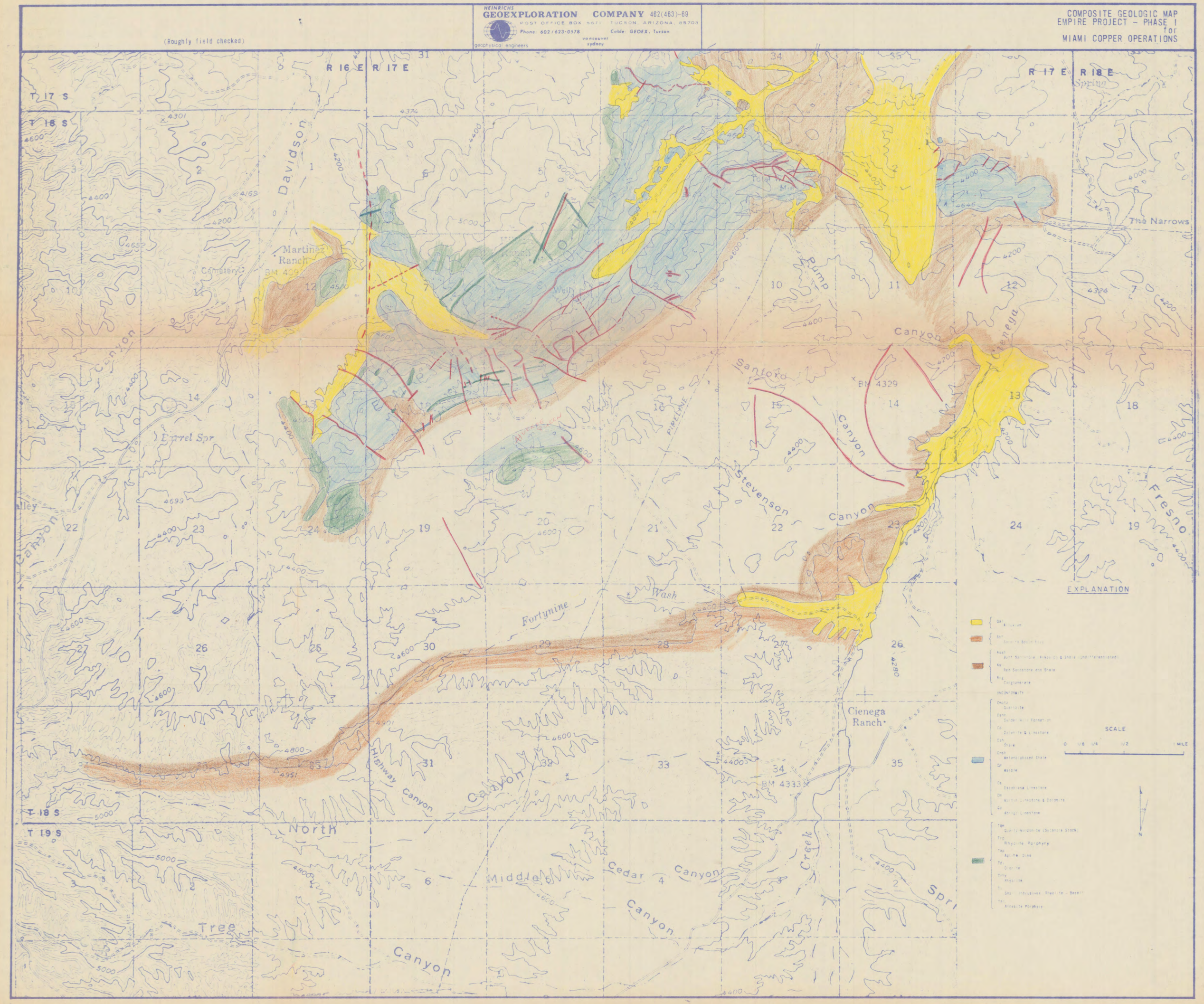
5/15/75

There is also a 1:62500
"Composite Plan"

See tube file for orginal



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geophysical engineers
vancouver
sydney
(Roughly field checked)
COMPOSITE GEOLOGIC MAP
EMPIRE PROJECT - PHASE I
for
MIAMI COPPER OPERATIONS
R 16 E R 17 E
R 17 E R 18 E
T 17 S
T 18 S
T 19 S
Davidson
Martinez Ranch
BM 409
Cemetery
Canyon
Barrel Spr
Pump
Canyon
Cienega
Sanford
BM 4329
Canyon
Stevenson
Canyon
PIPELINE
The Narrows
Fresno
Fortynine
Wash
Cienega Ranch
BM 4333
Highway
Canyon
North
Canyon
Middle
Cedar
Canyon
Canyon
Creek
Tree
Canyon
EXPLANATION
SCALE
0 1/8 1/4 1/2 1 MILE
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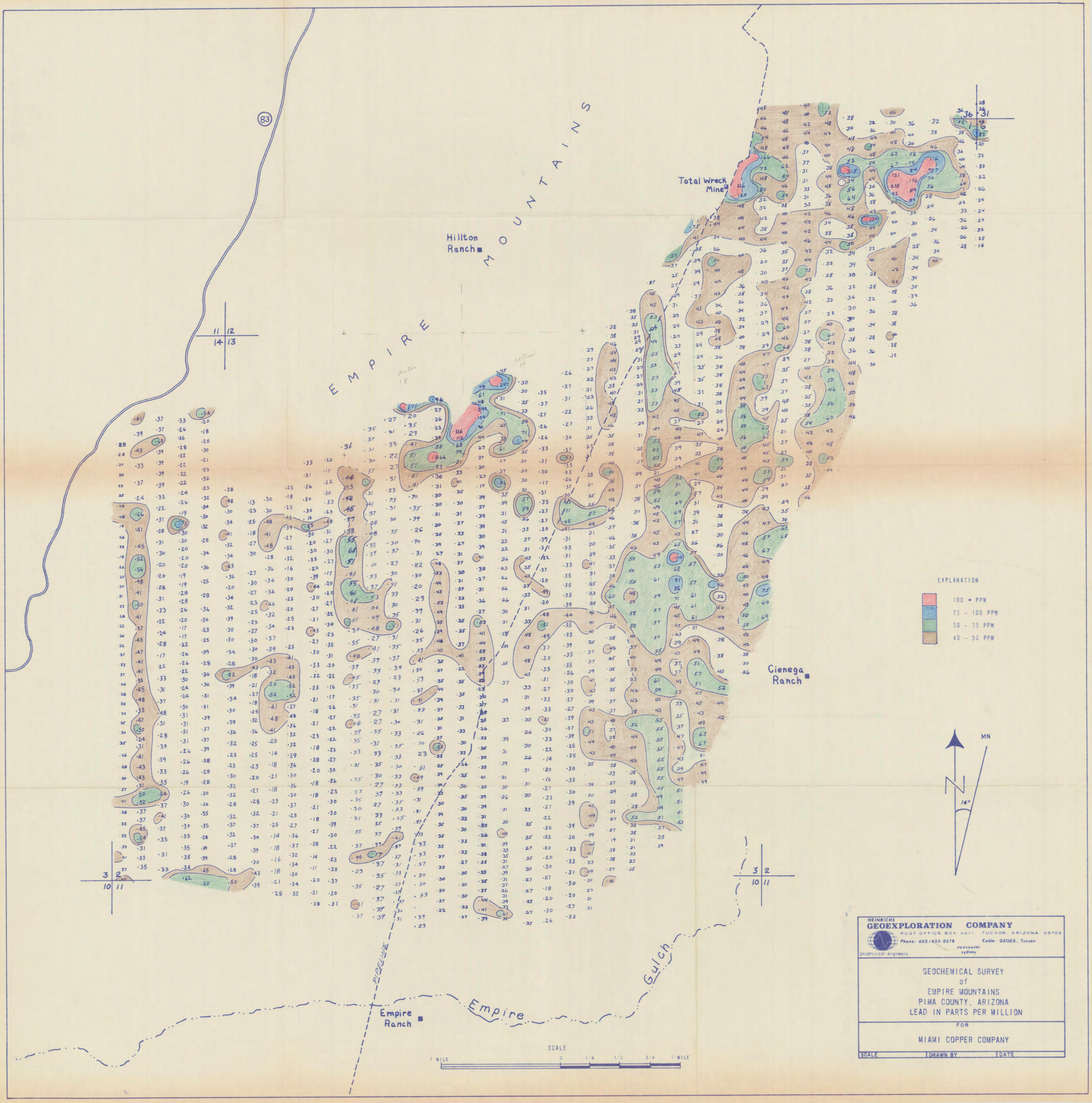

EMPIRE MOUNTAINS
Total Wreck Mine
Hillton Ranch
Cienega Ranch
Empire Ranch
Empire Gulch
PIPELINE
83
EXPLANATION
100 + PPM
75 - 100 PPM
50 - 75 PPM
40 - 50 PPM
MN
14°
SCALE
1 MILE
0
1/4
1/2
3/4
1 MILE
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vancouver
sydney
geophysical engineers
GEOCHEMICAL SURVEY
of
EMPIRE MOUNTAINS
PIMA COUNTY, ARIZONA
LEAD IN PARTS PER MILLION
FOR
MIAMI COPPER COMPANY
SCALE
DRAWN BY
DATE

EMPIRE MOUNTAINS

Total Wreck Mine

Hillton Ranch

Cienega Ranch

Empire Ranch

Empire Gulch

PIPELINE

83

11 12
14 13

3 2
10 11

3 2
10 11

36 31
1 6

EXPLANATION

100 + PPM
90 - 100 PPM
80 - 90 PPM
70 - 80 PPM
60 - 70 PPM
50 - 60 PPM
40 - 50 PPM
30 - 40 PPM

MN
14°

SCALE
1 MILE 0 1/4 1/2 3/4 1 MILE

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vancouver
sydney

GEOCHEMICAL SURVEY
of
EMPIRE MOUNTAINS
PIMA COUNTY, ARIZONA
COPPER IN PARTS PER MILLION

FOR
MIAMI COPPER COMPANY

SCALE | DRAWN BY | DATE

EMPIRE MOUNTAINS

Total Wreck Mine

Hillton Ranch

Cienega Ranch

Empire Ranch

Empire Gulch

PIPELINE

83

11 12
14 13

3 2
10 11

3 2
10 11

EXPLANATION

200 + PPM
150 - 200 PPM
100 - 150 PPM
80 - 100 PPM

MN
14°

SCALE
1 MILE 0 1/4 1/2 3/4 1 MILE

HEINRICHS GEOEXPLORATION COMPANY
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vancouver sydney

GEOCHEMICAL SURVEY
of
EMPIRE MOUNTAINS
PIMA COUNTY, ARIZONA
ZINC IN PARTS PER MILLION

FOR
MIAMI COPPER COMPANY

| SCALE | DRAWN BY | DATE |
|---|---|---|

EMPIRE MOUNTAINS

Total Wreck Mine

Hillton Ranch

Cienega Ranch

Empire Ranch

Empire Gulch

PIPELINE

83

11 12
14 13

36 31
1 6

3 2
10 11

1 2
12 13

EXPLANATION

6 + PPM
3 - 6 PPM
1 - 3 PPM

MN

N

140

SCALE

1 MILE 0 1/4 1/2 3/4 1 MILE

HEINRICHS GEOEXPLORATION COMPANY
Geophysical engineers
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vancouver sydney

GEOCHEMICAL SURVEY
of
EMPIRE MOUNTAINS
PIMA COUNTY, ARIZONA
MOLYBDENUM IN PARTS PER MILLION

FOR

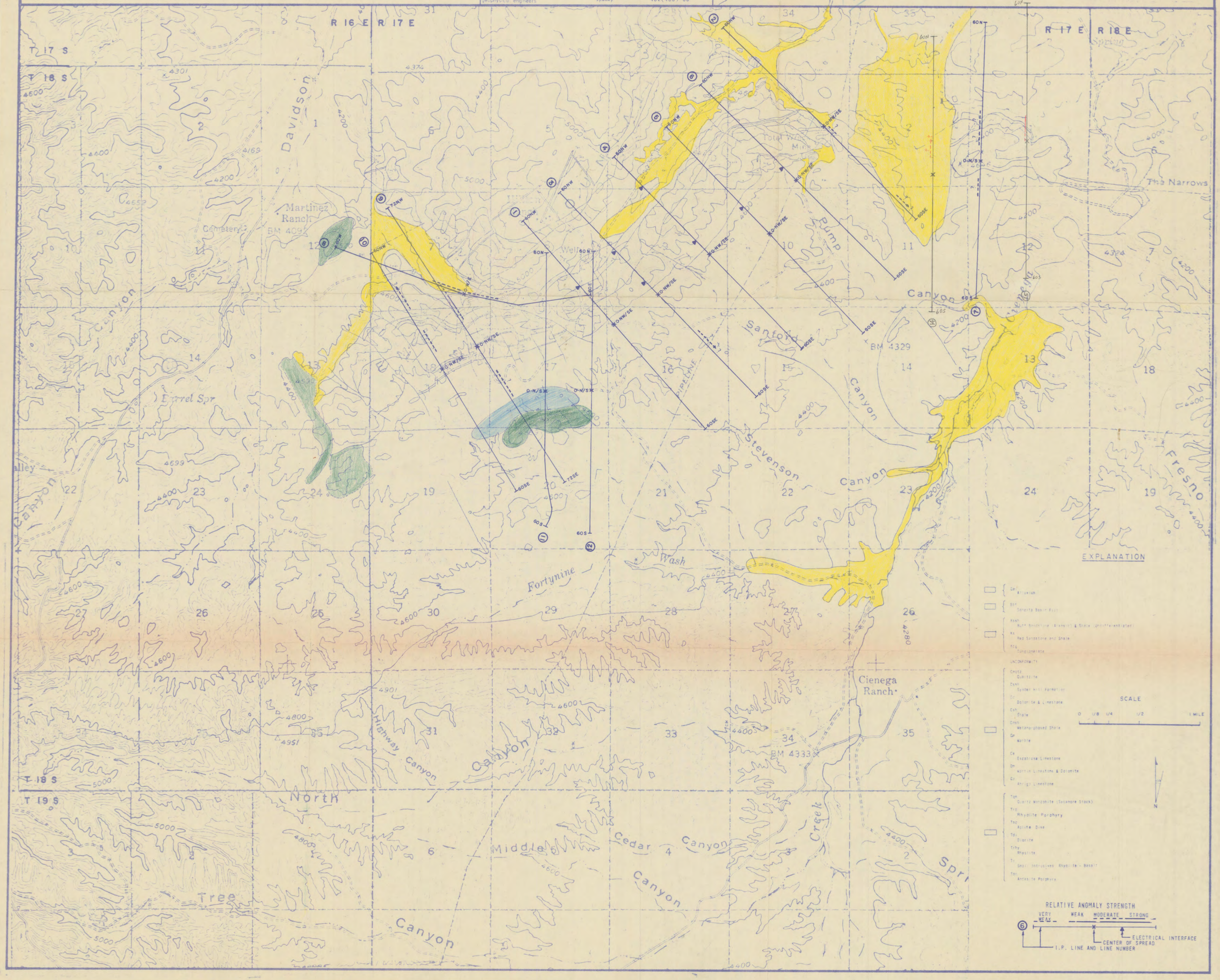
MIAMI COPPER COMPANY

| SCALE | DRAWN BY | DATE |
|---|---|---|

HEINRICHS
GEOEXPLORATION COMPANY
POST OFFICE BOX 5671 TUCSON, ARIZONA, 85703
Phone 602/623-0578 Cable: GEOEX, Tucson
geophysical engineers vancouver sydney
462(463)-69

File

INDUCED POLARIZATION LOCATION & INTERPRETATION PLAN
EMPIRE PROJECT - PHASE I
for
MIAMI COPPER OPERATIONS



CITIES SERVICE COMPANY
P. O. BOX 100
MIAMI, ARIZONA 85539

MIAMI COPPER OPERATIONS

(602) 473-2441

November 24, 1970

Heinrichs
GEOEX
Cable: GEOEX

REC'D NOV 25 1970 REC'D

BOX 5964 TUCSON, ARIZONA 85703
Phone: (AREA 602) 623-0578

Mr. W. E. Heinrichs,
President,
Heinrichs Geoexploration Company,
P. O. Box 5671,
Tucson, Arizona 85703.

Dear Walt:

Attached, for your file, are the reports on our microscopic examination of the thin and polished sections from drill hole Emp 1. Should you care to examine these sections personally, we would be happy to loan them to you.

Also attached are four photomicrographs of the polished sections; will you please return them to us. (Any questions on these should be directed to Dr. Dave Denison.)

Yours truly,

Robert C. Moore

Robert C. Moore

RCM;mes
cc: Mr. Simmons
Mr. Denison

FORM 233

CITIES SERVICE COMPANY
MIAMI COPPER OPERATIONS

# MEMORANDUM

Date November 17, 1970

To R. C. Moore — Geology — Dept.

From E. O. Anderson — Geology — Dept.

Re: Examination of Thin Sections; Empire Mountains Project

EMP-1; 50' Limestone

Very fine grain groundmass of dirty calcite, w/minor inclusions of quartz and very minor amounts of opaques ( ≤ 1%). Dirty groundmass probably due to the presence of organic material.

Fine grain stringers of calcite w/minor inclusions of quartz and opaques present in minor amounts.

EMP-1; 87' Limestone

Very fine grain, dirty calcite ground mass w/ very minor amounts of quartz and opaques. Calcite stringers less abundant than at 50'; also small veinlets of opaques present (2-3%).

EMP-1;111.5' Limestone

Very fine grain, dirty calcite groundmass w/ minor opaques and very minor quartz.
Stringers of calcite w/ inclusions of quartz and opaques similar to 50'. Heavier concentrations of opaques noted along some calcite stringers (3% and more).

EMP-1;155'

Very fine grain dirty calcite groundmass w/ minor inclusions of quartz and very minor opaques. Minor stringers of calcite w/ quartz inclusions and very minor opaques. Garnet?

EMP-1;173' Limestone

Very fine grain dirty calcite groundmass w/ very minor amounts of quartz and opaques. Calcite stringers(w/ very minor quartz and opaques)not abundant.
Small veinlets of opaques present (1-2%) and more?

EMP-1; 181' Limestone - Similar to 173'.

EMP-1; 201' Limestone

Very fine - fine grain dirty calcite groundmass w/ very minor quartz and opaques ( ≥ 1%).
Minor calcite stringers.

EMP-1; 260'

Fine grain groundmass of calcite and quartz w/ scattered garnet crystals and opaques. Calcite strings all but absent. Groundmass:

Calcite - up to 60%
Quartz - up to 40%
Garnet & Opaques - 2-3%

EMP-1; 275'

Quartz much less than in 260'
Fine--very fine dirty calcite groundmass w/ minor garnet?
crystals and opaques (1%)

EMP-1; 317'

Very fine grain groundmass of calcite w/ up to 10% quartz and 1% garnets and opaques.

EMP-1; 345' Dirty Sandstone

Fine grain quartz w/ very fine grain matrix of clay? possibly iron stained.
Small calcite vein present.
Opaques $\leq$ 1%

EMP-1; 387'

Fine grain quartz as above w/ some minor calcite
Garnets and opaques 1%
Small calcite veins present.

NOTE: Due to the dirty nature of the Limestone some opaques might have been overlooked, but as a whole opaques throughout the thin sections never appeared to be greater than 3%.

EOA:lg
cc: W. E. Heinrichs, Jr.
file

## POLISHED SECTIONS

Drill hole Emp. 1 on Hiltano IP anomaly, Empire Mountains, Pima County Arizona

87 Ft. Opaque minerals very rare. 2 large grains with "wormy" hematite (see photo). Several tiny grains probably hematite, possibly one or two are sphalerite (based on suggestion of white internal reflection). Sphalerite?? very fine grained.

173 Ft. Abundant graphite - fine grained to very fine grained (see photos). Graphite disseminated throughout groundmass and in poorly-defined "veinlets" (probably from organic-rich layers in limestone).

Rare very fine grained pyrite occurs disseminated in clusters (see photo). Rare pyrite grains in calcite stringers.

Very rate hamatite - very fine grained.

D. F. D.
11-19-70

CITIES SERVICE COMPANY
P. O. BOX 100
MIAMI, ARIZONA 85539

MIAMI COPPER OPERATIONS

HEINRICHS
GEOEX
Cable: GEOEX

(602) 473-2441

REC'D NOV 17 1970

November 16, 1970

P.O.Y. 5671 TUCSON, ARIZONA 85703
Phone: ( REA 602) 623-0578

Mr. Chris Ludwig, Senior Geophysicist,
Heinrichs Geoexploration Company,
P. O. Box 5671,
Tucson, Arizona 85703.

Dear Chris:

Thank you very much for your letter dated November 12th in which you presented the results of the laboratory I.P. testing on 35 core samples from EMP drill hole No. 1. As you probably know, we have decided to abandon the Hiltano I.P. anomaly phase of the general Empire's project.

In the interest of advancing geophysical science (art?), I am attaching a copy of our log for this hole as requested. (This log is, of course, proprietary.) Should you desire any assays in addition to those shown on the log, please let me know at once.

Yours truly,

Robert C. Moore

Robert C. Moore
District Geologist

RCM:mes
cc:(w/o log) W. E. Heinrichs, Jr.
W. W. Simmons

PROSPECT EMPIRE MTS. (PIMA CO., ARIZ.)

HOLE NO. EMP 1 LOCATION NW¼ NE¼ NE¼ SEC. 18, T. 18 S., R. 17 E.

STARTING DATE 10-16-70 COMPLETION DATE 10-27-70 COLLAR ELEV. ~ 4600 FT. BEARING UNK. INCLINATION -88° @ 382'

TOTAL LENGTH 396 TOTAL DEPTH ____ DRILLING CO. JOY DRILLER MACHEN

SAMPLER ____ GEOLOGIST RCM w/ EOA & JPV CORE COND. (GOOD / BROKEN / CRUSHED —)

| DATE 1970 | FOOTAGE | ~~ERR~~ LITH. | CORE WEIGHT | ROCK BIT REC. | LITHOLOGY | MINERALOGY: PY | OPY | CC | COMMO | A | STRUCT: BRECC | Cu ASSAYS % EXCEPT PREC. METALS, TROY OZ. / 2000#: TOT Cu | EX Cu | Ag | Pb | Zn | S | $MoS_2$ | REMARKS | CORE COND. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | | | | | | | | | | | | | | | |
| | 5 | | | | | | | | | | | | | | | | | | 0-20, NOT SAMPLED | |
| 10/16 | 10 | | | ROCK BIT | | | | | | | | | | | | | | | | |
| | 15 | | | | | | | | | | | | | | | | | | | |
| | 20 | 20 | | | | | | | | | | | | | | | | | | NO CORE |
| | 25 | | (EST.) | 90 | LIMESTONE | | | | | | NOT LOGGED | .008 | UND | | | | | | FRESH, DARK GREY, MICROXTAL LM w/ CALCITE STRINGERS ≤ ¼" THICK WHICH DIP ≥ 45° (MOSTLY ~ 45°). SOME Fe OX ALONG THE CALCITE STRINGERS. | |
| | 30 | | | | | | | | | | | .005 | | | | | | | | |
| | 35 | | | | | | | | | | | .005 | | | | | | | | |
| | 40 | | | | | | | | | | | .006 | | | | | | | | |
| 10/17 | 45 | | | | | | | | | | | .005 | | | | | | | | |
| | 50 | | | | | T | | | | | | .005 | | | | | | | | |
| | 55 | | | | | | | | | | ✓ | .006 | | | | | | | ✓54½-57½, RECEM. w/ $CaCO_3$ | |
| | 60 | | | | | | | | | | | .005 | | | | | | | | |
| | 65 | | | | | | | | | | | .005 | | | | | | | | |
| 10/19 | 70 | | | | | | | | | | | .005 | | | | | | | | |
| | 75 | | | | | | | | | | ✓ | .007 | | | | | | | ✓71½-74, THIEF | |
| 10/20 | 80 | | | | | | | | | | | .006 | | | | | | | 79-82, 2' CORE (DRILLING ON BIT @ 82 FT. | |
| | 85 | | | | | T | | | | | | .008 | | | | | | | | |
| | 90 | | | | | L | | | | | | .010 | | | | | | | 84-86, Fe OX GRAINS AFTER Py | |
| 10/21 | 95 | | | | | L | | | | | | .008 | | UND | .010 | .010 | .06 | UND | 88-93, DO | |
| | 100 | | | | | | | | | | | .004 | | | | | | | | |
| | 105 | | | | | T-? | | | | | | .005 | TRC | | | | | | 105-111, GOUGY (TREMOLITE?) | |
| | 110 | | | | | | | | | | ✓ | .005 | | | | | | | ✓107-110½, THIEF | |
| | 115 | | | | | | | | | | | .007 | | | | | | | 111-136, VERY DARK; MnOx, GRAPH., OR Ag IN GOUGE ON FRACTS? | |
| | 120 | | | | | | | | | | | .004 | | | | | | | | |
| | 125 | | | | | | | | | | | .004 | UND | | | | | | | |
| 10/22 | 130 | | | | | | | | | T | | .004 | TRC | | | | | | | |
| | 135 | | | | | | | | | | | .005 | | | | | | | | |
| | 140 | | | | | | | | | L | | .004 | | | | | | | | |
| | 145 | | | | | | | | | L | | .004 | | | | | | | | |
| | 150 | | | | | | | | | L | ✓ | .005 | | | | | | | ✓144½-151, REHEALED | |

LOCALLY THE LIMESTONE HAS WHAT APPEARS TO BE SMALL ACCUMULATIONS OF ORGANIC TRASH, POSSIBLY ALTERED TO GRAPHITE.

A= ASBESTOS (NOT LOGGED ABOVE 125 FT.)



PYRITE IS VERY FINE GRAINED; SOME "PYRITE" MAY BE CHALCOPYRITE.

PROSPECT EMPIRE MTS. (PIMA CO., ARIZ.)

HOLE NO. EMP 1 LOCATION SEC 18, T. 18 S., R. 17 E.

| DATE 1970 | FOOTAGE | ELEV. LITH. | CORE WEIGHT | % RECOV. | LITHOLOGY | MINERALOGY PY | CPY | CC | COV | MC | A | G | SERICT | BRECC | ASSAYS Cu TOT. CU. | Ag EX. CU. | Au | Pb | Zn | S | $MoS_2$ | REMARKS | CORE COND. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 150 | | | | | | | | | | | | | | | | | | | | | | |
| | 155 | | (EST.) | 90 | LM. (CON'T) | T | | | | | T | | | | .004 | TRC | | | | | | | |
| | 160 | | | | | | | | | | T | | | | .004 | | | | | | | 158-162, CORE SURF. WHITEISH | |
| | 165 | | | | | T- | | | | | | T? | | | .004 | | | | | | | | |
| | 170 | | | | | T- | | | | | T | | | | .004 | | | | | | | | |
| | 175 | | | | | | | | | | | | | ✓ | .005 | | | | | | | ✓170½-172, REHEALED ($CaCO_3$) | |
| | 180 | | | | | | | | | | | | | | .005 | | | | | | | 172-173, SOFT AND BLACK | |
| | 185 | | | | | | | | | | T | | | | .005 | | | | | | | 173-220, VUGGY | |
| | 190 | | | | | T | | | | | | | | | .005 | | | | | | | | |
| | 195 | | | | | T- | | | | | | | | ✓ | .005 | | | | | | | ✓193½-198? 198-210+ | |
| 10/23 | 200 | 202 | | | | T- | | | | | T | | | ✓ | .005 | | | | | | | | |
| | 205 | | | | | | | | | | | | | | .005 | | | | | | | 202-269, LIMONITE STAINED | |
| | 210 | | | | CALC. SS | | | | | | | | | | .005 | | | | | | | | |
| | 215 | | 215 | | w/ PINHEAD | | | | | | | | | | .005 | | | | | | | | |
| | 220 | | | | SIZE BOT. | | | | | | | | | | .005 | TRC | | | | | | 215-225, 6' CORE | |
| | 225 | | | | MN OX NOD- | | | | | | | | | | | | | | | | | | |
| | 230 | | | | ULES, ALSO | | | | | | | | | | .009 | TRC | | | | | | | |
| | 235 | | (EST.) | 65 | DENDRITES. | | | | | | | | | | .008 | TRC | UND | TRC | .02 | UND | .0015 | 230-240, 2' CORE | |
| | 240 | | | | CALCITE | | | | | | | | | | | | | | | | | | |
| | 245 | | | | VEINLETS. | | | | | | | | | | .006 | UND | | | | | | 240-248, 4' CORE | |
| | 250 | | 248 250 | | 90 | | | | | | | | | | | | | | | | | 240-241(?), GREENISH | |
| | 255 | | | | | | | | | | | | | | | | | | | | | 250-266, POOR RECOV. | |
| | 260 | | (EST.) | 35-50 | | | | | | | | | | | .005 | UND | | | | | | 254-260, SOFT CORE w/ | |
| | 265 | | 266 | | | | | | | | | | | | | | | | | | | HEM. GRAINS (AFTER PY?) | |
| 10/24 | 270 | 269 | | | | | | | | | | | | | .006 | UND | | | | | | 269, 50° CONTACT | |
| | 275 | | (EST.) | 90 | LM. LITHO- | L | | | | | | | | | .004 | TRC | UND | TRC | TRC | .02 | .0015 | | |
| | 280 | 282½ | | | GRAPHIC | L | | | | | | | | | .004 | UND | | | | | | | |
| | 285 | | | | | | | | | | | | | | .004 | | | | | | | 282½, 50° CONTACT (HEALED FLT.) | |
| | 290 | | | | CALC. SS | | | | | | | | | | .004 | | | | | | | | |
| | 295 | | | | w/ Fe OX | | | | | | | | | | .004 | | | | | | | | |
| | 300 | | | | ON FRACTS | | | | | | | | | | .005 | | UND | TRC | TRC | UND | UND | 300-306, HEAVY LIMONITE | |
| | 305 | | | | PLUS HEM. | T- | | | | | | | | | .005 | | | | | | | 301-305, SOFT CORE | |
| | 310 | | | | + MN OX | | | | | | | | | ✓ | .004 | TRC | | | | | | ✓305-308 | |

GRAINS. A = ASBESTOS

G = GRAPHITE

SHEET NO. 2 OF 3

* SEE NOTE ON PYRITE ON P. 1.

PROSPECT EMPIRE MTS. (PIMA CO., ARIZ)

HOLE NO. EMP 1 LOCATION SEC. 18, T. 18 S., R. 17 E

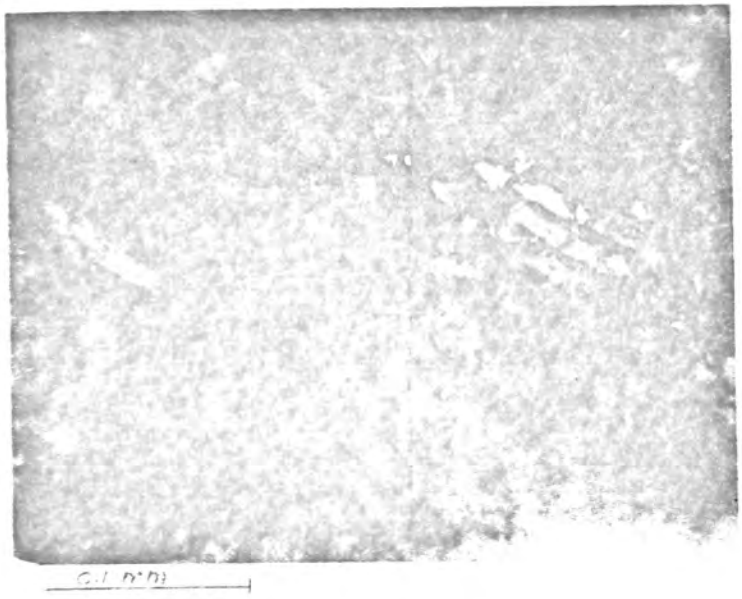
| DATE 1970 | FOOTAGE | ~~ELEV.~~ LITH. | CORE WEIGHT | % RECOV. | LITHOLOGY | MINERALOGY PY | CPY/CC | COV/MC | SERICITE | BRECC. | Cu TOT. CU. | ag ~~OX. CU.~~ | ASSAYS Au | Pb | Zn | S | $MoS_2$ | REMARKS | CORE COND. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 310 | | | | | | | | | | | | | | | | | | |
| | 315 | | (EST.) | 90 | CALC. SS | | | | | | .004 | TRC | | | | | | 310, REPORTED SWL AT END OF HOLE | |
| | 320 | | | | (CON'T.) | | | | | | .005 | UND | | | | | | | |
| | 323 | 323 | | | "DIABASE" | T- | | | | | .004 | TRC | | | | | | | |
| | 326 | 326 | | | | T- | | | | | .004 | UND | | | | | | 326-334, SOFT CORE | |
| 10/26 | 330 | | | | GREENISH, | | | | | | .003 | " | | | | | | 332, 1ST REP'T. OF $H_2O$ IN HOLE | |
| | 335 | | | | CLAEY, | | | | | | .003 | TRC | UND | UND | .01 | UND | .0010 | | |
| | 340 | | | | CALC. | | | | | | .005 | " | | | | | | 345-352, HEM. AFTER PY (GRA | |
| | 345 | | | | MUDSTONE | | | | | | .003 | UND | | | | | | 347-352, SOFT CORE | |
| | 350 | 351 | | | | | | | | ✓ | .003 | | | | | | | ✓ 353-?, WELL REHEALED | |
| | 355 | | | | CALC. SS | | | | | | .003 | | | | | | | | |
| | 360 | | | | w/ LIM. | | | | | | .003 | | | | | | | | |
| | 365 | | | | ON FRACTS | | | | | | .002 | TRC | TRC | TRC | TRC | UND | .0010 | | |
| | 370 | | | | | | | | | | .002 | " | | | | | | | |
| 10/27 | 375 | | | | | | | | | | .003 | UND | | | | | | | |
| | 380 | 381 | | | | | | | | | .004 | " | | | | | | 381-385, GREENISH CALC. SS w/ | |
| | 385 | 385 | | | SEE "REM." | | | | | | .009 | TRC | | | | | | PINHEAD-SIZE HEM. GRAINS | |
| | 390 | | | | CALC. SS | | | | | | .007 | " | | | | | | (AFTER PY?) | |
| | 395 | 396 | | | | | | | | | | | | | | | | | |
| | 400 | | | | LAB. I.P. TESTS MADE AT: (SAMPLES | | | | | | | | | | | | | CHAR. SAMPS. SAVED: 22, 44, | |
| | 405 | | | | SAVED BY GEOEX.) 21, 31, 44, 54, 57, | | | | | | | | | | | | | 72½, 89, 112, 143½, 159½, 178, | |
| | 410 | | | | 65, 70, 84, 91, 103, 108, 120, 130, 145, | | | | | | | | | | | | | 186, 200, 227, 260, 270, 283½, | |
| | 415 | | | | 156, 163, 173, 181, 194, 206, 227, 260, | | | | | | | | | | | | | 325½, 331½, 351½, 355½, 369, | |
| | 420 | | | | 271, 279, 289, 307, 315, 324, 339, 347, | | | | | | | | | | | | | 383, 395. | |
| | 425 | | | | 357, 369, 374, 387, 396. | | | | | | | | | | | | | | |
| | 430 | | | | ANOMALOUS ZONE, 38-177 FEET | | | | | | | | | | | | | THIN SECTIONS MADE AT: 50, | |
| | 435 | | | | | | | | | | | | | | | | | 87, 111½, 155, 173, 181, 201, 260, | |
| | 440 | | | | | | | | | | | | | | | | | 275, 317, 345, 387. | |
| | 445 | | | | | | | | | | | | | | | | | POLISHED SECS, 87, AND 173 FT. | |
| | 450 | | | | | | | | | | | | | | | | | | |
| | 455 | | | | | | | | | | | | | | | | | POSSIBLE AQUIFERS: | |
| | 460 | | | | | | | | | | | | | | | | | 71½-75 FLT. 218-268 VUG. | |
| | 465 | | | | | | | | | | | | | | | | | 106-111 FLT. 297-305 FLT. | |
| | 470 | | | | | | | | | | | | | | | | | 171½-218 FLT. 323-352 FLT. | |

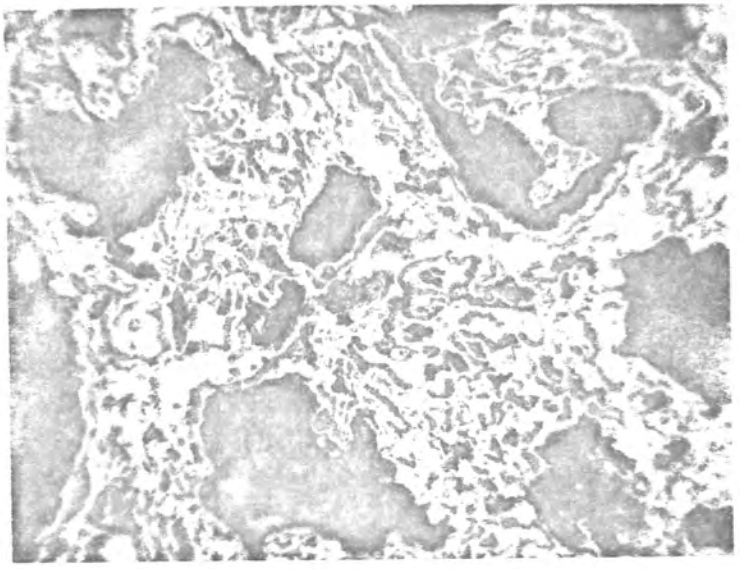
"DIABASE" AT 323-326 HAS CALCITE STRINGERS, SEEMS ANOM. LOW SP. GR.

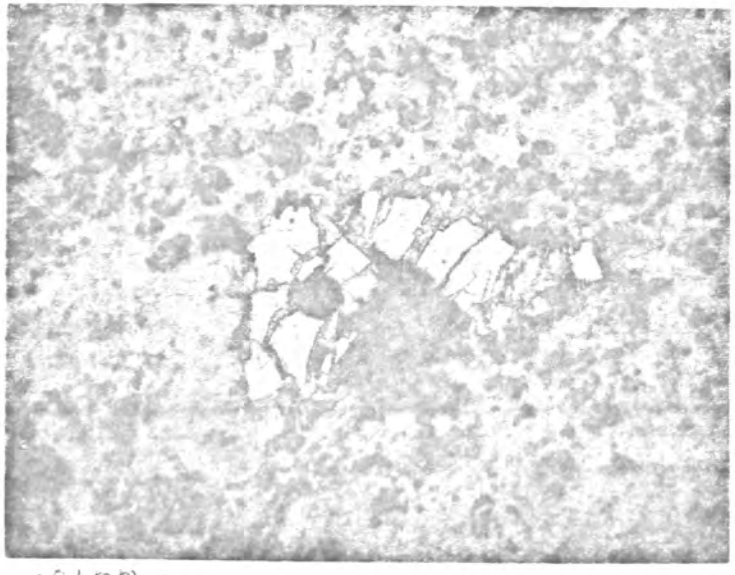
SHEET NO. 3 OF 3

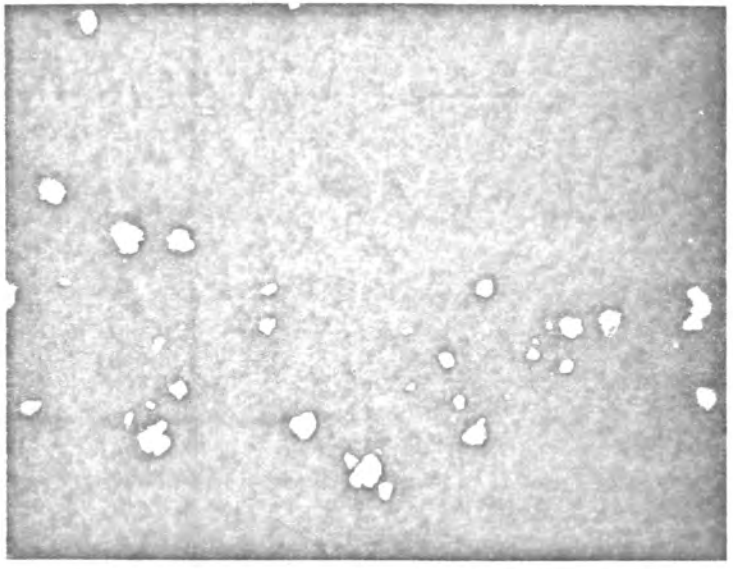
376-387 FLT.

394-? VUG.









1/2 sec

EMP-1-87

250x oil immersion

blue filter in, prism out

hm

1/15 sec

EMP-1-173

160x - air

blue filter in; prism out

fg dissem py

1/8 sec

EMP-1-173

160 x - air

blue filter in, prism out

Graphite

1/2 sec

EMP-1-173

250 x - oil immersion

blue filter in, prism out

Graphite

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Emp I Job 463
LINE ____ HALF ____ SP. ____ DATE 3/11/70

| | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SEND | IDENTITY | 279' | | 206' | | 194' | | 271 | | 130' | | 173' | | 145' | | 57 | | | | | |
| RECEIVE | | | | | | | | | | | | | | | | | | | | | |
| RANGE | RAW P.F.E. | 2.1 | 1.9 | 2.1 | 2.1 | 2.7 | 2.7 | 3.4 | 2.8 | 4.6 | 3.0 | 20.0 | 20.1 | 96 | 9.3 | 5.9 | | | | | |
| DC 1 | CORRECTED P.F.E. | 1.6 | 1.6 | 2.0 | 1.9 | 2.7 | 2.5 | 2.0 | 1.8 | 0.8 | 0.3 | 19.1 | 19.1 | 8.5 | 8.5 | 5.8 | | | | | |
| DC 2 | | | | | | | | | | | | | | | | | | | | | |
| DC 3 | DIAMETER | 1.96 | | 2.0 | | 2.0 | | 2.0 | | 2.0 | | 1.95 | | 1.99 | | 1.99 | | | | | |
| DC 4 | (A) Diam.$^2$ | 3.85 | | 4 | | 4 | | 4 | | 4 | | 3.8 | | 3.96 | | 3.96 | | | | | |
| DC 5 | (B) Volume | 268 | | 393 | 394 | 194.5 | 195 | 645.5 | 670 | 849 | 963 | 78.0 | 78.4 | 73.9 | 76.4 | 3.68 | | | | | |
| DC 6 | A x B | 1032 | | 1572 | 1576 | 778 | 780 | 2582 | 2680 | 3364 | 3852 | 296 | 298 | 292 | 302 | 14.6 | | | | | |
| DC 7 (C) | 31(A x B) | 32,000 | | 48,750 | 48,856 | 24,120 | 24,190 | 80,000 | 83,100 | 104,400 | 119,300 | 9176 | 9240 | 9050 | 9360 | 452. | | | | | |
| DC 8 | | | | | | | | | | | | | | | | | | | | | |
| DC AVG. | | | | | | | | | | | | | | | | | | | | | |
| AC 1 (D) | CURRENT | 1.0 | | 70 | | 50 | | 10 | | 1 | | 10 | | 1 | | 100 | | | | | |
| AC 2 (E) | LENGTH | 5.3 | | 6.0 | | 4.2 | | 5.7 | | 6.7 | | 3.8 | | 5.5 | | 4.4 | | | | | |
| AC AVG. F | (D x E) | 5.3 | | 420 | | 210 | | 5.7 | | 6.7 | | 38 | | 5.5 | | 44 | | | | | |
| S.P. | C/F = Ω | 6040 | | 116 | 116 | 115 | 115 | 14030 | 14060 | 15590 | 17810 | 242 | 243 | 165 | 170 | 10 | | | | | |
| AC NOISE | | | | | | | | | | | | | | | | | | | | | |
| POT RES. | | | | | | | | | | | | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMP Job 463
LINE ____ HALF ____ SP. ____ DATE 3/11/70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | FOOTAGE | 227 | 108 | 307 | 120 | 163 | 91 | 156 | 54 | 44 |
| RECEIVE | | | | | | | | | | |
| RANGE | READING | 1.0 | 2.4 | 0.9 | 10.5 | 19.5 | 1.8 | 10.5 | 27.0 | 15.0 |
| DC 1 | CORRECTED | -1.1 | 1.9 | 0.7 | 11.1 | 19.1 | 0.9 | 8.9 | 26.5 | 14.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | DIAL: | 2.0 | 2.0 | 1.99 | 198 | 1.98 | 1.98 | 1.99 | 1.98 | 1.98 |
| DC 4 | DIAL$^2$ | 4 | 4 | 3.96 | 3.92 | 3.92 | 3.92 | 3.96 | 3.92 | 3.92 |
| DC 5 | VOLTAGE | 271 | 705 | 29 | 68.5 | 58.9 | 256.0 | 1006.0 | 96.9 | 2995.0 |
| DC 6 | $D^2 \times V$. | 1084 | 2820 | 115 | 269 | 231 | 1003 | 3980 | 380 | 11,730 |
| DC 7 A | $31(D^2 \cdot V)$ | 33,600 | 87,450 | 3562 | 8,340 | 7,160 | 31,093 | 123,500 | 11,780 | 363,630 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | I | 200 | 50 | 10 | 2 | 5 | 5 | 2 | 2 | 4 |
| AC 2 | L | 3.9 | 5.25 | 3.3 | 4.0 | 6.4 | 4.7 | 5.2 | 5.75 | 5.5 |
| AC AVG B | $(I \cdot L)$ | 1,170 | 262.5 | 33 | 8 | 32 | 23.5 | 10.4 | 11.5 | 22 |
| S.P. | | | | | | | | | | |
| AC NOISE | $A/B = A_{2\pi}$ | 2872 | 3328 | 108 | 1,042 | 2238 | 1322 | 11,880 | 1023 | 16,520 |
| POT RES. | | | | | | | | | | |

25 ...

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMP- Job 463

LINE ____ HALF ____ SP. ____ DATE 11/2/70

PAGE 1

| SEND | Cal | Cal | 279' | 206' | 194' | 271' | 130' | 173' | 145' | 57' |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | | | | | | | | | | |
| RANGE | | | 10 | | | | 10 | | | |
| DC 1 | 0.1 | 0.0 | 2.1, 1.9 | 2.1, 2.1 | 2.7, 2.7 | 3.4, 2.8 | 4.6 3.0 | 20.0 20.1 | 9.6 9.3 | 5.9 |
| DC 2 | | | | | | | | (1.0 Hg 9.5) | | |
| DC 3 | | | | | | | | | | |
| DC 4 I | 500 | | 1 μa | 70 μa | 50 μa | 10 μa | 1 μa | 10 μa | 1 μa | 100 μa |
| DC 5 L | | | 5.3" | 6.0" | 4.2" | 5.7" | 6.7" | 3.8" | 5.5" | 4.4" |
| DC 6 D | | | 1.96" | 2.0" | 2.0" | 2.0" | 2.0" | 1.95" Sp[illegible] | 1.99" | 1.99" |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 493 | 494 | 268 | 393, 394 | 194.5, 195 | 645.5, 670 | 841, 963 | 78.0 78.4 | 73.9 76.4 | 3.68 |
| AC 2 | 0.2 | 0.0 | 1.0, 0.5 | +0.2, +0.3 | +0.1, +0.4 | 2.8, 1.9 | 7.6 5.4 | 0.2 0.4 | 2.2 1.6 | 0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | 170K | 12K | 9K | 47K | 130K | 11K | 65K | 1.5K |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMP-1 Job 463.
LINE ____ HALF ____ SP. ____ DATE ____

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 227' | 108' | 307' | 120' | 163' | 91' | 158' | 54' | 44' | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| DC 1 | -1.0 | 3.4 | 0.9 | 10.5 | 19.5 | 7.8 | 10.5 | 27.0 | 15.0 | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 I. | 300 μa | 50 μa | 10 μa | 2 μa | 5 μa | 5 μa | 2 μa. | 2 μa | 4 μa | |
| DC 5 L. | 3.9" | 5.25" | 3.3" | 4.0" | 6.4" | 4.7" | 5.2" | 5.75" | 5.5" | |
| DC 6 D. | 2.0" | 2.0" | 1.99" | 1.98" | 1.98" | 1.98" | 1.99" | 1.98" | 1.98" | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 271.0 | 705.0 | 29.0 | 68.5 | 52.9 | 256.0 | 1006.0 | 96.9 | 2995.0 | |
| AC 2 | +0.2 | 1.0 | 0.3 | -1.2 | +0.8. | 1.8. | 3.8 | 0.9 | 0.6 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 2K | 72K. | 3K | 70K | 10K | 33K | 260K. | 25K | 190K | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMP-I
LINE ____ HALF ____ SP. ____ DATE 6/11/70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAN. | CAN. | | 70' | 70' | 70' | 347' | 347' | 357' | 357' |
| RECEIVE | | | | | | | | | | |
| RANGE | 1.0 | 1.0 | | | | | | | | |
| DC 1 | | | | | | | | | | |
| DC 2 | 0.2. | 0.2. | | 5.2 | 4.3 | 3.8 | 1.0 | 1.0 | 1.9 | 1.6 |
| DC 3 | | | CPFE. | 2.1 | 2.0 | 2.0 | 0.7 | 0.7 | 1.1 | 0.8 |
| DC 4 | | | | | 2.0 | | 0.7 | | | |
| ~~DC 5~~ | CUR: | 500 μa | | 20 μa | 10 μa | 10 μa | 50 μa | 50 μa | 50 μa | 50 μa |
| DC 6 | L | | | | | 6.9" | | 6.1" | | 4.8" |
| DC 7 | D. | | | | | 1.98" | | 1.98" | | 1.98" |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 49.2 | 49.2 | | 9740.0 | 5665.0 | 6020.0 | 228.0 | 228.0 | 6380.0 | 6485.0 |
| AC 2 | 0.0 | 0.0 | | 6.0 | 4.2 | 3.4 | 0.2. | 0.2. | 1.2. | 0.6. |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | 9719. | | 91 | | 3257 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | 120K. | → | 370K | 6K. | → 6K. | 100K | |

HEINRICHS GEOEXPLORATION CO. PROJECT EMP-2
I.P. RECEIVER NOTES LINE ____ HALF ____ SP. ____ DATE 6/11/70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAN | | 65' | 65' | 374' | 374' | 396' | 396' | 181' | 181' |
| RECEIVE | | | | | | | | | | |
| RANGE | 1.0 | | 10.0 | 10.0 | 100.0 | 100.0 | 100.0 | 100.0 | 10.0 | 10.0 |
| DC 1 | | | | | | | | | | |
| DC 2 | 0.2 | | 24.0 | 24.0 | 3.4 | 3.3 | 2.0 | 1.7 | 1.2 | 1.0 |
| DC 3 | | CPFE. | 24.3 | 24.2 | 2.9 | 2.6 | 0.9 | 0.9 | 0.6 | 0.6 |
| DC 4 | | | | | | | | | | |
| DC 5 CUR | 500μa | | 50μa | 50μa | 50μa | 50μa | 50μa | 50μa | 50μa | 50μa |
| DC 6 L | | | | 3.9" | | 5.9" | | 4.7" | | 4.9" |
| DC 7 D | | | | 1.98" | | 1.98" | | 1.98" | | 1.98" |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 49.2 | | 171.0 | 164.5 | 3045.0 | 3105.0 | 2505.0 | 2575.0 | 859.0 | 865.0 |
| AC 2 | 0.0 | | -1.0 | -0.8 | 1.5 | 1.0 | 1.7 | 1.2 | 0.7 | 0.4 |
| AC AVG. | | | | | | | | | | |
| S.P. | | P/2π | 107 | 103 | 1259 | 1279 | 1245 | 1332 | 426 | 429 |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | 9K | | 54K | 62K | 38K | 81K | 22K | 23K |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMP I
LINE ____ HALF ____ SP. ____ DATE 5/11/70

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 369' | 369' | 289' | 289' | 289' | 387' | 387' | 31' | 31' | 103' | |
| RECEIVE | | | | | | | | | | | |
| RANGE | 10.0 | 10.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| DC 1 | | | | | | | | | | | |
| DC 2 | 1.8 | 1.6 | 1.9 | 1.9 | 1.4 | 5.0 | 4.2 | 2.7 | 2.0 | 2.0 | 3.0 |
| DC 3 | 0.7 | 0.8 | 0.6 | 0.3 | 0.7 | 2.9 | 2.5 | 2.0 | 1.6 | -0.4 | 2.4 |
| DC 4 | | | | | | | | | | | 0.6 |
| DC 5 CUR: | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa |
| DC 6 L | ——— | 3.5" | ——— | ——— | 4.75" | ——— | 4.4" | ——— | 5.3" | 4.8" | 50 μa |
| DC 7 D. | ——— | 1.98" | ——— | ——— | 1.98" | ——— | 1.98" | ——— | 1.98" | 1.98" | |
| DC 8 | | | | | | | | | | | |
| DC AVG. | | | | | | | | | | | |
| AC 1 | 900.5 | 920.5 | 2485.0 | 2565.0 | 2660.0 | 2545.0 | 2805.0 | 1900.0 | 1925.0 | 2140.0 | 2285.0 |
| AC 2 | 1.8 | 1.1 | 2.1 | 2.8 | 0.9 | 3.8 | 3.0 | 1.0 | 0.3 | 4.4 | 4.4 |
| AC AVG. | | | | | | | | | | | 2485.0 |
| S.P. | 625 | 639 | 1272. | 1312 | 1361 | 1406 | 1649 | 871 | 883 | 1288 | 3.2 |
| AC NOISE | | | | | | | | | | 1322<br>1438 | |
| POT RES. | 20K. | ——— 22K | 35K | ——— | ——— 39K | 39K | ——— 49K | 42K | ——— 45K | 35K | ——— 50K |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Emp-2
LINE ____ HALF ____ SP. ____ DATE 5/11/70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 339' | 339' | 84' | 84' | 315' | 315' | 315' | 21' | 21' | 21' |
| RECEIVE | | | | | | | | | | |
| RANGE | 10.0 | 10.0 | 10.0 | 10.0 | 100.0 | 100.0 | 100.0 | 10.0 | 10.0 | 10.0 |
| DC 1 | | | | | | | | | | |
| DC 2 | 1.7 | 1.6 | 2.8 | 2.8 | 2.6 | 1.8 | 2.0 | 3.4 | 3.1 | 2.9 |
| DC 3 | 1.4 | 1.3 | 2.4 | 2.4 | 0.9 | 0.8 | 1.0 | 2.4 | 2.2 | 2.3 |
| DC 4 | | | | | | | | | | |
| DC 5CUR | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa |
| DC 6 L | ——— | 4.0" | ——— | 3.1" | ——— | ——— | 3.4" | ——— | ——— | 3.8" |
| DC 7 D. | ——— | 1.98" | ——— | 1.98 | ——— | ——— | 1.98" | ——— | ——— | 1.98" |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 101.0 | 101.5 | 176.5 | 177.0 | 7810.0 | 8130.0 | 8385.0 | 525.0 | 538.0 | 550.5 |
| AC 2 | 0.2. | 0.2 | 0.4 | 0.4 | 3.0 | 1.6 | 1.6 | 1.6 | 1.3 | 0.8 |
| AC AVG. | | | | | | | | | | |
| S.P. | 61 | 62. | 138 | 139 | 5583 | 5812 | 5994 | 336 | 344 | 352 |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3.5K | 3.5K | 5.5K | 6K. | 100K | ——— | 150K | 13K | ——— | 14K. |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMP-I
LINE ____ HALF ____ SP. ____ DATE 5/11/70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 324' | 324' | 324' | 324' | 260' | 260' | | CAN. | CAN. | |
| RECEIVE | | | | | | | | | | |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | 1.0 | 1.0 | |
| DC 1 | | | | | | | BATT- | | | |
| DC 2 | 0.7 | 0.2 | 0.4 | 0.3 | 1.0 | 1.3 | ERIES | 0.2 | 0.2 | |
| DC 3 | 0.1 | -0.2 | 0.0 | 0.0 | 0.8 | 1.0 | | | | |
| DC 4 | | | | | | | RE- | | | |
| DC 5 CUR | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | 50 μa | PLACE | 500 μa | 500 μa | |
| DC 6 L | ——— | ——— | ——— | 3.0" | ——— | 3.0" | | | | |
| DC 7 D. | ——— | ——— | D | 1.98" | ——— | 1.98" | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | | | | | | | | |
| AC 2 | 46.75 | 47.4 | 47.6 | 48.3 | 37.4 | 37.4 | | 49.3 | 49.3 | |
| AC AVG. | 0.8 | 0.3 | 0.4 | 0.2 | 0.0 | 0.2 | | 0.0 | -0.0 | |
| S.P. | | | | | | | | | | |
| AC NOISE | 19 | 19 | 19 | 20 | 30 | 30 | | | | |
| POT RES. | 1.7K | ——— | ——— | 1.8K | 1.8K | 1.8 | | | | |

HEINRICHS GEOEXPLORATION COMPANY

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

September 4, 1970

Mr. Robert C. Moore
Geology Department
Miami Copper Operations
P.O. Box 100
Miami, Arizona 85539

Re: Empire Mountains Project
I.P. Detail Results
GEOEX Job # 462 & 463

Dear Bob:

As we discussed in several recent telephone conversations, here is a brief report on the status of the Empire Mountains Project, mainly regarding the induced polarization anomaly being detailed.

The I.P. anomaly discussed in our Phase I report of August, 1970 on Lines 8, 9 and 10 has since been detailed by four lines of 300 feet dipoles. These four lines are parallel to and along Line 9, one west and two east thereof, 600 feet apart, oriented about N32°W and roughly centered on the anomaly seen on Line 9 at 24NW. The attached Composite Sketch Plan shows these four lines with respect to section corners and mining claims and also shows the approximate outline of the surface projected I.P. anomalism. This anomaly will be designated as the Hiltano Anomaly for future reference.

Lines 9 (Spread 2) and 9E are the mostly strongly anomalous of the four detail lines. Line 9W is only very weakly responsive and for the time being the anomaly is considered cut off to the west by Line 9W. Line 9E-2 is still definitely anomalous, but somewhat weaker than on Lines 9 (Spread 2) and 9E, and therefore another line to the east is being run.

The three definitely anomalous lines suggest a body becoming more shallow to the east, striking about N70°E, from about 300

Cont'd....

to 600 feet in apparent width. On Line 9 the depth to the top of the anomalous source is probably between 150 and 200 feet, on Line 9E between 100 and 150 feet and on Line 9E-2 less than 100 feet to the top. All three lines suggest a body with limited depth extent - probably not extending much below 300 feet below surface.

The strength of I.P. response and related distribution and geometry factors, indicate a minimum average of 1% by volume of total polarizable material across the interpreted anomalous widths. In the most strongly anomalous zones, particularly considering the limited depth extent of the probable source, there could be much more than 1% by volume polarizable material involved, say 2% to even 10% depending on type and geometry. Therefore, this anomaly could definitely be economically interesting if consisting at least in part of base and or precious metal-ore sulfides.

The area of the anomaly has been inspected for possible causes obvious on the surface. None were noticed although a suite of rocks was collected for laboratory I.P. testing just in case any of the rocks have non-obvious polarizable constitutents.

Basically the rock types involved in the area of the anomaly are fossiliferous limestones and quartzite dipping southeasterly $20^{\circ}$ to $40^{\circ}$ and with a strike roughly parallel to the I.P. anomaly elongation. Numerous diabase-looking dikes (and sills) several feet in width were also noted in the anomalous area. The most detailed geological mapping available to us (Areal Geology Lead Mountain Area by C.O. Alexis, 1939) shows the anomaly area to be mostly within Permian blue limestone and partially in (or below) the Permian quartzite. A half dozen or so mapped minor faults project northerly towards and may intersect in the anomalous zone. The major Hilton Fault just north of the anomaly could also be involved. Tongues or dikes of granitic material off the Sycamore stock come to within about 500 feet of the anomaly to the north.

These geologic considerations are quite favorable for a replacement or even contact type of mineralized zone being related to the I.P. anomaly, particularly considering the type of deposition in the Hiltano Camp and Total Wreck mines nearby. There is no immediately apparent well defined possibility of a large volume disseminated type of mineralized zone

Cont'd....

Cont'd.....

directly associated with the anomaly. However, with possible thrust faulting nearby to the west, many other complex structural relations may also be involved. Moreover there is an interesting intrusive mass nearby to the north-west.

Of course, there are many possible non-economic causes which could be responsible for the I.P. response. In particular, formational polarizers such as pyritic and/or graphitic sediments or perhaps iron or manganese oxides or even clay minerals could be responsible. Some of the limestone, mainly near the diabase, contains appreciable amphibole(?) in the form of what appears to be asbestos and tremolite. It is conceivable that these minerals could be polarizable and samples will be tested in the laboratory for this possibility. Magnetite has been ruled out as a possible cause in that a magnetic traverse over the anomaly shows no obvious correlation.

Other somewhat discouraging factors are the absence of a well defined self potential low related to the I.P. anomaly and the lack of any definite surface evidence of base metal mineralization. No self potential low implies the lack of appreciable quantities of actively oxidizing, near surface, relatively interconnected sulfides, but does not rule out the possibility of important quantities of electrochemically inactive sulfides being present.

Regardless, we strongly recommend that this anomaly be drilled and the polarizable cause determined unless perhaps the laboratory sample tests show strongly polarizable surface material. An initial drill site and two contingency sites have been selected about 100 feet westerly from Line 9E which should intersect the source within 400 feet of the surface. The initial proposed drill hole #1 (PDH#1), at least, should be vertical and programmed for about 400 feet total length unless the polarizable source has obviously been intersected and well penetrated at a shallower depth. The depth and orientation of the two contingency holes, PDH#2 and PDH#3, should depend on the outcome of drilling PDH#1. A short bulldozed trail off the main road can easily be made to reach these sites.

The land status situation in the anomalous area is somewhat complex but the main portion of the anomaly appears to be on open federal and state ground. The anomaly is, however, bounded on the south by a group of patented claims owned by Mr. E.P. Hilton, P.O. Box 1308, Tucson, Arizona.

Cont'd.....

Cont'd.....

Fourteen federal lode mining claims were staked on your behalf, to best cover the anomaly, on August 18, 19 and 20, 1970, and designated as EMP#1 through 14. A prospecting permit on a block of state land 80 acres in extent has also been applied for on August 19, 1970. We should be informed of the status of the state land sometime between September 18 and October 3. The federal claims have not been recorded yet to minimize courthouse prospecting problems and we have until November 16, 1970 to do so.

A Composite Sketch Plan is enclosed at a scale of 1" = 300' showing the detail I.P. lines, patented and unpatented claims of Mr. Hilton, your claims and the state land applied for. Also, the surface projected I.P. anomalism and proposed drill holes are shown. A copy of the detailed geologic map by C.O. Alexis at 1" = 500' is also included and roughly shows the surface projected I.P. anomaly.

Also attached for your file please find a copy of the application for prospection permit and permit receipt and a quit claim deed for the 14 mining claims.

If drilling is started before mid-December, 1970 it could serve as a claim validation for EMP#1 through 8. Preferably, if the initial drilling is completed prior to mid-November, a decision one way or another as to monumenting the claim corners and end centers might be made based on drilling results.

In the near future, we will prepare a composite plan showing all pertinent geology, geophysics, land status, previous workings, etc., all to the same scale to better display the overall situation. The sketch map should suffice for the present.

We have been obtaining I.P. coverage in the other main area of interest several miles east of the Total Wreck Mine, but no target definitely warranting drilling has been identified for sure, let alone well enough defined to pick possible drilling sites, or even to efficiently obtain land. Results are still encouraging enough to keep pursuing the coverage, however.

We hope this covers all the details you need and we will keep you informed of new developments. If you have any questions, please let us know at once.

Sincerely,
HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig

Chris S. Ludwig
Senior Geophysicist

Enclosures:

cc: Mr. W.W. Simmons

CSL/re:

HEINRICHS GEOEXPLORATION COMPANY

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

November 19, 1970

Miami Copper Operations
Cities Service Company
P.O. Box 100
Miami, Arizona 85539

Attention: Mr. Robert Moore, District Geologist

Re: Progress Report
October 20 - November 20
1970

Project 482-69 (MIM-BA)

Continued intermittent aeromagnetic interpretation mainly directed towards determining which anomalies and zones should be field checked. The field checking is continuing and one and one half weeks have been spent in the field this period mainly on initial ground magnetic and geologic investigation of specific anomalies. This initial ground phase is roughly half completed and several targets warranting one or two lines of I.P. follow-up have been selected. An I.P. crew starts on this phase today.

Project 462 (463)-69 (MIM-EM)

Ten lines of geochemical follow-up and reconnaissance I.P. have been completed and several more are planned. Several small and weak I.P. anomalies have resulted and a semi-detailed geologic inspection is planned on them to determine if they warrant additional coverage or study.

Cont'd.....

Drill hole #1 on the Hiltano I.P. anomaly has been completed and went to a depth of 396 feet. No significant economic mineralization was encountered although the source of the I.P. anomaly was obviously intersected and appears to mainly be within the interval from about 38 feet to 177 feet as verified by laboratory I.P. tests on 35 core samples. The responsive material is likely a mixture of graphite or carbonaceous material with some pyrite. A letter dated November 12 details these results. This anomaly has been abandoned.

Project 453-69 (SW GEN)

No activity this month.

HEINRICHS GEOEXPLORATION COMPANY

Chris S. Ludwig
Senior Geophysicist

CSL/re:

HEINRICHS GEOEXPLORATION COMPANY

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

November 12, 1970

Mr. Robert C. Moore
Geology Department
Miami Copper Operations
Cities Service Company
P.O. Box 100
Miami, Arizona 85539

Re: Empire Mountains
Hiltano Anomaly Drill
Hole #1 Core I.P.
Laboratory Results

GEOEX Job #462 or #463

Dear Bob:

The laboratory results on core from Drill Hole #1 in the Empire Mountains Hiltano anomaly have shown an anomalous zone roughly between 38 and 177 feet in depth definitely strong and thick enough to be the cause of the surface I.P. anomaly and properly situated depth-wise. The cause of the anomalous I.P. effects seems to mainly be a mixture of finely disseminated pyrite and a sooty black material probably carbonaceous or graphitic in composition within a fossiliferous limestone. The sooty black material could also conceivably be very finely divided sulfides or manganese oxides.

The hole, particularly the darker sections of limestone, should be assayed for silver, lead and zinc with occasional checks for copper and gold and perhaps molybdenum. Analyses for total sulfide content would also be valuable as would some sort of test for graphite or carbon - perhaps an x-ray analysis on several pertinent samples.

No more drilling is recommended on this anomaly unless the assays show significant mineralization in that the main cause (at least) has obviously been intersected.

Following is a tabulation of our laboratory I.P. results with the anomalous intervals indicated by red lines in the PFE (percent frequency effect) and MCF (metallic conduction factor). Resistivity is tabulated as divided by 2pi and in units of ohm-feet. Therefore all sample results are shown in the same units as the field data. The field frequency spread, 0.3 and 3.0 Hz, was also used for the laboratory tests.

| Footage | PFE | Resistivity | MCF |
|---|---|---|---|
| 21 | 2.3 | 344 | 7 |
| 31 | 1.8 | 877 | 2 |
| 44 | 14.7 | 16,520 | 0.9 |
| 54 | 26.5 | 1020 | 26 |
| 57 | 5.8 | 10 | 580 |
| 65 | 24.3 | 105 | 231 |
| 70 | 2.0 | 9720 | 0.2 |
| 84 | 2.4 | 139 | 17 |
| 91 | 0.9 | 1320 | 0.7 |
| 103 | 0.3 | 1333 | 0.2 |
| 108 | 1.9 | 333 | 6 |
| 120 | 11.1 | 1040 | 11 |
| 130 | 0.6 | 16,700 | 0.04 |
| 145 | 8.5 | 168 | 51 |
| 156 | 8.9 | 11,900 | 0.8 |
| 163 | 19.1 | 224 | 85 |
| 173 | 19.1 | 243 | 79 |
| 181 | 0.6 | 428 | 1 |
| 194 | 2.6 | 115 | 23 |
| 206 | 2.0 | 116 | 17 |
| 227 | -1.1 | 29 | -38 |
| 260 | 0.9 | 30 | 30 |
| 271 | 1.9 | 14,000 | 0.1 |
| 279 | 1.6 | 6040 | 0.3 |
| 289 | 0.5 | 1320 | 0.4 |
| 307 | 0.7 | 108 | 6 |
| 315 | 0.9 | 5800 | 0.2 |
| 324 | 0.0 | 19 | 0 |
| 339 | 1.4 | 62 | 23 |
| 347 | 0.7 | 91 | 8 |
| 357 | 1.0 | 3260 | 0.3 |
| 369 | 0.8 | 632 | 1 |
| 374 | 2.5 | 1270 | 2 |
| 387 | 2.7 | 1480 | 2 |
| 396 | 0.9 | 1310 | 1 |

Cont'd.....

We will save the 35 core samples in case they are needed in the future.

We are now in the last stages of following up the geochemical anomalies with I.P. on the Empire Project. No particularly interesting I.P. anomalism has been located to date.

Sincerely,
HEINRICHS GEOEXPLORATION COMPANY

Chris

Chris S. Ludwig
Senior Geophysicist

cc: Mr. W.W. Simmons

Enclosures:

CSL/re:

November 12, 1970

Mr. Robert C. Moore
Geology Department
Miami Copper Operations
Cities Service Company
P.O. Box 100
Miami, Arizona 85539

Re: Empire Mountains
Hiltano Anomaly Drill
Hole #1 Core I.P.
Laboratory Results

GEOEX Job #462 or #463

Dear Bob:

The laboratory results on core from Drill Hole #1 in the Empire Mountains Hiltano anomaly have shown an anomalous zone roughly between 38 and 177 feet in depth definitely strong and thick enough to be the cause of the surface I.P. anomaly and properly situated depth-wise. The cause of the anomalous I.P. effects seems to mainly be a mixture of finely disseminated pyrite and a sooty black material probably carbonaceous or graphitic in composition within a fossiliferous limestone. The sooty black material could also conceivably be very finely divided sulfides or manganese oxides.

The hole, particularly the darker sections of limestone, should be assayed for silver, lead and zinc with occasional checks for copper and gold and perhaps molybdenum. Analyses for total sulfide content would also be valuable as would some sort of test for graphite or carbon - perhaps an x-ray analysis on several pertinent samples.

No more drilling is recommended on this anomaly unless the assays show significant mineralization in that the main cause (at least) has obviously been intersected.

Following is a tabulation of our laboratory I.P. results with the anomalous intervals indicated by red lines in the PFE (percent frequency effect) and MCF (metallic conduction factor). Resistivity is tabulated as divided by 2pi and in units of ohm-feet. Therefore all sample results are shown in the same units as the field data. The field frequency spread, 0.3 and 3.0 Hz, was also used for the laboratory tests.

| Footage | PFE | Resistivity | MCF |
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| 21 | 2.3 | 344 | 7 |
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| 57 | 5.8 | 10 | 580 |
| 65 | 24.3 | 105 | 231 |
| 70 | 2.0 | 9720 | 0.2 |
| 84 | 2.4 | 139 | 17 |
| 91 | 0.9 | 1320 | 0.7 |
| 103 | 0.3 | 1333 | 0.2 |
| 108 | 1.9 | 333 | 6 |
| 120 | 11.1 | 1040 | 11 |
| 130 | 0.6 | 16,700 | 0.04 |
| 145 | 8.5 | 168 | 51 |
| 156 | 8.9 | 11,900 | 0.8 |
| 163 | 19.1 | 224 | 85 |
| 173 | 19.1 | 243 | 79 |
| 181 | 0.6 | 428 | 1 |
| 194 | 2.6 | 115 | 23 |
| 206 | 2.0 | 116 | 17 |
| 227 | -1.1 | 29 | -38 |
| 260 | 0.9 | 30 | 30 |
| 271 | 1.9 | 14,000 | 0.1 |
| 279 | 1.6 | 6040 | 0.3 |
| 289 | 0.5 | 1320 | 0.4 |
| 307 | 0.7 | 108 | 6 |
| 315 | 0.9 | 5800 | 0.2 |
| 324 | 0.0 | 19 | 0 |
| 339 | 1.4 | 62 | 23 |
| 347 | 0.7 | 91 | 8 |
| 357 | 1.0 | 3260 | 0.3 |
| 369 | 0.8 | 632 | 1 |
| 374 | 2.5 | 1270 | 2 |
| 387 | 2.7 | 1480 | 2 |
| 396 | 0.9 | 1310 | 1 |

Cont'd.....

We will save the 35 core samples in case they are needed in the future.

We are now in the last stages of following up the geochemical anomalies with I.P. on the Empire Project. No particularly interesting I.P. anomalism has been located to date.

Sincerely,
HEINRICHS GEOEXPLORATION COMPANY

Chris

Chris S. Ludwig
Senior Geophysicist

cc: Mr. W.W. Simmons

Enclosures:

CSL/re:

| Footage | PFE | Resistivity | MCF. | Footage | PFE | Resistivity | MCF. |
|---|---|---|---|---|---|---|---|
| 21 | 2.3 | 344 | 7 | 307 | 0.7 | 108 | 6 |
| 31 | 1.8 | 877 | ~~2.1~~ 2 | 315 | 0.9 | ~~5796~~ 5800 | ~~0.16~~ 0.2 |
| 44 | 14.7 | 16,520 | ~~0.89~~ 0,9 | 324 | 0.0 | 19 | 0 |
| 54 | 26.5 | ~~1,023~~ 1020 | 2.6 | 339 | 1.4 | 62. | 23 |
| 57 | 5.8 | 10 | 580 | 347 | 0.7 | 91 | 8. |
| 65 | 24.3 | 105 | 231 | 357 | 1.0 | ~~3257~~ 3260 | ~~0.31~~ 0.3 |
| 70 | 2.0 | ~~9719~~ 9720 | ~~0.20~~ 0.2 | 369 | 0.8 | 632 | ~~1.3~~ 1 |
| 84 | 2.4 | 139 | 17 | 374 | 2.5 | ~~1267~~ 1270 | ~~2.0~~ 2 |
| 91 | 0.9 | ~~1,322~~ 1320 | ~~0.68~~ 0.7 | 387 | 2.7 | ~~1478~~ 1480 | ~~1.8~~ 2 |
| 103 | 0.3 | 1333 | ~~0.23~~ 0,2 | 396 | 0.9 | ~~1314~~ 1310 | ~~0.7~~ 1 |
| 108 | 1.9 | 333 | 6 | | | | |
| 120 | 11.1 | ~~1,042~~ 1040 | 11 | | | | |
| 130 | 0.6 | 16,700 | ~~0.036.~~ 0.04 | | | | |
| 145 | 8.5 | 168 | 51 | | | | |
| 156 | 8.9 | ~~11,880~~ 11,900 | ~~0.75~~ 0.8 | | | | |
| 163 | 19.1 | 224 | 85 | | | | |
| 173 | 19.1 | 243 | 79 | | | | |
| 181 | 0.6 | 428 | ~~1.4~~ 1 | | | | |
| 194 | 2.6 | 115 | 23 | | | | |
| 206 | 2.0 | 116 | 17 | | | | |
| 227 | -1.1 | 29 | -38 | | | | |
| 260 | 0.9 | 30 | 30. | | | | |
| 271 | 1.9 | ~~14,045~~ 14,000 | ~~0.14~~ 0.1 | | | | |
| 279 | 1.6 | 6,040 | ~~0.27~~ 0.3 | | | | |
| 289 | 0.5 | ~~1315~~ 1320 | 0.4 | | | | |

PROSPECT EMPIRE MOUNTAINS

DATUM: FOOT CLAMP (+2 FT)

HOLE NO. 1 LOCATION 60' E OF 1/16 COR.

STARTING DATE 10-16-70 COMPLETION DATE _____ COLLAR ELEV. _____ BEARING _____ INCLINATION _____

TOTAL LENGTH _____ TOTAL DEPTH _____ DRILLING CO. JCY DRILLER _____

SAMPLER _____ GEOLOGIST E.O.A., R.C.M., J.P.U. CORE COND. (GOOD 1, BROKEN ✓, CRUSHED —)

| DATE | FOOTAGE | ELEV. | CORE WEIGHT | % RECOV. | LITHOLOGY | MINERALOGY PY | CPY | CC | COV | MC | A | | | | SERIOUS | BRECC | ASSAYS TOT.CU. | OX.CU. | | | | | | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | Rock Bit | | | | | | | | | | | | | | | | | | | |
| | 5 | | | | " | | | | | | | | | | | | | | | | | | | |
| | 10 | | | | " | | | | | | | | | | | | | | | | | | | |
| | 15 | | | | " | | | | | | | | | | | | | | | | | | | LOCAL |
| | 20 | | | | " | | | | | | | | | | | | | | | | | | | FRESH, BORGANIC TRASH → GRA |
| | 25 | | | | LM | – | | | | | | | | | | | | | | | | | | DARK GREY, MICROXTALLINE |
| | 30 | | | | | – | | | | | | | | | | | | | | | | | | w/ ≤ 1/4" CALCITE STRINGERS |
| | 35 | | | | | – | | | | | | | | | | | | | | | | | | ≥ 45° (MOST ARE ± 45°) |
| | 40 | | | | | – | | | | | | | | | | | | | | | | | | FeOX stain along |
| | 45 | | | | | – | | | | | | | | | | | | | | | | | | calcite stringers |
| | 50 | | | | | T | | | | | | | | | | | | | | | | | | |
| | 55 | | | | | – | | | | | | | | | | ✓ | | | | | | | | ✓54½-57½, RECEM. w/ $CaCO_3$ |
| | 60 | | | | | – | | | | | | | | | | | | | | | | | | |
| | 65 | | | | | – | | | | | | | | | | | | | | | | | | |
| | 70 | | | | | – | | | | | | | | | | | | | | | | | | |
| | 75 | | | | | – | | | | | | | | | | ✓ | | | | | | | | ✓71½-74', THIEF |
| | 80 | | | | | | | | | | | | | | | | | | | | | | | 79-82', 2 FT. CORE (DRILLING |
| | 85 | | | | | T | | | | | | | | | | | | | | | | | | ON BIT @ 82) |
| | 90 | | | | | L | | | | | | | | | | | | | | | | | | |
| | 95 | | | | | L | | | | | | | | | | | | | | | | | | 84-86' [illegible] → FeOx |
| | 100 | | | | | – | | | | | | | | | | | | | | | | | | 88-93 do |
| | 105 | | | | | T-? | | | | | | | | | | | | | | | | | | |
| | 110 | | | | | – | | | | | | | | | | ✓ | | | | | | | | ✓107½-110½, THIEF |
| | 115 | | | | | – | | | | | | | | | | | | | | | | | | 105-111 GOUGY (TOSM.?) |
| | 120 | | | | | – | | | | | | | | | | | | | | | | | | 111-136, VERY DARK, MnOX? GRAPH? |
| | 125 | | | | | – | | | | | | | | | | | | | | | | | | ON FRACTS (GOUGE) |
| | 130 | | | | | – | | | | | t | | | | | | | | | | | | | |
| | 135 | | | | | – | | | | | | | | | | | | | | | | | | |
| | 140 | | | | | – | | | | | L | | | | | | | | | | | | | |
| | 145 | | | | | – | | | | | L | | | | | | | | | | | | | ✓144½-151, RE EAGED |
| | 150 | | | | | – | | | | | L | | | | | ✓ | | | | | | | | |

A. ASBESTOS (NOT LOGGED < 125 FT.

SHEET NO. 1 OF ____

PROSPECT _____

HOLE NO. _____ LOCATION _____

| DATE | FOOTAGE | ELEV. | CORE WEIGHT | % RECOV. | LITHOLOGY | MINERALOGY PY | CPY | CC | COV | MC | A | G | | | SERICITE | BRECC. | ASSAYS TOT. CU. | OX. CU. | | | | | REMARKS | CORE COND. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 150 | | | | | T | | | | | T | | | | | | | | | | | | Py VERY FINE GRAINED | |
| | 155 | | | | | – | | | | | T | | | | | | | | | | | | | |
| | 160 | | | | | T- | | | | | | T? | | | | | | | | | | | 158-162, COLE SURF. WHITEISH | |
| | 165 | | | | | T- | | | | | T | | | | | | | | | | | | ✓170½-172, REHEALED (Ca/Cb) | |
| | 170 | | | | | – | | | | | – | | | | | ✓ | | | | | | | 172-173, SOFT & BLACK | |
| | 175 | | | | | – | | | | | | | | | | | | | | | | | 173-220, JUGGY | |
| | 180 | | | | | – | | | | | T | | | | | | | | | | | | | |
| | 185 | | | | | T | | | | | | | | | | | | | | | | | | |
| | 190 | | | | | T- | | | | | | | | | | ✓ | | | | | | | ✓198-210+ (193½-198?) | |
| | 195 | | | | | T- | | | | | T | | | | | ✓ | | | | | | | | |
| | 200 | 202 | | | QTZITE*, | – | | | | | | | | | | | | | | | | | 202-269 LIM. STAINED | |
| | 205 | | | | CALC. | – | | | | | | | | | | | | | | | | | | |
| | 210 | | | | w/ mn. | – | | | | | | | | | | | | | | | | | | |
| | 215 | | | | NODULES (SM) | – | | | | | | | | | | | | | | | | | 215-225, 6' CORE | |
| | 220 | | | | – DISSEM | – | | | | | | | | | | | | | | | | | 230-240, 2' CORE | |
| | 225 | | | | + VEINLETS | – | | | | | | | | | | | | | | | | | 240-248, 4' CORE | |
| | 230 | | | | + CALCITE | – | | | | | | | | | | | | | | | | | | |
| | 235 | | | | VEINLETS | – | | | | | | | | | | | | | | | | | | |
| | 240 | | | | | – | | | | | | | | | | | | | | | | | 240-241(?), GREENISH | |
| | 245 | | | | | – | | | | | | | | | | | | | | | | | | |
| | 250 | | | | | – | | | | | | | | | | | | | | | | | 250-266, POOR RECOV. | |
| | 255 | | | | | – | | | | | | | | | | | | | | | | | 254-260, SOFT CORE w/ Hem | |
| | 260 | | | | | – | | | | | | | | | | | | | | | | | (AFTER PY?) | |
| | 265 | | | | | – | | | | | | | | | | | | | | | | | 50° CONTACT | |
| | 270 | 269 | | | lm, FINER | L | | | | | | | | | | | | | | | | | | |
| | 275 | | | | GRAINED | L | | | | | | | | | | | | | | | | | | |
| | 280 | 282½ | | | THAN <202 | – | | | | | | | | | | | | | | | | | | |
| | 285 | | | | QZT* w/ FeOx | – | | | | | | | | | | | | | | | | | 50° CONTACT, HEALED FLT. | |
| | 290 | | | | ON FRACTS | – | | | | | | | | | | | | | | | | | | |
| | 295 | | | | + HEM "SPOTS" | – | | | | | | | | | | | | | | | | | 300-306, HEAVY LIM. | |
| | 300 | | | | + mn " | T- | | | | | | | | | | | | | | | | | 301-305 SOFT CORE | |
| | 305 | | | | | – | | | | | | | | | | ✓ | | | | | | | ✓305-308 | |
| | 310 | | | | | | | | | | | | | | | | | | | | | | | |

PROBABLY IS
ZTITE ~~MAY~~ BE LM. (IAN) CALC. SS

SHEET NO. 2 OF ____

ASBESTOS (ON FRACTS) G = GRAPHITE "Py" MAY BE CPY, TARNISHED

PROSPECT _____

HOLE NO. _____ LOCATION _____

| ATE | FOOTAGE | ELEV. | CORE WEIGHT | SP RECOV | LITHOLOGY | MINERALOGY | | | | | | | | | SERICITE | BRECC. | ASSAYS | | | | | | | REMARKS | CORE COND. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | PY | CPY | CC | COV | MO | | | | | | | TOT.CU | OX.CU | | | | | | | |
| | 310 | | | | | – | | | | | | | | | | | | | | | | | | | |
| | 315 | | | | | – | | | | | | | | | | | | | | | | | | | |
| | 320 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 325 | 324 | | | DK w/ red | T | | | | | | | | | | | | | | | | | | | |
| | 330 | 328 | | | SHALE | T | | | | | | | | | | | | | | | | | | 324-328, SOFT CORE | |
| | 335 | | | | | – | | | | | | | | | | | | | | | | | | | |
| | 340 | | | | Grayish | – | | | | | | | | | | | | | | | | | | FRACS GREEN ? | |
| | 345 | | | | Blackish | – | | | | | | | | | | | | | | | | | | 325-328, HEM (LATER FLD) | |
| | 350 | 351 | | | SS - Fine | T | | | | | | | | | | | | | | | | | | 340-350, SOFT CORE | |
| | 355 | | | | | – | | | | | | | | | ✓ | | | | | | | | | 353-?, SEALED FRACS. | |
| | 360 | | | | SS | | | | | | | | | | | | | | | | | | | | |
| | 365 | | | | w/ Lam | – | | | | | | | | | | | | | | | | | | | |
| | 370 | | | | SS Shales | | | | | | | | | | | | | | | | | | | | |
| | 375 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 380 | 381 | | | | | | | | | | | | | | | | | | | | | | | |
| | 385 | | | | Grayish Pale SS w/ HEM Veins | | | | | | | | | | | | | | | | | | | | |
| | 390 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 395 | | | | SS | | | | | | | | | | | | | | | | | | | | |
| | 400 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 405 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 410 | | | | | | | | | | | | | | | | | | | | | | | TD = 396 | |
| | 415 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 420 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 425 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 430 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 435 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 440 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 445 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 450 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 455 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 460 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 465 | | | | | | | | | | | | | | | | | | | | | | | | |
| | 470 | | | | | | | | | | | | | | | | | | | | | | | | |

Chris

PROSPECT EMPIRE MOUNTAINS — DATUM: FOOT CLAMP (2 FT)

HOLE NO. 1 LOCATION 60' E OF 1/16 COR.

STARTING DATE 10-16-70 COMPLETION DATE ____ COLLAR ELEV. ____ BEARING ____ INCLINATION ____

TOTAL LENGTH ____ TOTAL DEPTH ____ DRILLING CO. Joy ____ DRILLER ____

SAMPLER ____ GEOLOGIST R.O.A., R.C.M. ____ CORE COND. (GOOD +, BROKEN /, CRUSHED −)

| DATE | FOOTAGE | ELEV. | CORE WEIGHT | OXIDATION | RELATION | LITHOLOGY | MINERALOGY: PY | CPY | CC | COVINC | A | SERICITE | ASSAYS: PARSEC Cu | TOT. Cu | OX. Cu | REMARKS | CORE CONE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0 | | | | | Rock Bit | | | | | | | | | | | |
| | 5 | | | | | " | | | | | | | | | | | |
| | 10 | | | | | " | | | | | | | | | | | |
| | 15 | | | | | " | | | | | | | | | | | |
| | 20 | | | | | LM | − | | | | | | | | | LOCAL | |
| | 25 | | | | | | − | | | | | | | | | FRESH, ORGANIC TRASH → GRAPHITE? | |
| | 30 | | | | | | − | | | | | | | | | DARK GREY, MICROXTALLINE | |
| | 35 | | | | | | − | | | | | | | | | W/ ≤ 1/4" CALCITE STRINGERS | |
| | 40 | | | | | | − | | | | | | | | | ≥ 45° (MOST ARE ≠ 45°) | |
| | 45 | | | | | | T | | | | | | | | | FeOX stain along | |
| | 50 | | | | | | − | | | | | | ✓ | | | calcite stringers | |
| | 55 | | | | | | − | | | | | | | | | | |
| | 60 | | | | | | − | | | | | | | | | ✓54½-57½, RECEM. W/ CaCO3 | |
| | 65 | | | | | | − | | | | | | | | | | |
| | 70 | | | | | | − | | | | | | ✓ | | | | |
| | 75 | | | | | | | | | | | | | | | ✓71½-74', THIEF | |
| | 80 | | | | | | T | | | | | | | | | 79-82', 2 FT. CORE (DRILLING | |
| | 85 | | | | | | L | | | | | | | | | ON BIT @82) | |
| | 90 | | | | | | L | | | | | | | | | 84-86' fg Py → FeOx | |
| | 95 | | | | | | − | | | | | | | | | 88-93 do | |
| | 100 | | | | | | T-? | | | | | | | | | | |
| | 105 | | | | | | − | | | | | | ✓ | | | ✓107½-110½, THIEF | |
| | 110 | | | | | | − | | | | | | | | | 105-111- GOUGY (TREM.?) | |
| | 115 | | | | | | − | | | | | | | | | 111-136, VERT DARK, MnOX? coated | |
| | 120 | | | | | | − | | | | | | | | | ON FRACTS (GOUGE) | |
| | 125 | | | | | | − | | | | t | | | | | | |
| | 130 | | | | | | − | | | | | | | | | | |
| | 135 | | | | | | − | | | | L | | | | | | |
| | 140 | | | | | | − | | | | L | | | | | ✓144½- | |
| | 145 | | | | | | − | | | | L | | ✓ | | | | |
| | 150 | | | | | | | | | | | | | | | | |

SHEET NO. 1 OF ____

A: ASBESTOS

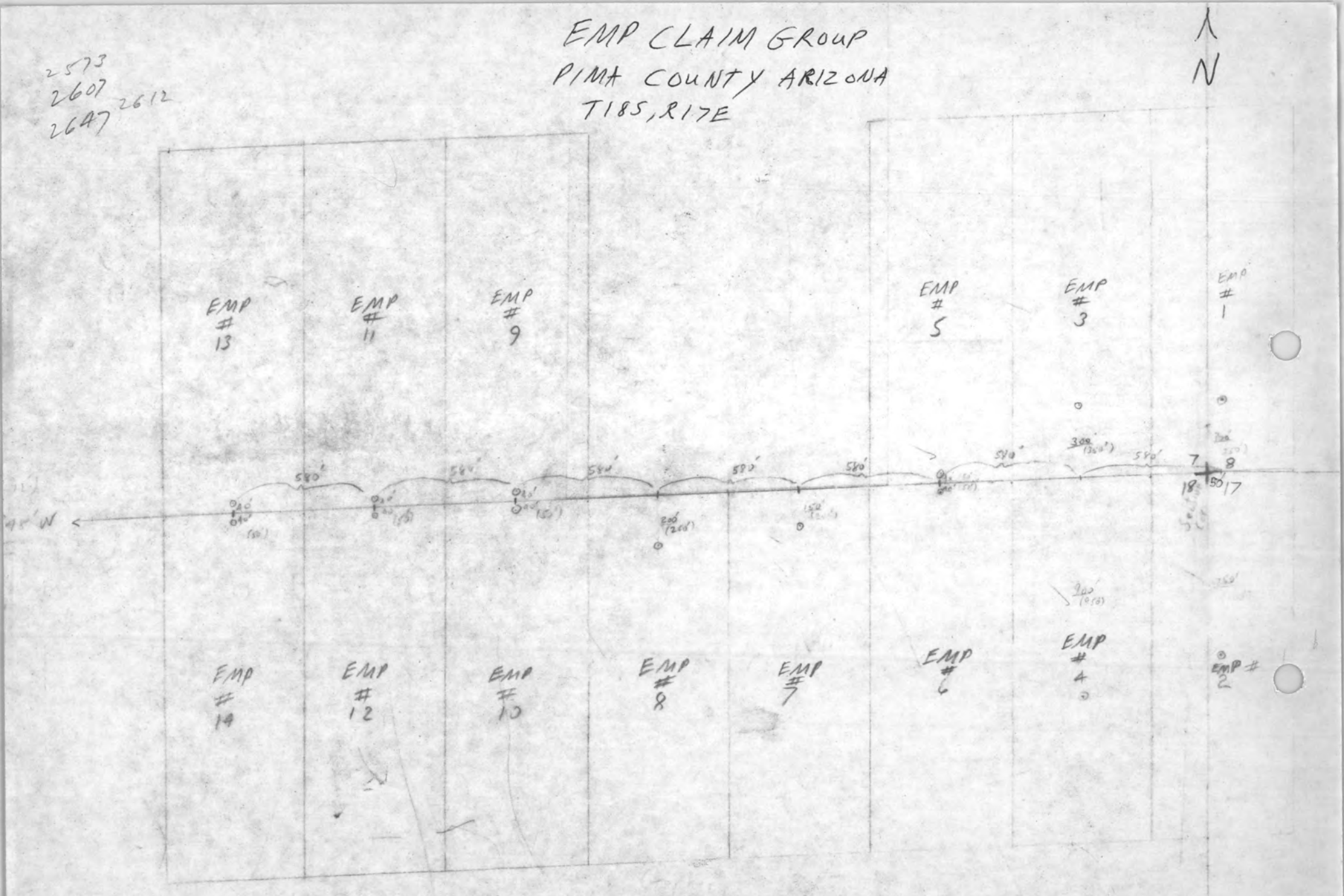
PROSPECT ______________________

HOLE NO. ______ LOCATION ______________________

| DATE | FOOTAGE | ELEV. | CORE WEIGHT | RECOV. | LITHOLOGY | PY | CP | CC | COV | MO | | | | SERICIT | BRECC. | TOT.CU | OX.CU | | | | | REMARKS | CORE COND. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 310 | | | | | — | | | | | | | | | | | | | | | | | |
| | 315 | | | | | — | | | | | | | | | | | | | | | | | |
| | 320 | | | | | | | | | | | | | | | | | | | | | | |
| | 325 | -[illegible]- | | | [illegible] | T | | | | | | | | | | | | | | | | | |
| | 330 | | | | [illegible] | | | | | | | | | | | | | | | | | [illegible] | |
| | 335 | | | | | | | | | | | | | | | | | | | | | | |
| | 340 | | | | [illegible] | — | | | | | | | | | | | | | | | | [illegible] | |
| | 345 | | | | [illegible] | — | | | | | | | | | | | | | | | | [illegible] HEM [illegible] | |
| | 350 | -351- | | | [illegible] ? | | | | | | | | | | | | | | | | | [illegible] | |
| | 355 | | | | [illegible] | — | | | | | | | | V | | | | | | | | [illegible] SEALED [illegible] | |
| | 360 | | | | [illegible] | — | | | | | | | | | | | | | | | | | |
| | 365 | | | | w/ [illegible] | — | | | | | | | | | | | | | | | | | |
| | 370 | | | | on FRACTS | | | | | | | | | | | | | | | | | | |
| | 375 | | | | | | | | | | | | | | | | | | | | | | |
| | 380 | -381- | [illegible] | | [illegible] SS w/HEM SPOTS | | | | | | | | | | | | | | | | | | |
| | 385 | | | | | | | | | | | | | | | | | | | | | | |
| | 390 | | | | | | | | | | | | | | | | | | | | | | |
| | 395 | | | | SS | | | | | | | | | | | | | | | | | | |
| | 400 | | | | | | | | | | | | | | | | | | | | | | |
| | 405 | | | | | | | | | | | | | | | | | | | | | | |
| | 410 | | | | | | | | | | | | | | | | | T.D. [illegible] | |
| | 415 | | | | | | | | | | | | | | | | | | | | | | |
| | 420 | | | | | | | | | | | | | | | | | | | | | | |
| | 425 | | | | | | | | | | | | | | | | | | | | | | |
| | 430 | | | | | | | | | | | | | | | | | | | | | | |
| | 435 | | | | | | | | | | | | | | | | | | | | | | |
| | 440 | | | | | | | | | | | | | | | | | | | | | | |
| | 445 | | | | | | | | | | | | | | | | | | | | | | |
| | 450 | | | | | | | | | | | | | | | | | | | | | | |
| | 455 | | | | | | | | | | | | | | | | | | | | | | |
| | 460 | | | | | | | | | | | | | | | | | | | | | | |
| | 465 | | | | | | | | | | | | | | | | | | | | | | |
| | 470 | | | | | | | | | | | | | | | | | | | | | | |

# EMP CLAIM GROUP
PIMA COUNTY ARIZONA
T18S, R17E

2573
2607
2647 2612

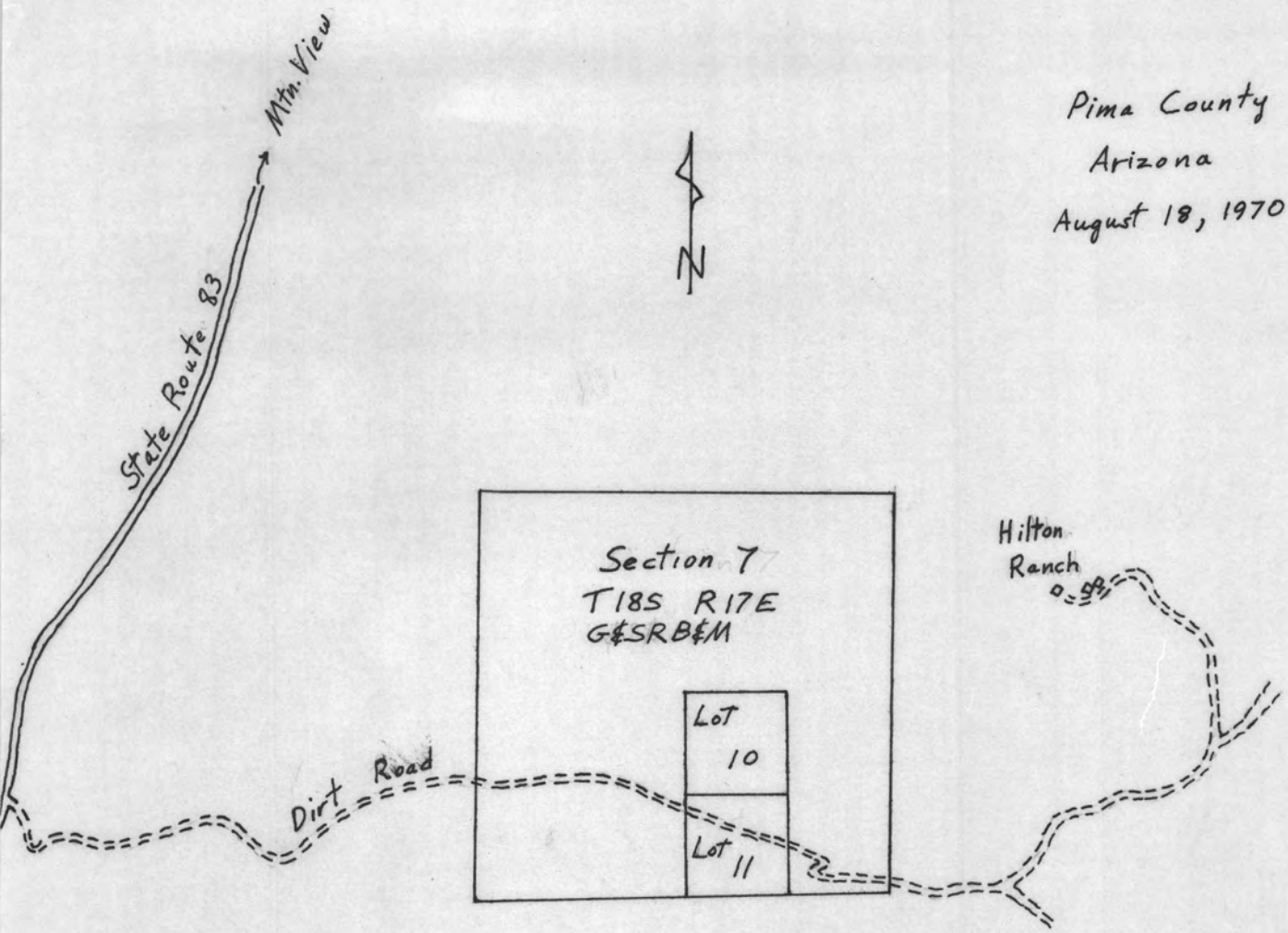



Section 18

Scale 1" = 500'

575
2875

2615
13075



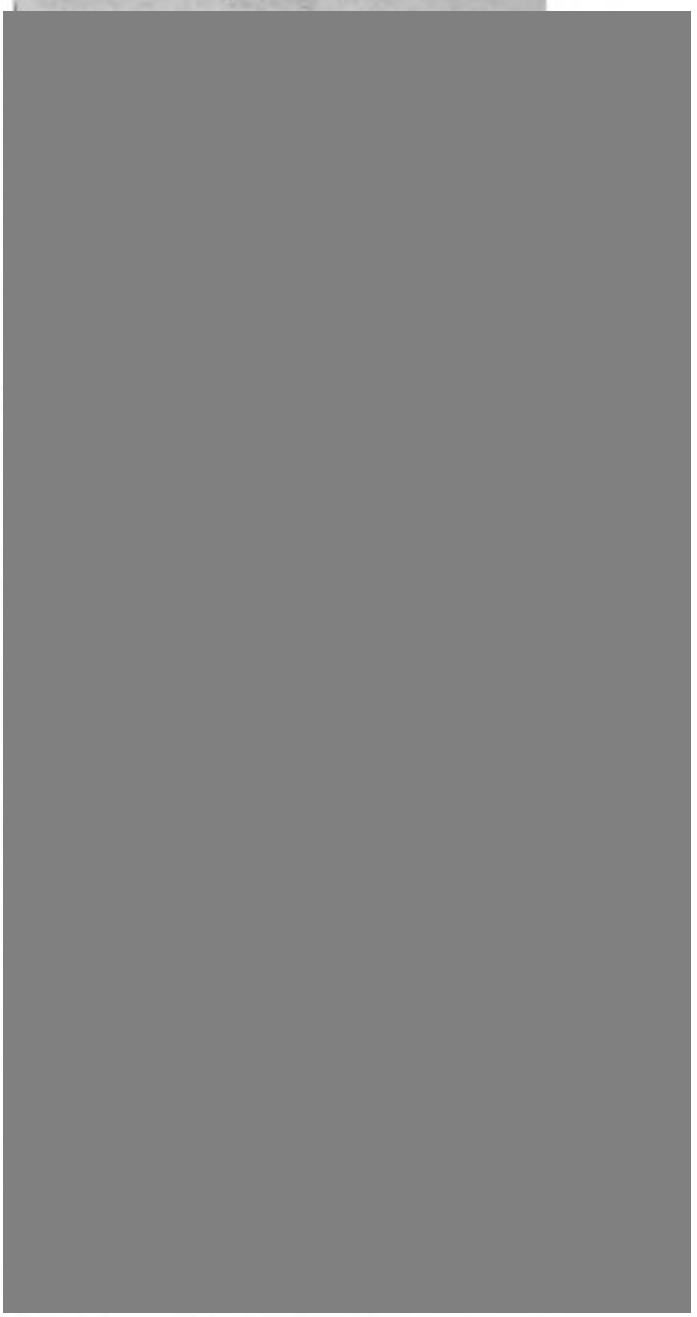

Scale

0 1/8 1/4 1/2 1 mile

Sketch to Accompany
Application for Mineral Prospecting
Permit
on
Lots 10 & 11 section 7
by
Heinrichs Geoexploration Company

Doc

# UA Professor Proves Accurate On Copper Sites



Arizona Daily Star
Friday Aug. 7, 1970

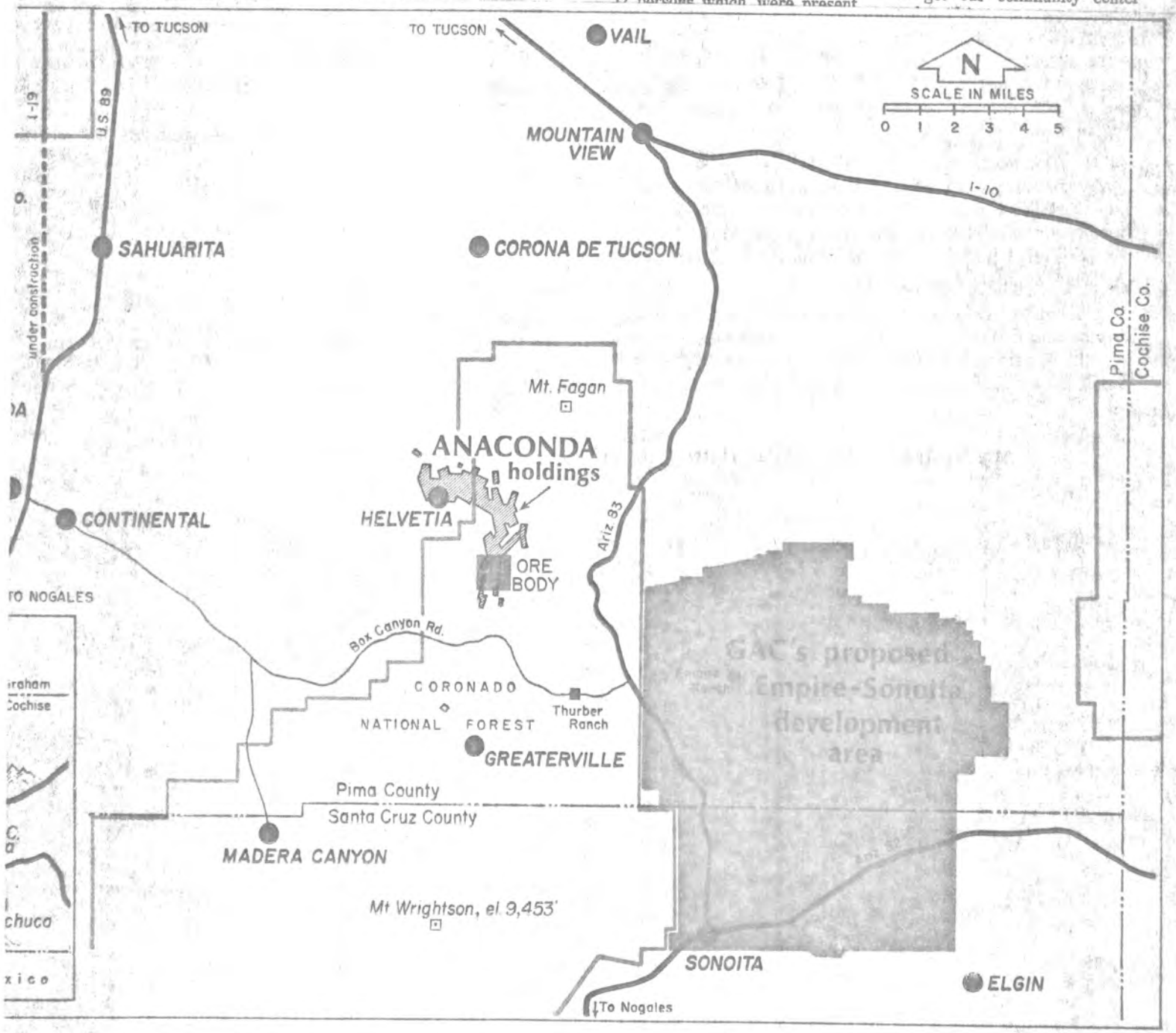
How does the industry back up? The cost of new cars brings nightmares at dusk. The manufacturers are being pressured by the Nader syndrome, the outcry for new safety devices, the roar for anti-pollution mecha-

On June 26, it was announced in the C[illegible]en that Motorola had taken [illegible]tion to purchase some land Orange Grove Road with the intention of building a plant there sometime in the future.

political office was not the one that proposed turnin[illegible] Rio into a neighborhood p[illegible]k and community center.

This proposal was the project of a coalition of approximately 12 persons which were present

True, I am proud of being a Chicano and also a militant, as the Citizen called us, if that means getting the much-needed park for the "barrios." Call us anything you want, but just let u[illegible] get our community center




# Mine Sites, Planned Development

f State Highway 83 . . . a large residential de- projects, each largely in a valley area, would be about three miles apart. The ore body and planned GAC Properties Inc. development are 35 to 45 miles southeast of Tucson.

1970 Tucson Daily Citizen

# Anaconda's Helvetia Pit May

By RICHARD E. WILBUR
Citizen Business Editor

An open pit copper mine planned by the Anaconda Co. on 6,000 acres in the Helvetia area may be as big an operation as the company's Twin Buttes Mine near here.

"Indications are that this ore body will be mined by open pit methods of a magnitude comparable to the mines presently being operated by Anaconda and other companies south of Tucson," the company said.

Robert D. Lynn, manager of Anaconda's interests in Pima County, estimated "the potential pit area" east of Helvitia will be about three miles from the proposed Empire-Sonita residential development of GAC Properties Inc.

Anaconda recently told the Pima County Planning & Zoning Commission its intentions of mining an ore body about 40 miles southeast of Tucson in the Helvetia Mining District in the Santa Rita Mountains.

The company said it doesn't know when this will start.

Whenever Anaconda undertakes mining in the Helvetia area, said Lynn today "our objective will be to establish a viable mining operation which will create the least disturbance to the ecological features of the area."

The company's Twin Buttes Mine, which started operating last November about 25 miles south of Tucson, is slightly more than three miles from the town of Green Valley.

Anaconda has two ore bodies in the Helvetia area, according to Lynn. One is in a valley area on the east slope of the Santa Ritas, approximately 2½ miles from State Highway 83. This is the property whose pit would be about three miles from GAC property, and whose location is indicated on the map accompanying this article.

The other copper ore mass is in the foothills of the western slope of the Santa Ritas, Lynn said. A mine there would be visible from the Santa Cruz Valley, he said.

Lynn said mining operations on the eastern ore body — "the better-looking one" for copper recovery purposes — would be "pretty well visible from" Highway 83.

What about residents in the proposed GAC area? Lynn said it's "possible" that "in the middle stages" of mining the eastern ore body, some residents might be able to see the mine, depending on the elevation of the home sites.

GAC recently advanced a plan to develop 60,000 acres of rural land where it said it envisions up to 60,000 persons living within about 100 years from now.

Most of this land is the former Empire Ranch bought by GAC. The southern boundary of the proposed GAC development area is about eight miles north of Sonoita. Sonoita is about 13 miles south of Interstate 10.

A second hearing on GAC's request for rezoning of the area is scheduled Sept. 9 by the planning commission.

In the eastern Helvetia area, Anaconda has 2,350 acres of privately held land and mineral rights (the right to mine) on about 4,000 acres of public land administered by the U.S. Forest Service as part of the Coronado National Forest, according to Lynn.

The Anaconda official estimated mining operations on the eastern ore body "probably" would require the use of those 6,000 acres, considering land that would be needed for a mill-concentrator, for dumps of tailings (waste from the mill) and of overburden (waste removed in digging the open pit mine), and for various buildings.

To obtain surface use of the 4,000 acres of Forest Service land, there are three possible approaches for the copper company, Lynn said. He said Anaconda has chosen one that would involve land exchanges.

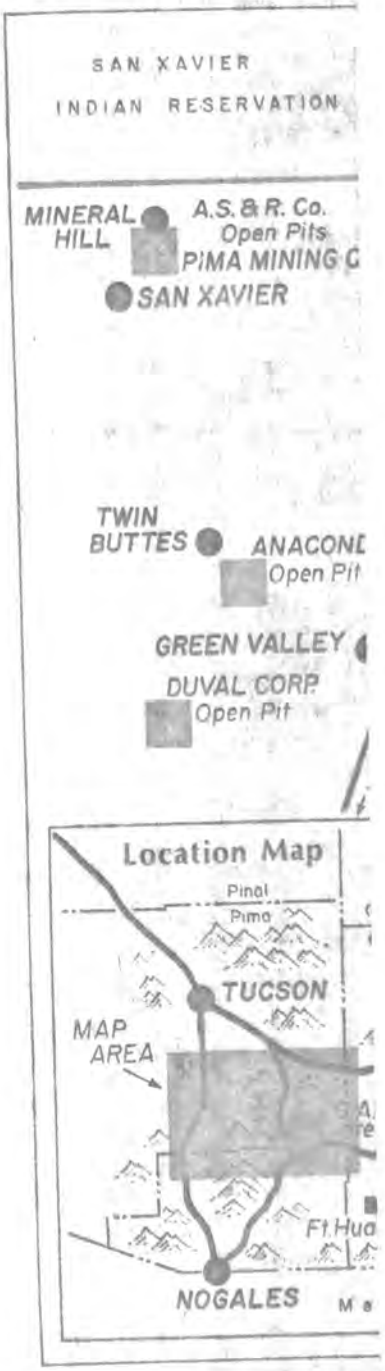
Anaconda proposes to purchase land areas more suitable for recreation or scenic purposes than exist in the 4,000-acre area concerned, and turn these areas over to the Forest Service in exchange for the 4,000 acres of Forest Service land the company would need for its eastern Helvetia mining operation, according to Lynn.

Where the copper firm would get water for its big new mine hasn't been determined yet, according to Lynn. Anaconda hasn't any firm mining plans for the ore body yet, "so we don't know where we're going to get the water," he said.

Twin Buttes required four years to develop in preparation for mining, removal of more than 200 million tons of overburden, and an investment of more than $200 million, according to Anaconda officials.

It is processing about 24,000 to 30,000 tons of ore daily, Lynn said. The company expects the amount of actual copper metal derived from Twin Buttes ore to reach a total 80,000 tons a year.

The Twin Buttes payroll last year was $8,230,468, the company reported. Employes totaled 1,039 at the start of this year.




A copper mine to the west o
velopment to the east. These

HEINRICHS
GEOEXPLORATION CO.
Box 5964 Tucson, Arizona 85703
Phone: (602) 623-0578
Cable: GEOEX

AUG

Job 463

xxxxxxxx
New Box No. 5964

March 25, 1970

Mrs. Ann B. Ohrel

Dear Mrs. Ohrel:

Heinrichs GEOEXploration has been contracted to conduct a regional mineral survey of the Empire Mountains and adjacent land. Our land status maps show that your land lies within our region of interest.

Our exploration program will cover a large area with limited access. For this reason we would greatly appreciate your permission to cross your land and use the roads thereon. We would like to assure you that all gates and fences will be left as they are found. We will not be littering the country in any way and will avoid watering tanks and feeders whenever possible. We would appreciate any comments if you note actions to the contrary by our personnel.

To avoid any technical problems we would request that you sign below if you approve.

Thank you.

Sincerely yours,
HEINRICHS GEOEXPLORATION COMPANY

Walter E. Heinrichs, Jr.
President

Date:_____

Signed By:_____-

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

0.5 CAL FACTOR

PROJECT Mesa 463 Samples
LINE ____ HALF ____ SP. ____ DATE ____

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | #1 | #2 | #3 | #4 | #5 | #6 | #6 | #7 | | |
| RECEIVE | 1060 | 321 | 1330 | 546 | 262 | | | | | |
| RANGE | | | | | | | | | | |
| DC 1 PFE | 0.5 | 1.6 | 4.1 | 2.7 | 2.5 | 2.5 | 1.7 | 2.5 | | |
| DC 2 | 0.6 | 1.5 | 3.5 | 3.4 | 2.3 | 2.5 | 1.8 | 2.4 | | |
| DC 3 | | | 3.2 | 3.1 | 2.3 | | | 1.5 | ? | |
| DC 4 | | | | | | | | 1.7 | | |
| DC 5 | | | | | | | | 1.7 | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | 0.6 | 1.6 | 3.6 | 3.1 | 2.4 | 2.5 | 1.8 | 1.7 | | |
| AC 1 | | | | | | | | | | |
| AC 2 | | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

Line 9 : 300' SE of last electrode at
< on line : should be ±to 24 ...

(27 / 21 ...)

Project Empire # 463

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

# EMPIRE MOUNTAINS QUADRANGLE
ARIZONA–PIMA CO.
15 MINUTE SERIES (TOPOGRAPHIC)

(MT. WRIGHTSON)

Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS and USCE

Topography from aerial photographs by ER-55 plotter
Aerial photographs taken 1955. Field check 1958

Polyconic projection. 1927 North American datum
10,000-foot grid based on Arizona coordinate system, central zone
1000-meter Universal Transverse Mercator grid ticks,
zone 12, shown in blue

Dashed land lines indicate approximate locations

Unchecked elevations are shown in brown

TRUE NORTH / MAGNETIC NORTH 13°
APPROXIMATE MEAN DECLINATION, 1958

SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVAL 40 FEET
DATUM IS MEAN SEA LEVEL

THIS MAP COMPLIES WITH NATIONAL MAP ACCURACY STANDARDS
FOR SALE BY U. S. GEOLOGICAL SURVEY, DENVER 25, COLORADO OR WASHINGTON 25, D. C.
A FOLDER DESCRIBING TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

ARIZONA
QUADRANGLE LOCATION

ROAD CLASSIFICATION

Heavy-duty — Light-duty
Medium-duty — Unimproved dirt
U. S. Route — State Route

(FT. HUACHUCA)

EMPIRE MOUNTAINS, ARIZ.
N3145—W11030/15
1958

page 1

24Aug70 (1) R

Base @ Y in Rd. by Well To Hilton Ranch

| Line of Pos. | scale | Reading | Time | |
|---|---|---|---|---|
| Base | +1 | 99 | 1.43 | |
| R-1 | +1 | 106 | | |
| R-2 | +1 | 106 | | S-34 @ 100's of Base |
| 3 | +1 | 104 | | |
| 4 | +1 | 103 | | |
| 5 | +1 | 101 | .47 | |
| 6 | +1 | 98 | | |
| * 7 | +1 | 63 | | at well |
| 8 | +1 | 98 | | |
| 9 | +1 | 97 | | |
| 10 | +1 | 91 | .51 | |
| 11 | +1 | 99 | | |
| 12 | +1 | 101 | | |
| 13 | +1 | 97 | | |
| 14 | +1 | 96 | | |
| 15 | +1 | 107 | .55 | |
| 16 | +1 | 102 | | |
| 17 | +1 | 112 | | |
| 18 | +1 | 102 | | |
| 19 | +1 | 108 | | |
| 20 | +1 | 112 | .59 | |
| 21 | +1 | 125 | | (?) Iron under road - intermittent |
| 22 | | 177 | | |
| 23 | +1 | 171 | | |
| 24 | +1 | 139 | | |
| 25 | +1 | 123 | 2.05 | |
| 26 | +1 | 127 | | |
| 27 | +1 | 167 | | |
| 28 | +1 | 149 | | |
| 29 | +1 | 138 | | |
| 30 | +1 | 133 | .10 | |

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

| | Scale | Read. | Time | |
|---|---|---|---|---|
| R-31 | +1 | 133 | | at cattle guard entering Hilton |
| Base | +1 | 98 | 2.26 | |

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I.P. LINE 9-E ① 9E

Page 1
Mag.

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

| Line+Sta. | Scale | Read. | Time | |
|---|---|---|---|---|
| Base | +1 | 106 | 3.20 | |
| 9E-1S. | +1 | 104 | | |
| 9E-2S | +1 | 104 | | |
| 3 | +1 | 105 | | |
| 4 | +1 | 103 | | |
| 5 | +1 | 103 | .29 | |
| 6 | +1 | 102 | | |
| 7 | +1 | 103 | | |
| 8 | +1 | 103 | | |
| 9 | | 104 | .36 | |
| Base | | 106 | 3:45 | |
| Nartl Base | | 106 | 3:45 | |
| 9E-1N | | 111 | | |
| -2N | | 112 | | |
| 3 | | 114 | | |
| 4 | | 117 | | |
| 5 | | 117 | | |
| 6 | | 114 | J40-111 | |
| 7 | | 114 | 4:00 @ | Road |
| 8 | | 122 | | |
| 9 | | 126 | | |
| 10 | | 127 | | |
| 11 | | 134 | | |
| 12 | | 143 | | |
| 13 | | 152 | .10 | |
| 14 | | 168 | | |
| 15 | | 136 | | |
| 16 | | 124 | | at I.P. Sta. 18 N |
| 17 | | 130 | | |
| 18 | | 123 | .20 | |

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p. 2

LINE 9-E

| Sta. | Scale | Read | Time |
|---|---|---|---|
| 19S | | 121 | 4.21 |
| 20 | | 120 | |
| 21 | | 120 | |
| 22 | | 118 | .26 |
| Base | | 107 | 4.50 |

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page 11

LINE 1

| Station | Reading | Scale | Time |
|---|---|---|---|
| Base | 111 | +1 | 1.31 |
| Base | 110 | +1 | 3.10 |
| L-1 | 103 | +1 | .34 |
| L-2 | 100 | +1 | .35 |
| L-3 | 99 | +1 | .36 |
| L-4 | 99 | +1 | .37 |
| L-5 | 97 | +1 | .37 |
| L-6 | 95 | +1 | .38 |
| L-7 | 95 | +1 | .39 |
| L-8 | 93 | +1 | .39 |
| L-9 | 63 | +1 | .40 |
| L-10 | 216 | +1 | culvert .42 |
| L10--5 | 90 | +1 | .43 |
| L11 | 91 | +1 | .44 |
| L12 | CULVERT | | |
| L13 | 20 | +1 | .45 |
| L14 | 73 | +1 | .47 |
| L15 (15' from culvert) | 82 | +1 | .48 |

Line 1

| Sta. | Read | Scale | Time |
|---|---|---|---|
| L-16 | 82 | +1 | 1.49 |
| L-17 | 81 | +1 | .50 |
| L-18 | 83 | +1 | .51 |
| L-19 | 78 | +1 | |
| L-20 | 78 | +1 | |
| L-21 | 80 | +1 | |
| L-22 | 79 | +1 | |
| L-23 | 77 | +1 | |
| L-24 | 78 | +1 | |
| L-25 | 78 | +1 | .57 |
| L-26 | 78 | +1 | |
| L-27 | 78 | +1 | |
| L-28 | 76 | +1 | |
| L-29 | 76 | +1 | |
| L-30 | 75 | +1 | 2.00 |
| L-31 | 75 | +1 | |
| L-32 | 75 | +1 | |

p. 3

LINE 1

| Sta | Readi | Scale | Time |
|---|---|---|---|
| L-33 | 75 | +1 | At 2.03 |
| L-34 | 74 | +1 | |
| L-35 | 73 | +1 | .06 |
| L-36 | 75 | +1 | |
| L-37 | 76 | +1 | |
| L-38 | 75 | +1 | |
| L-39 | 73 | +1 | |
| L-40 | 70 | +1 | .11 |
| L-41 | 71 | +1 | |
| L-42 | 72 | +1 | |
| L-43 | 72 | +1 | |
| L-44 | 71 | +1 | |
| L-45 | 73 | +1 | .16 |
| L-46 | 72 | +1 | |
| L-47 | 71 | +1 | |
| L-48 | 71 | +1 | |
| L-49 | 69 | +1 | |
| L-50 | 68 | +1 | 2.24 |

LINE 1

| Sta. | Read. | Scale | Time |
|---|---|---|---|
| L-51 | 69 | +1 | 2.24 |
| L-52 | 68 | +1 | |
| L-53 | 69 | +1 | |
| L-54 | 68 | +1 | |
| L-55 | 68 | +1 | .27 |
| L-56 | | | |
| L-57 | | | |
| L-58 | | | |
| L-59 | | | |
| L-60 | | | |

21 Aug 70

② S

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

| Line & Posit. | Scale | Reading | Time | |
|---|---|---|---|---|
| S-29 | +1 | 97 | 2:08 | |
| S-30 | | 98 | | stream bed going |
| S-31 | | 101 | | To Total Wreck ? |
| S-32 | | 101 | | |
| S-33 | | 104 | | |
| S-34 | | 100 | | at fork in Rd. |
| 35 | | 96 | | |
| 36 | | 97 | | |
| 37 | | 93 | | |
| 38 | | 91 | | @ Y in Rd. |
| 39 | | 91 | | ~300'E of stone Tank |
| 40 | | 90 | | |
| 41 | | 108 | | stream bed (wide) |
| 42 | | 85 | | |
| 43 | | 87 | | |
| 44 | | 98 | | Wash |
| 45 | | 86 | | |
| 46 | | 95 | | |
| 47 | | 88 | | |
| 48 | | 89 | | |
| 49 | | 89 | | |
| 50 | | 91 | | |
| 51 | | 91 | | Road |
| 52 | | 88 | | Seems |
| 53 | | 92 | 2:41 | To |
| 54 | | 90 | | go |
| 55 | | 92 | 2:44 | North To |
| Base | | 106 | 3:15 | Valley (Tuc-Bansin) |

Doesn't seem to be on map

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21 Aug 70 ① S

| Line & posit. | Scale | Reading | Time | |
|---|---|---|---|---|
| Base | +1 | 106 | 1:32 | @ Y in Rd. |
| S-1 | | 110 | | |
| S-2 | | 109 | | |
| 3 | | 106 | | |
| 4 | | 109 | | |
| 5 | | 110 | | |
| 6 | | 107 | | |
| 7 | | 106 | | |
| 8 | | 106 | | |
| 9 | | 106 | | |
| 10 | | 105 | | |
| 11 | | 106 | | |
| 12 | | 103 | | |
| 13 | | 107 | | |
| 14 | | 109 | | |
| 15 | | 109 | | |
| 16 | | 105 | | |
| 17 | | 102 | | |
| 18 | | 100 | 1:55 | |
| 19 | | 102 | | |
| 20 | | 103 | | |
| 21 | | 100 | | |
| 22 | | 100 | | |
| 23 | | 97 | | |
| 24 | | 97 | | |
| 25 | | 97 | | |
| 26 | | 96 | | |
| 27 | | 97 | | |
| 28 | | 96 | 2:05 | |

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21 Aug 70 J (3)

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| Line & Dist | Scale | Reading | Time | |
|---|---|---|---|---|
| J-60 | +1 | 89 | 11:12 | |
| J-61 | | 85 | | |
| J-62 | | 84 | | |
| 63 | | 82 | | |
| 64 | | 80 | | |
| 65 | | 81 | | |
| 66 | | 80 | | |
| 67 | | 79 | | |
| 68 | | 79 | | Small Knoll To North |
| 69 | | 79 | | |
| 70 | | 78 | | |
| 71 | | 79 | | |
| 72 | | 74 | | |
| 73 | | 79 | | |
| 74 | | 78 | | |
| 75 | | 78 | 11:30 | |
| 76 | | 81 | | |
| 77 | | 77 | | |
| 78 | | 77 | | |
| 79 | | 77 | | |
| 80 | | 76 | | Pile of rocks N. of Rd. |
| 81 | | 77 | | |
| 82 | | 73 | | |
| 83 | | 74 | | |
| 84 | | 73 | | |
| 85 | | 69 | | |
| 86 | | 68 | | |
| 87 | | 70 | | |
| 88 | | 71 | | |
| 89 | | 69 | 11:45 | @ 100 E. of fence |
| Base | | 106 | 1:25 | @ cattle guard NW and SE Knoll on |



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21 Aug 70 J (2)

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| Line + Position | Scale | Reading | Time | |
|---|---|---|---|---|
| J-30 | +1 | 125 | 10:37 | |
| J-31 | | 128 | | Bottom Switchback |
| J-32 | | 126 | | |
| 37 | | 125 | | |
| 34 | | 124 | | |
| 35 | | 124 | | |
| 36 | | 124 | | |
| 37 | | 120 | | |
| 38 | | 116 | | |
| 39 | | 114 | | 9E-7N 114 |
| 40 | | 111 | 10:50 | (near I.P. Line being run) |
| 41 | | 109 | | |
| 42 | | 110 | | |
| 43 | | 108 | | |
| 44 | | 104 | | |
| 45 | | 104 | | |
| 46 | | 103 | | |
| 47 | | 102 | | |
| 48 | | 98 | | |
| 49 | | 95 | | |
| 50 | | 95 | | |
| 51 | | 95 | | |
| 52 | | 93 | | |
| 53 | | 86 | | |
| 54 | | 89 | | |
| 55 | | 91 | | |
| 56 | | 81 | | |
| 57 | | 89 | 11:05 | 4 I.P. electrode pits near road |
| 58 | | 87 | | |
| 59 | | 86 | | |

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21 Aug 70

J ①

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

| Line | Scale | Reading | Time | |
|---|---|---|---|---|
| J | | | | |
| Base | +1 | 110 | 10:00 | @ Y in road |
| J-1 | | 109 | | |
| J-2 | | 112 | | |
| 3 | | 115 | | |
| 4 | | 115 | | |
| 5 | | 119 | | |
| 6 | | 122 | | Hill crest |
| 7 | | 127 | | |
| 8 | | 125 | | Near Culvert |
| 9 | | 125 | | |
| 10 | | 120 | | |
| 11 | | 118 | | |
| 12 | | 118 | | |
| 13 | | 121 | | |
| 14 | | 125 | | |
| 15 | | 123 | | |
| 16 | | 128 | | |
| 17 | | 128 | | |
| 18 | | 129 | | |
| 19 | | 128 | | |
| 20 | | 126 | | |
| 21 | | 126 | | |
| 22 | | 124 | | |
| 23 | | 91 | | Near Culvert |
| 24 | | 125 | | |
| 25 | | 124 | | |
| 26 | | 120 | | |
| 27 | | 116 | | |
| 28 | | 110 | 10:30 @ | Switchback (near truck & pipe) |
| 29 | | 121 | | |

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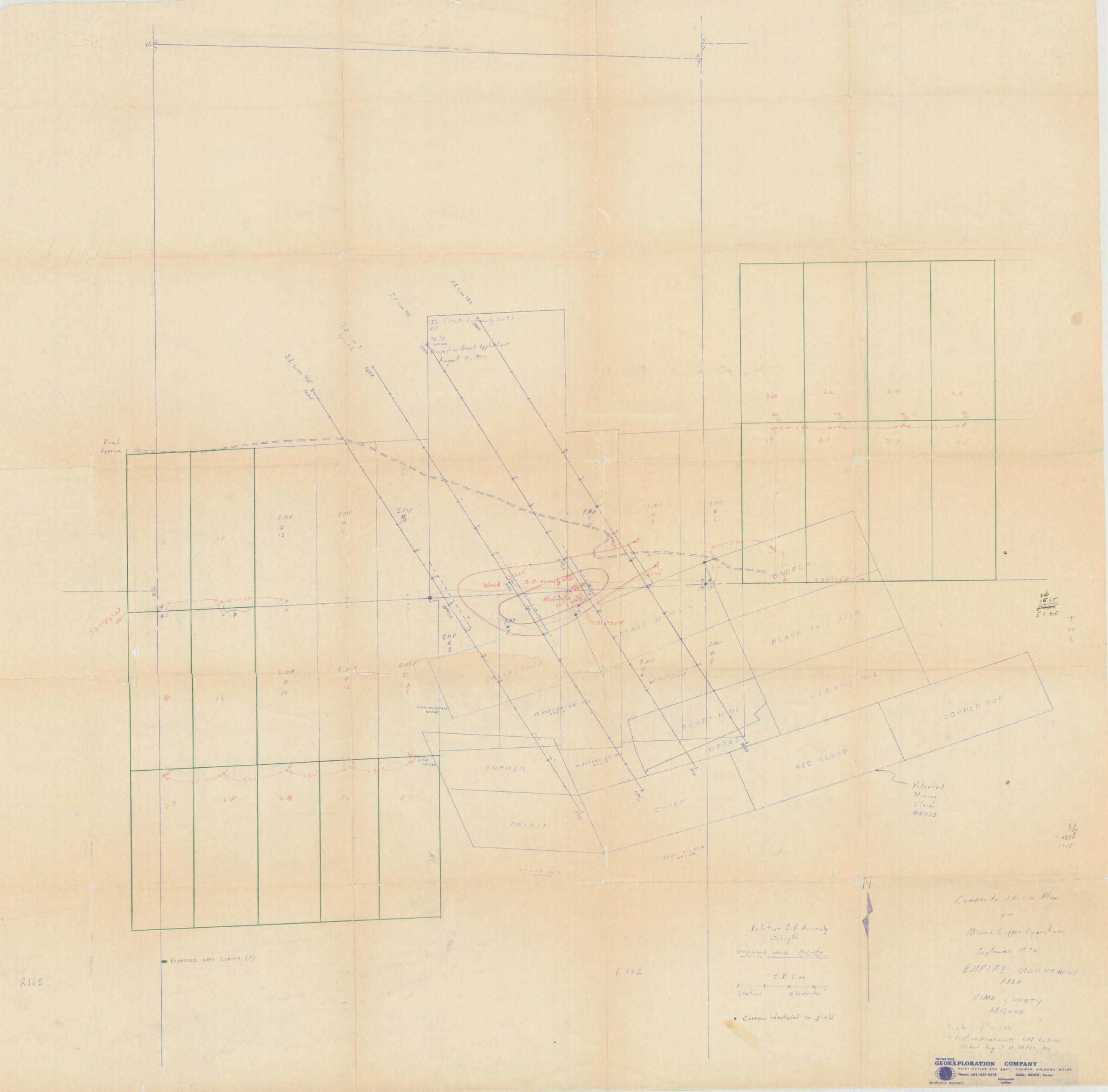



Composite Sketch Plan
for
Miami Copper Operations
September 1970
EMPIRE MOUNTAINS AREA
PIMA COUNTY
ARIZONA

Scale: 1" = 300'
⊙ Location Monuments EMP CLAIMS Staked August 18, 19 & 20, 1970

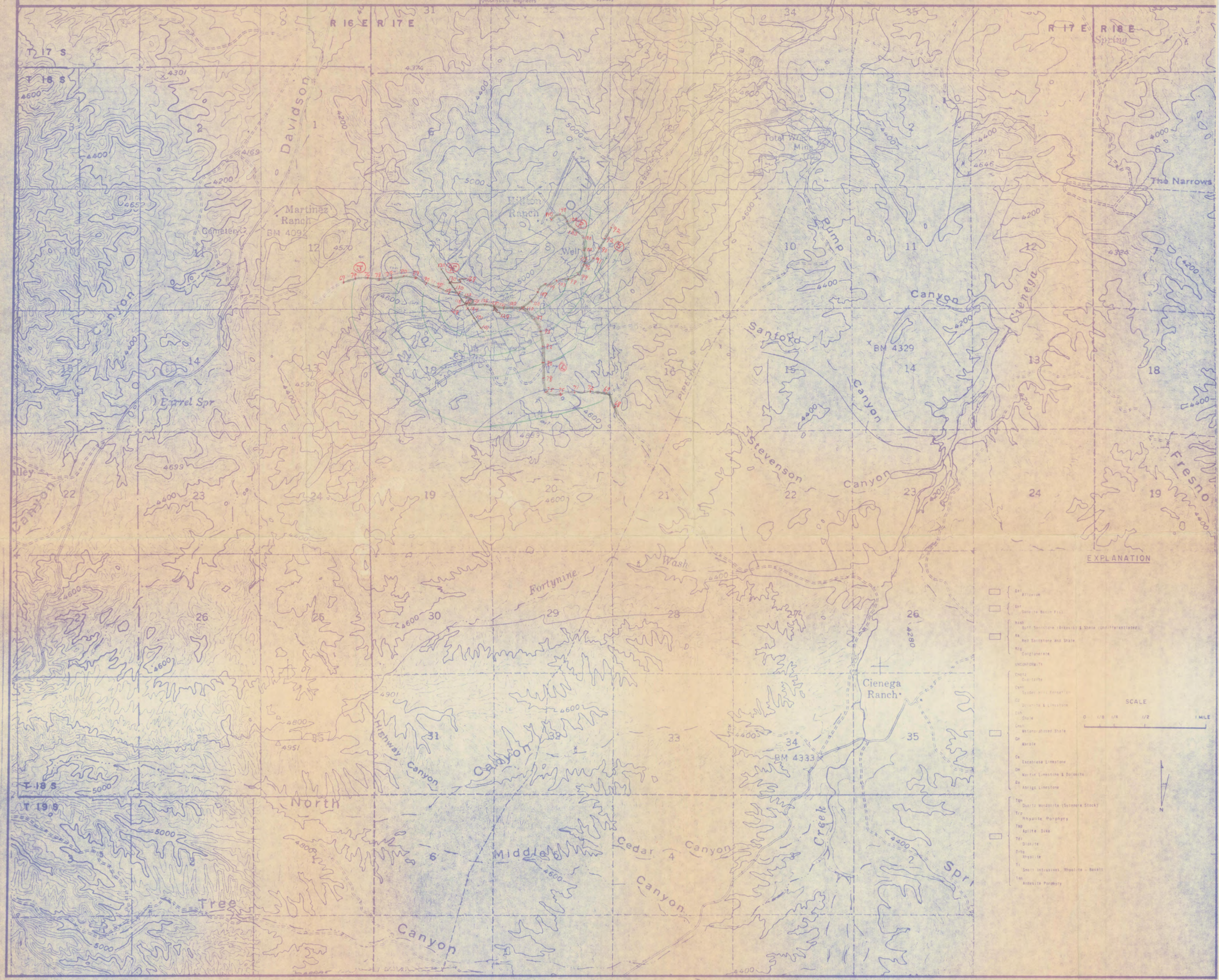
HEINRICHS GEOEXPLORATION COMPANY
POST OFFICE BOX 5671, TUCSON, ARIZONA, 85703
Phone: 602/623-0578 Cable: GEOEX, Tucson
geophysical engineers vancouver sydney

Vertical Intensity Ground Magnetic Readings (in 10's of gammas)

(Roughly field checked)

HEINRICHS GEOEXPLORATION COMPANY 462(463)-69
POST OFFICE BOX 5671, TUCSON, ARIZONA, 85703
Phone: 602/623-0578 Cable: GEOEX, Tucson
geophysical engineers vancouver sydney

COMPOSITE GEOLOGIC MAP
EMPIRE PROJECT - PHASE I
for
MIAMI COPPER OPERATIONS




Random Magnetic Survey of Empire Mtn.

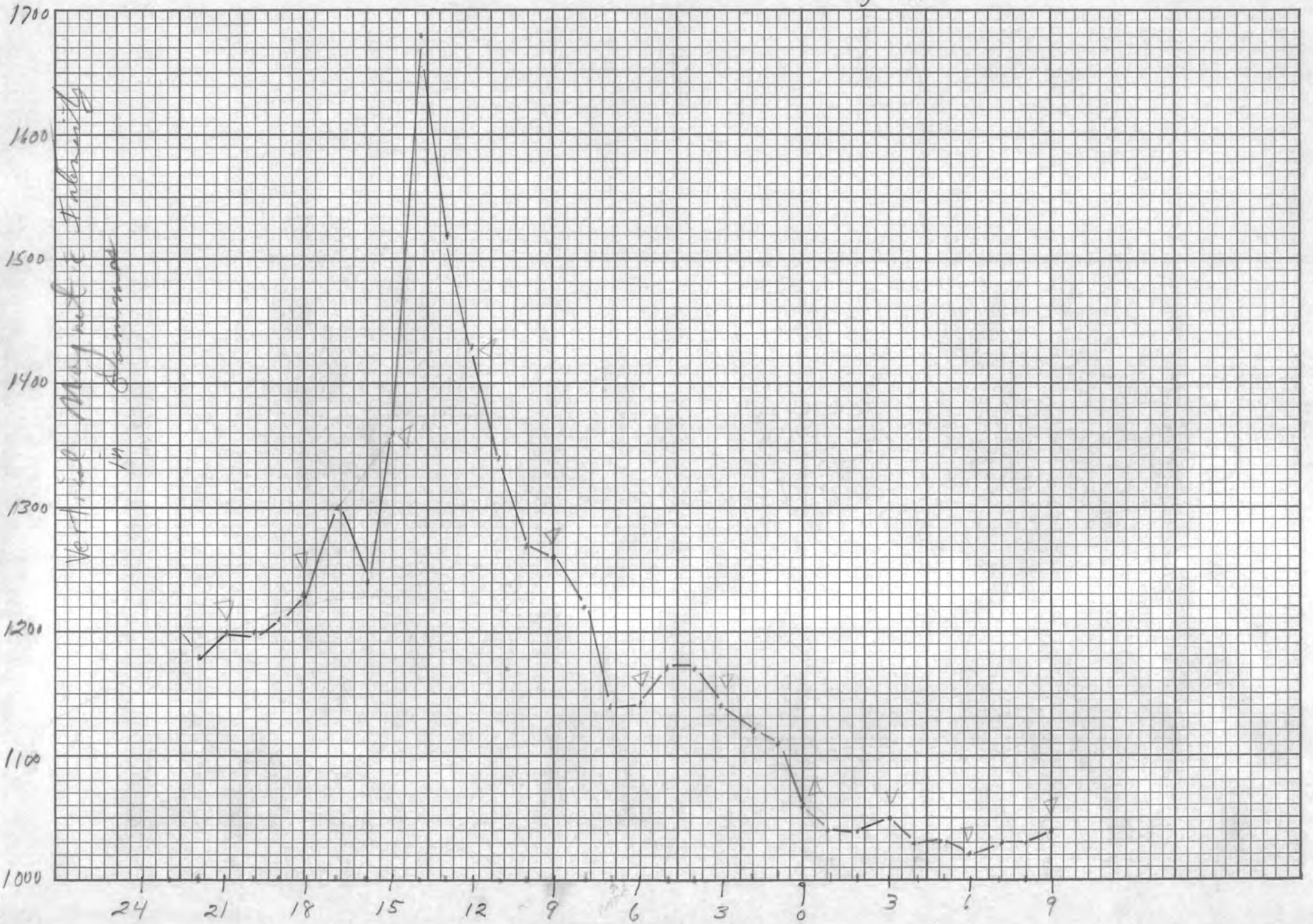
68 ⇒ 680 γ
68-67 ⇒ 10 γ

Data in 10's of gammas as

(R) Line name

K+E 10 X 10 TO THE INCH 46 0782
7 X 10 INCHES MADE IN U.S.A.
KEUFFEL & ESSER CO.

Line 9E Looking NE



HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N50°E




AREA Empire Atlas - 463 LINE 1 a = 750' SCALE: 1" = 750' DATE: April 23, 1970

LINE a = ' SCALE: DATE:

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING ____

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N45°E




AREA Empire Mts -463 LINE 2 a = 750' SCALE: 1" = 750' DATE: April 23, 1970

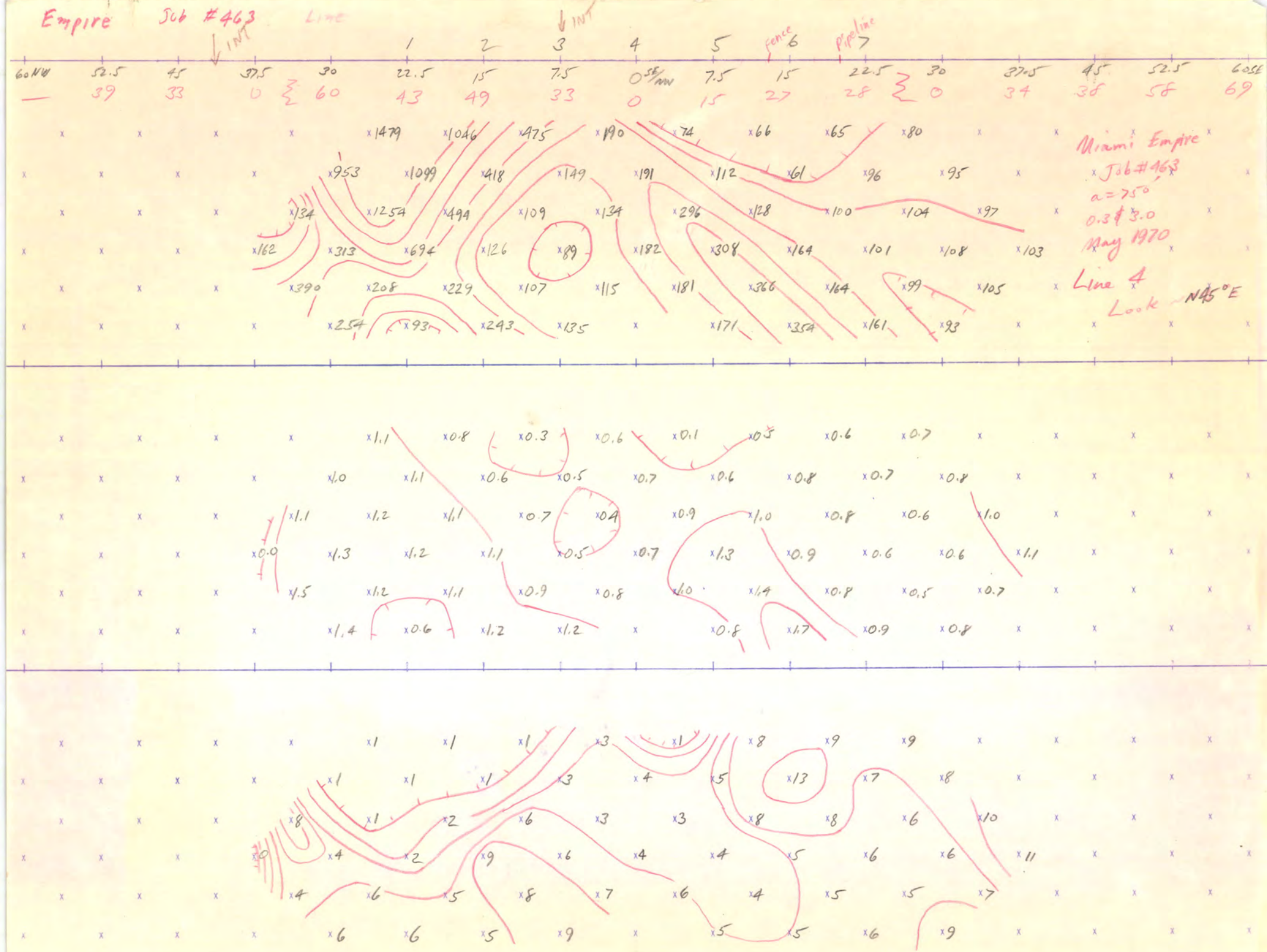
LINE ____ a = ____ ' SCALE: ____ DATE: ____

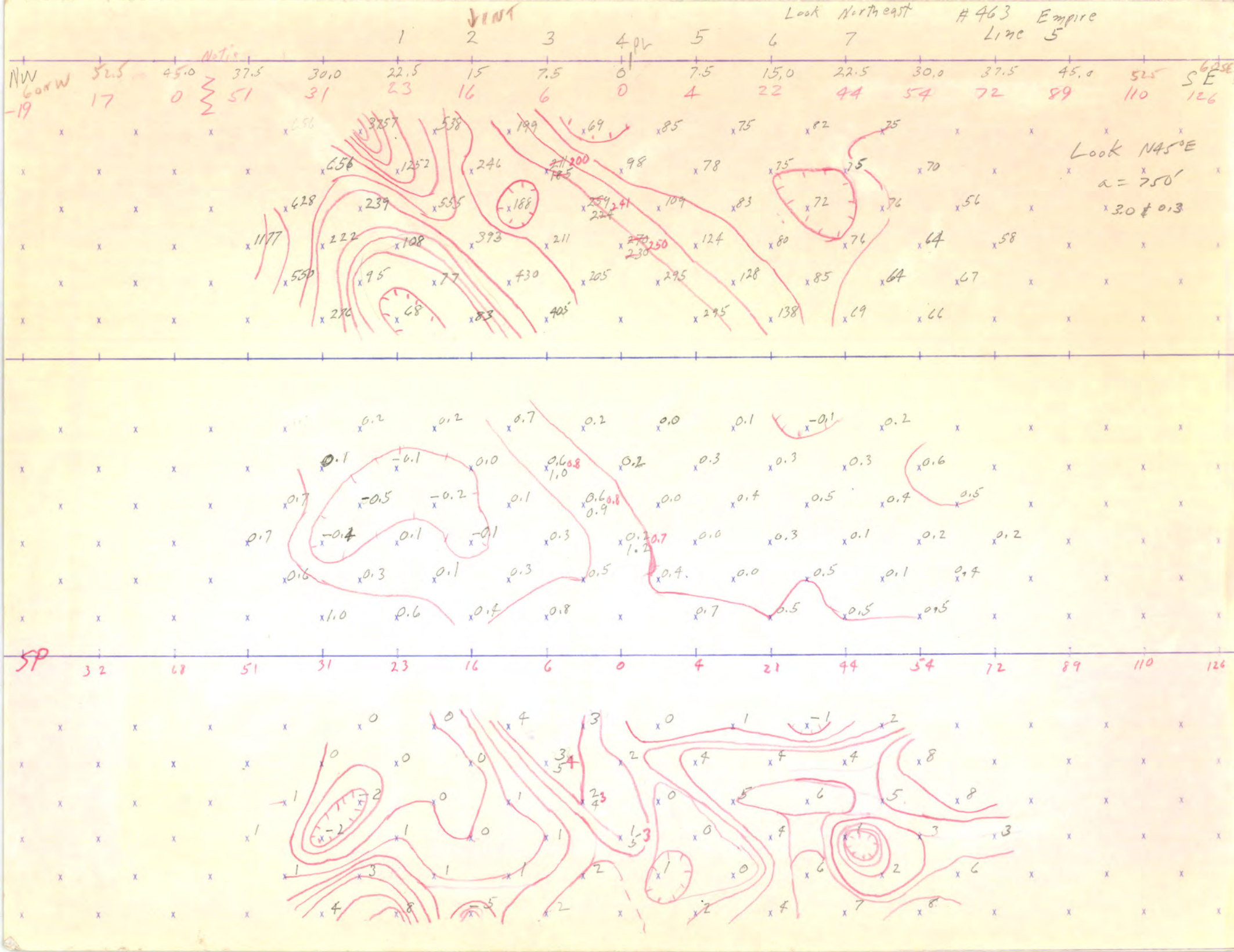
HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING NW

HEINRICHS GEOEX. INDUCED POLARIZATION SECTIONAL DATA PLOT, LOOKING N 45 E

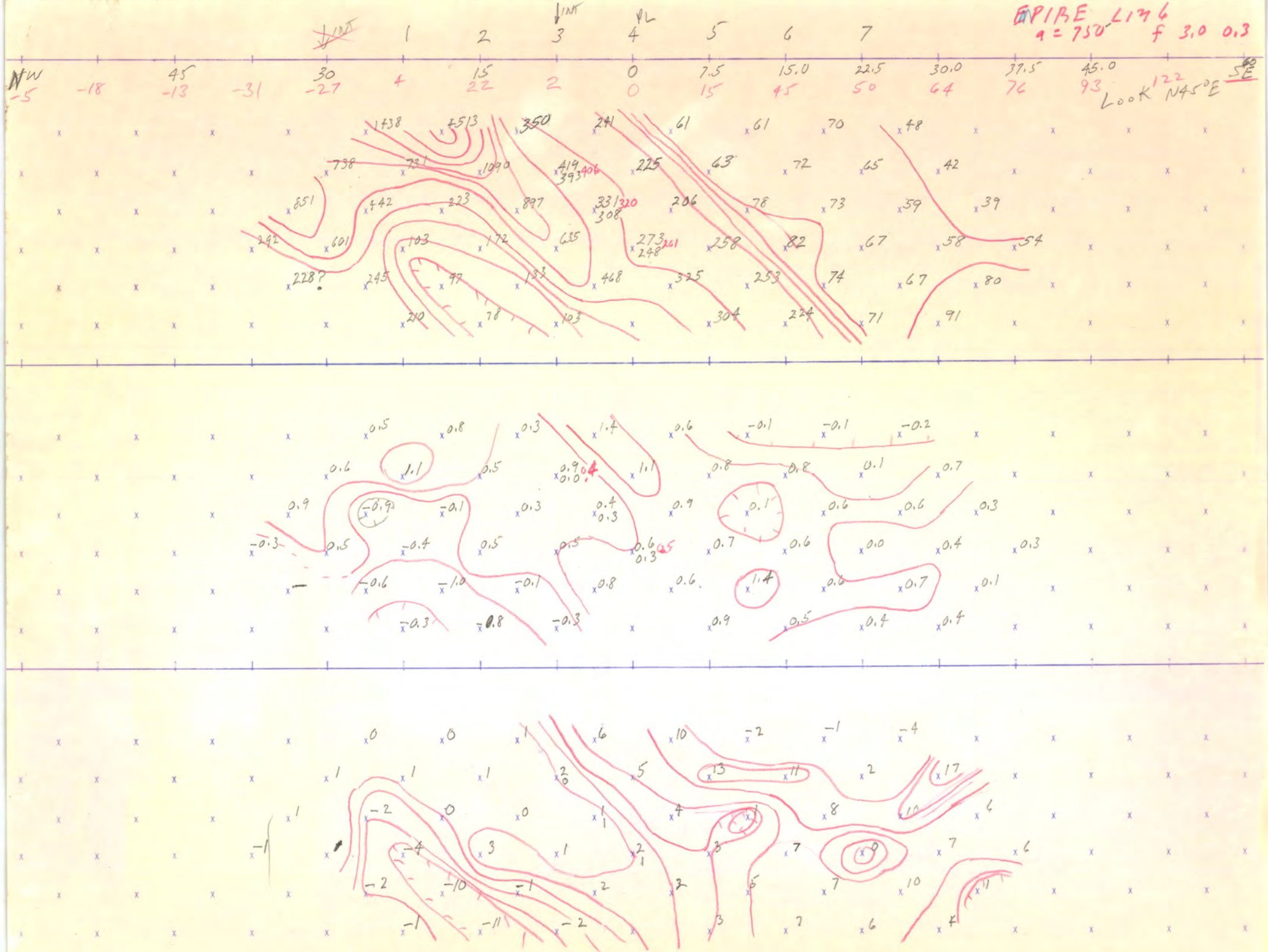


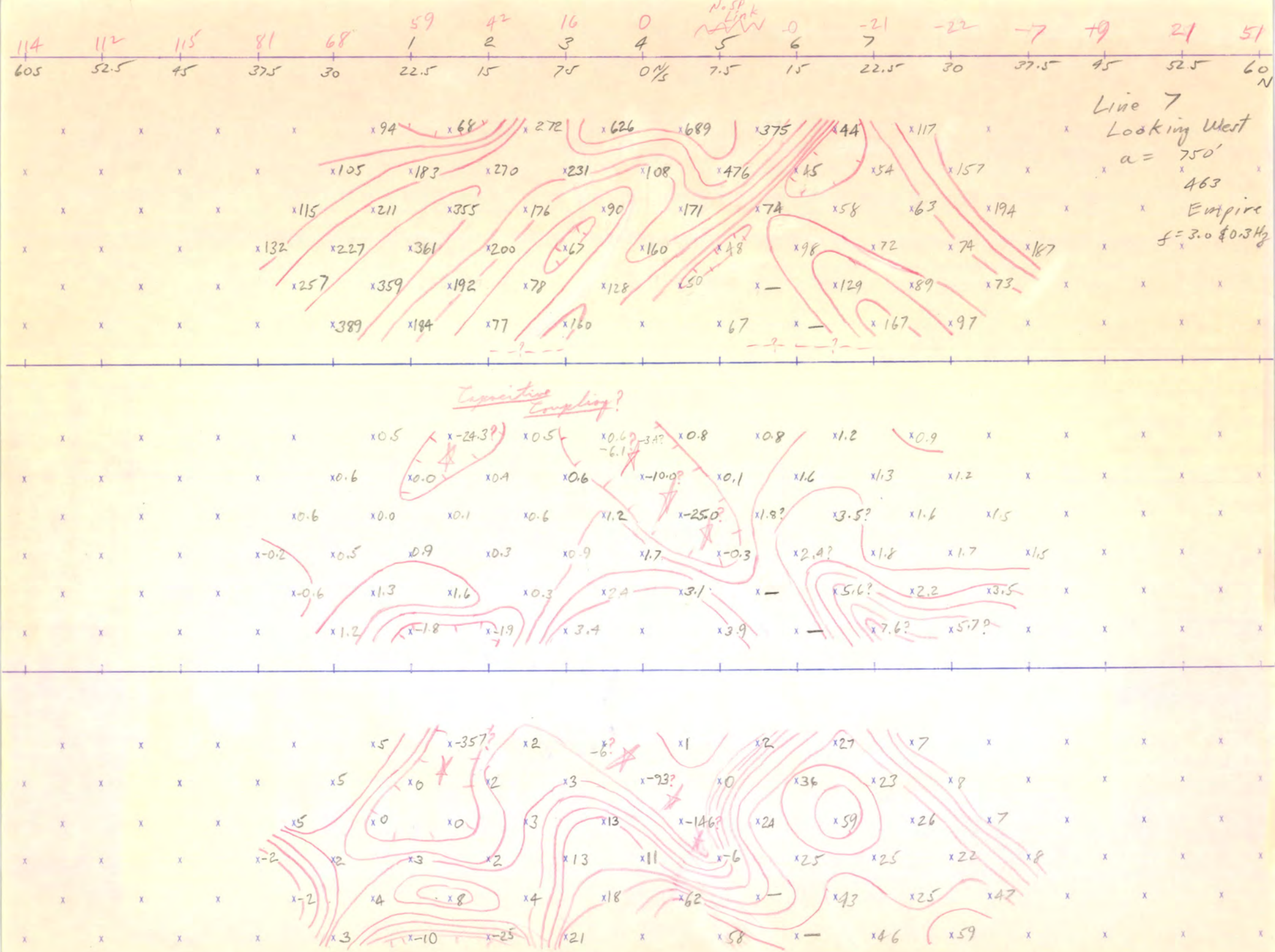

AREA Miami - Empire Mines LINE 3 a = 750' SCALE: 1"=750' DATE: April, 1970 LINE a = ' SCALE: DATE:

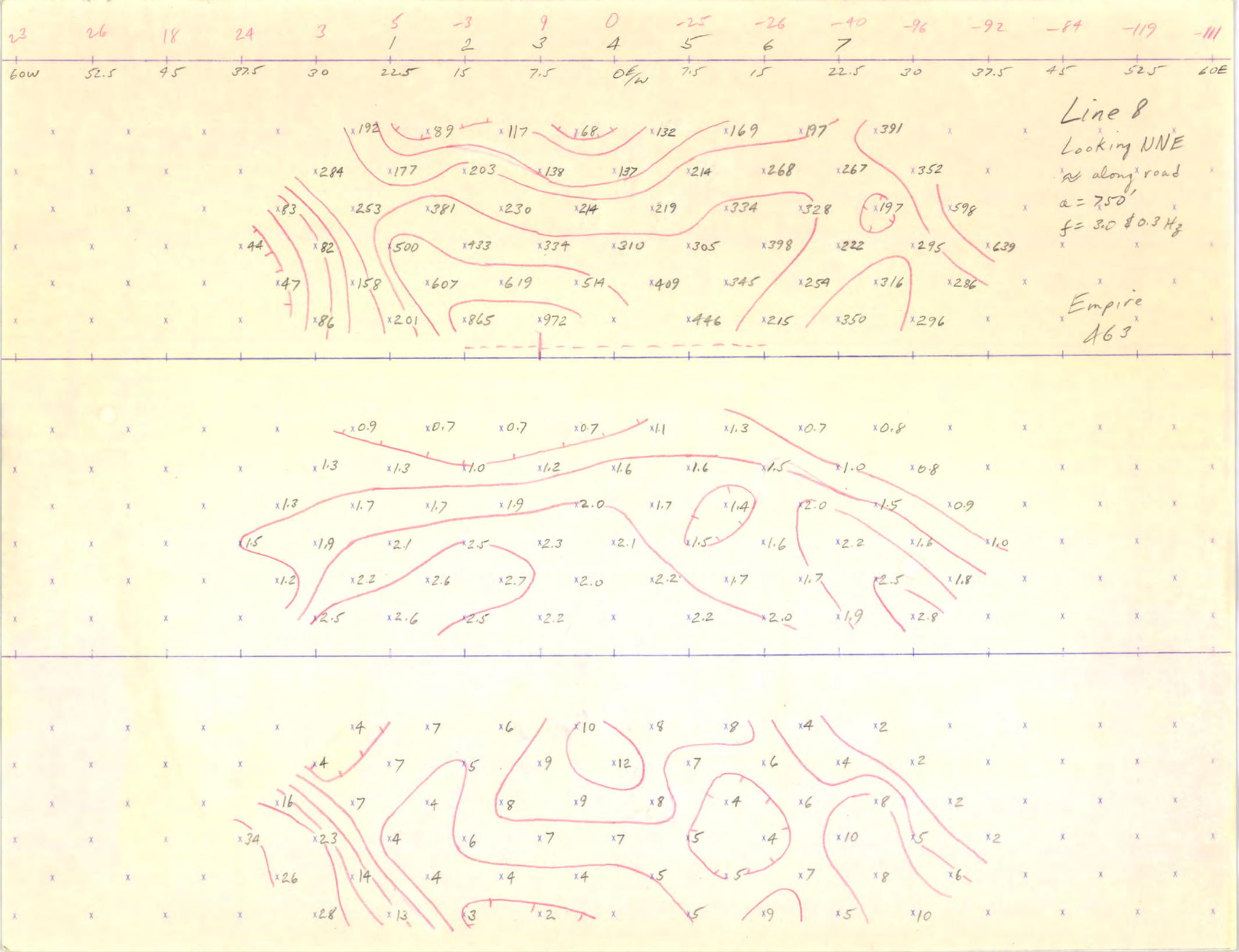

Empire Job #463 Line
INT
INT
1
2
3
4
5
fence
6
pipeline
7
60NW 52.5 45 37.5 30 22.5 15 7.5 0 SE/NW 7.5 15 22.5 30 37.5 45 52.5 60SE
— 39 33 0 Σ 60 43 49 33 0 15 27 28 Σ 0 34 38 58 69
Miami Empire
Job #463
a=75'
0.3 & 3.0
May 1970
Line 4
Look N45°E

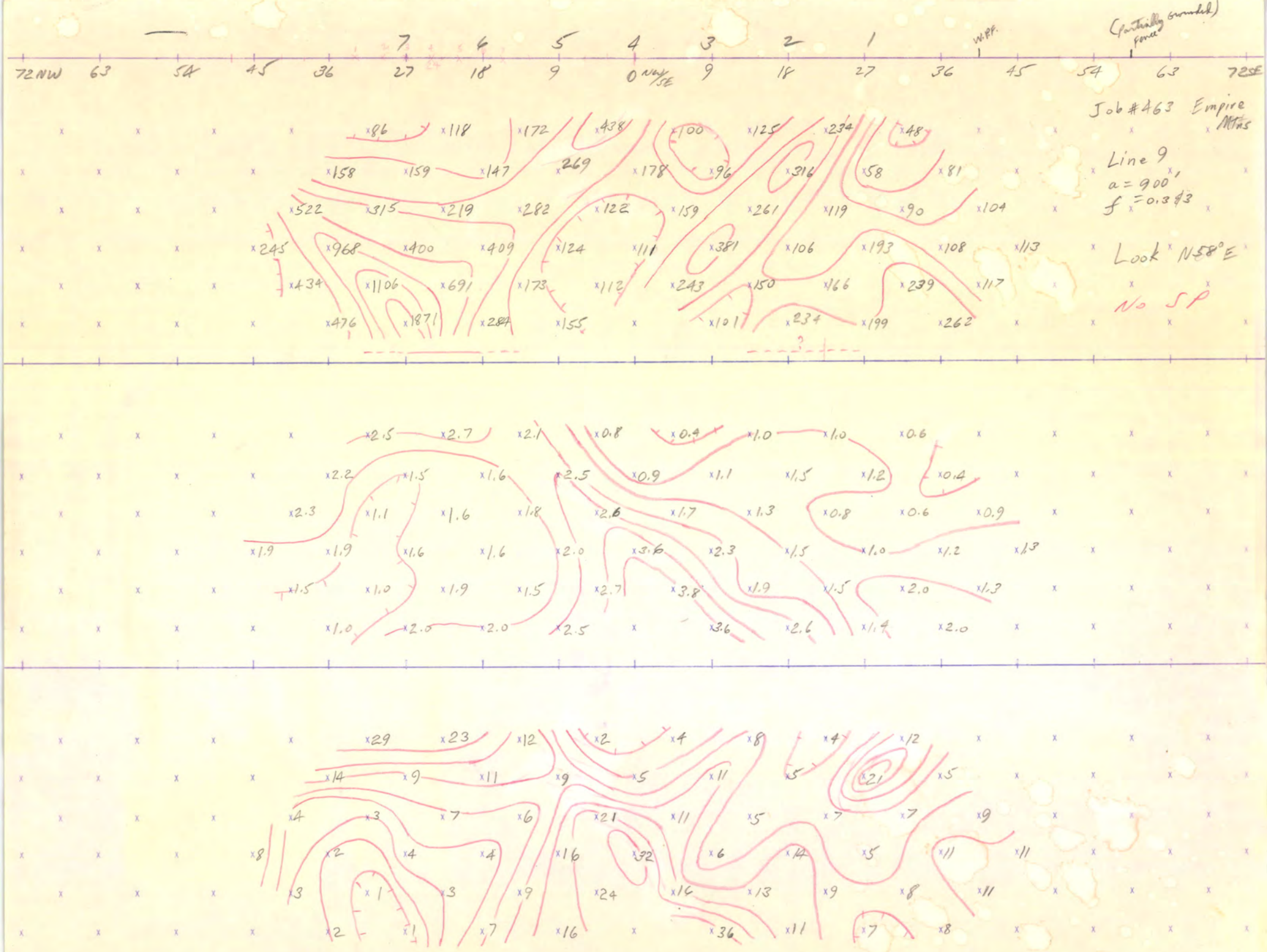


Look Northeast
#463 Empire
Line 5
Look N45°E
a = 750'
3.0 & 0.3
NW
SE
SP

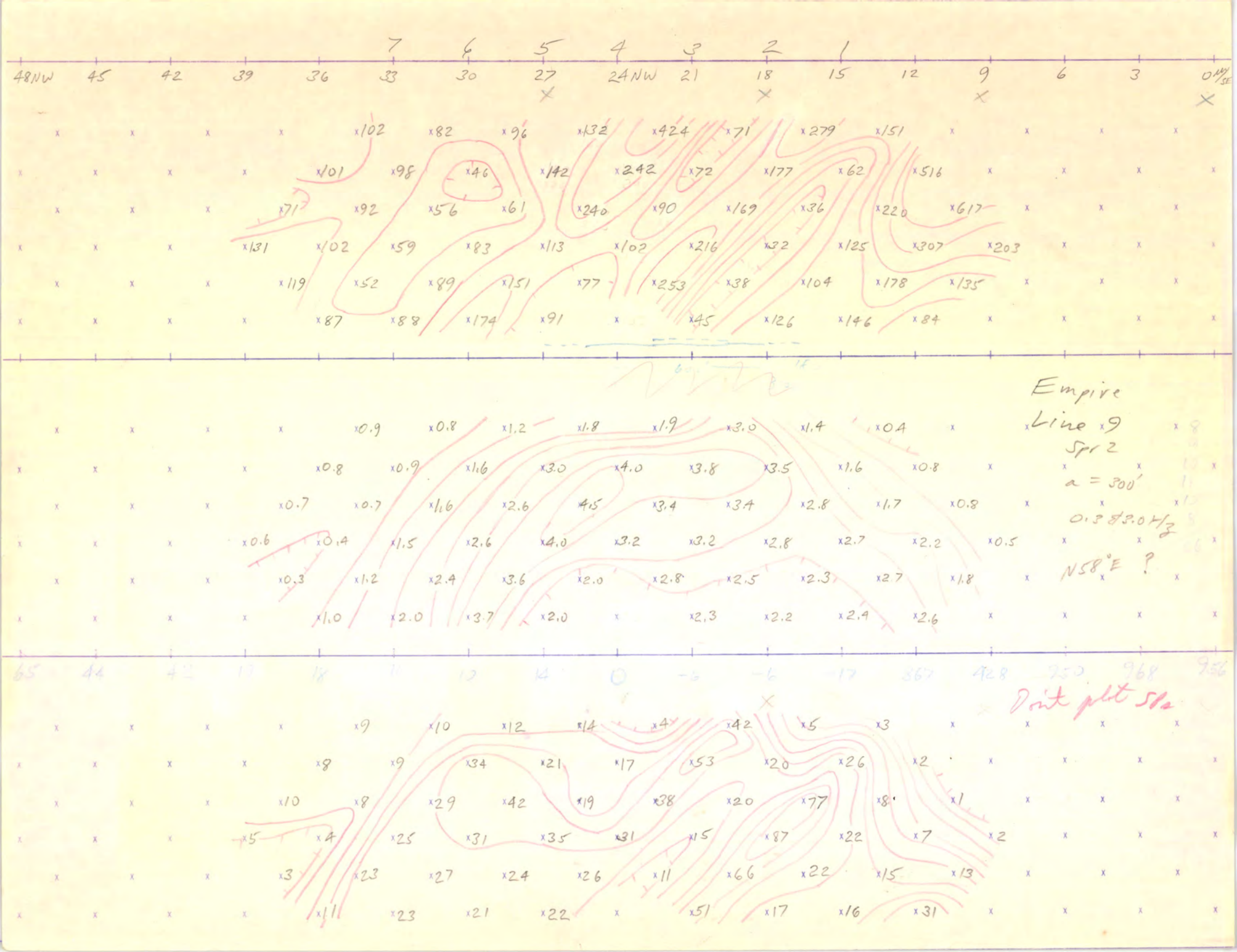

EPIRE LINE
a = 750' f 3.0 0.3
NW
SE
Look N45°E
1 2 3 4 5 6 7
45 30 15 0 7.5 15.0 22.5 30.0 37.5 45.0
-5 -18 -13 -31 -27 4 22 2 0 15 45 50 64 76 93 122

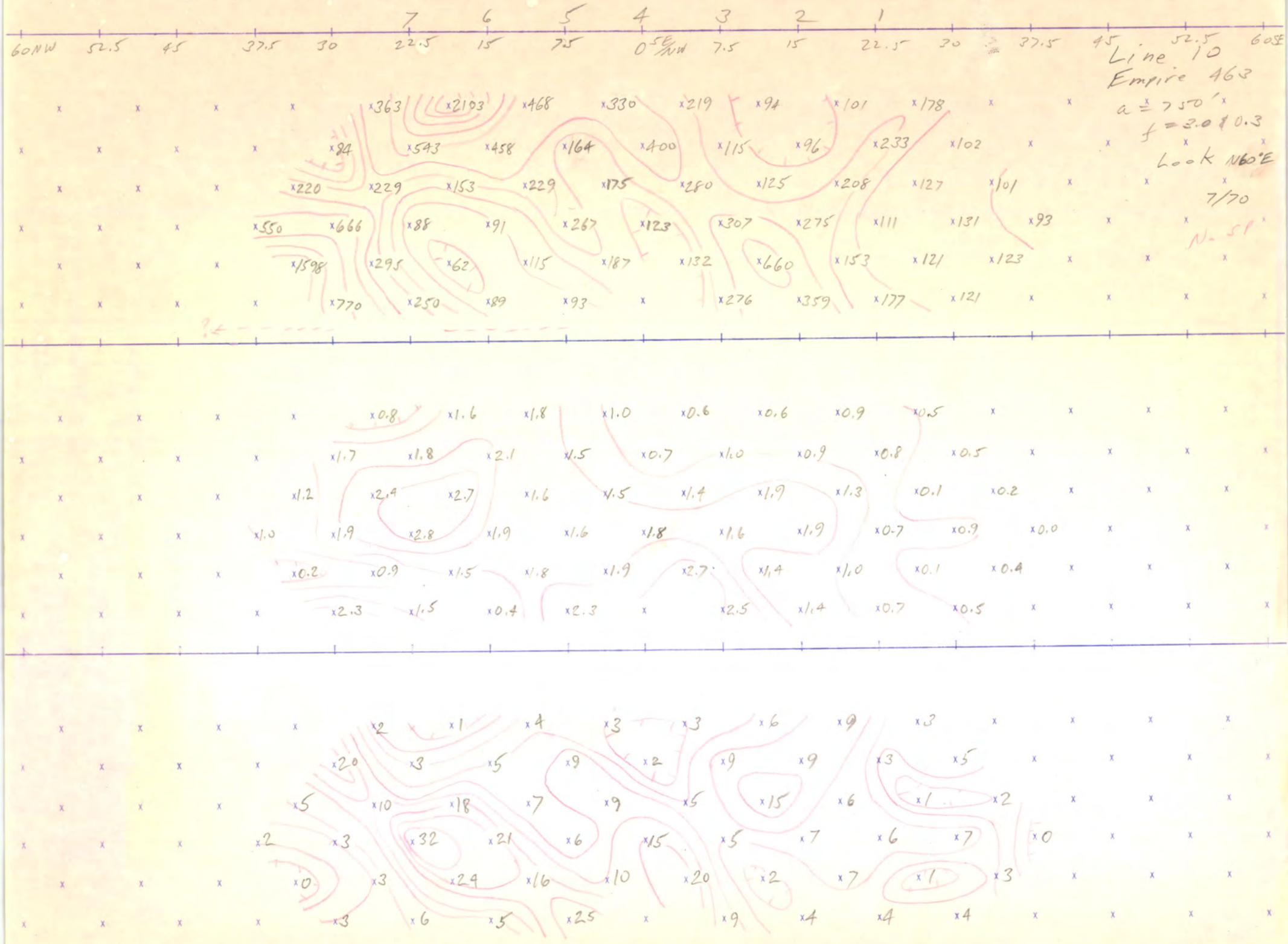

114 112 115 81 68 59 42 16 0 N.SP Link 0 -21 -22 -7 +9 21 51
605 52.5 45 37.5 30 22.5 15 7.5 0 N/S 7.5 15 22.5 30 37.5 45 52.5 60 N
Line 7
Looking West
a = 750'
463
Empire
f = 3.0 & 0.3 Hz
Capacitive Coupling?

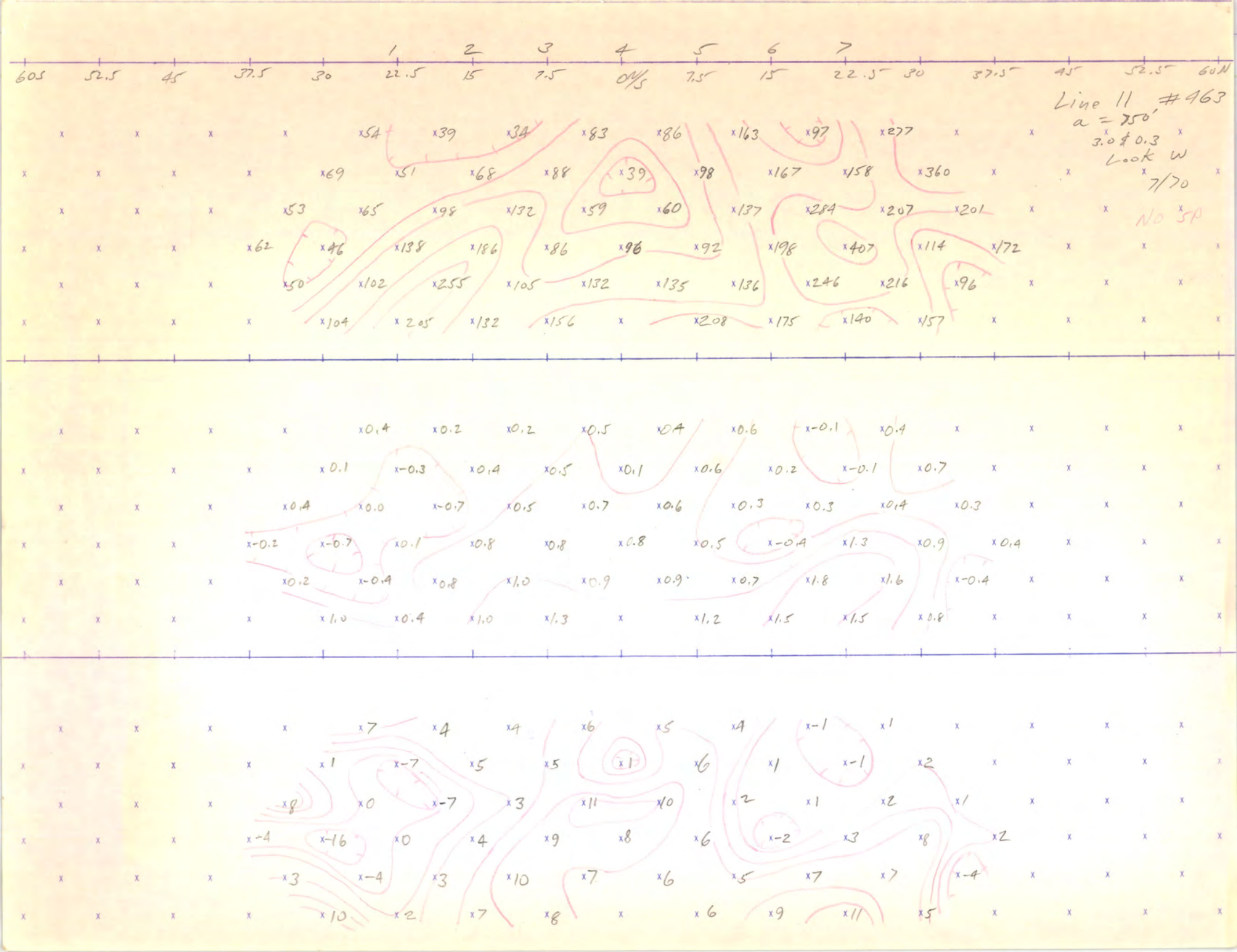

23 26 18 24 3 5 -3 9 0 -25 -26 -40 -96 -92 -84 -119 -111
1 2 3 4 5 6 7
60W 52.5 45 37.5 30 22.5 15 7.5 0E/W 7.5 15 22.5 30 37.5 45 52.5 60E
Line 8
Looking NNE
along road
a = 7.5'
f = 3.0 & 0.3 Hz
Empire
463

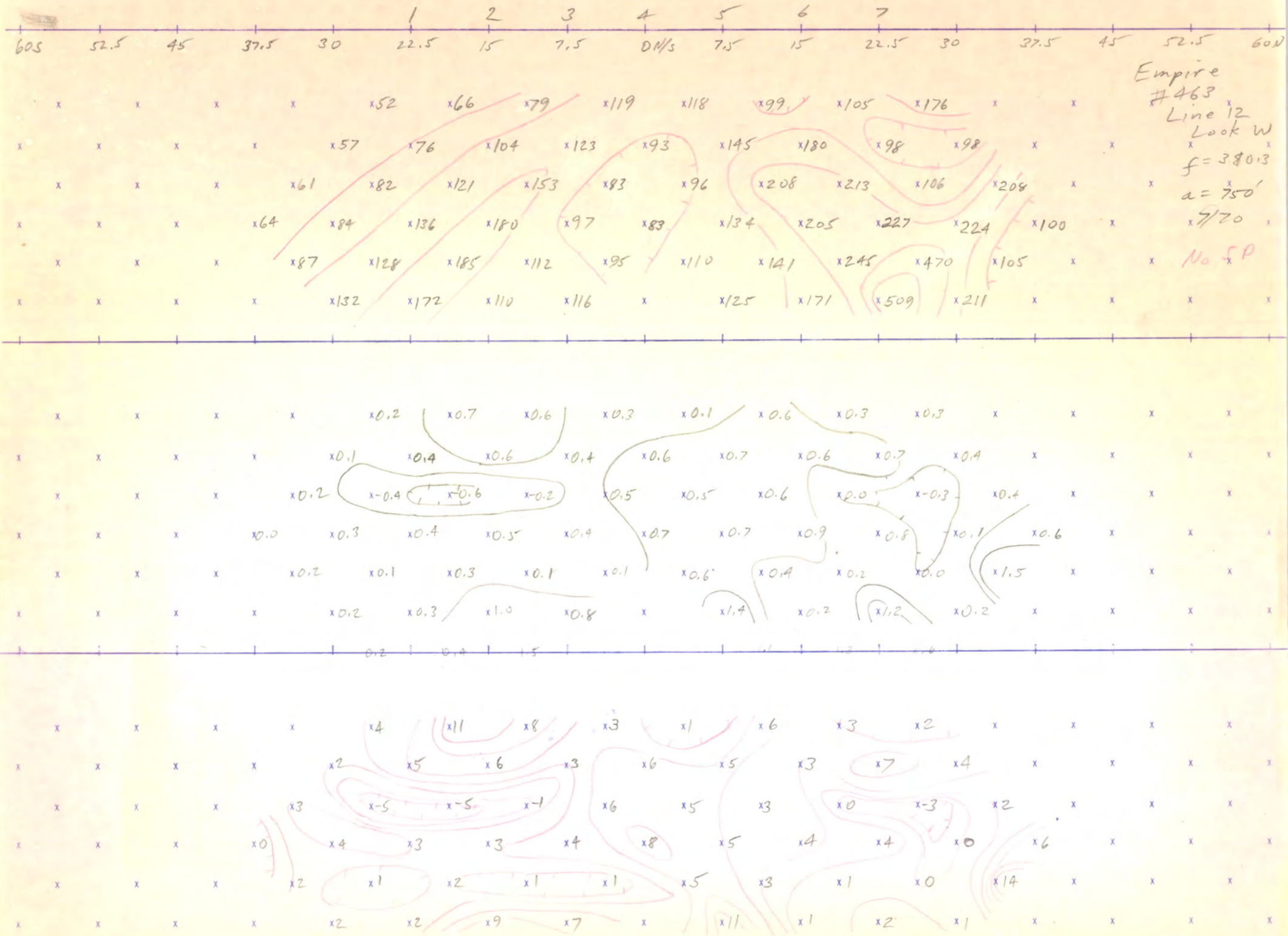


7 6 5 4 3 2 1
W.P.F.
(Partially grounded) fence
72NW 63 54 45 36 27 18 9 0 NW/SE 9 18 27 36 45 54 63 72SE
Job #463 Empire Mtns
Line 9
a = 900'
f = 0.3 & 3
Look N58°E
No SP


7 6 5 4 3 2 1
48NW 45 42 39 36 33 30 27 24NW 21 18 15 12 9 6 3 0
Empire
Line 9
Spr 2
a = 300'
0.3 & 3.0 H/s
N58°E ?
Don't plot 58


7 6 5 4 3 2 1
60NW 52.5 45 37.5 30 22.5 15 7.5 0 SE/NW 7.5 15 22.5 30 37.5 45 52.5 60SE
Line 10
Empire 463
a = 750'
f = 2.0 & 0.3
Look N60°E
7/70
N-51
?

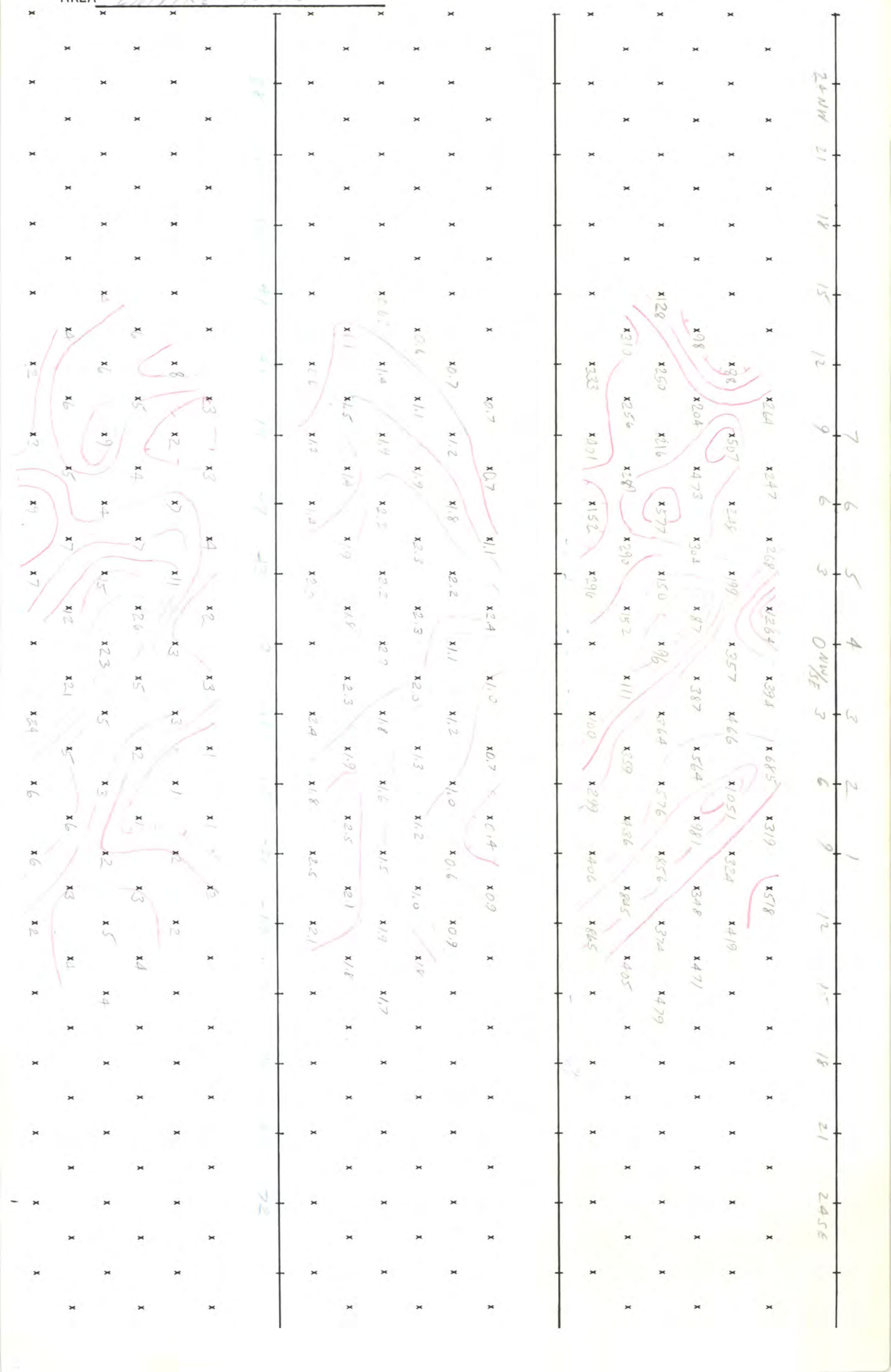

1 2 3 4 5 6 7
60S 52.5 45 37.5 30 22.5 15 7.5 0N/S 7.5 15 22.5 30 37.5 45 52.5 60N
Line 11 #463
a = 750'
3.0 & 0.3
Look W
7/70
NO SP
x54 x39 x34 x83 x86 x163 x97 x277
x69 x51 x68 x88 x39 x98 x167 x158 x360
x53 x65 x98 x132 x59 x60 x137 x284 x207 x201
x62 x46 x138 x186 x86 x96 x92 x198 x407 x114 x172
x50 x102 x255 x105 x132 x135 x136 x246 x216 x96
x104 x205 x132 x156 x208 x175 x140 x157
x0.4 x0.2 x0.2 x0.5 x0.4 x0.6 x-0.1 x0.4
x0.1 x-0.3 x0.4 x0.5 x0.1 x0.6 x0.2 x-0.1 x0.7
x0.4 x0.0 x-0.7 x0.5 x0.7 x0.6 x0.3 x0.3 x0.4 x0.3
x-0.2 x-0.7 x0.1 x0.8 x0.8 x0.8 x0.5 x-0.4 x1.3 x0.9 x0.4
x0.2 x-0.4 x0.8 x1.0 x0.9 x0.9 x0.7 x1.8 x1.6 x-0.4
x1.0 x0.4 x1.0 x1.3 x1.2 x1.5 x1.5 x0.8
x7 x4 x4 x6 x5 x4 x-1 x1
x1 x-7 x5 x5 x1 x6 x1 x-1 x2
x8 x0 x-7 x3 x11 x10 x2 x1 x2 x1
x-4 x-16 x0 x4 x9 x8 x6 x-2 x3 x8 x2
x3 x-4 x3 x10 x7 x6 x5 x7 x7 x-4
x10 x2 x7 x8 x6 x9 x11 x5


1 2 3 4 5 6 7
60S 52.5 45 37.5 30 22.5 15 7.5 0N/S 7.5 15 22.5 30 37.5 45 52.5 60N
Empire
#463
Line 12
Look W
f = 3803
a = 750'
5/70
No SP

JOB# 463 LINE# 9W SP 1 a = 300' LOOKING N58°E

CLIENT M. C. O. DATE Aug. 1970 FREQUENCIES 0.3 & 3.0 Hz

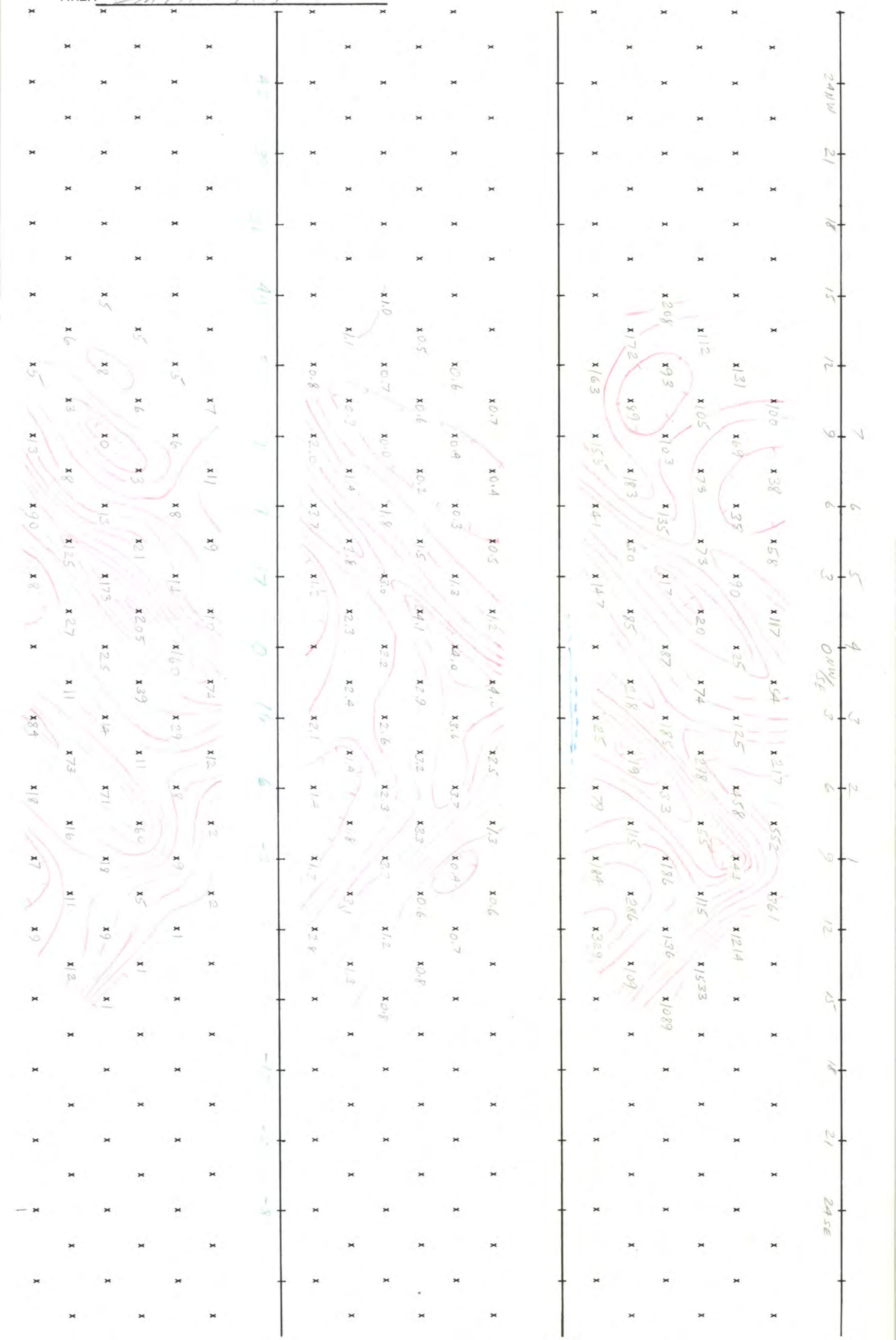
AREA EMPIRE MINES.



JOB# 463 LINE# 9E SP 1 a = 300' LOOKING N58°E

CLIENT M.C.O. DATE Aug. 1970 FREQUENCIES 0.3 & 3.0 Hz

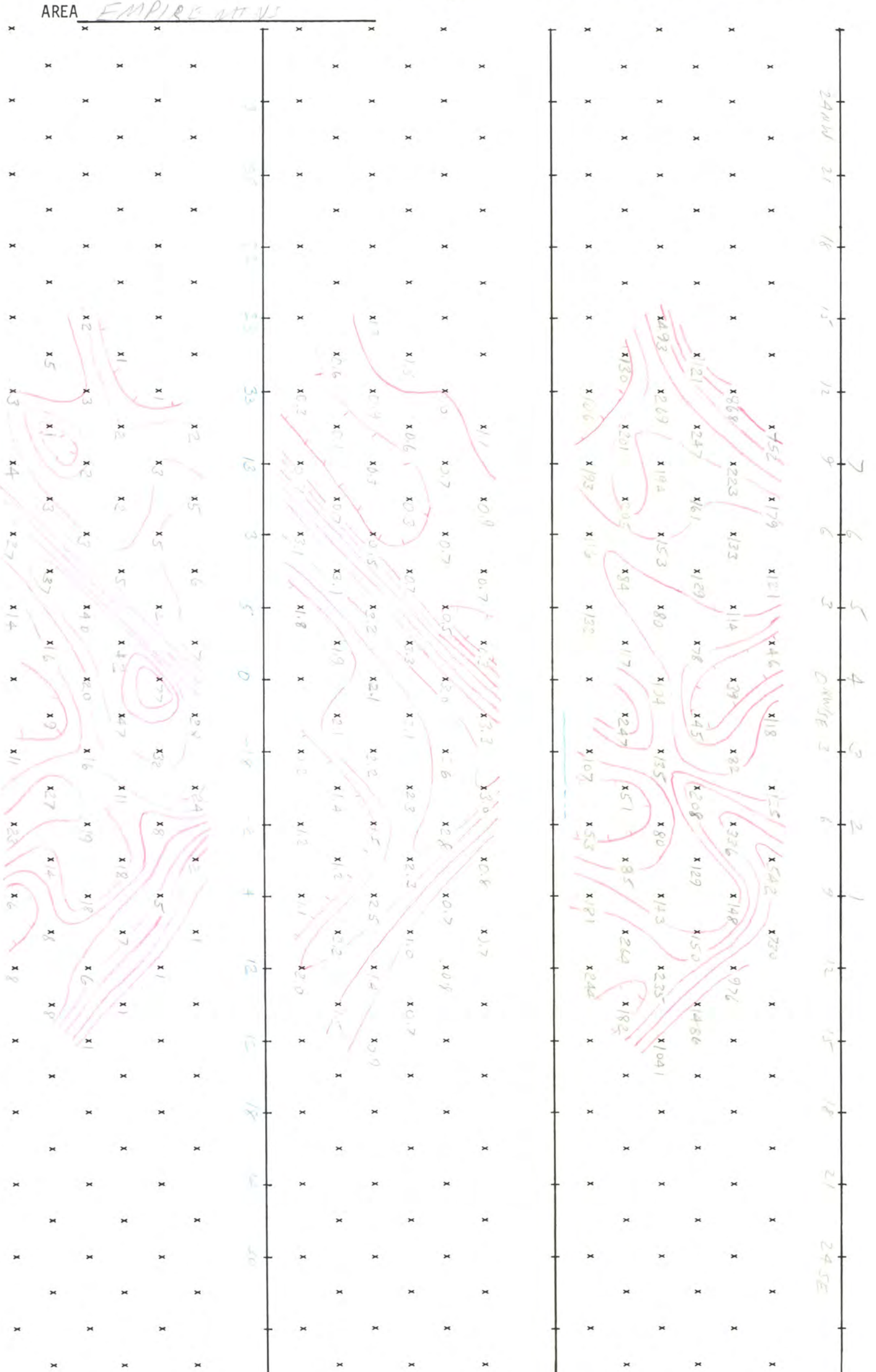
AREA EMPIRE MTNS.



JOB# 163 LINE# 9E-2 SP 1 a = 300' LOOKING N58°E

CLIENT U.C.O DATE Aug. 1970 FREQUENCIES 0.3 & 3.0 Hz

AREA EMPIRE MTN VI

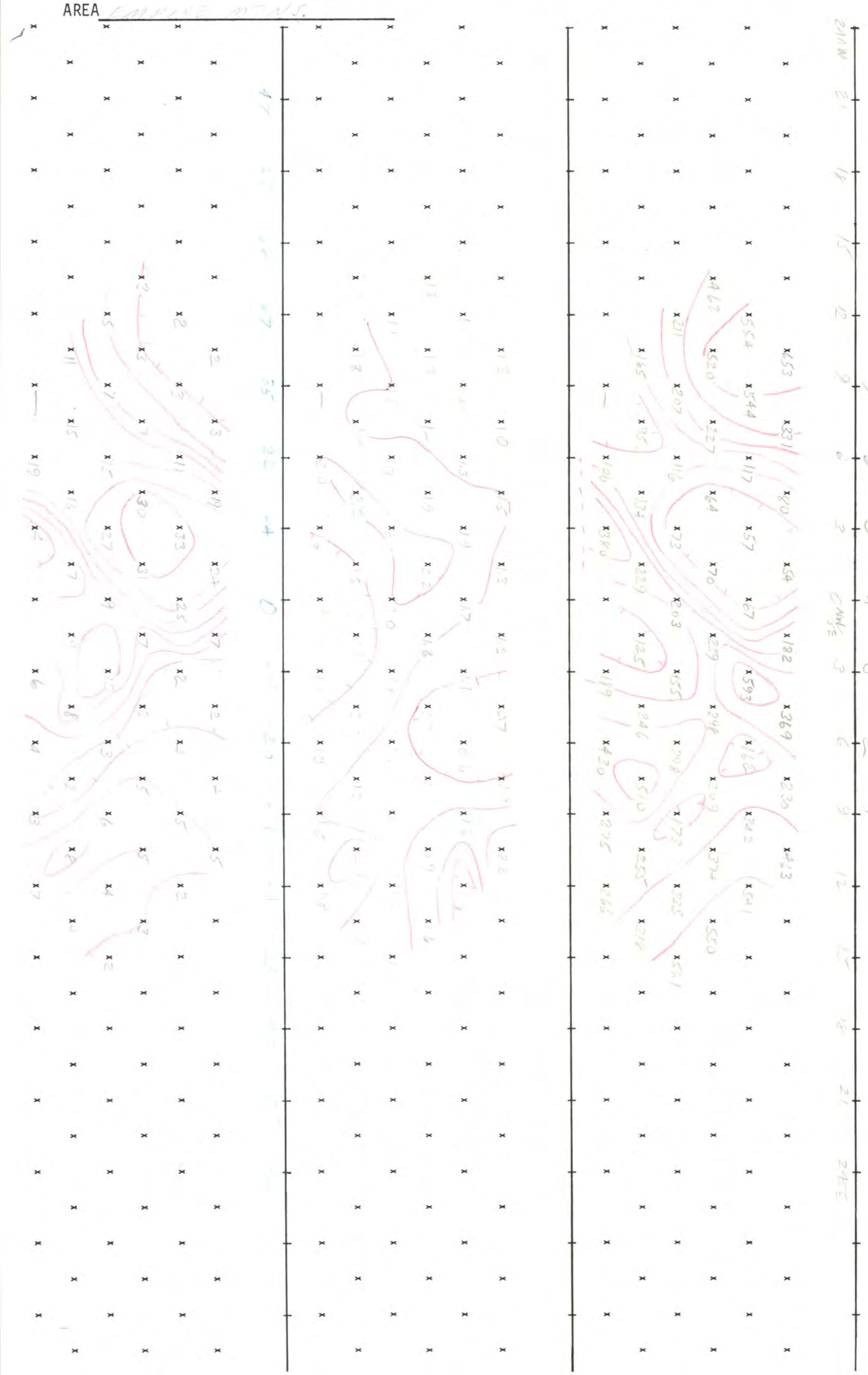


9E-3

JOB# 463 LINE# 9-E-3 SP 1 a = 300' LOOKING N58E

CLIENT M.C.S. DATE Sept '70 FREQUENCIES 0.3 & 3.0 Hz

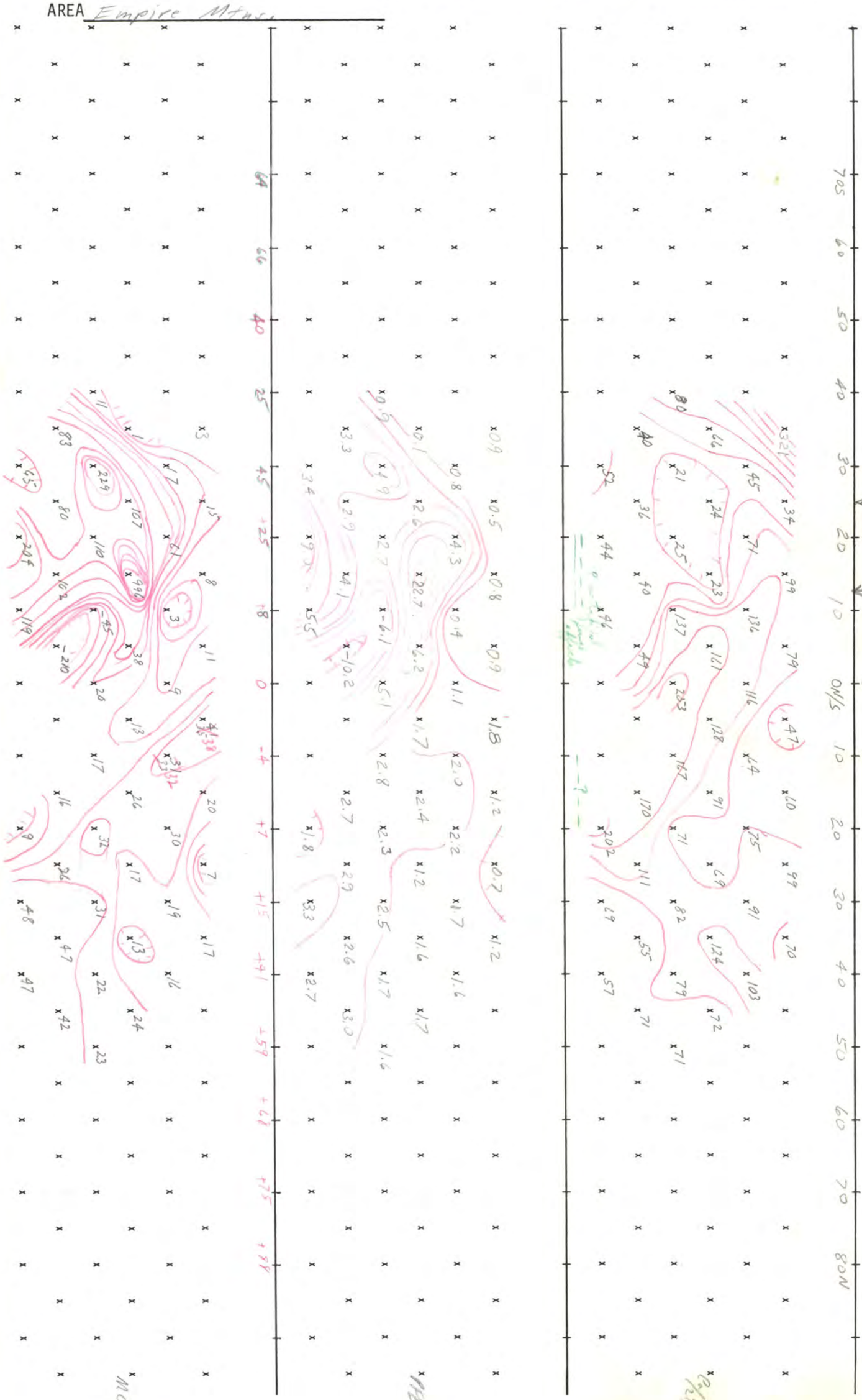
AREA EMPIRE MTNS.



JOB# 463 LINE# 13 SP 1 a = 1000' LOOKING West

CLIENT M.C.O. DATE Oct. 1970 FREQUENCIES 0.1 & 1.0 Hz

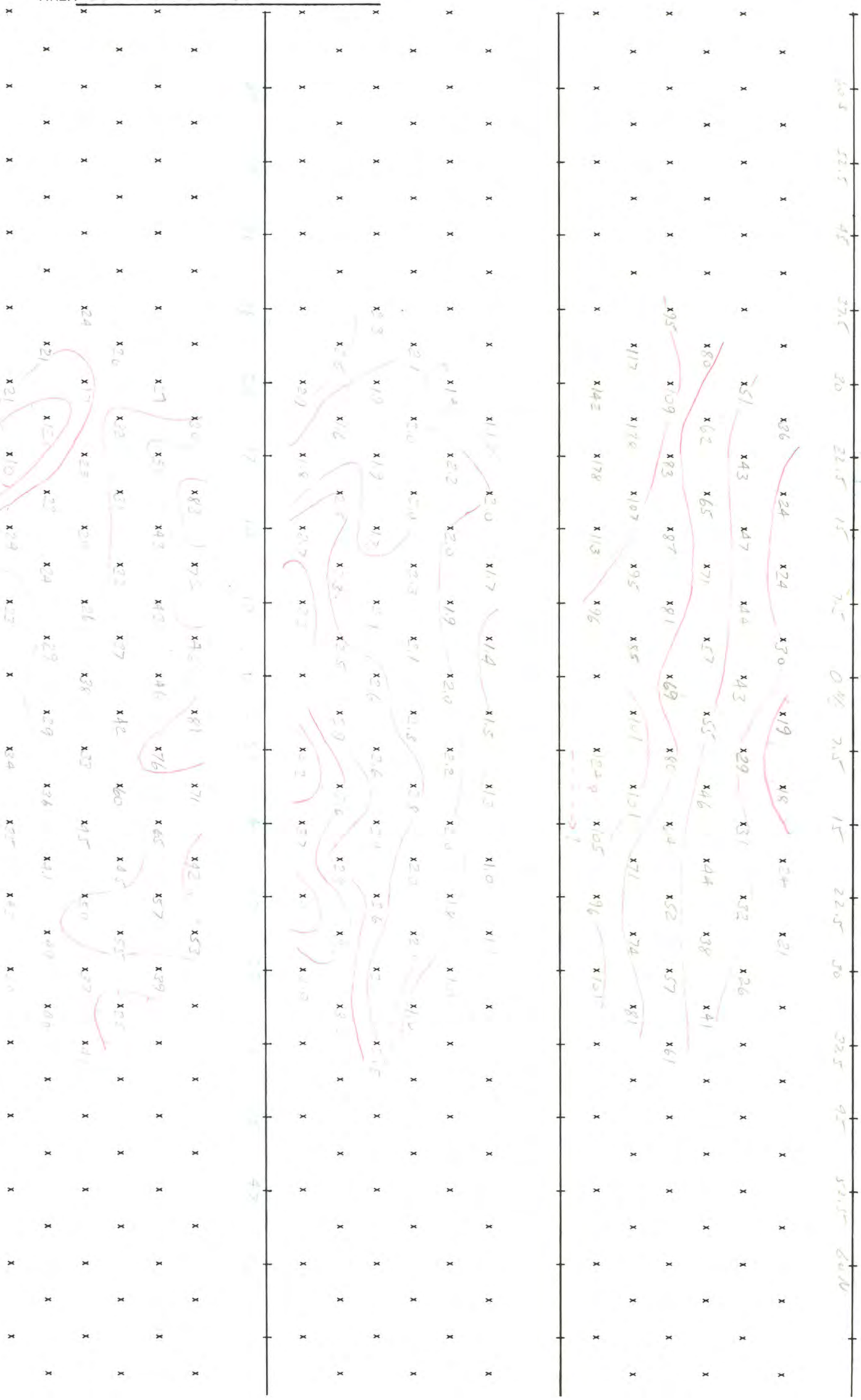
AREA Empire Mtns.



JOB# 463 LINE# 14 SP 1 a = 750' LOOKING West

CLIENT M.C.O. DATE Aug. 1970 FREQUENCIES 0.3 & 3.0 Hz

AREA [illegible]



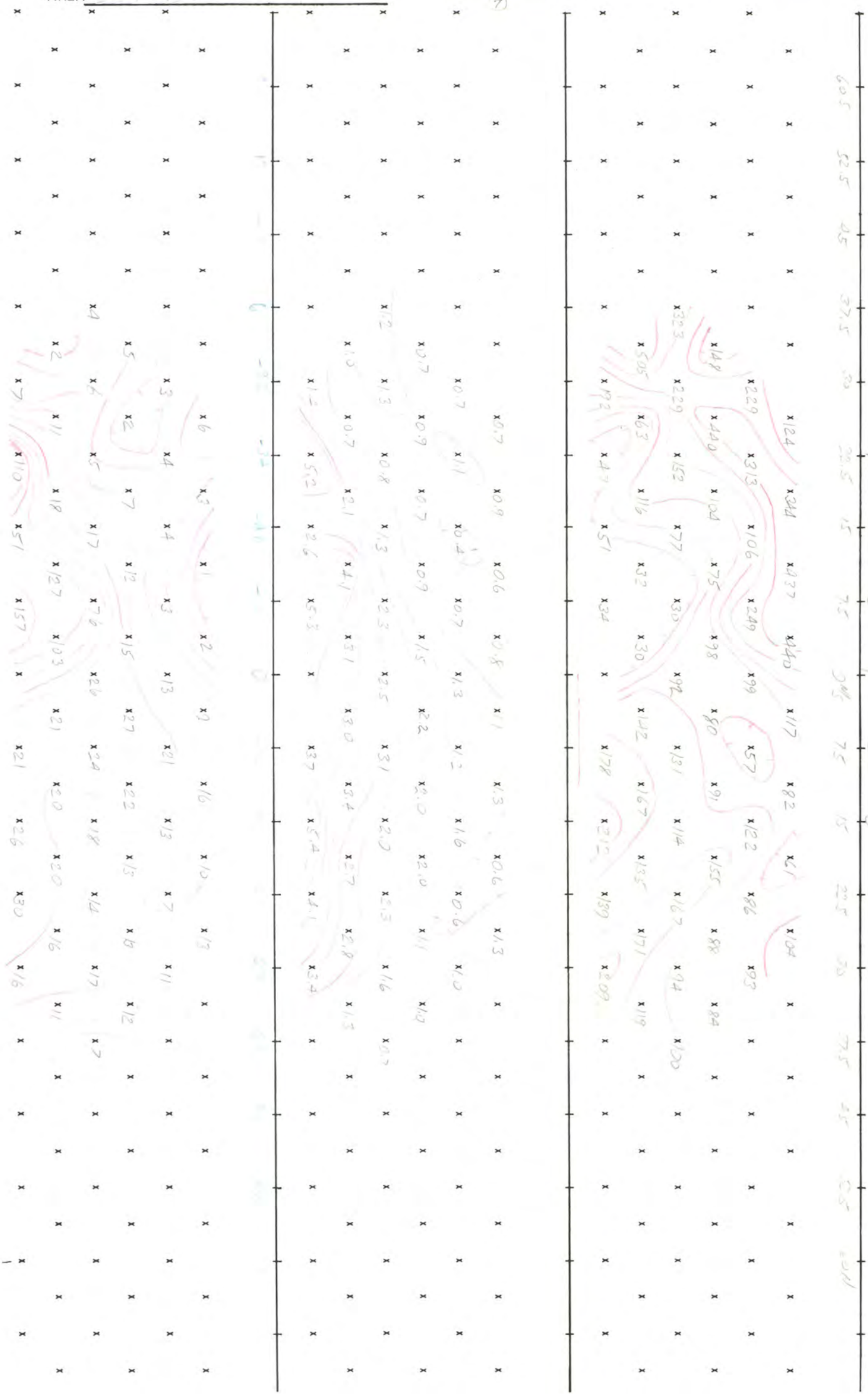
JOB# 465 LINE# 15 SP 1 a = 750 LOOKING West

CLIENT M.C.O. DATE 11/70 FREQUENCIES 0.3 & 3.0 Hz

September 1970

(7)

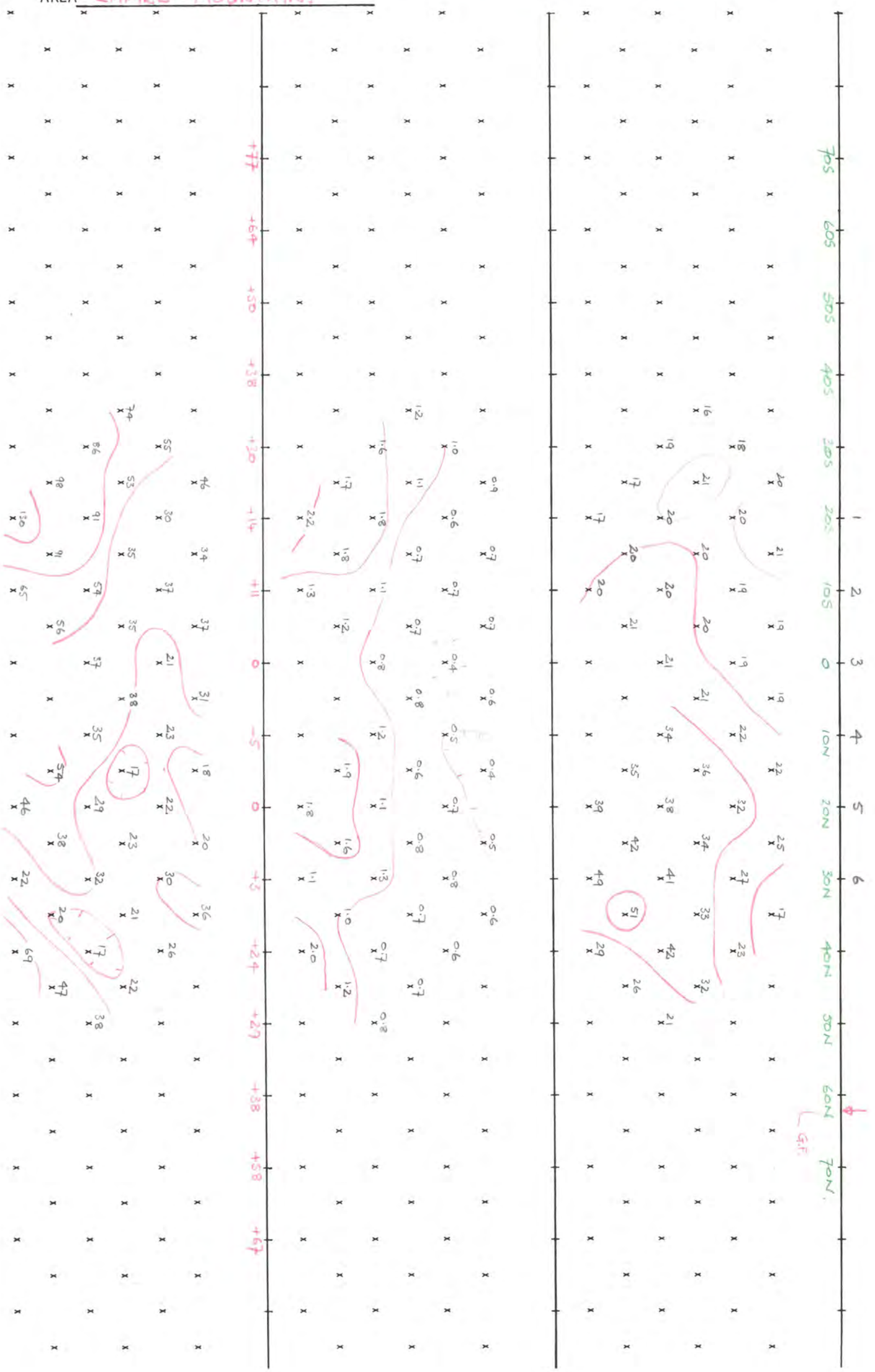
AREA [illegible]



JOB# 463 LINE# 16 SP 1 a = 1000 LOOKING WEST

CLIENT MIAMI COPPER OPERATIONS DATE 10-19-70 FREQUENCIES 1.0 & 0.1 Hz

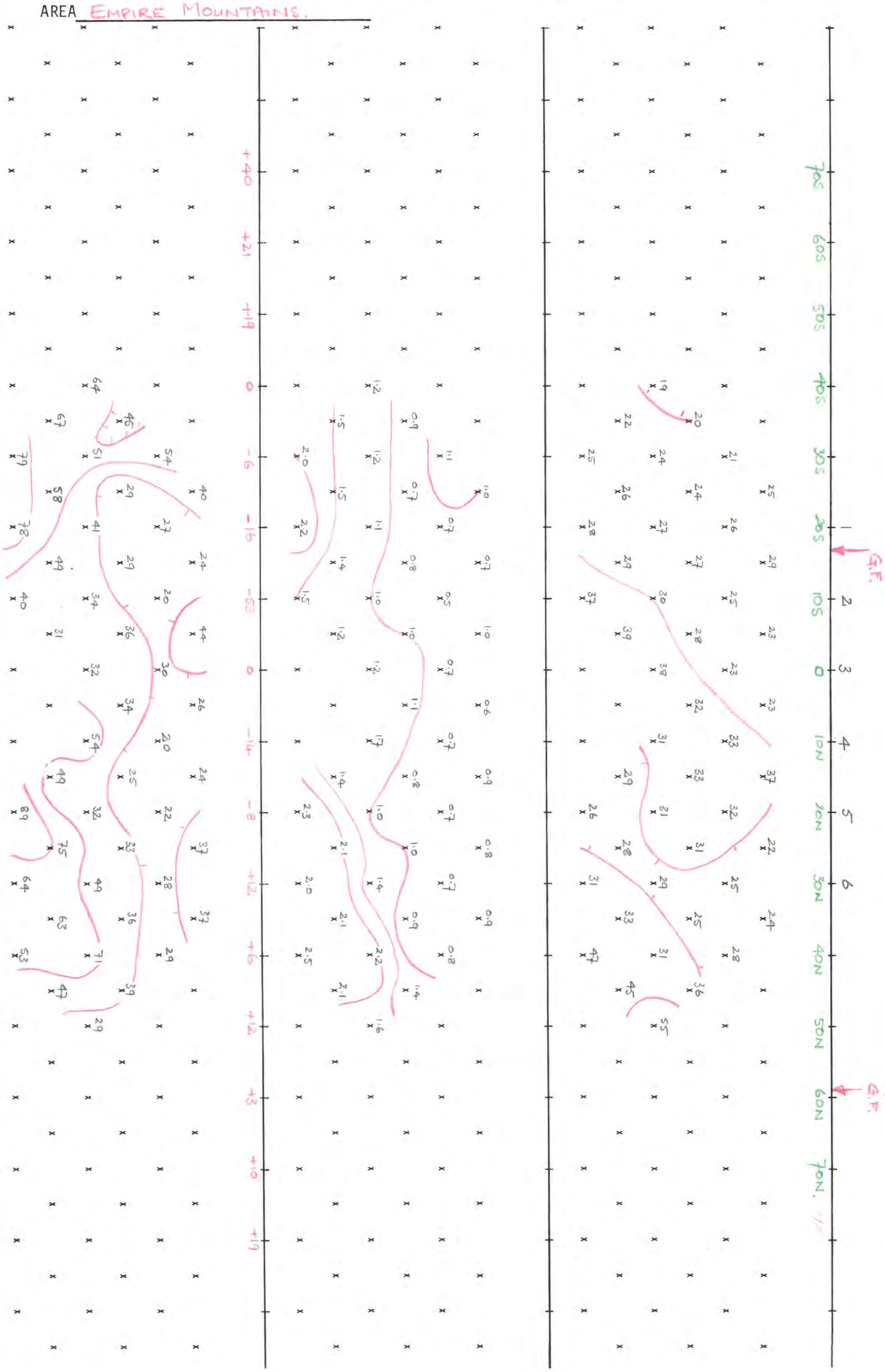
AREA EMPIRE MOUNTAINS



JOB# 463 LINE# 17 SP 1 a = 1000 LOOKING WEST.

CLIENT MIAMI COPPER OPERATIONS DATE 10-21-70 FREQUENCIES 1.0 & 0.1 Hz

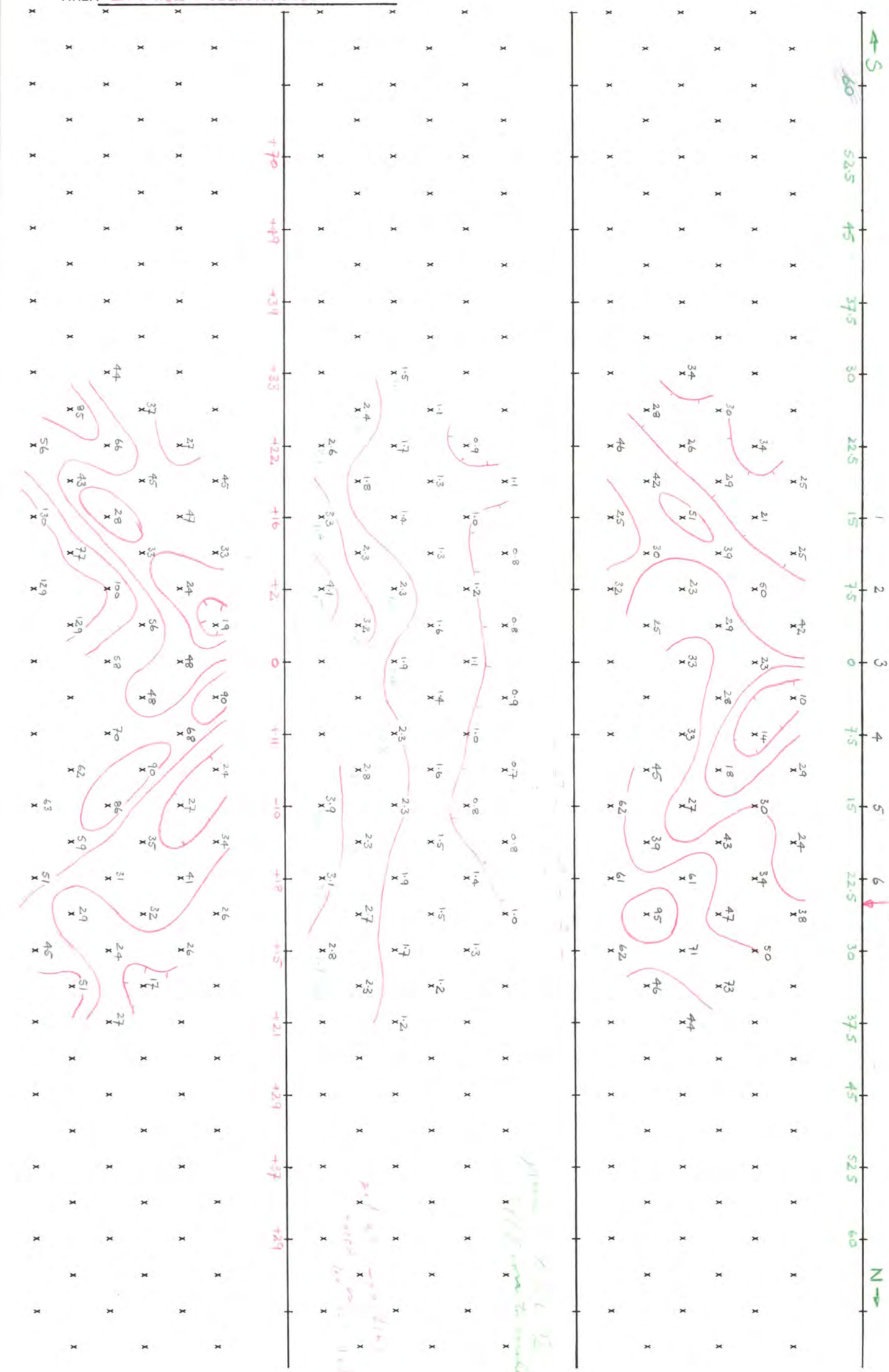
AREA EMPIRE MOUNTAINS.



JOB# 463 LINE# 18 SP 1 a = 750 LOOKING WEST

CLIENT MIAMI COPPER OPERATIONS DATE 10-23-70 FREQUENCIES 3.0 & 2.3 Hz

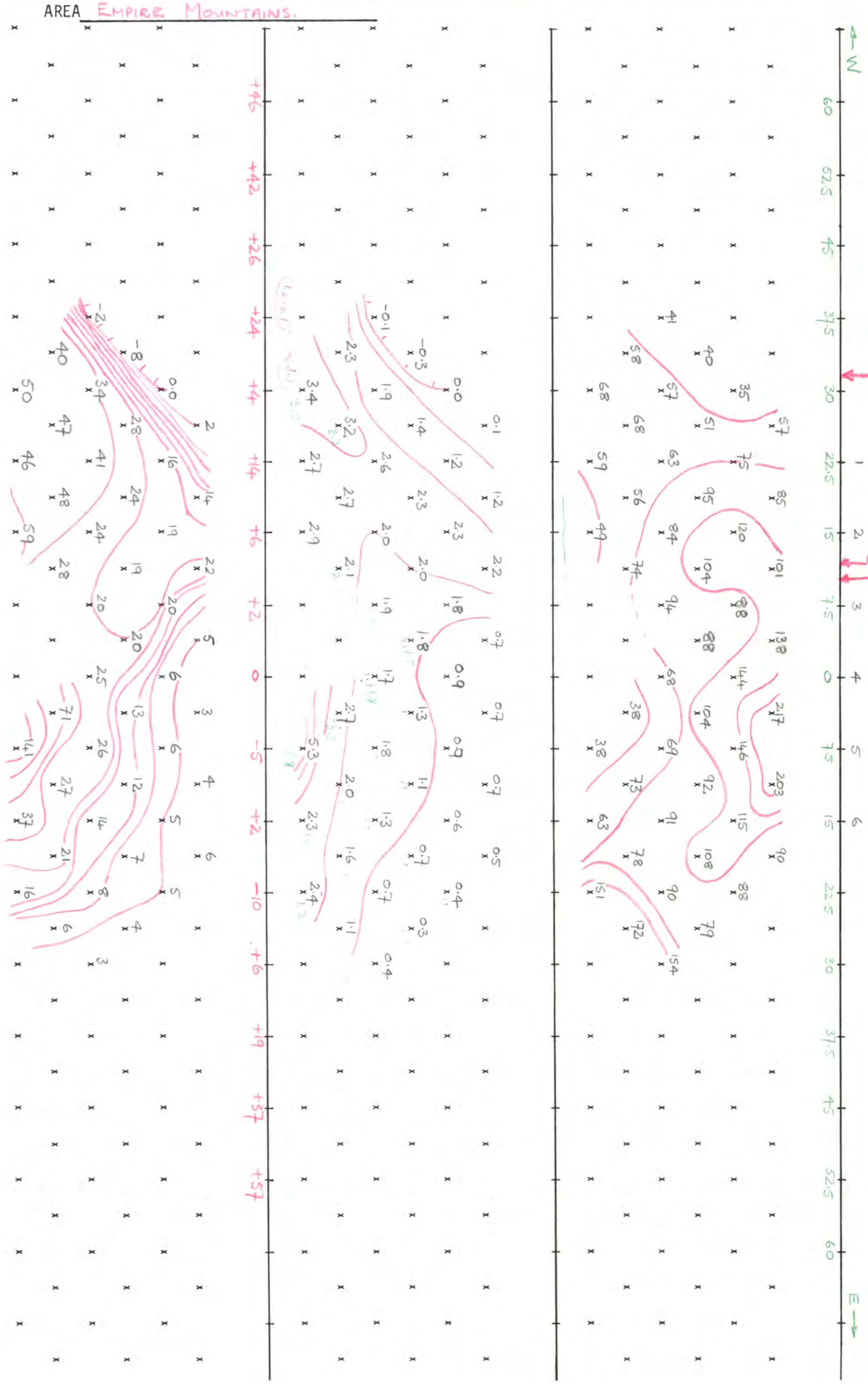
AREA EMPIRE MOUNTAINS



JOB# 463 LINE# 19 SP 1 a = 750 LOOKING NORTH

CLIENT MIAMI COPPER OPERATIONS DATE 10-26-70 FREQUENCIES 3.0 & 0.3 Hz

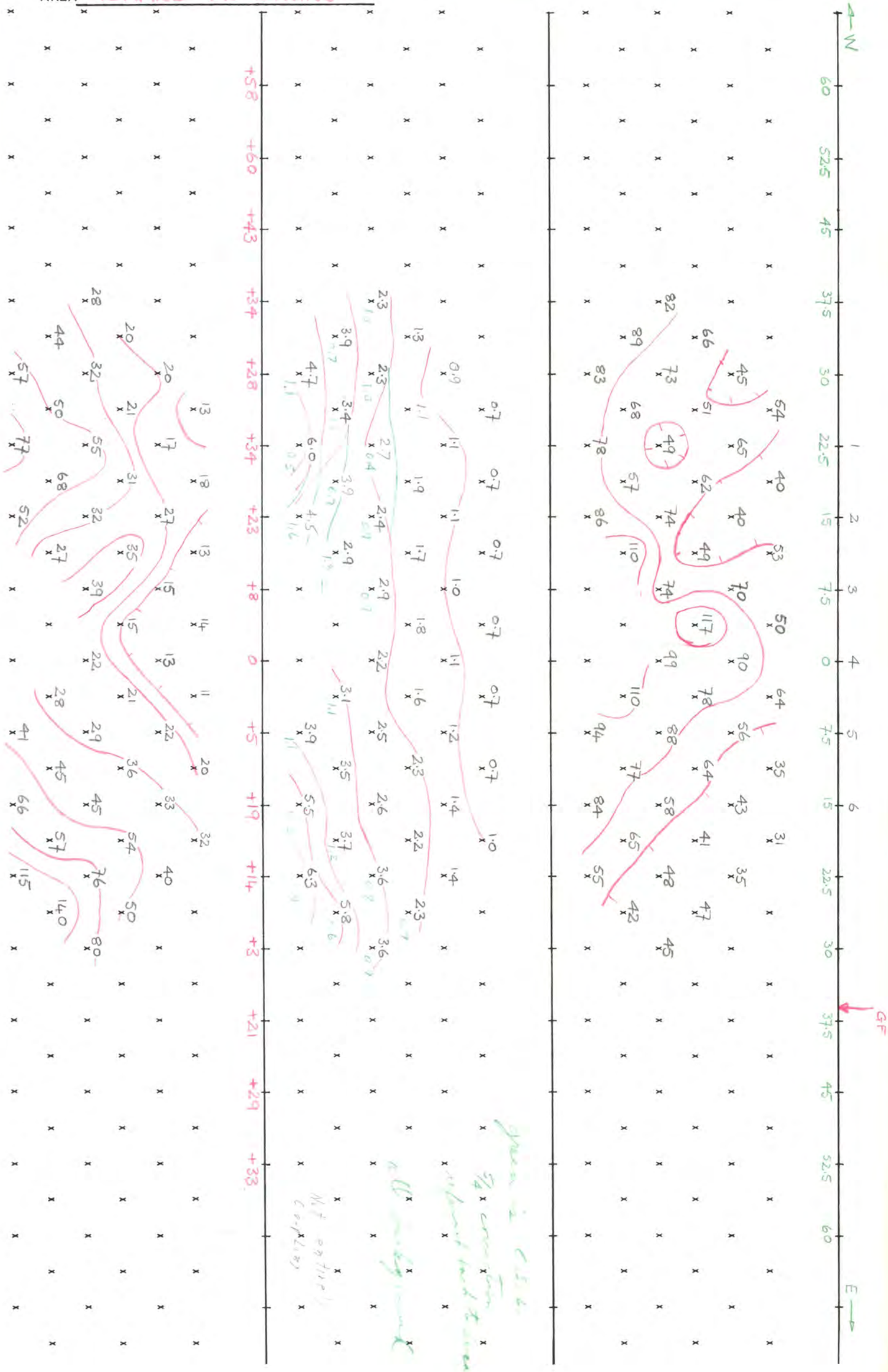
AREA EMPIRE MOUNTAINS.



JOB# 463 LINE# 20 SP 1 a = 750 LOOKING N 25 E.

CLIENT MIAMI COPPER OPERATIONS DATE 10-27-70 FREQUENCIES 3.0 & 0.3 Hz

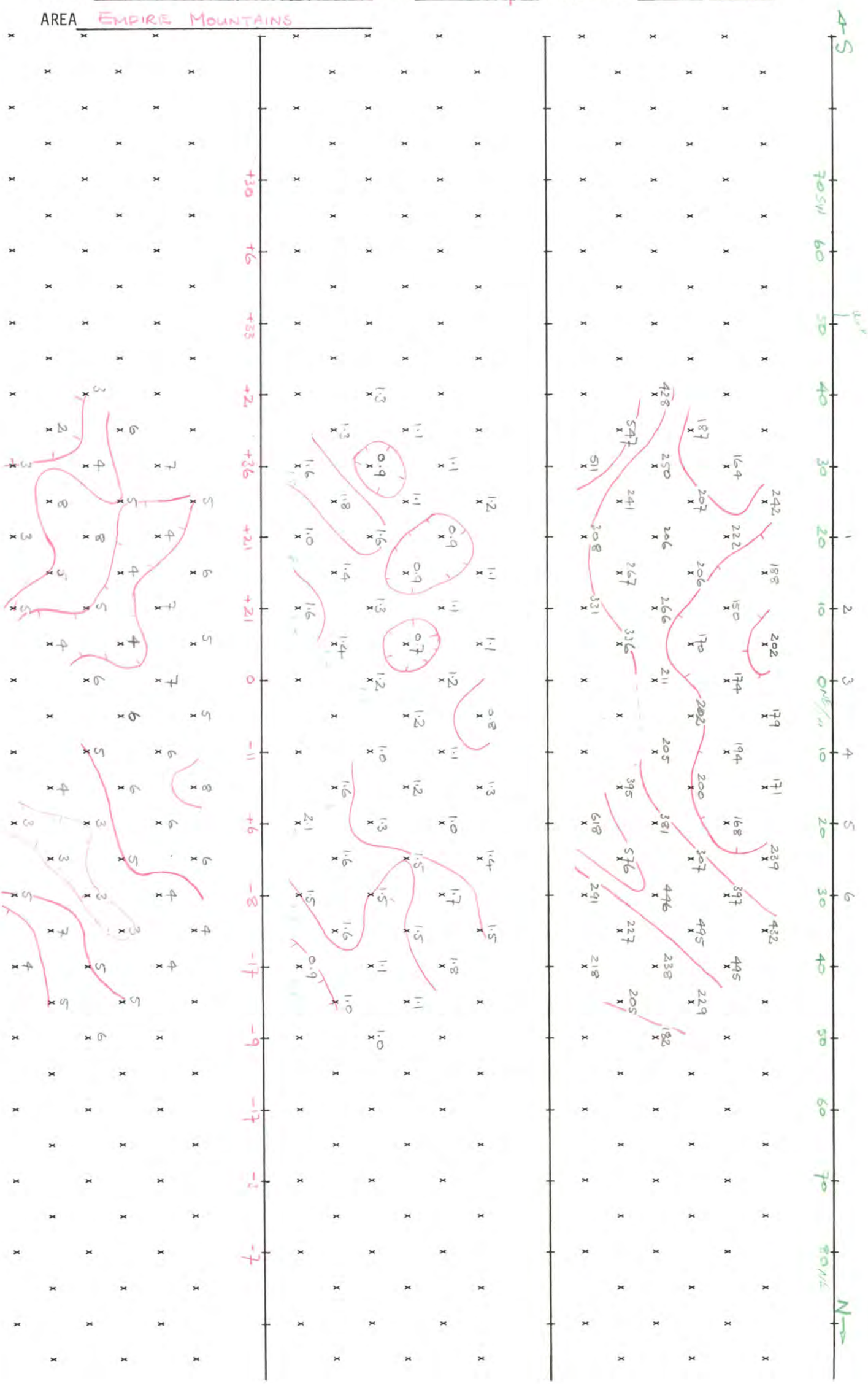
AREA EMPIRE MOUNTAINS



JOB# 463 LINE# 21 SP I a = 1000 LOOKING N 52° W

CLIENT MIAMI COPPER OPERATIONS DATE 10-30-70 FREQUENCIES 1.0 & 0.1 Hz

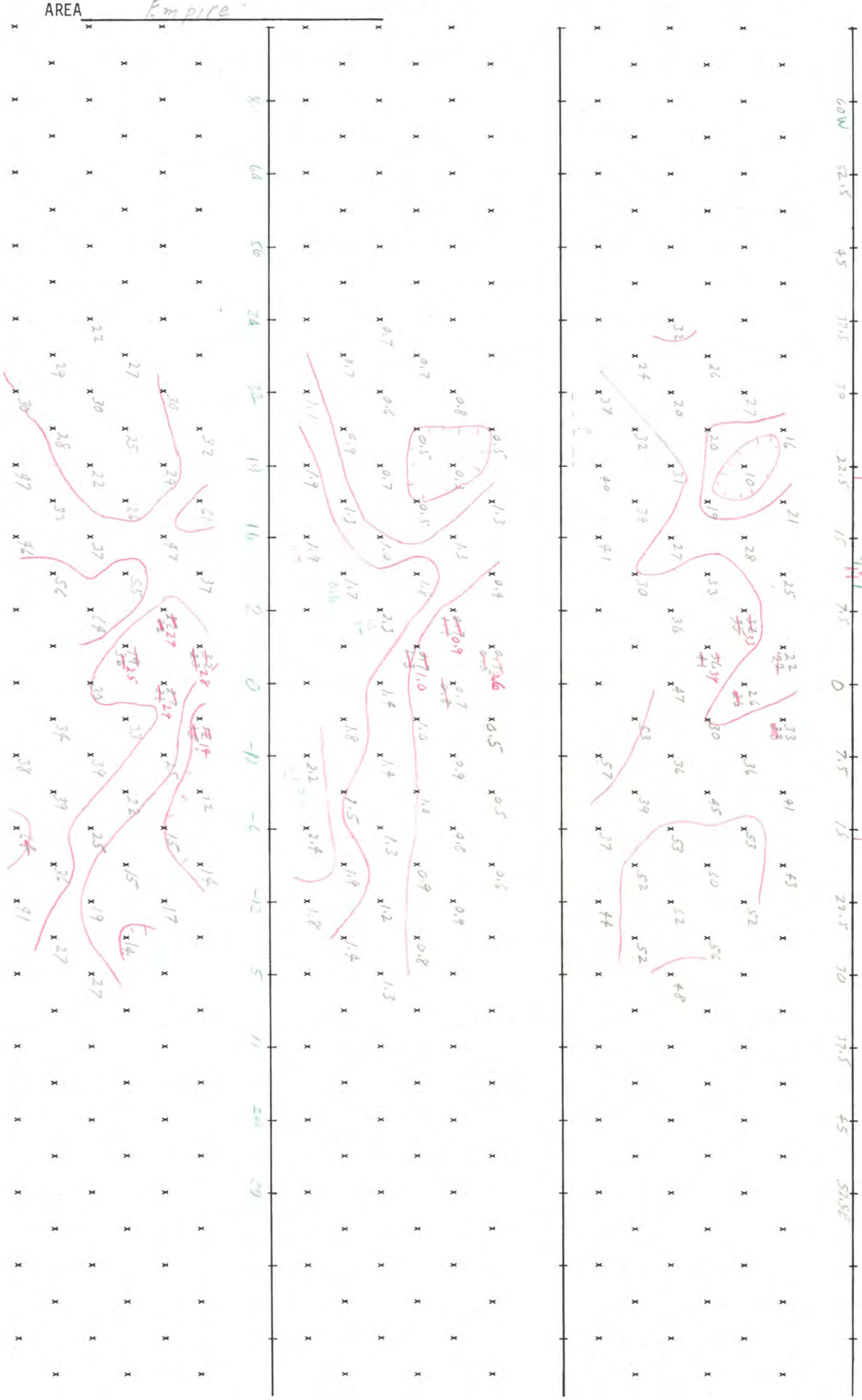
AREA EMPIRE MOUNTAINS



JOB# 463 LINE# 22 SP 1 a = 750 LOOKING North

CLIENT Mumi DATE 5/11/70 FREQUENCIES 3.0 & 0.3 Hz

AREA Empire



JOB# 463 LINE# 23 SP 1 a = 750' LOOKING North

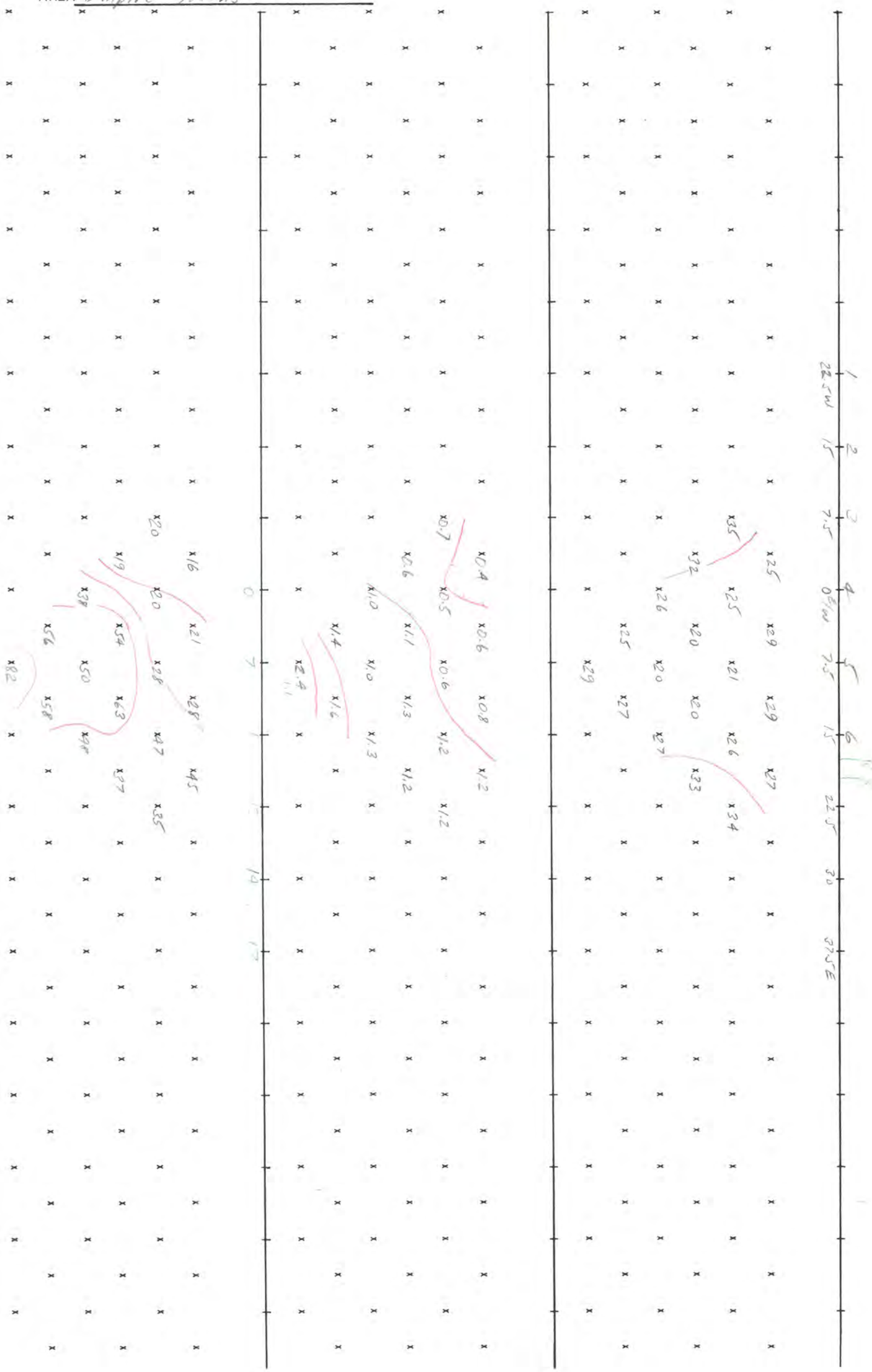
CLIENT M.C.O. DATE 11/10/70 FREQUENCIES 3 & 0.3 Hz

AREA Empire Mtns

JOB# 463 LINE# 24 SP 1 a = 750' LOOKING North

CLIENT M.C.O. DATE Nov. 1970 FREQUENCIES 0.3 & 3.0 Hz

AREA Empire Mtns



JOB# 463 LINE# 25 SP 1 a = 750 LOOKING North

CLIENT M.C.O. DATE Nov. 1970 FREQUENCIES 0.3 & 3.0 Hz

AREA Empire Mtn.

JOB# 463 LINE# 26 SP 1 a = 750' LOOKING N51E

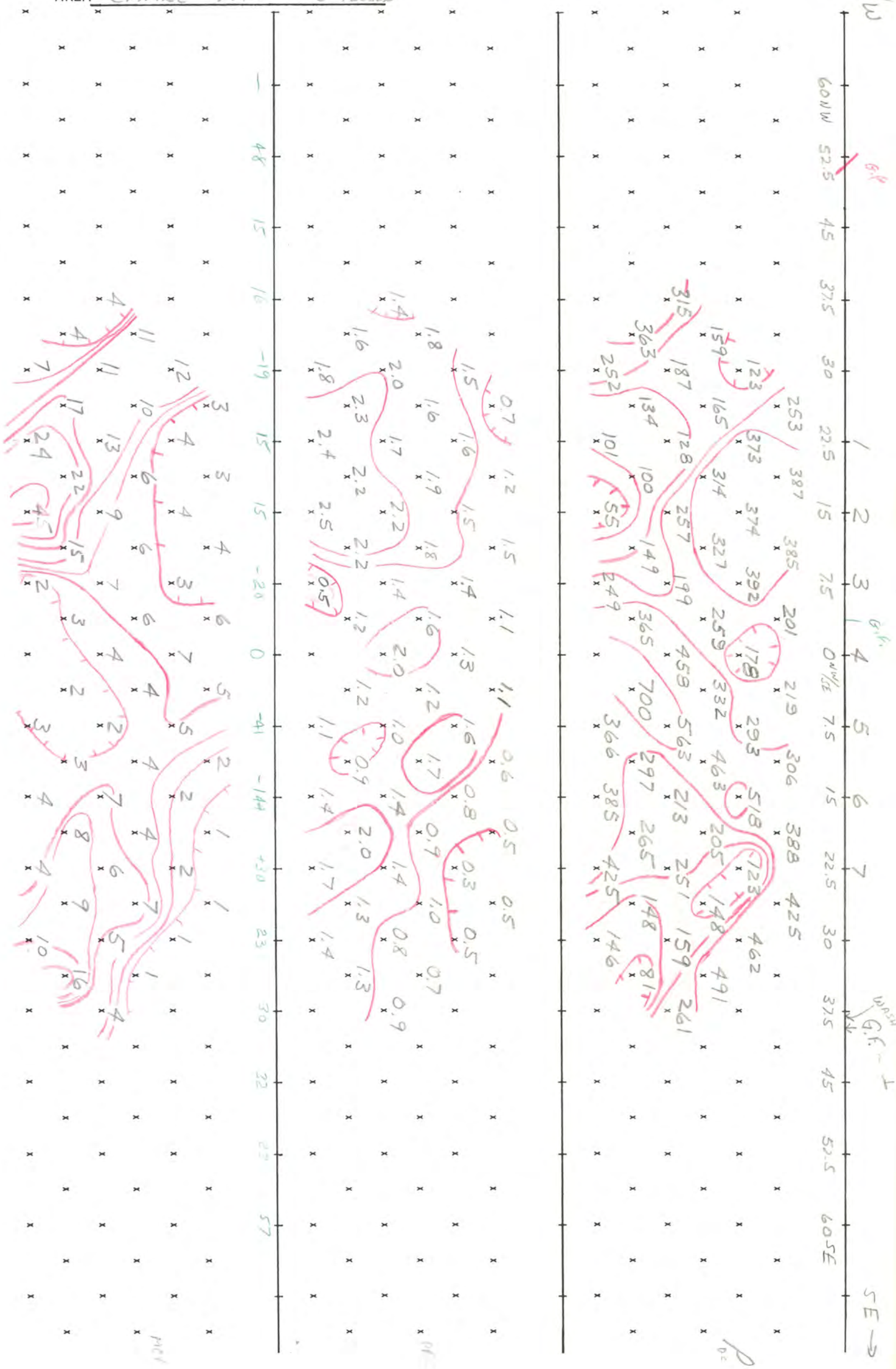
CLIENT M.C.O. DATE Nov. 1970 FREQUENCIES 0.3 & 3.0 Hz

AREA Empire Mtns

JOB# 463 LINE# 27 SP 1 a = 750' LOOKING N45°E

CLIENT MIAMI DATE 11-30-70 FREQUENCIES 3 & 0.3 Hz

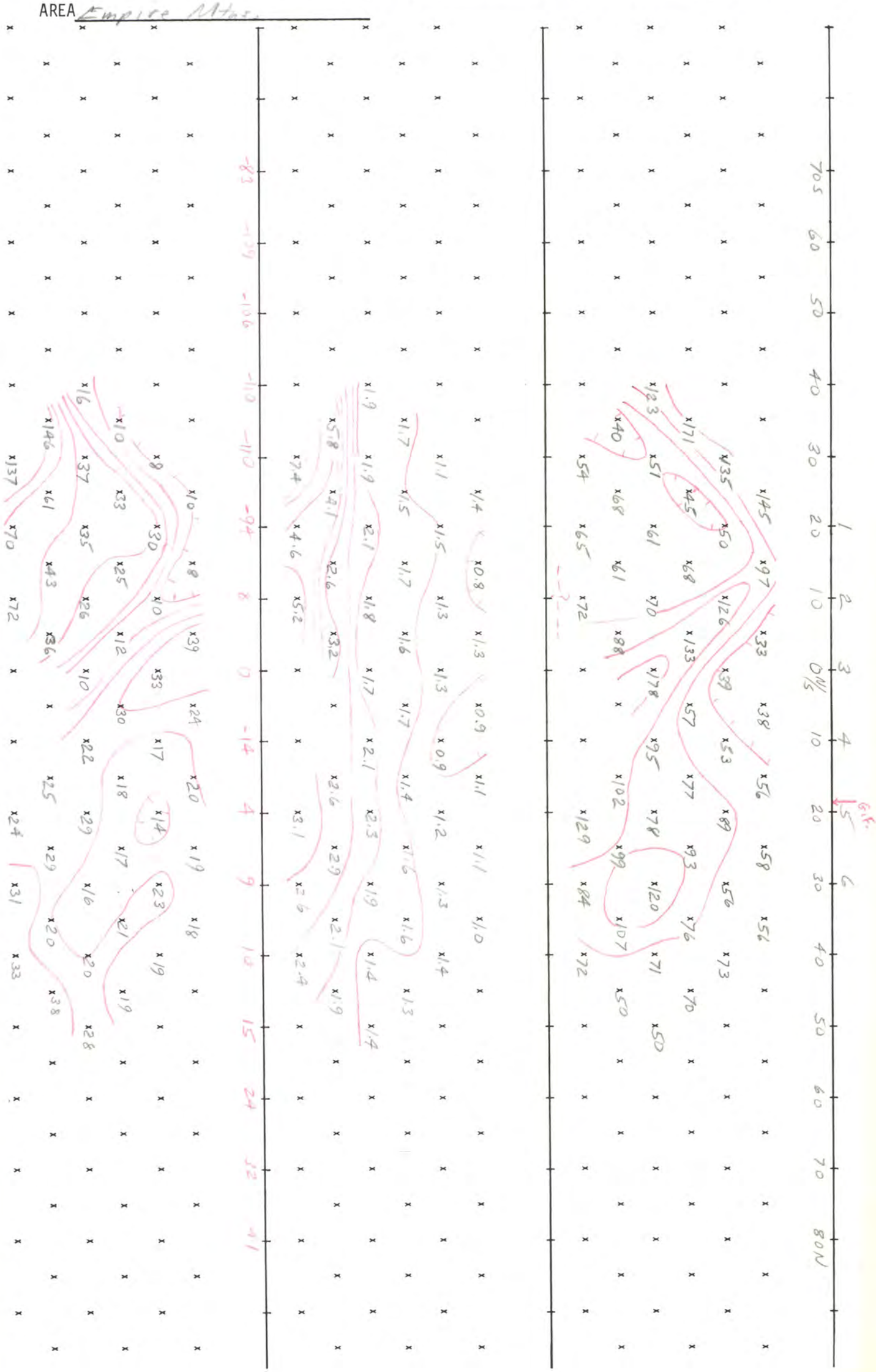
AREA EMPIRE MTS. - SE TUCSON



JOB# 463 LINE# 28 SP 1 a = 1000' LOOKING West

CLIENT M.C.O. DATE Nov. 1970 FREQUENCIES 0.1 & 1.0 Hz

AREA Empire State



LINES 1, 2 & 3

PAGE 1

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE-
LINE 1 HALF SE SP. 1 DATE 4/15

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 5-6 | 2-3 | 1-2 | CAL |
| RECEIVE | 0-7.5 | → | 7.5-15 | → | → | 15-22.5 | → | → | → | 1-2 |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.5 | 1.1 | 0.5 | 0.9 | 1.5 | 0.6 | 1.8 | 1.0 | 1.6 | -0.1 |
| DC 2 I | 3 | 3 | 3 | 3 | 3 | 4 | 3 | 3 | 3 | 2000 |
| DC 3 $K_n$ | 2.25 | 9 | 2.25 | 9 | 22.5 | 2.25 | 9 | 22.5 | 45 | |
| DC 4 | | | | | | | | | | |
| DC 5 $\rho$ | 132 | 70 | 114 | 95 | 81 | 107 | 205 | 178 | 183 | (1.015) |
| DC 6 PFE | 0.6 | 1.2 | 0.6 | 1.0 | 1.6 | 0.7 | 1.9 | 1.1 | 1.7 | (-0.1) |
| DC 7 MEF | 5 | 17 | 5 | 11 | 20 | 7 | 9 | 6 | 9 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 17.4 | 22.9 | 15.0 | 31.2 | 10.7 | 18.9 | 67.4 | 23.4 | 12.0 | 19.7 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | +0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +1.5 | | -23.4 | | | +12.2 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 1 HALF SS SP. 1 DATE 7/15

PAGE 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 22.5-30 | | | | → | 30-37.5 | | | | |
| RANGE | 10 | 1.0 | 1.0 | 1.0 | 0.1 | 10 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.3 | 0.5 | 0.9 | 1.1 | 1.6 | 0.3 | 0.4 | 0.6 | 1.1 | 1.0 |
| DC 2 I | 5 | 5 | 3 | 3 | 3 | 5 | 5 | 5 | 3 | 3 |
| DC 3 $K_n$ | 2.25 | 9 | 22.5 | 45 | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 112 | 145 | 227 | 193 | 203 | 111 | 94 | 108 | 157 | 138 |
| DC 6 PFE | 0.4 | 0.6 | 1.0 | 1.2 | 1.7 | 0.4 | 0.5 | 0.7 | 1.2 | 1.1 |
| DC 7 MCF | 4 | 4 | 4 | 6 | 8 | 4 | 5 | 6 | 8 | 8 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 246 | 79.2 | 29.8 | 12.7 | 7.62 | 243 | 51.7 | 23.7 | 10.3 | 5.16 |
| AC 2 | +0.1 | 0.0 | 0.0 | 0.0 | +0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +15.9 | | | | | -4.7 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 1 HALF S SP. 1 DATE 11/15

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | -2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | → | 37.5-45 | ← | ← | ← | → | 45-52.5 | ← | ← | → |
| RANGE | 0.1 | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | 1.9 | 0.4 | 0.5 | 0.7 | 0.6 | 1.2 | 0.6 | 0.5 | 0.4 | 0.8 |
| DC 2 I | 3 | 5 | 5 | 5 | 3 | 3 | 5 | 5 | 5 | 3 |
| DC 3 $K_n$ | 126 | 9 | 22.5 | 45 | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 154 | 142 | 118 | 125 | 165 | 151 | 175 | 135 | 131 | 148 |
| DC 6 PFE | 2.0 | 0.5 | 0.6 | 0.8 | 0.7 | 1.3 | Picture at 4300' 0.6 | 0.6 | 0.5 | 0.9 |
| DC 7 MEF | 13 | 4 | 5 | 6 | 4 | 9 | 3 | 4 | 4 | 5 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 3.61 | 22.5 | 25.8 | 13.7 | 6.21 | 3.53 | 38.4 | 14.8 | 8.22 | 3.94 |
| AC 2 | 0.0 | 40.1 | 0.5 | 0.0 | 0.0 | 0.0 | +0.2 | 0.0 | +0.1 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -19.4 | | | | | +27.6 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE
LINE 1 HALF SE SP. 1 DATE 9/15



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 5,5,6,0 | → | → | | | | | | | |
| RANGE | 1.0 | 0.1 | 0.1 | | | | | | | |
| DC 1 | 0.8 | 0.3 | 0.7 | | | | | | | |
| DC 2 I | 5 | 5 | 5 | | | | | | | |
| DC 3 $K_n$ | 45 | 78.75 | 126 | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 $\rho$ | 204 | 144 | 136 | | | | | | | |
| DC 6 PFE | 0.8 | 0.4 | 0.8 | | | | | | | |
| DC 7 mV | 4 | 3 | 6 | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 22.3 | 9.01 | 5.70 | | | | | | | |
| AC 2 | +0.2 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | -2.6 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire Mt.

LINE 1 HALF S SP. 1 DATE 4/15/70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 0-75 | | 75-150 | | | 150-225 | | | | 225-300 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 900 | 950 | 800 | 900 | 950 | 350 | 800 | 900 | 950 | 390 |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 3.0 | 5.0 |
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | | | | | 300-375 | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 440 | 780 | 880 | 950 | 440 | 380 | 440 | 780 | 880 | 950 |
| CURRENT | 5.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 |

FREQUENCIES 3.0HZ .3HZ

SENDER NO. 6644-5

OPERATOR Lee, J.T.

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire Mtn.
LINE 1 HALF S SP. 1 DATE 4/17/73

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 |
| RECEIVE | 375-450 | | | | | 450-525 | | | | 525-600 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 440 | 380 | 440 | 770 | 880 | 440 | 380 | 440 | 770 | 440 |
| CURRENT | 5.0 | 5.0 | 5.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 3.0 | 5.0 |
| SEND | 5-6 | 4-5 | | CAL. | | | | | | |
| RECEIVE | | | | 1-2 | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 380 | 440 | | 670 | | | | | | |
| CURRENT | 5.0 | 5.0 | | 2.0 | | | | | | |

FREQUENCIES 3.0Hz .3Hz
SENDER NO. 6644.5
OPERATOR Lee, J.T.
RECEIVER NO.
OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Empire

LINE 1 HALF W SP. 1 DATE 8/16

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | | | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 0-2.5 | 2.5-15 | 15-22.5 | | | → | 22.5-30 | | | |
| RANGE | | | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| DC 1 | | | 0.6 | 0.9 | 1.3 | 1.5 | 0.8 | 1.0 | 1.2 | 1.4 |
| DC 2 I | | | 3 | 5 | 5 | 5 | 3 | 3 | 5 | 5 |
| DC 3 $K_n$ | | | 2.25 | 9 | 22.5 | 45 | 2.25 | 9 | 22.5 | 45 |
| DC 4 | | | | | | | | | | |
| DC 5 P | | | 79 | 67 | 77 | 178 | 331 | 192 | 151 | 164 |
| DC 6 MF | | | 0.7 | 1.0 | 1.4 | 1.6 | 0.9 | 1.1 | 1.3 | 1.5 |
| DC 7 MCF | | | 9 | 15 | 18 | 9 | 3 | 6 | 9 | 9 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | 104 | 36.5 | 16.8 | 19.5 | 435 | 63.2 | 33.1 | 18.0 |
| AC 2 | | | 0.0 | 0.0 | +0.1 | 0.0 | +0.1 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -12.7 | +12.1 | -15.2 | | | | +11.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 1 HALF NW SP. 1 DATE 8/16



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 |
| RECEIVE | → | 30-37.5 | → | → | → | → | → | 37.5-45 | → | → |
| RANGE | 1.0 | 10 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 |
| DC 1 | 1.7 | 1.4 | 0.8 | 1.2 | 1.1 | 1.5 | 1.8 | 1.3 | 0.8 | 1.1 |
| DC 2 I | 5 | 3 | 3 | 3 | 5 | 5 | 5 | 3 | 3 | 3 |
| DC 3 K | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 | 126 | 9 | 22.5 | 45 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 358 | 216 | 232 | 114 | 85 | 87 | 182 | 290 | 283 | 148 |
| DC 6 PFE | 1.2 | 1.4 | 0.9 | 1.3 | 1.2 | 1.6 | 1.9 | 1.4 | 0.9 | 1.2 |
| DC 7 MEF | 5 | 6 | 4 | 11 | 14 | 18 | 10 | 5 | 3 | 8 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 22.4 | 284 | 76.1 | 15.5 | 9.25 | 5.45 | 7.11 | 95.2 | 37.2 | 9.70 |
| AC 2 | 0.0 | +0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | +0.1 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | −2.8 | | |
| S.P. | | +8.0 | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PROJECT EMPIRE

LINE 1 HALF NW SP. 1 DATE 4/16

PAGE 3

| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | CAL |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | → | → | 45-52.5 | → | → | → | 52.5-60 | → | → | 6-7 |
| RANGE | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 10 |
| DC 1 | 1.4 | 1.8 | 1.2 | 0.8 | 1.1 | 1.3 | 1.5 | 1.2 | 1.6 | 0.0 |
| DC 2 I | 5 | 5 | 3 | 3 | 3 | 5 | 3 | 3 | 3 | 2000 |
| DC 3 $K_n$ | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 | 45 | 78.75 | 126 | |
| DC 4 | | | | | | | | | | |
| DC 5 P | 108 | 113 | 449 | 419 | 234 | 175 | 407 | 349 | 174 | (1015) [illegible] |
| DC 6 PFE | 1.5 | 1.9 | 1.3 | 0.9 | 1.2 | 1.4 | 1.6 | 1.3 | 1.8 | (-0.1) |
| DC 7 MCF | 14 | 17 | 3 | 2 | 5 | 8 | 4 | 4 | 10 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 6.78 | 4.43 | 59.0 | 27.5 | 8.77 | 6.83 | 26.7 | 13.1 | 4.08 | 197 |
| AC 2 | 0.0 | -0.1 | +0.1 | 0.0 | 0.0 | 0.0 | +0.1 | 0.0 | -0.2 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +16.8 | | | | -21.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 1 HALF NW SP. 1 DATE 4/16

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 |
| RECEIVE | 15 22.5 | | | | 22.5-30 | | | | | 30.-37.5 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 780 | 440 | 380 | 440 | 880 | 780 | 440 | 380 | 440 | 950 |
| CURRENT | 3.0 | 5.0 | 5.0 | 5.0 | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 3.0 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | | | | | | 37.5-45 | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 880 | 770 | 440 | 380 | 440 | 950 | 870 | 760 | 440 | 380 |
| CURRENT | 3.0 | 3.0 | 5.0 | 5.0 | 5.0 | 3.0 | 3.0 | 3.0 | 5.0 | 5.0 |

FREQUENCIES _____ _____

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 1 HALF NW SP. 1 DATE 4/16



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | CAL | |
| RECEIVE | 45-52.5 | | | | 52.5-60 | | | | 6-7 | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 950 | 860 | 760 | 430 | 950 | 860 | 760 | | 170 | |
| CURRENT | 3.0 | 3.0 | 3.0 | 5.0 | 3.0 | 3.0 | 3.0 | | 2.0 | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES ____ ____

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

Lennon

624-5547

1714 W Grant

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 2 HALF NW SP. 1 DATE 4/17



| | | | 2 | 3 | 4 | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | | | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 0-2.5 | 2.5-5 | 22.5 | | | → | 22.5-30 | | | |
| RANGE | | | 10 | 1.0 | 1.0 | 0.1 | 10 | 10 | 1.0 | 1.0 |
| DC 1 | | | 1.1 | -0.4 | 1.0 | 0.9 | 0.8 | 1.1 | 0.6 | 1.6 |
| DC 2 I | | | 4 | | | | | | | → |
| DC 3 $K_m$ | | | 2.25 | 9 | 22.5 | 45 | 2.25 | 9 | 22.5 | 45 |
| DC 4 | | | | | | | | | | |
| DC 5 ρ | | | 210 | 214 | 114 | 81 | 115 | 327 | 292 | 159 |
| DC 6 PFE | | | 1.2 | 0.0 | 1.1 | 1.0 | 0.9 | 1.2 | 0.7 | 1.7 |
| DC 7 MCE | | | 6 | 0 | 10 | 12 | 8 | 4 | 2 | 11 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | 363 | 93.9 | 20.0 | 7.05 | 201 | 143 | 51.2 | 13.9 |
| AC 2 | | | 0.0 | 0.0 | 0.0 | -0.1 | +0.1 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +8.4 | -15.3 | -1.5 | | | | +23.2 | | | |
| AC NOISE | Ground Fence | | | | | | | | | |
| POT RES. | 1.5 | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 2 HALF NW SP. 1 DATE 4/17

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 |
| RECEIVE | → | 30-37.5 | — | — | — | — | → | 37.5-45 | — | — |
| RANGE | 0.1 | 10 | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 1.0 |
| DC 1 | 1.5 | 1.0 | 0.9 | 1.3 | 1.0 | 2.0 | 2.2 | 1.0 | 0.9 | 1.4 |
| DC 2 I | 4 | — | — | — | — | — | — | — | — | → |
| DC 3 $K_a$ | 28.25 | 2.25 | 9 | 22.5 | 45 | 28.25 | 126 | 9 | 22.5 | 45 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 107 | 120 | 147 | 346 | 297 | 154 | 105 | 84 | 120 | 268 |
| DC 6 PFE | 1.6 | 1.0 | 1.0 | 1.4 | 1.1 | 2.1 | 2.4 | 1.1 | 1.0 | 1.3 |
| DC 7 MCE | 15 | 10 | 7 | 4 | 4 | 14 | 23 | 13 | 8 | 6 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 5.35 | 175 | 64.2 | 60.6 | 26.0 | 7.70 | 3.28 | 36.8 | 21.0 | 23.5 |
| AC 2 | -0.1 | +0.3 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | +0.1 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +13.5 | | | | | | +12.6 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE
LINE 2 HALF NW SP. 1 DATE 4/17

PAGE 3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | CAL |
| RECEIVE | ← | ← | 45-52.5 | ← | ← | → | 52.5-60 | ← | → | 6-7 |
| RANGE | 1.0 | 0.1 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 0.1 | 1.0 | 10 |
| DC 1 | 1.5 | 2.9 | 0.9 | 1.0 | 1.3 | 1.6 | 1.2 | 0.8 | 1.4 | -0.1 |
| DC 2 I | 4 | ← | ← | ← | ← | ← | ← | ← | → | 2000 |
| DC 3 $K_a$ | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 | 45 | 78.75 | 126 | |
| DC 4 | | | | | | | | | | |
| DC 5 $\rho$ | 232 | 122 | 119 | 155 | 356 | 317 | 148 | 185 | 429 | (1.015) |
| DC 6 PFE | 1.6 | 3.0 | 1.0 | 1.1 | 1.4 | 1.7 | 1.3 | 0.9 | 1.5 | (-0.1) |
| DC 7 MCE | 7 | 24 | 8 | 7 | 4 | 5 | 9 | 5 | 4 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 11.6 | 3.83 | 20.9 | 13.6 | 10.8 | 9.91 | 13.0 | 92.6 | 13.4 | 197 |
| AC 2 | 10.1 | -0.1 | 0.0 | 0.0 | 0.0 | +0.1 | +0.1 | -0.1 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +28.8 | | | | +17.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE MT 5

LINE 2 HALF NW SP. 1 DATE 4/17



| SEND | 3 4 | 4 5 | 5 6 | 6 7 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 15-22.5 | — | — | → | 22.5 30 | — | — | — | → | 30-37.5 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 820 | 460 | 460 | 700 | 720 | 820 | 460 | 460 | 700 | 520 |
| CURRENT | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3 4 | 4-5 | 5-6 |
| RECEIVE | — | — | — | — | → | 37.5 165 | — | — | — | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 720 | 820 | 460 | 460 | 700 | 520 | 720 | 820 | 460 | 460 |
| CURRENT | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |

FREQUENCIES 3.0 0.3

SENDER NO. 6644 S

OPERATOR B PAWELCZYK

RECEIVER NO.

OPERATOR JCK

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE MTS.

LINE 2 HALF NW SP. 1 DATE 4/17



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3 4 | 4-5 | 1-2 | 2-3 | 3 4 | | CAL 6-7 | |
| RECEIVE | 4.5-525 | ——— | ——— | ——→ | 52.5 60. | ——— | ——→ | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 520 | 720 | 820 | 460 | 520 | 720 | 820 | | 300 | |
| CURRENT | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 40 | 4.0 | | 2.0 | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES F D

SENDER NO. 6445

OPERATOR B PAWELCZYK

RECEIVER NO.

OPERATOR TEX

COMMENTS:

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 2 HALF SE SP. 1+ DATE 4/20

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | CAL |
| RECEIVE | 6-25 | " | 15-15 | " | " | 15-22.5 | " | " | " | 1-2 |
| RANGE | 10 | 1.0 | 10 | 1.0 | 1.0 | 10 | 1.0 | 1.0 | 0.1 | 10 |
| DC 1 | 10.1 | -1.1 | 1.2 | 1.3 | 1.0 | 0.5 | 1.3 | 0.7 | 1.2 | -0.1 |
| DC 2 I | 4 | " | " | " | " | " | " | " | " | 2000 |
| DC 3 $K_n$ | 2.25 | 9 | 2.25 | 9 | 22.5 | 2.25 | 9 | 22.5 | 45 | |
| DC 4 | | | | | | | | | | |
| DC 5 $\rho$ | 177 | 205 | 177 | 104 | 111 | 255 | 156 | 82 | 76 | (1.010) |
| DC 6 PFE | 0.2 | -1.0 | 1.3 | 1.4 | 1.1 | 0.6 | 1.3 | 0.8 | 1.2 | (-0.1) |
| DC 7 MCR | 1 | -5 | 7 | 13 | 10 | 2 | 8 | 10 | 16 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 311 | 90.2 | 311 | 45.8 | 19.6 | 449 | 68.5 | 14.5 | 6.71 | 198 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | +0.2 | -0.1 | +0.2 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +18.4 | | +22.7 | | | +10.5 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PROJECT Empire #463

LINE 2 HALF SE SP. 1 DATE 4/20



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 22.5-30 | | | | → | 30-37.5 | | | | |
| RANGE | 10 | 10 | 1.0 | 0.1 | 0.1 | 10 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.3 | 0.5 | 1.1 | 0.8 | 1.1 | 0.3 | 1.6 | 0.8 | 1.1 | 1.0 |
| DC 2 I | 4 | | | | 1.3 | | | | | → |
| DC 3 $K_a$ | 2.25 | 9 | 22.5 | 45 | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 |
| DC 4 | | | | | | | | | | |
| DC 5 ρ | 93 | 266 | 140 | 73 | 50 | 77 | 102 | 247 | 125 | 65 |
| DC 6 PFE | 0.3 | 0.6 | 1.2 | 1.0 | 1.1 | 0.4 | 1.7 | 0.9 | 1.2 | 0.9 |
| DC 7 MCF | 3 | 2 | 9 | 14 | 22 | 5 | 17 | 4 | 10 | 14 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 164 | 117 | 24.7 | 6.41 | 2.53 | 135 | 45.1 | 43.5 | 11.0 | 3.26 |
| AC 2 | +0.2 | 0.0 | -0.1 | -0.2 | +0.2 | 0.0 | 0.0 | 0.0 | -0.1 | +0.4 |
| AC AVG. | | | | | 60 sec. | | | | | |
| S.P. | +39.8 | | | | AC DAMP | +23.9 | | | | |
| AC NOISE | | | | | DC | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 2 HALF SE SP. 1 DATE 4/80

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-3 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | → | 3&5 | — | — | — | → | 4-5&5 | — | — | → |
| RANGE | 0.1 | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 0.1 | 1.0 | 0.1 |
| DC 1 | 1.4 | 0.5 | 0.8 | 1.0 | 0.8 | 0.8 | 0.6 | 0.9 | 1.7 | 0.5 |
| DC 2 I | 1 | — | — | — | — | — | — | — | — | → |
| DC 3 $K_n$ | 126 | 9 | 22.5 | 45 | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 60 | 62 | 101 | 222 | 111 | 63 | 73 | 112 | 237 | 126 |
| DC 6 PFE | 1.4 | 0.6 | 0.9 | 1.1 | 0.9 | 0.9 | 0.7 | 1.1 | 1.7 | 0.6 |
| DC 7 MCF | 23 | 10 | 9 | 5 | 8 | 14 | 10 | 10 | 7 | 5 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.90 | 37.3 | 17.8 | 19.5 | 5.52 | 1.97 | 12.8 | 9.82 | 11.9 | 3.95 |
| AC 2 | +0.2 | 0.0 | +0.1 | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | +0.2 | -0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +26.9 | | | | | +7.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 1963
LINE 2 HALF SE SP. 1 DATE 4/20



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 5 0 5 6 0 | → | → | | | | | | | |
| RANGE | 0.1 | 0.1 | 0.1 | | | | | | | |
| DC 1 | 1.3 | 2.5 | 2.0 | | | | | | | |
| DC 2 I | 9 | → | → | | | | | | | |
| DC 3 $K_n$ | 45 | 28.75 | 126 | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 $\rho$ | 52 | 76 | 162 | | | | | | | |
| DC 6 $\rho_a$ | 1.3 | 2.4 | 2.2 | | | | | | | |
| DC 7 MCF | 25 | 31 | 14 | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 4.54 | 3.84 | 5.08 | | | | | | | |
| AC 2 | +0.2 | +0.4 | -0.3 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +16.7 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire Mts

LINE 2 HALF SE SP. 1 DATE 4/21

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1 2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 0-7.5 | → | 7.5 15 | → | → | 15-22.5 | → | → | → | 22.5-3 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 700 | 540 | 800 | 700 | | 480 | 800 | 700 | 540 | 500 |
| CURRENT | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | → | → | → | → | 3-3.75 | → | → | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 480 | 800 | 700 | 540 | 700 | 500 | 480 | 800 | 700 | 540 |
| CURRENT | 4.0 | 4.0 | 4.0 | 3.0 1.X | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |

FREQUENCIES 3 3.0

SENDER NO. 6644 S

OPERATOR Pawelczyk

RECEIVER NO.

OPERATOR Tex

COMMENTS: Voltage FLUX approx 20 ON 1-2 Continued on STARTing from 22.5-3

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire Mts

LINE 2 HALF SE SP. 1 DATE 4/20

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6 7 |
| RECEIVE | 3.75-45 | → | → | → | → | 45-52 | → | → | → | 52. 6. |
| RANGE | | | | | | | | | | |
| VOLTAGE | 700 | 500 | 480 | 800 | 700 | 700 | 500 | 480 | 800 | 700 |
| CURRENT | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| SEND | 5-6 | 4-5 | | | | | | | | |
| RECEIVE | → | → | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 500 | 480 | | | | | | | | |
| CURRENT | 4.0 | 4.0 | | | | | | | | |

FREQUENCIES 3 3.0

SENDER NO. 6644 S

OPERATOR B Pawelczyk

RECEIVER NO.

OPERATOR TCX

COMMENTS: 750' spreads

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 3 HALF SE SP. 1 DATE 4/25

PAGE 1

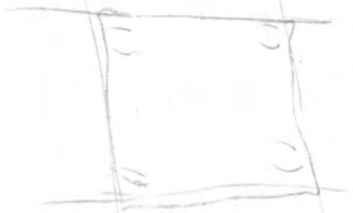
| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | CAL |
| RECEIVE | 0-7.5 | → | 7.5-15 | → | → | 15-22.5 | → | → | → | 3-4 |
| RANGE | | | | | | 10 | 1.0 | 1.0 | 0.1 | 10 |
| DC 1 | | | | | | +0.1 | 0.6 | 1.0 | 0.9 | -0.3 |
| DC 2 I | | | | | | 4 | 3 | 1.5 | 1 | 2.000 |
| DC 3 $K_n$ | | | | | | 2.25 | 9 | 22.5 | 45 | |
| DC 4 | | | | | | | | | | |
| DC 5 P | | | | | | 78 | 160 | 176 | 98 | (1.010) |
| DC 6 Eff | | | | | | 0.4 | 0.9 | 1.3 | 1.3 | (-0.3) |
| DC 7 MV | | | | | | 5 | 6 | 7 | 13 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | | | | 137 | 52.9 | 11.6 | 2.15 | 198 |
| AC 2 | | | | | | 0.0 | 0.0 | 0.0 | -0.2 | -0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +25.7 | | 11.8 | | | +0.9 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 3 HALF SE SP. 1 DATE 4/85

PAGE 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 22.5-30 | | | | | 30-37.5 | | | | |
| RANGE | 10 | 1.0 | 1.0 | 1.0 | 0.1 | 10 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.1 | 0.4 | 0.7 | 0.6 | 0.4 | 0.3 | 0.9 | 0.9 | 1.5 | 2.0 |
| DC 2 I | 5 | 4 | 3 | 1.5 | 1 | Pipeline 0.5 -3080 | 5 | 4 | 3 | 1.5 |
| DC 3 K | 2.25 | 9 | 22.5 | 45 | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 112 | 132 | 232 | 321 | 141 | 101 | 114 | 107 | 170 | 219 |
| DC 6 PFE | 0.4 | 0.7 | 1.0 | 0.9 | 0.7 | 0.6 | 1.2 | 1.2 | 1.8 | 2.3 |
| DC 7 MCA | 4 | 5 | 4 | 3 | 5 | 6 | 11 | 11 | 11 | 11 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 246 | 57.9 | 30.6 | 10.6 | 1.77 | 233 | 62.8 | 18.8 | 11.2 | 4.13 |
| AC 2 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | -0.1 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +20/- | | | | | +59.7 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |



HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #163
LINE 3 HALF SE SP. 1 DATE 8/25

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | → | 32.5-41.5 | | | | → | 45-52.5 | | | ↗ |
| RANGE | .01 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | 2.21 | 0.5 | 0.5 | 0.4 | 0.9 | 2.0 | 0.8 | 0.7 | 0.6 | 1.0 |
| DC 2 I | 1 | 5 | 5 | 4 | 3 | 1.5 | 5 | 5 | 4 | 3 |
| DC 3 $K_n$ | 126 | 9 | 22.5 | 45 | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 95 | 110 | 128 | 108 | 167 | 227 | 125 | 138 | 109 | 163 |
| DC 6 $\rho_a$ | 2.6 | 0.8 | 0.8 | 0.7 | 1.2 | 2.3 | 1.1 | 1.0 | 0.9 | 1.3 |
| DC 7 MEA | 27 | 7 | 6 | 6 | 7 | 10 | 9 | 7 | 8 | 8 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | .7419 | 60.4 | 28.2 | 9.50 | 6.29 | 2.69 | 27.5 | 15.2 | 5.48 | 3.85 |
| AC 2 | +0.2 | -0.1 | 0.0 | 0.0 | 0.0 | +0.1 | +0.1 | 0.0 | 0.0 | +0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +24.2 | | | | | +29.3 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 3 HALF SE SP. 1 DATE 4/25

PAGE 4

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 3.5-20 | → | → | | | | | | | |
| RANGE | 1.0 | 0.1 | 0.1 | | | | | | | |
| DC 1 | 0.9 | +0.4 | 1.0 | | | | | | | |
| DC 2 I | 5 | 5 | 4 | | | | | | | |
| DC 3 $R_a$ | 45 | 78.75 | 126 | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 P | 140 | 146 | 113 | | | | | | | |
| DC 6 PFR | 1.2 | 0.7 | 1.3 | | | | | | | |
| DC 7 MCA | 9 | 5 | 12 | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 15.4 | 9.17 | 3.54 | | | | | | | |
| AC 2 | 0.0 | 0.0 | +0.1 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +24.2 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 3 HALF SE SP. 1 DATE 4/25

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | CAL |
| RECEIVE | 0-7.5 | → | 7.5-15 | → | → | 15-22.5 | → | → | → | 3-4 |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | 840 | 940 | 700 | 800 | |
| CURRENT | | | | | | 4.0 | 3.0 | 1.5 | 1.0 | |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 22.5-3 | → | → | → | | 3-3.75 | → | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 440 | 840 | 940 | 900 | 780 | 600 | 440 | 840 | 940 | 900 |
| CURRENT | 5.0 | 4.0 | 3.0 | 1.5 | 1.0 | 5.0 | 5.0 | 4.0 | 3.0 | 1.5 |

FREQUENCIES 3 3.0

SENDER NO. 66445

OPERATOR PAWELCZYK

RECEIVER NO.

OPERATOR TEX

COMMENTS:

1-2 - 1.0
2-3 - 1.5
3-4 - 3.0
4-5 - 4.0
5-6 - 5.0
6-7, 5.0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE
LINE 3 HALF SE SP. 1 DATE 4/25

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | → | 3.75-4.5 | ——— | ——— | ——— | ——— | 4.5-5.2 | ——— | ——— | ——— |
| RANGE | | | | | | | | | | |
| VOLTAGE | 780 | 600 | 440 | 840 | 940 | 900 | 600 | 440 | 840 | 940 |
| CURRENT | 1.0 | 5.0 | 5.0 | 4.0 | 3.0 | 1.5 | 5.0 | 5.0 | 4.0 | 3.0 |
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 5.2-6 | ——— | → | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 600 | 440 | 940 | | | | | | | |
| CURRENT | 5.0 | 5.0 | 4.0 | | | | | | | |

FREQUENCIES 3 3.0
SENDER NO. 6644 5
OPERATOR BILL P
RECEIVER NO.
OPERATOR TEX

COMMENTS:
1-2 - 1.0
2-3 - 1.5
3-4 - 3.0
4-5 - 4.0
5-6 - 5.0
6-7 - 5.0

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mts. #463
LINE 3 HALF NW SP. 1 DATE 4/28



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | CAL- |
| RECEIVE | 0-7.5 | → | 7.5-15 | → | → | 15-22.5 | → | → | → | 6-7 |
| RANGE | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| DC 1 | 0.4 | 0.8 | 0.1 | 0.4 | 0.8 | 0.1 | 0.6 | 0.8 | 0.9 | -0.1 |
| DC 2 I | 5 | 5 | 4 | 5 | 5 | 3 | 4 | 5 | 5 | 2000 |
| DC 3 $K_n$ | 2.25 | 9 | 2.25 | 9 | 22.5 | 2.25 | 9 | 22.5 | 45 | |
| DC 4 | | | | | | | | | | |
| DC 5 $\rho$ | 116 | 159 | 138 | 176 | 247 | 85 | 39 | 62 | 96 | (1.036) |
| DC 6 PFE | 0.5 | 0.7 | 0.2 | 0.6 | 0.9 | 0.2 | 0.7 | 0.9 | 1.2 | (-0.1) |
| DC 7 MCA | 4 | 6 | 1 | 3 | 4 | 2 | 18 | 14 | 12 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 218 | 35.1 | 236 | 94.1 | 53.7 | 109 | 16.8 | 13.4 | 10.3 | 193 |
| AC 2 | 0.0 | +0.1 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | -0.4 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -5.6 | | -1.4 | | | +34.0 | | | NOISEY MG | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 3 HALF NW SP. 1 DATE 4/87

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 25-30 | — | | | | 30-37.5 | — | | | |
| RANGE | 10 | 1.0 | 0.1 | 0.1 | 0.1 | 10 | 10 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.5 | 0.5 | 0.6 | 0.5 | 1.2 | 1.1 | 1.0 | 1.0 | 1.1 | 1.4 |
| DC 2 I | 1.5 | 3.0 | 4.0 | 5.0 | 5.0 | 1.0 | 1.5 | 3.0 | 4.0 | 5.0 |
| DC 3 $K_n$ | 2.25 | 9 | 22.5 | 45 | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 |
| DC 4 | | | | | | | | | | |
| DC 5 $\rho$ | 448 | 43 | 22 | 35 | 52 | 434 | 833 | 197 | 136 | 224 |
| DC 6 PFE | 0.6 | 0.6 | 0.7 | 0.9 | 1.2 | 1.2 | 1.0 | 1.1 | 1.2 | 1.5 |
| DC 7 MCF | 1 | 14 | 32 | 25 | 27 | 3 | 1 | 6 | 9 | 7 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 288 | 13.7 | 3.79 | 3.80 | 3.16 | 186 | 134 | 25.4 | 11.7 | 13.7 |
| AC 2 | 0.0 | -0.1 | -0.1 | -0.1 | -0.2 | 0.0 | +0.2 | -0.1 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -9.1 | | | | | -9.6 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 3 HALF NW SP. 1 DATE 4/30

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | → | 32.5-45 | — | — | — | → | 45-52.5 | — | — | → |
| RANGE | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 |
| DC 1 | 1.5 | 1.5 | 1.0 | 1.1 | 0.9 | 0.6 | 0.9 | 1.0 | 1.2 | 1.2 |
| DC 2 I | 5.0 | 1.0 | 1.5 | 3.0 | 4.0 | 5.0 | 1.0 | 1.5 | 3.0 | 4.0 |
| DC 3 $K_n$ | 126 | 9 | 22.5 | 45 | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 |
| DC 4 | | | | | | | | | | |
| DC 5 C | 311 | 116 | 348 | 122 | 87 | 140 | 154 | 507 | 183 | 128 |
| DC 6 PFE | 1.6 | 1.5 | 1.1 | 1.2 | 1.1 | 1.3 | 1.0 | 1.1 | 1.3 | 1.4 |
| DC 7 MC | 5 | 13 | 8 | 10 | 13 | 7 | 6 | 2 | 7 | 11 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 11.9 | 12.4 | 33.4 | 7.88 | 4.25 | 5.37 | 6.62 | 16.3 | 6.73 | 3.92 |
| AC 2 | -0.1 | +0.2 | 0.0 | +0.1 | -0.2 | -0.6 | 0.0 | +0.1 | -0.1 | -0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 3 HALF NW SP. 1 DATE 1/27



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-3 | 2-3 | 3-1 | | | | | | | |
| RECEIVE | 5,2,5,6 | → | → | | | | | | | |
| RANGE | 0.1 | 1.0 | 0.1 | | | | | | | |
| DC 1 | 1.5 | 1.3 | 1.3 | | | | | | | |
| DC 2 I | 1.0 | 1.5 | 3.0 | | | | | | | |
| DC 3 $K_n$ | 45 | 78.75 | 126 | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 ρ | 223 | 680 | 250 | | | | | | | |
| DC 6 PFE | 1.5 | 1.4 | 1.4 | | | | | | | |
| DC 7 MCK | 7 | 2 | 6 | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 4.79 | 12.5 | 5.25 | | | | | | | |
| AC 2 | +0.3 | 0.0 | -0.1 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +19.7 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 3 HALF NW SP. 1 DATE 4/27

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 |
| RECEIVE | 0-7.5 | → | 7.5-15. | → | → | 15-22.5 | → | → | → | 22.5-3. |
| RANGE | | | | | | | | | | |
| VOLTAGE | 460 | 580 | 880 | 440 | 580 | 940 | 880 | 440 | 580 | 1000 |
| CURRENT | 5.0 | 5.0 | 4.0 | 5.0 | 5.0 | 3.0 | 4.0 | 5.0 | 5.0 | 1.5 |
| SEND | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | → | → | → | → | 3. 3.75 | → | → | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 960 | 880 | 460 | 580 | 760 | 1000 | 960 | 880 | 460 | 580 |
| CURRENT | 3.0 | 4.0 | 5.0 | 5.0 | 1.0 | 1.5 | 3.0 | 4.0 | 5.0 | 5.0 |

FREQUENCIES 3 3.0

SENDER NO. 6644 S

OPERATOR BILL P

RECEIVER NO.

OPERATOR Tex

COMMENTS:
1-2 - 1.0
2-3 - 1.5
3-4 — 3.
4-5 — 4
5-6 — 5.
6-7 — 5.

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 3 HALF NW SP. 1 DATE 4/29

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 |
| RECEIVE | 37.5-45 | → | → | → | → | 45-52.5 | → | → | → | 52.5-6 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 760 | 1000 | 960 | 860 | 440 | 760 | 1000 | 960 | 860 | 760 |
| CURRENT | 1.0 | 1.5 | 3.0 | 4.0 | 5.0 | 1.0 | 1.5 | 3.0 | 4.0 | 1.0 |
| SEND | 2-3 | 3 4 | | | | | | | | |
| RECEIVE | → | → | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 1000 | 960 | | | | | | | | |
| CURRENT | 1.5 | 3.0 | | | | | | | | |

FREQUENCIES 3 3.0

SENDER NO.

OPERATOR BILL P

RECEIVER NO.

OPERATOR TEX

COMMENTS:

JOB 463 LINE 11 SP 1 7/8-9/70 — 750 FEET=DIPOLE LENGTH

CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 100.300 | -.10 | 3.00 | .30 | .0500 | .9975 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 85.97 | .35 | 3.5 | .30 | 3.5 | 0.00 | ** | .40 | 2.00 | 1 | 1 | 76.340 | -.10 |
| 2 | 2 | 98.15 | .45 | 4.6 | .32 | 3.3 | .13 | ** | .40 | 2.00 | 2 | 2 | 21.790 | -.20 |
| 3 | 1 | 82.97 | .50 | 6.0 | .50 | 6.0 | 0.00 | ** | .60 | 2.00 | 3 | 1 | 73.530 | .10 |
| 4 | 2 | 38.95 | .05 | 1.3 | -.40 | -10.3 | .45 | ** | .20 | 2.50 | 4 | 2 | 10.830 | .20 |
| 5 | 3 | 61.04 | .60 | 9.8 | .03 | .6 | .57 | ** | .60 | 2.00 | 5 | 3 | 5.410 | -.10 |
| 6 | 1 | 34.44 | .15 | 4.4 | .00 | .0 | .15 | ** | .20 | 2.50 | 6 | 1 | 38.310 | 0.00 |
| 7 | 2 | 88.11 | .45 | 5.1 | .30 | 3.4 | .15 | ** | .40 | 2.50 | 7 | 2 | 24.450 | -.20 |
| 8 | 3 | 59.43 | .65 | 10.9 | .06 | 1.1 | .59 | ** | .80 | 2.50 | 8 | 3 | 6.570 | .20 |
| 9 | 4 | 96.84 | .60 | 6.2 | .03 | .3 | .57 | ** | .70 | 2.30 | 9 | 4 | 4.930 | .10 |
| 10 | 1 | 39.19 | .15 | 3.8 | .03 | .7 | .12 | ** | .10 | 3.00 | 10 | 1 | 52.360 | -.20 |
| 11 | 2 | 68.40 | .35 | 5.1 | .14 | 2.1 | .21 | ** | .40 | 2.50 | 11 | 2 | 18.980 | 0.00 |
| 12 | 3 | 131.61 | .45 | 3.4 | .25 | 1.9 | .20 | ** | .60 | 2.50 | 12 | 3 | 14.580 | .20 |
| 13 | 4 | 86.47 | .75 | 8.7 | .09 | 1.0 | .66 | ** | .80 | 2.50 | 13 | 4 | 4.780 | 0.00 |
| 14 | 5 | 132.37 | .90 | 6.8 | .28 | 2.2 | .62 | ** | .90 | 2.40 | 14 | 5 | 4.010 | -.10 |
| 15 | 1 | 54.27 | .40 | 7.4 | .32 | 5.9 | .08 | ** | .40 | 3.00 | 15 | 1 | 72.290 | -.10 |
| 16 | 2 | 50.51 | -.35 | -6.9 | -.67 | -13.2 | .32 | ** | -.20 | 3.00 | 16 | 2 | 16.920 | .20 |
| 17 | 3 | 98.47 | -.70 | -7.1 | -.99 | -10.1 | .29 | ** | -.60 | 2.50 | 17 | 3 | 11.040 | .10 |
| 18 | 4 | 185.78 | .75 | 4.0 | .52 | 2.8 | .23 | ** | .80 | 2.50 | 18 | 4 | 10.270 | 0.00 |
| 19 | 5 | 134.99 | 1.00 | 9.5 | .16 | 1.5 | .84 | ** | 1.00 | 2.50 | 19 | 5 | 3.310 | -.10 |
| 20 | 6 | 155.92 | 1.30 | 8.3 | .55 | 3.5 | .75 | ** | 1.40 | 2.50 | 20 | 6 | 3.060 | .10 |
| 21 | 2 | 69.38 | .05 | .7 | -.15 | -2.2 | .20 | ** | .20 | 3.00 | 21 | 2 | 23.150 | .20 |
| 22 | 3 | 65.43 | -.05 | -.8 | -.56 | -8.6 | .51 | ** | 0.00 | 3.00 | 22 | 3 | 8.750 | 0.00 |
| 23 | 4 | 137.92 | .05 | .4 | -.30 | -2.2 | .35 | ** | .20 | 2.50 | 23 | 4 | 7.670 | .20 |
| 24 | 5 | 254.52 | .80 | 3.1 | .55 | 2.2 | .25 | ** | .80 | 2.50 | 24 | 5 | 8.040 | -.10 |
| 25 | 6 | 131.96 | .95 | 7.2 | .01 | .1 | .94 | ** | 1.00 | 3.00 | 25 | 6 | 3.120 | 0.00 |
| 26 | 3 | 52.88 | .40 | 7.6 | -.29 | -5.4 | .69 | ** | .60 | 3.00 | 26 | 3 | 7.030 | .30 |
| 27 | 4 | 45.64 | -.75 | -16.4 | -2.29 | -50.2 | 1.54 | ** | -.80 | 3.00 | 27 | 4 | 3.070 | .20 |
| 28 | 5 | 102.39 | -.40 | -3.9 | -1.27 | -12.4 | .87 | ** | -.30 | 2.50 | 28 | 5 | 3.270 | .10 |
| 29 | 6 | 205.16 | .35 | 1.7 | -.17 | -.8 | .52 | ** | .40 | 3.00 | 29 | 6 | 4.880 | 0.00 |
| 30 | 4 | 62.24 | -.25 | -4.0 | -1.27 | -20.5 | 1.02 | ** | -.20 | 3.00 | 30 | 4 | 4.170 | 0.00 |
| 31 | 5 | 49.56 | .15 | 3.0 | -2.10 | -42.3 | 2.25 | ** | .20 | 3.00 | 31 | 5 | 1.890 | 0.00 |
| 32 | 6 | 104.15 | 1.00 | 9.6 | -.29 | -2.8 | 1.29 | ** | 1.10 | 3.00 | 32 | 6 | 2.460 | .10 |
| 33 | 1 | 163.10 | .60 | 3.7 | .60 | 3.7 | 0.00 | ** | .70 | 2.50 | 33 | 1 | 180.500 | .10 |
| 34 | 2 | 97.85 | .55 | 5.6 | .42 | 4.3 | .13 | ** | .60 | 2.50 | 34 | 2 | 27.100 | 0.00 |
| 35 | 3 | 60.09 | .65 | 10.8 | .07 | 1.2 | .58 | ** | .70 | 3.00 | 35 | 3 | 7.980 | 0.00 |
| 36 | 4 | 95.76 | .95 | 9.9 | .38 | 3.9 | .57 | ** | 1.00 | 3.00 | 36 | 4 | 6.340 | 0.00 |
| 37 | 1 | 97.31 | .05 | .5 | .05 | .5 | 0.00 | ** | .10 | 2.50 | 37 | 1 | 108.340 | 0.00 |
| 38 | 2 | 166.51 | .20 | 1.2 | .20 | 1.2 | 0.00 | ** | .20 | 2.50 | 38 | 2 | 46.300 | -.10 |
| 39 | 3 | 136.76 | .30 | 2.2 | .11 | .8 | .19 | ** | .40 | 2.50 | 39 | 3 | 15.180 | .10 |
| 40 | 4 | 91.68 | .50 | 5.5 | -.11 | -1.2 | .61 | ** | .50 | 3.00 | 40 | 4 | 6.100 | -.10 |
| 41 | 5 | 135.33 | .85 | 6.3 | .25 | 1.9 | .60 | ** | .80 | 4.00 | 41 | 5 | 6.840 | -.20 |
| 42 | 1 | 288.38 | .40 | 1.4 | .40 | 1.5 | 0.00 | ** | .50 | 2.50 | 42 | 1 | 297.600 | .10 |
| 43 | 2 | 158.41 | -.10 | -.6 | -.10 | -.6 | 0.00 | ** | -.10 | 2.50 | 43 | 2 | 44.180 | -.10 |
| 44 | 3 | 284.23 | .30 | 1.1 | .30 | 1.1 | 0.00 | ** | .40 | 2.50 | 44 | 3 | 31.550 | .10 |
| 45 | 4 | 197.87 | -.40 | -2.0 | -.61 | -3.1 | .21 | ** | -.40 | 2.50 | 45 | 4 | 11.070 | -.10 |
| 46 | 5 | 135.67 | .70 | 5.2 | .11 | .8 | .59 | ** | .80 | 3.50 | 46 | 5 | 6.000 | .10 |
| 47 | 6 | 208.18 | 1.15 | 5.5 | .64 | 3.1 | .51 | ** | 1.20 | 4.00 | 47 | 6 | 6.550 | 0.00 |
| 48 | 2 | 359.88 | .70 | 1.9 | .70 | 1.9 | 0.00 | ** | .60 | 2.50 | 48 | 2 | 99.670 | -.30 |

1.8 3. 51. 5. 9.23 .1 1.5 3.8 52. 6. 5.22 0 FEET=DIPOLE LENGTH

CAL GROUP NO. 0

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 53.000 | 2.50 | 3.000 | 22.37 | .20 | .90 | -8.6850 | 1588.9434 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 55 | 5 | 49.69 | 10.28 | 207.0 | 10.28 | 207.0 | 0.00 | ** | 1.50 | 3.00 | 55 | 5 | 8.110 | -.20 |
| 56 | 6 | 32.29 | 10.19 | 315.4 | 10.19 | 315.4 | 0.00 | ** | 1.60 | 3.00 | 56 | 6 | 3.290 | .20 |
| 57 | 4 | 39.57 | 9.03 | 228.3 | 9.03 | 228.3 | 0.00 | ** | .40 | 2.00 | 57 | 4 | 7.610 | .10 |
| 58 | 5 | 22.20 | 8.28 | 373.3 | 8.28 | 373.3 | 0.00 | ** | -.40 | 2.80 | 58 | 5 | 3.440 | 0.00 |
| 59 | 6 | 36.24 | 9.44 | 260.3 | 9.44 | 260.3 | 0.00 | ** | .80 | 3.00 | 59 | 6 | 3.720 | .10 |

HEINRICHS GEOEXPLORATION CO.

N 32° W Bearing

PROJECT EMPIRE 463

PAGE 1

I.P. RECEIVER NOTES

LINE 9 HALF S SP. 2 DATE 8-17-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | CAL | 21-24N | → | 18-21N | → | → | 15-18N | → | → | → |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.0 | 1.8 | 3.0 | 1.9 | 4.0 | 4.5 | 3.0 | 3.8 | 3.6 | 3.2 |
| DC 2 I | 1000 | 1.5 | 1.5 | 1 | 1.5 | 1.5 | 1 | 1 | 1.5 | 1.5 |
| DC 3 $K_m$ | | 0.9 | 3.6 | 0.9 | 3.6 | 9 | 0.9 | 3.6 | 9 | 18 |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 P | | 134 | 140 | 424 | 245 | 236 | 71 | 72 | 92 | 102 |
| DC 7 PFE | (0.0) | 1.8 | 3.0 | 1.9 | 4.0 | 4.5 | 3.0 | 3.8 | 3.6 | 3.2 |
| DC 8 MCF | | 13 | 21 | 4 | 16 | 19 | 42 | 53 | 39 | 31 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 100.5 | 221 | 57.0 | 465 | 98.8 | 37.8 | 77.3 | 19.4 | 14.8 | 8.25 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -5.5 | | +0.0 | | | -11.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 2K | | 1K | | | 3K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9 HALF S SP. 2 DATE 8-17-70



| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 12-15N | — | — | — | → | 9-12N | — | — | — | → |
| RANGE | 10 | 1.0 | 1.0 | 1.0 | 1.0 | 10 | 1.0 | 0.1 | 0.1 | 0.1 |
| DC 1 | 1.4 | 3.5 | 3.4 | 3.2 | 2.8 | 0.4 | 1.6 | 3.1 | 2.8 | 2.4 |
| DC 2 F | 1 | 1 | 1 | 1.5 | 1.5 | 1 | 1 | 1 | 1 | 1.5 |
| DC 3 K | 0.9 | 3.6 | 9 | 18 | 31.5 | 0.9 | 3.6 | 9 | 18 | 31.5 |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 P | 279 | 177 | 169 | 216 | 253 | 151 | 62 | 36 | 32 | 38 |
| DC 7 PFE | 1.4 | 3.5 | 3.4 | 3.2 | 2.8 | 0.4 | 1.6 | 2.8 | 2.8 | 2.5 |
| DC 8 MCH | 5 | 20 | 20 | 15 | 11 | 3 | 26 | 77 | 87 | 66 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 307 | 47.8 | 18.3 | 17.5 | 11.8 | 168 | 17.0 | 3.94 | 1.74 | 1.78 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | -0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | +383.6 | | | | | +61.6 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 1K | | | | | 1K | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMIRE 463
LINE 9 HALF 5 SP. 2 DATE 8-17-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 9-12N | 6-9N | → | → | → | → | 3-6N | → | → | → |
| RANGE | 0.1 | 10 | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | 2.7 | 0.8 | 1.7 | 2.7 | 2.3 | 2.2 | 0.8 | 2.2 | 2.7 | 2.4 |
| DC 2 I | 1.5 | 1 | 1 | 1 | 1 | 1.5 | 1 | 1 | 1 | 1 |
| DC 3 K | 50.4 | 3.6 | 9 | 18 | 31.5 | 50.4 | 9 | 18 | 31.5 | 50.4 |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 ρ | 45 | 516 | 220 | 125 | 104 | 126 | 617 | 306 | 178 | 146 |
| DC 7 PFE | 2.3 | 0.8 | 1.7 | 2.7 | 2.3 | 2.2 | 0.8 | 2.2 | 2.7 | 2.4 |
| DC 8 MCF | 51 | 2 | 8 | 22 | 22 | 17 | 1 | 7 | 15 | 16 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.32 | 143 | 24.2 | 6.82 | 3.25 | 3.70 | 68.3 | 16.7 | 5.52 | 2.84 |
| AC 2 | 0.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | ? |
| AC AVG. | | | | | | | | | | |
| S.P. | | +521.2 | | | | | 18.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 1K | | | | | 1K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9 HALF S SP. E DATE 8-17-2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 0-3N | → | → | | | | | | | |
| RANGE | 1.0 | 0.1 | 0.1 | | | | | | | |
| DC 1 | 0.5 | 1.8 | 2.6 | | | | | | | |
| DC 2 T | 1 | 1 | 1 | | | | | | | |
| DC 3 $K_a$ | 18 | 31 | 50.4 | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 P | 203 | 135 | 84 | | | | | | | |
| DC 7 PFE | 0.5 | 1.8 | 2.6 | | | | | | | |
| DC 8 MEA | 2 | 13 | 31 | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 11.3 | 4.23 | 1.64 | | | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | -11.7 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 1K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 9 HALF 5 SP. 2 DATE 8-17-2



| SEND | 4-5 | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | CAL | 21-24N | → | 18-21N | → | → | 15-18N | → | → | → |
| RANGE | 150X10 | 150X10 | 150X10 | 100X10 | 150X10 | 150X10 | 100X10 | 100X10 | 150X10 | 150X10 |
| VOLTAGE | 140 | 110 | 160 | 145 | 110 | 160 | 305 | 145 | 110 | 160 |
| CURRENT | 1.0 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.0 | 1.0 | 1.5 | 1.5 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 12-15N | → | → | → | → | 9-12N | → | → | → | → |
| RANGE | 100X10 | 100X10 | 100X10 | 150X10 | 150X10 | 100X10 | 100X10 | 100X10 | 100X10 | 150X10 |
| VOLTAGE | 240 | 305 | 145 | 110 | 160 | 230 | 240 | 305 | 145 | 110 |
| CURRENT | 1.0 | 1.0 | 1.0 | 1.5 | 1.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.5 |

FREQUENCIES 3 03

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

Cal

3-4

255

1.0 A

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 9 HALF S SP. 2 DATE 8/10/74



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 9-12N | 6-9N | ← | ← | ← | ← | 3-6N | ← | ← | ← |
| RANGE | 150X10 | 100X10 | 100X10 | 100X10 | 100X10 | 150X10 | 100X10 | 100X10 | 100X10 | 100X10 |
| VOLTAGE | 160 | 230 | 240 | 305 | 140 | 105 | 230 | 240 | 300 | 140 |
| CURRENT | 1.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.5 | 1.0 | 1.0 | 1.0 | 1.0 |
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 0-3N | ← | ← | | | | | | | |
| RANGE | 100X10 | 100X10 | 100X10 | | | | | | | |
| VOLTAGE | 230 | 240 | 306 | | | | | | | |
| CURRENT | 1.0 | 1.0 | 1.0 | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9 HALF N SP. 2 DATE 8-12-2



| SEND | S.P. | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 24-27N | 27-30N | → | → | 30-33N | → | → | → | 33-36N | → |
| RANGE | | 10 | 1.0 | 0.1 | 10 | 1.0 | 1.0 | 0.1 | 10 | 1.0 |
| DC 1 | | 1.7 | 4.0 | 3.2 | 1.2 | 3.6 | 4.5 | 3.1 | 0.8 | 1.6 |
| DC 2 I | | 1 | → | → | → | → | → | → | 1.5 | 1 |
| DC 3 K | | 0.9 | 3.6 | 9 | 0.3 | 3.6 | 9 | 18 | 0.9 | 3.6 |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 ρ | | 130 | 240 | 88 | 96 | 144 | 243 | 103 | 82 | 46 |
| DC 7 PFE | | 1.7 | 4.0 | 3.2 | 1.2 | 3.0 | 4.5 | 3.1 | 0.8 | 1.6 |
| DC 8 MCE | | 13 | 17 | 36 | 12 | 21 | 18 | 30 | 10 | 34 |
| DC AVG. | | | | | | | | | | |
| AC 1 | | 143 | 64.3 | 9.56 | 106 | 38.9 | 26.0 | 5.56 | 137. | 12.8 |
| AC 2 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +13.8 | -3.4 | | | +0.8 | | | | +7.2 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 1K | 1K | | | 2K | | | | 1K | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9 HALF N SP. 2 DATE 8-17-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 |
| RECEIVE | 33-36N | ——— | ——— | 36-39 | ——— | ——— | ——— | ——— | ——— | 39-42 |
| RANGE | 0.1 | 0.1 | 0.1 | 10 | 10 | ~~1.0~~ 0.1 | 0.1 | 0.1 | 0.1 | 1.0 |
| DC 1 | 2.66 | 4.0 | 2.0 | 0.9 | ~~0.9~~ | 1.6 | 2.6 | 3.6 | ~~1.6~~ 2.0 | 0.8 |
| DC 2 1 | 1 | 1 | 1 | 1.5 | 0.9 | 1 | 1 | 1 | 1 | 1.5 |
| DC 3 K | 9 | 18 | 31.5 | 0.9 | 3.6 | 9 | 18 | 31.5 | 50.4 | 3.6 |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 ρ | 61 | 113 | 77 | 102 | 98 | 56 | 83 | 151 | 91 | 101 |
| DC 7 PFE | 2.6 | 4.0 | 2.0 | 0.9 | 0.9 | 1.6 | 2.6 | 3.6 | 2.0 | 0.8 |
| DC 8 MCF | 42 | 35 | 26 | 9 | 9 | 29 | 31 | 24 | 22 | 8 |
| DC AVG. | ~~2.66~~ | | | | 40.8 | 6.17 | | | | |
| AC 1 | 6.66 | 6.05 | 2.4 | 169 | ~~469~~ | ~~40.8~~ | 4.54 | 4.66 | 1.77 | 41.8 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | +1.0 | | | | | | +22.5 |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | 5K | | | | | | 3K |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9 HALF N SP. 2 DATE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 |
| RECEIVE | 39-42 | → | → | → | 42-45 | → | → | → | 45-48N | → |
| RANGE | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 |
| DC 1 | 0.7 | 1.5 | 2.4 | ~~3.3~~ | 0.7 | 0.4 | 1.2 | 2.0 | 0.6 | 0.3 |
| DC 2 | 1.5 | 1 | 1 | 3.7 | 1.5 | 1 | 1 | 1 | 1.5 | 1.5 |
| DC 3 | 9 | 18 | 31.5 | 50.4 | 9 | 18 | 31.5 | 50.4 | 18 | 31.5 |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | 92 | 59 | 89 | 174 | 71 | 102 | 52 | 88 | 131 | 119 |
| DC 7 PFE | 0.7 | 1.5 | 2.4 | 3.7 | 0.7 | 0.4 | 1.2 | 2.0 | 0.6 | 0.3 |
| DC 8 MCA | 8 | 25 | 27 | 21 | 10 | 4 | 23 | 23 | 5 | 3 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 15.3 | 3.26 | 2.78 | 3.34 | 11.8 | 5.69 | 1.65 | 1.72 | 10.9 | 5.67 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | +2.3 | | | | +20.4 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | 1K | | | | 2K | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE ____ HALF ____ SP. ____ DATE ____



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | | | | | | | | | |
| RECEIVE | 45-48 | | | | | | | | | |
| RANGE | 0.1 | | | | | | | | | |
| DC 1 | 1.0 | | | | | | | | | |
| DC 2 I | 1 | | | | | | | | | |
| DC 3 $K_m$ | 50.4 | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 P | 87 | | | | | | | | | |
| DC 7 PFE | 1.0 | | | | | | | | | |
| DC 8 MCF | 11 | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.72 | | | | | | | | | |
| AC 2 | 0.0 | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 9 HALF N SP. 2 DATE 8/17/70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 27-30N | → | → | 30-33N | → | → | → | 33-36N | → | → |
| RANGE | 100X10 | 100X10 | 100X10 | 100X10 | 100X10 | 100X10 | 100X10 | 150X10 | 100X10 | 100X10 |
| VOLTAGE | 300 | 240 | 230 | 160 | 300 | 240 | 230 | 120 | 155 | 300 |
| CURRENT | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.5 | 1.0 | 1.0 |
| SEND | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 |
| RECEIVE | → | → | 36-39N | → | → | → | → | → | 39-42N | → |
| RANGE | 100X10 | 100X10 | 150X10 | 150X10 | 100X10 | 100X10 | 100X10 | 100X10 | 150X10 | 150X10 |
| VOLTAGE | 240 | 230 | 175 | 120 | 160 | 300 | 240 | 230 | 175 | 120 |
| CURRENT | 1.0 | 1.0 | 1.5 | 1.5 | 1.0 | 1.0 | 1.0 | 1.0 | 1.5 | 1.5 |

FREQUENCIES 3.0 0.3

SENDER NO. 9662-S

OPERATOR AL WILDER

RECEIVER NO. 20693-R

OPERATOR BILL FREEMAN

COMMENTS:

| 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 |
|---|---|---|---|---|---|
| 2C | 2C | 2C | 4C | 4C | 4C |
| 1.0 | 1.0 | 1.0 | 1.0 | 1.5 | 1.5 |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 9 HALF N SP. 2 DATE 8-17-20



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 |
| RECEIVE | 39-42N | → | → | 42-45N | → | → | → | 45-48N | → | → |
| RANGE | 100X10 | 100X10 | 100X10 | 150X10 | 150X10 | 100X10 | 100X10 | 150X10 | 150X10 | 100X10 |
| VOLTAGE | 155 | 300 | 240 | 175 | 120 | 160 | 300 | 175 | 120 | 155 |
| CURRENT | 1.0 | 1.0 | 1.0 | 1.5 | 1.5 | 1.0 | 1.0 | 1.5 | 1.5 | 1.0 |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 9602-5

OPERATOR AL WILDER

RECEIVER NO. 20693-R

OPERATOR BILL FREEMAN

COMMENTS:

Job 463, Line 9W, Sp 1 N½ 5½, 8/19/70 300.

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 9W HALF S SP. 1 DATE 8-19-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | CAL | 0-3S | → | 3-6S | → | → | 6-9S | → | → | → |
| RANGE | 10 | 100 | 1.0 | 1.0 | 1.0 | 0.1 | 10 | 10 | 1.0 | 0.1 |
| DC 1 | 0.0 | 2.4 | 2.3 | ~~1.0~~ 1.0 | 1.1 | 2.4 | 0.7 | 1.2 | ~~2.3~~ | 2.2 |
| DC 2 | | | | Out | | | | | 2.0 | |
| DC 3 Cur | 1.0 | 1 | 0.7 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| DC 4 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 5 n | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | 1100. | 38.1 | | | | | | | |
| AC 1 | ~~99~~.3 | ~~1000~~ | ~~43.8~~ | 430. | 79.8 | 7.56 | 750. | 127. | 33.5 | 4.22 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | 3.0 | | | | | | | | | |
| S.P. | 0.3 | -12.3 | | -10.7 | | | -7.0 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 5K | | 3K | | | 3K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 9W HALF S SP. 1 DATE 8-19-70

| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 9-12s | — | — | — | → | 12-15s | — | — | — | → |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.4 | 1.0 | 1.3 | 1.8 | 2.3 | 0.9 | 0.6 | 1.2 | 1.6 | 1.9 |
| DC 2 | | | | | | | | | | |
| DC 3 (Hz) | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. | 1. |
| DC 4 # | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. |
| DC 5 n | 1. | 2. | 3. | 4. | 5. | 1. | 2. | 3. | 4. | 5. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 351. | 287. | 61.4 | 19.7 | 3.42 | 566. | 88.8 | 107. | 31.3 | 11.1 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +10.5 | | | | | +99.5 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 4k | | | | | 3k | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 9N HALF S SP. 1 DATE 8-19-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 12-15s | 15-18s | | | | → | 2-18s | — | — | → |
| RANGE | 0.1 | 10 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.1 | 0.9 | 1.8 | 1.8 | 2.5 | 1.8 | 1.8 | 1.9 | 2.1 | 2.5 |
| DC 2 | 2.4 | | 1.0 | 1.5 | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Card | 1. | 1.5 | 1.5 | 1. | 1. | 1.5 | 1.5 | 1.5 | 1. | 1. |
| DC 5 # | 20. | 21. | 22. | 23. | 24. | 25. | 26. | 27. | 28. | 29. |
| DC 6 n | 6. | 2. | 3. | 4. | 5. | 6. | 3. | 4. | 5. | 6. |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.92 | 172. | 57.0 | 46.5 | 13.4 | 8.68 | 76.6 | 30.4 | 26.1 | 7.8 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +7.2 | | | | | +4.3 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 1K | | | | | 2.5K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 9N HALF S SP. / DATE 8-19-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 2/-24S | → | → | | | | | | | |
| RANGE | ~~1.0~~ | ~~1.0~~ | ~~1.0~~ | | | | | | | |
| DC 1 | 1.7 | 1.8 | 2.1 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 Cut | 1.5 | 1.5 | 1. | | | | | | | |
| DC 4 " | 30. | 31. | 32. | | | | | | | |
| DC 5 " | 4. | 5. | 6. | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 39.0 | 18.8 | 16.7 | | | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | -9.6 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3.5K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 9W HALF S SP. 1 DATE 8-19-72

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-3 | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | CAL | 0-3s | → | 3-6s | → | | 6-9s | → | → | |
| RANGE | 10X100 | 10X100 | 3X300 | 10X100 | 10X100 | 10X100 | 10X100 | 10X100 | 10X100 | 10X100 |
| VOLTAGE | 260 | 180 | 130 | 300 | 180 | 120 | 240 | 300 | 180 | 130 |
| CURRENT | 1.0 | 1.0 | 0.9 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 9-12s | → | → | → | → | 12-15s | → | → | → | → |
| RANGE | 10X100 | 10X100 | 10X100 | 10X100 | 10X100 | 10X100 | 10X100 | 10X100 | 10X100 | 10X100 |
| VOLTAGE | 140 | 240 | 300 | 180 | 125 | 140 | 140 | 260 | 300 | 180 |
| CURRENT | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |

FREQUENCIES 3 0.3

SENDER NO. 9662-S

OPERATOR Bill Freeman

RECEIVER NO. 20693-R

OPERATOR Steve Cruze

COMMENTS: NEW POT MAN
Jim HAMMETT
#72

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 9W HALF S SP. 1 DATE 8-19-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 15-18S | 15-18S | — | — | — | → | 18-21S | — | — | → |
| RANGE | 10X100 | 10X150 | 10X150 | 10X100 | 10X100 | 10X150 | 10X150 | 10X150 | 10X100 | 10X100 |
| VOLTAGE | 130 | 380 | 220 | 260 | 300 | 280 | 380 | 220 | 260 | 310 |
| CURRENT | 1.0 | 1.5 | 1.5 | 1.0 | 1.0 | 1.5 | 1.5 | 1.5 | 1.0 | 1.0 |
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 21-24S | — | — | | | | | | | |
| RANGE | 10X150 | 10X150 | 10X100 | | | | | | | |
| VOLTAGE | 380 | 220 | 260 | | | | | | | |
| CURRENT | 1.5 | 1.5 | 1.0 | | | | | | | |

FREQUENCIES 3 0.3

SENDER NO. 9662-S

OPERATOR Bill Freeman

RECEIVER NO. 20693-R

OPERATOR Steve Cruze

COMMENTS:

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 9-W HALF N SP. 1 DATE 8/19/20

PAGE 5

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | S.P. | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 |
| RECEIVE | 0-3N | 3-6N | → | → | 6-9N | → | → | → | 9-12N | |
| RANGE | | ~~100~~ | ~~10~~ | ~~1.0~~ | ~~10~~ | ~~1.0~~ | ~~1.0~~ | ~~0.1~~ | ~~10~~ | ~~1.0~~ |
| DC 1 | ONLY | 2.6 | 0.9 | 2.1 | 1.4 | 1.8 | 2.0 | 2.2 | 0.8 | 1.9 |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | | 1. | 1.5 | 1.5 | 1. | 1. | 1.5 | 1.5 | 1.5 | 1. |
| DC 4 # | | 40. | 41. | 42. | 43. | 44. | 45. | 46. | 47. | 48. |
| DC 5 # | | 1. | 2. | 3. | 1. | 2. | 3. | 4. | 1. | 2. |
| DC 6 | | | | | | | | | | |
| DC 7 | | ~~+1~~ | ~~+1~~ | ~~2.0~~ | ~~+1~~ | ~~2.0~~ | ~~2.2~~ | ~~2.1~~ | ~~0.7~~ | ~~1.8~~ |
| DC 8 | | | | | | | | | | |
| DC AVG. | | 1620 | | | | | | | | |
| AC 1 | | 1720 | 173. | 75.3 | 292. | 65.3 | 17.0 | 9.22 | 405. | 67.1 |
| AC 2 | | 0.5 | -0.3 | 0.2 | 0.6 | -0.4 | -0.4 | 0.2 | 0.2 | 0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | -12.7 | +5.7 | | | +26.3 | | | | +21.5 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 4K | 4K | | | 4.5K | | | | 4K | |

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PROJECT Empire

LINE 9-W HALF N SP. 1 DATE 8/19/71

PAGE 6

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | |
| RECEIVE | | | | 12-15N | | | | | | |
| RANGE | 1.0 | 1.0 | 0.1 | 10 | 10 | 1.0 | 1.0 | 1.0 | 0.1 | |
| DC 1 | 2.4 | 2.3 | 1.8 | ~~4.6~~ | 1.4 | 2.2 | 2.3 | 2.1 | ~~0.2~~ | |
| DC 2 | | | | 0.8 | | | | | 2.0 | |
| DC 3 Cnd | 1. | 2. | 1.5 | 1.5 | 1.5 | 1. | 1. | 2. | 1.5 | |
| DC 4 # | 49. | 50. | 51. | 52. | 53. | 54. | 55. | 56. | 57. | |
| DC 5 M | 3. | 4. | 5. | 1. | 2. | 3. | 4. | 5. | 6. | |
| DC 6 | | | | | | | | | | |
| DC 7 | ~~2.3~~ | ~~2.3~~ | ~~1.8~~ | ~~0.7~~ | ~~1.2~~ | ~~1.9~~ | ~~2.2~~ | ~~1.9~~ | ~~2.2~~ | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | 433. | | | | | | |
| AC 1 | 32.7 | 16.2 | 7.06 | ~~40.2~~ | 207. | 51.1 | 31.1 | 17.9 | 8.57 | |
| AC 2 | 0.3 | 0.2 | 0.1 | 0.3 | 0.4 | 0.6 | 0.3 | 0.4 | 0.0 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | +0.3 | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | 6k | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 9-W HALF N SP. 1 DATE 8/16/65

PAGE 7

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | |
| RECEIVE | 15→21N | → | → | → | → | 15-21N | → | → | → | |
| RANGE | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | |
| DC 1 | 0.7 | 1.2 | 2.0 | 1.4 | 1.5 | 0.8 | 1.4 | 1.8 | 1.4 | |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | 1.5 | 1. | 1. | 1. | 2. | 2. | 1.5 | 1. | 1. | |
| DC 4 # | 58. | 59. | 60. | 61. | 62. | 63. | 64. | 65. | 66. | |
| DC 5 n | 2. | 3. | 4 | 5. | 6. | 3. | 4. | 5. | 6. | |
| DC 6 | | | | | | | | | | |
| DC 7 | 0.7 | 1.1 | 1.4 | 1.4 | 1.4 | 0.6 | 1.4 | 1.5 | 1.2 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 36.3 | 22.2 | 11.7 | 8.97 | 5.88 | 21.5 | 20.4 | 7.93 | 7.79 | |
| AC 2 | 0.0 | 0.2 | 0.2 | 0.1 | 0.2 | 0.4 | 0.0 | 0.6 | 0.4 | |
| AC AVG. | | | | | | | | | | |
| S.P. | +24.9 | | | | | -15.8 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 5k | | | | | 3k | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 9-W HALF N SP. L DATE 8/19/2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 21-24 | ← | → | | | | | | | |
| RANGE | ~~0.1~~ | ~~1.0~~ | ~~0.1~~ | | | | | | | |
| DC 1 | ~~0.1~~ | 1.1 | 0.6 | | | | | | | |
| DC 2 | 0.6 | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cur | 1. | 1.5 | 1. | | | | | | | |
| DC 5 # | 67. | 68. | 69. | | | | | | | |
| DC 6 " | 4. | 5. | 6. | | | | | | | |
| DC 7 | ~~0.6~~ | 1.1 | ~~0.6~~ | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | 7.00 | | | | | | | | | |
| AC 1 | ~~6.48~~ | 14.5 | 6.52 | | | | | | | |
| AC 2 | 0.1 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +7.8 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 5K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

**PROJECT** EMPIRE 463
LINE 9N HALF N SP. 1 DATE 8-19-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 3-6N | → | → | 6-9N | → | → | → | 9-12N | → | → |
| RANGE | 10X100 | 10X150 | 10X150 | 10X100 | 10X100 | 10X150 | 10X150 | 10X150 | 10X100 | 10X100 |
| VOLTAGE | 260 | 210 | 380 | 300 | 260 | 220 | 380 | 270 | 300 | 260 |
| CURRENT | 1.0 | 1.5 | 1.5 | 1.0 | 1.0 | 1.5 | 1.5 | 1.5 | 1.0 | 1.0 |
| SEND | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 |
| RECEIVE | 9-12N | → | 12-15N | → | → | → | → | → | 15-18N | → |
| RANGE | 10X200 | 10X150 | 10X150 | 10X150 | 10X100 | 10X100 | 10X200 | 10X150 | 10X150 | 10X100 |
| VOLTAGE | 300 | 380 | 200 | 270 | 300 | 260 | 300 | 380 | 200 | 180 |
| CURRENT | 2.0 | 1.5 | 1.5 | 1.5 | 1.0 | 1.0 | 2.0 | 1.5 | 1.5 | 1.0 |

FREQUENCIES 3 0.3
SENDER NO. 9662-S
OPERATOR STEVE CRUZE
RECEIVER NO. 20693-R
OPERATOR BILL FREEMAN

**COMMENTS:** MOISTURE IN SENDER: SLIGHT DELAY WHILE DRYING OUT SAME ELECTRODES SEEM POLARIZED

LINE VOLTAGE @ 85 ON 2-3

GULLY MOISTURE

JOB 463, LINE 9W, SP1 N1/2 S1/2, 8/19/70 300 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 99.300 | 0.00 | 3.00 | .30 | 0.0000 | 1.0070 |

| COMPUTED DATA | | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 40 | 1 | 1506.54 | 2.35 | 1.6 | 2.35 | 1.6 | 0.00 | ** | 2.60 | 1.00 | 40 | 1 | 1620.000 | .50 |
| 41 | 2 | 421.88 | 1.05 | 2.5 | 1.05 | 2.5 | 0.00 | ** | .90 | 1.50 | 41 | 2 | 173.000 | -.30 |
| 42 | 3 | 463.93 | 2.00 | 4.3 | 2.00 | 4.3 | 0.00 | ** | 2.10 | 1.50 | 42 | 3 | 75.200 | .20 |
| 43 | 1 | 268.37 | 1.10 | 4.1 | 1.10 | 4.1 | 0.00 | ** | 1.40 | 1.00 | 43 | 1 | 292.000 | .60 |
| 44 | 2 | 240.99 | 2.00 | 8.3 | 2.00 | 8.3 | 0.00 | ** | 1.80 | 1.00 | 44 | 2 | 65.300 | -.40 |
| 45 | 3 | 104.77 | 2.20 | 21.0 | 2.20 | 21.0 | 0.00 | ** | 2.00 | 1.50 | 45 | 3 | 17.000 | -.40 |
| 46 | 4 | 113.87 | 2.10 | 18.4 | 2.10 | 18.4 | 0.00 | ** | 2.20 | 1.50 | 46 | 4 | 9.220 | .20 |
| 47 | 1 | 246.67 | .70 | 2.8 | .70 | 2.8 | 0.00 | ** | .80 | 1.50 | 47 | 1 | 405.000 | .20 |
| 48 | 2 | 247.89 | 1.80 | 7.3 | 1.80 | 7.3 | 0.00 | ** | 1.90 | 1.00 | 48 | 2 | 67.100 | .20 |
| 49 | 3 | 303.50 | 2.25 | 7.4 | 2.25 | 7.4 | 0.00 | ** | 2.40 | 1.00 | 49 | 3 | 32.700 | .30 |
| 50 | 4 | 150.21 | 2.20 | 14.6 | 2.20 | 14.6 | 0.00 | ** | 2.30 | 2.00 | 50 | 4 | 16.200 | .20 |
| 51 | 5 | 151.99 | 1.75 | 11.5 | 1.75 | 11.5 | 0.00 | ** | 1.80 | 1.50 | 51 | 5 | 7.060 | .10 |
| 52 | 1 | 263.73 | .65 | 2.5 | .65 | 2.5 | 0.00 | ** | .80 | 1.50 | 52 | 1 | 433.000 | .30 |
| 53 | 2 | 507.32 | 1.20 | 2.4 | 1.20 | 2.4 | 0.00 | ** | 1.40 | 1.50 | 53 | 2 | 207.000 | .40 |
| 54 | 3 | 473.36 | 1.90 | 4.0 | 1.90 | 4.0 | 0.00 | ** | 2.20 | 1.00 | 54 | 3 | 51.100 | .60 |
| 55 | 4 | 576.73 | 2.15 | 3.7 | 2.15 | 3.7 | 0.00 | ** | 2.30 | 1.00 | 55 | 4 | 31.100 | .30 |
| 56 | 5 | 289.89 | 1.90 | 6.6 | 1.90 | 6.6 | 0.00 | ** | 2.10 | 2.00 | 56 | 5 | 17.900 | .40 |
| 57 | 6 | 295.78 | 2.00 | 6.8 | 2.00 | 6.8 | 0.00 | ** | 2.00 | 1.50 | 57 | 6 | 8.570 | 0.00 |
| 58 | 2 | 88.35 | .70 | 7.9 | .70 | 7.9 | 0.00 | ** | .70 | 1.50 | 58 | 2 | 36.300 | 0.00 |
| 59 | 3 | 203.63 | 1.10 | 5.4 | 1.10 | 5.4 | 0.00 | ** | 1.20 | 1.00 | 59 | 3 | 22.200 | .20 |
| 60 | 4 | 216.33 | 1.90 | 8.8 | 1.90 | 8.8 | 0.00 | ** | 2.00 | 1.00 | 60 | 4 | 11.700 | .20 |
| 61 | 5 | 288.53 | 1.35 | 4.7 | 1.35 | 4.7 | 0.00 | ** | 1.40 | 1.00 | 61 | 5 | 8.970 | .10 |
| 62 | 6 | 151.46 | 1.40 | 9.2 | 1.40 | 9.2 | 0.00 | ** | 1.50 | 2.00 | 62 | 6 | 5.880 | .20 |
| 63 | 3 | 98.21 | .60 | 6.1 | .60 | 6.1 | 0.00 | ** | .80 | 2.00 | 63 | 3 | 21.500 | .40 |
| 64 | 4 | 249.98 | 1.40 | 5.6 | 1.40 | 5.6 | 0.00 | ** | 1.40 | 1.50 | 64 | 4 | 20.400 | 0.00 |
| 65 | 5 | 256.10 | 1.50 | 5.9 | 1.50 | 5.9 | 0.00 | ** | 1.80 | 1.00 | 65 | 5 | 7.930 | .60 |
| 66 | 6 | 400.93 | 1.20 | 3.0 | 1.20 | 3.0 | 0.00 | ** | 1.40 | 1.00 | 66 | 6 | 7.790 | .40 |
| 67 | 4 | 127.65 | .55 | 4.3 | .55 | 4.3 | 0.00 | ** | .60 | 1.00 | 67 | 4 | 7.000 | .10 |
| 68 | 5 | 310.02 | 1.10 | 3.5 | 1.10 | 3.5 | 0.00 | ** | 1.10 | 1.50 | 68 | 5 | 14.500 | 0.00 |
| 69 | 6 | 332.91 | .60 | 1.8 | .60 | 1.8 | 0.00 | ** | .60 | 1.00 | 69 | 6 | 6.520 | 0.00 |

BUSINESS FORMS PRINTING COMPANY ENGINEERED FOR HIGH SPEED PRINTERS

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463
LINE 9W HALF N SP. 1 DATE 8-19-2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 5-4 |
| RECEIVE | 15-18N | → | → | 18-21N | → | → | → | 21-24N | → | → |
| RANGE | 10X100 | 10X100 | 10X200 | 10X200 | 10X150 | 10X100 | 10X100 | 10X100 | 10X150 | 10X100 |
| VOLTAGE | 300 | 260 | 300 | 280 | 280 | 300 | 260 | 130 | 270 | 300 |
| CURRENT | 1.0 | 1.0 | 2.0 | 2.0 | 1.5 | 1.0 | 1.0 | 1.0 | 1.5 | 1.0 |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3 0.3
SENDER NO. 2662-S
OPERATOR STEVE CRUZE
RECEIVER NO. 20693-R
OPERATOR BILL FREEMAN

COMMENTS:

JOB 463, LINE 9W, SP1 N1/2 S1/2, 8/19/70 — 300 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 99.300 | 0.00 | 3.00 | .30 | 0.0000 | 1.0070 |

| COMPUTED DATA | | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 1020.91 | 2.40 | 2.4 | 2.40 | 2.4 | 0.00 | ** | 2.40 | 1.00 | 1 | 1 | 1100.000 | 0.00 |
| 2 | 2 | 157.00 | 2.30 | 14.6 | 2.30 | 14.6 | 0.00 | ** | 2.30 | .90 | 2 | 2 | 38.100 | 0.00 |
| 3 | 1 | 393.63 | 1.00 | 2.5 | 1.00 | 2.5 | 0.00 | ** | 1.00 | 1.00 | 3 | 1 | 430.000 | 0.00 |
| 4 | 2 | 292.49 | 1.10 | 3.8 | 1.10 | 3.8 | 0.00 | ** | 1.10 | 1.00 | 4 | 2 | 79.800 | 0.00 |
| 5 | 3 | 70.16 | 2.40 | 34.2 | 2.40 | 34.2 | 0.00 | ** | 2.40 | 1.00 | 5 | 3 | 7.560 | 0.00 |
| 6 | 1 | 684.52 | .70 | 1.0 | .70 | 1.0 | 0.00 | ** | .70 | 1.00 | 6 | 1 | 750.000 | 0.00 |
| 7 | 2 | 465.95 | 1.20 | 2.6 | 1.20 | 2.6 | 0.00 | ** | 1.20 | 1.00 | 7 | 2 | 127.000 | 0.00 |
| 8 | 3 | 309.70 | 2.00 | 6.5 | 2.00 | 6.5 | 0.00 | ** | 2.00 | 1.00 | 8 | 3 | 33.500 | 0.00 |
| 9 | 4 | 78.18 | 2.20 | 28.1 | 2.20 | 28.1 | 0.00 | ** | 2.20 | 1.00 | 9 | 4 | 4.220 | 0.00 |
| 10 | 1 | 319.40 | .40 | 1.3 | .40 | 1.3 | 0.00 | ** | .40 | 1.00 | 10 | 1 | 351.000 | 0.00 |
| 11 | 2 | 1050.89 | 1.00 | 1.0 | 1.00 | 1.0 | 0.00 | ** | 1.00 | 1.00 | 11 | 2 | 287.000 | 0.00 |
| 12 | 3 | 563.73 | 1.30 | 2.3 | 1.30 | 2.3 | 0.00 | ** | 1.30 | 1.00 | 12 | 3 | 61.400 | 0.00 |
| 13 | 4 | 363.53 | 1.80 | 5.0 | 1.80 | 5.0 | 0.00 | ** | 1.80 | 1.00 | 13 | 4 | 19.700 | 0.00 |
| 14 | 5 | 110.98 | 2.30 | 20.7 | 2.30 | 20.7 | 0.00 | ** | 2.30 | 1.00 | 14 | 5 | 3.420 | 0.00 |
| 15 | 1 | 517.61 | .90 | 1.7 | .90 | 1.7 | 0.00 | ** | .90 | 1.00 | 15 | 1 | 566.000 | 0.00 |
| 16 | 2 | 323.87 | .60 | 1.9 | .60 | 1.9 | 0.00 | ** | .60 | 1.00 | 16 | 2 | 88.800 | 0.00 |
| 17 | 3 | 981.43 | 1.20 | 1.2 | 1.20 | 1.2 | 0.00 | ** | 1.20 | 1.00 | 17 | 3 | 107.000 | 0.00 |
| 18 | 4 | 576.45 | 1.60 | 2.8 | 1.60 | 2.8 | 0.00 | ** | 1.60 | 1.00 | 18 | 4 | 31.300 | 0.00 |
| 19 | 5 | 358.80 | 1.90 | 5.3 | 1.90 | 5.3 | 0.00 | ** | 1.90 | 1.00 | 19 | 5 | 11.100 | 0.00 |
| 20 | 6 | 99.79 | 2.40 | 24.1 | 2.29 | 22.9 | .11 | ** | 2.40 | 1.00 | 20 | 6 | 1.920 | 0.00 |
| 21 | 2 | 419.45 | .90 | 2.1 | .90 | 2.1 | 0.00 | ** | .90 | 1.50 | 21 | 2 | 172.000 | 0.00 |
| 22 | 3 | 347.85 | 1.00 | 2.9 | 1.00 | 2.9 | 0.00 | ** | 1.00 | 1.50 | 22 | 3 | 57.000 | 0.00 |
| 23 | 4 | 855.54 | 1.50 | 1.8 | 1.50 | 1.8 | 0.00 | ** | 1.50 | 1.00 | 23 | 4 | 46.500 | 0.00 |
| 24 | 5 | 435.70 | 2.50 | 5.7 | 2.50 | 5.7 | 0.00 | ** | 2.50 | 1.00 | 24 | 5 | 13.400 | 0.00 |
| 25 | 6 | 298.99 | 1.80 | 6.0 | 1.80 | 6.0 | 0.00 | ** | 1.80 | 1.50 | 25 | 6 | 8.680 | 0.00 |
| 26 | 3 | 471.17 | 1.80 | 3.8 | 1.80 | 3.8 | 0.00 | ** | 1.80 | 1.50 | 26 | 3 | 76.600 | 0.00 |
| 27 | 4 | 374.35 | 1.90 | 5.1 | 1.90 | 5.1 | 0.00 | ** | 1.90 | 1.50 | 27 | 4 | 30.400 | 0.00 |
| 28 | 5 | 845.33 | 2.10 | 2.5 | 2.10 | 2.5 | 0.00 | ** | 2.10 | 1.00 | 28 | 5 | 26.100 | 0.00 |
| 29 | 6 | 405.79 | 2.50 | 6.2 | 2.50 | 6.2 | 0.00 | ** | 2.50 | 1.00 | 29 | 6 | 7.800 | 0.00 |
| 30 | 4 | 479.31 | 1.70 | 3.5 | 1.70 | 3.5 | 0.00 | ** | 1.70 | 1.50 | 30 | 4 | 39.000 | 0.00 |
| 31 | 5 | 404.74 | 1.80 | 4.4 | 1.80 | 4.4 | 0.00 | ** | 1.80 | 1.50 | 31 | 5 | 18.800 | 0.00 |
| 32 | 6 | 865.41 | 2.10 | 2.4 | 2.10 | 2.4 | 0.00 | ** | 2.10 | 1.00 | 32 | 6 | 16.700 | 0.00 |
| 40 | 1 | 1506.54 | 2.35 | 1.6 | 2.35 | 1.6 | 0.00 | ** | 2.60 | 1.00 | 40 | 1 | 1620.000 | .50 |
| 41 | 2 | 421.88 | 1.05 | 2.5 | 1.05 | 2.5 | 0.00 | ** | .90 | 1.50 | 41 | 2 | 173.000 | -.30 |
| 42 | 3 | 463.93 | 2.00 | 4.3 | 2.00 | 4.3 | 0.00 | ** | 2.10 | 1.50 | 42 | 3 | 75.200 | .20 |
| 43 | 1 | 268.37 | 1.10 | 4.1 | 1.10 | 4.1 | 0.00 | ** | 1.40 | 1.00 | 43 | 1 | 292.000 | .60 |
| 44 | 2 | 240.99 | 2.00 | 8.3 | 2.00 | 8.3 | 0.00 | ** | 1.80 | 1.00 | 44 | 2 | 65.300 | -.40 |
| 45 | 3 | 104.77 | 2.20 | 21.0 | 2.20 | 21.0 | 0.00 | ** | 2.00 | 1.50 | 45 | 3 | 17.000 | -.40 |
| 46 | 4 | 113.87 | 2.10 | 18.4 | 2.10 | 18.4 | 0.00 | ** | 2.20 | 1.50 | 46 | 4 | 9.220 | .20 |
| 47 | 1 | 246.67 | .70 | 2.8 | .70 | 2.8 | 0.00 | ** | .80 | 1.50 | 47 | 1 | 405.000 | .20 |
| 48 | 2 | 247.89 | 1.80 | 7.3 | 1.80 | 7.3 | 0.00 | ** | 1.90 | 1.00 | 48 | 2 | 67.100 | .20 |
| 49 | 3 | 303.50 | 2.25 | 7.4 | 2.25 | 7.4 | 0.00 | ** | 2.40 | 1.00 | 49 | 3 | 32.700 | .30 |
| 50 | 4 | 150.21 | 2.20 | 14.6 | 2.20 | 14.6 | 0.00 | ** | 2.30 | 2.00 | 50 | 4 | 16.200 | .20 |
| 51 | 5 | 151.99 | 1.75 | 11.5 | 1.75 | 11.5 | 0.00 | ** | 1.80 | 1.50 | 51 | 5 | 7.060 | .10 |
| 52 | 1 | 263.73 | .65 | 2.5 | .65 | 2.5 | 0.00 | ** | .80 | 1.50 | 52 | 1 | 433.000 | .30 |
| 53 | 2 | 507.32 | 1.20 | 2.4 | 1.20 | 2.4 | 0.00 | ** | 1.40 | 1.50 | 53 | 2 | 207.000 | .40 |
| 54 | 3 | 473.36 | 1.90 | 4.0 | 1.90 | 4.0 | 0.00 | ** | 2.20 | 1.00 | 54 | 3 | 51.100 | .60 |
| 55 | 4 | 576.73 | 2.15 | 3.7 | 2.15 | 3.7 | 0.00 | ** | 2.30 | 1.00 | 55 | 4 | 31.100 | .30 |

BUSINESS FORMS PRINTING COMPANY BLUE-SPACE BAR ENGINEERED FOR HIGH SPEED PRINTERS

Job 463, Line 9E, Sp 1 5½, 8/21/70 300.

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9E HALF S SP. 1 DATE 8-21-7.

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 ① | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | CAL | 0-3S | → | 3-6S | → | → | 6-9S | → | → | → |
| RANGE | 10 | 10 | 1.0 | 1.0 | 1.0 | 0.1 | 10 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.0 | 1.3 | 1.1 | 4.0 | 4.0 | 4.1 | 2.5 | 3.4 | 2.9 | 2.2 |
| DC 2 | | | | | | | | | | |
| DC 3 CUR | 1.5 | 2. | 2. | 1.5 | 2. | 2. | 1.5 | 1.5 | 2. | 2. |
| DC 4 # | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
| DC 5 # | | 1. | 2. | 1. | 2. | 3. | 1. | 2. | 3. | 4. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 150. | 261. | 49.5 | 92.3 | 13.2 | 4.14 | 353. | 51.0 | 15.2 | 8.55 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | 3.2 | | | | | | | | | |
| S.P. | 0.3 | +16.3 | | -10.5 | | - | -7.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 8K | | 7K | | | 6K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9E HALF S SP. 1 DATE 8-21-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 9-12s | — | — | — | → | 12-15 | — | — | — | → |
| RANGE | ~~100~~ | ~~10~~ | ~~1.0~~ | ~~1.0~~ | ~~1.0~~ | ~~10~~ | ~~1.0~~ | ~~0.1~~ | ~~0.1~~ | ~~0.1~~ |
| DC 1 | 1.3 | 3.7 | 3.2 | 2.6 | 2.4 | 0.6 | 0.4 | 3.3 | 2.3 | 1.4 |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | 2. | 1.5 | 1.5 | 2. | 2. | 1. | 2. | 1.5 | 1.5 | 2. |
| DC 4 # | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. |
| DC 5 n | 1. | 2. | 3. | 4. | 5. | 1. | 2. | 3. | 4. | 5. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1210. | 184. | 48.2 | 20.0 | 13.5 | 399. | 24.5 | 8.84 | 2.65 | 1.20 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +3.7 | | | | | -2.5 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 8K | | | | | 5K | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9E HALF S SP. 1 DATE 8-21-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 12-15 | 15-18 | ——— | ——— | ——— | ——→ | 18-21 | ——— | ——— | ——→ |
| RANGE | 0.01 | 10 | 1.0 | 1.0 | 0.1 | 0.1 | 10.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 2.1 | 0.7 | 0.6 | 3.3 | 1.8 | 1.4 | 0.8 | 1.1 | 3.1 | 1.3 |
| DC 2 | | | | | | | | | | |
| DC 3 Card | 2. | 1. | 2. | 1.5 | 1.5 | 2. | 1. | 2. | 1.5 | 1.5 |
| DC 4 # | 20. | 21. | 22. | 23. | 24. | 25. | 26. | 27. | 28. | 29. |
| DC 5 " | 6. | 2. | 3. | 4. | 5. | 6. | 3. | 4. | 5. | 6. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | 169. | | | |
| AC 1 | 0,974 | 335. | 25,4 | 15,0 | 5,40 | 3,08 | 16.8 | 14,9 | 13,2 | 5,42 |
| AC 2 | 0.0 | 0,0 | 0,0 | 0,0 | 0,0 | 0,0 | 0.0 | -0.2 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -14.2 | | | | | +11.6 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 7K | | | | | 6K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9E HALF S SP. 1 DATE 8-21-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 21-24 | → | → | | | | | | | |
| RANGE | ~~1.0~~ | ~~0.1~~ | ~~0.1~~ | | | | | | | |
| DC 1 | 0.8 | 1.4 | 2.8 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | 1. | 2. | 1.5 | | | | | | | |
| DC 4 | 30. | 31. | 32. | | | | | | | |
| DC 5 | 4. | 5. | 6. | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 60.0 | 6.83 | 9.53 | | | | | | | |
| AC 2 | 0.0 | 0.2 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | -4.7 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 9-E HALF S SP. 1 DATE 8/21



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 |
| RECEIVE | 0-3 | → | 3-6 | — | → | 6-9 | — | — | → | 9-12 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 200V | 230V | 310V | 200V | 230V | 340V | 310V | 200V | 230V | 210V |
| CURRENT | 2.0A | 2.0A | 1.5A | 2.0A | 2.0A | 1.5A | 1.5A | 2.0A | 2.0A | 2.0A |
| SEND | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | — | — | — | → | 12-15 | — | — | — | — | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 340V | 310V | 200V | 230V | 280V | 210V | 340V | 310V | 200V | 230V |
| CURRENT | 1.5A | 1.5A | 2.0A | 2.0A | 1.0A | 2.0A | 1.5A | 1.5A | 2.0A | 2.0A |

FREQUENCIES 3.0 0.3

SENDER NO. 9662-5

OPERATOR SB

RECEIVER NO. 2069J-R

OPERATOR Bill F.

COMMENTS:

1-2 – 1.0 @ 4B
2-3 – 2.0 @ 4B
3-4 – 1.5 @ 4B
4-5 – 1.5 @ 4B
5-6 – 2.0A @ 4B
6-7 – 2.0A @ 4B

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463
LINE 9-E HALF S SP. 1 DATE 8/21

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 |
| RECEIVE | 15-18 | → | → | → | → | 18-21 | → | → | → | 21-24 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 340V | 210V | 340V | 310V | 200V | 340V | 210V | 340V | 310V | 340V |
| CURRENT | 1.0A | 2.0A | 1.5A | 1.5A | 2.0A | 1.0A | 2.0A | 1.5A | 1.5A | 1.0A |
| SEND | 2-3 | 3-4 | | CAL | | | | | | |
| RECEIVE | → | → | | 4-5 | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 210V | 340V | | 310V | | | | | | |
| CURRENT | 2.0A | 1.5A | | 1.5A | | | | | | |

FREQUENCIES 3.0 0.3
SENDER NO. 9662-S
OPERATOR 58
RECEIVER NO. 20692-R
OPERATOR Bill F.

COMMENTS:

Job 463, Line 9E, Sp 1 N½, 8/21/70 300.

∴

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9E HALF N SP. 1 DATE 8-21-7.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4½ | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | CAL | 0-3N | → | 3-6N | → | → | 6-9N | → | → | → |
| RANGE | 10 | 10 | 1.0 | 10 | 1.0 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | 0.0 | 4.0 | 3.7 | 1.0 | 9.0 | 2.8 | 1.4 | 1.4 | 4.1 | 2.3 |
| DC 2 | | | | | | | 0.5 | | | |
| DC 3 Cur | 1.5 | 2. | 1. | 1.5 | 2. | 1. | 1.5 | 1.5 | 2. | 1. |
| DC 4 # | | 2. | 1 | 3. | 33. | 34. | 35. | 36. | 37. | 38. |
| DC 5 M | | 1. | 2. | 1. | 2. | 3. | 1. | 2. | 3. | 4. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | 96.1 | | | |
| AC 1 | 151. | 110. | 33.3 | 191. | 13.9 | 8.163 | 37.1 | 37.1 | 4.55 | 5.22 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | 3.0 | | | | | | | | | |
| S.P. | 0.3 | +17.0 | | -16.2 | | | +28.2 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 3K | | 1K | | | 3K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9E HALF N SP. 1 DATE 8-21-72

| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 9-12N | | | | → | 12-15N | | | | |
| RANGE | ~~1.0~~ | ~~1.0~~ | ~~1.0~~ | ~~0.1~~ | ~~0.1~~ | ~~1.0~~ | ~~1.0~~ | ~~1.0~~ | ~~1.0~~ | ~~0.1~~ |
| DC 1 | 0.4 | 0.3 | 1.5 | ~~1.85~~ | 2.3 | 0.7 | 0.4 | 0.2 | 1.8 | 3.8 |
| DC 2 | | | | 3.0 | | | | | | |
| DC 3 Cur | 2. | 1.5 | 1.5 | 2. | 1. | 2. | 2. | 1.5 | 1.5 | 2. |
| DC 4 # | 39. | 40. | 41. | 42. | 43. | 44. | 45. | 46. | 47. | 48. |
| DC 5 M | 1. | 2. | 3. | 4. | 5. | 1. | 2. | 3. | 4. | 5. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 84.3 | 16.0 | 12.1 | 1.85 | 2.64 | 222. | 38.7 | 12.2 | 11.1 | 1.87 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +6.7 | | | | | +13.3 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3K | | | | | 4K | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9E HALF N SP. 1 DATE 8-21-74



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 12-15N | 15-18N | — | — | — | → | 18-21N | — | — | → |
| RANGE | ~~0.1~~ | ~~1.0~~ | 1.0 | ~~0.1~~ | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | 1.2 | 0.6 | 0.6 | 0.0 | 1.4 | 3.7 | 0.5 | 0.7 | 0.3 | 1.9 |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | 1, | 2. | 2, | 1.5 | 1.5 | 2. | 2. | 2. | 1.5 | 1.5 |
| DC 4 # | 49. | 50. | 51. | 52. | 53. | 54. | 55. | 56. | 57. | 58. |
| DC 5 " | 6. | 2. | 3. | 4. | 5. | 6. | 3. | 4. | 5. | 6. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 2.91 | 72.6 | 23.4 | 8.68 | 8.63 | 1.58 | 25.0 | 10.3 | 4.27 | 4.57 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 6.0 | 0.0 | 0.0 | −0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | −13.5 | | | | | +3.7 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 3 k | | | | | 5 K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9E HALF N SP. 1 DATE 8-21-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 21-24 | | | | | | | | | |
| RANGE | ~~1.0~~ | ~~1.0~~ | ~~0.1~~ | | | | | | | |
| DC 1 | 1.0 | 1.1 | 0.8 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | 2. | 2. | 1.5 | | | | | | | |
| DC 4 # | 59. | 60. | 61. | | | | | | | |
| DC 5 " | 4. | 5. | 6. | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 23.0 | 10.9 | 4.84 | | | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +2.5 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 5K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 9E HALF N SP. 1 DATE 8/21

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 0-3 | → | 3-6 | → | → | 6-9 | → | → | → | 9-12 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 210V | 330V | 330V | 210V | 330V | 300V | 320V | 210V | 330V | 200V |
| CURRENT | 2.0A | 1.0A | 1.5A | 2.0A | 1.0A | 1.5A | 1.5A | 2.0A | 1.0A | 2.0A |
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | → | → | → | → | 12-15 | → | → | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 300V | 320V | 210V | 330V | 230V | 300V | 300V | 320V | 210V | 330V |
| CURRENT | 1.5A | 1.5A | 2.0A | 1.0A | 2.0A | 2.0A | 1.5A | 1.5A | 2.0A | 1.0A |

FREQUENCIES 3.0 0.3

SENDER NO. 9662-S

OPERATOR SS

RECEIVER NO. 20693-R

OPERATOR Bell F.

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 9-E HALF N SP. 1 DATE 8/21

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 |
| RECEIVE | 15-18 | → | → | → | → | 18-21 | → | → | → | 21-24 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 230V | 200 | 300V | 320V | 210V | 230V | 200V | 300V | 320V | 230V |
| CURRENT | 2.0A | 2.0A | 1.5A | 1.5A | 2.0A | 2.0A | 2.0A | 1.5A | 1.5A | 2.0A |
| SEND | 5-6 | 4-5 | | | | | | | | CH2 |
| RECEIVE | → | → | | | | | | | | 3-4 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 200V | 300V | | | | | | | | 340V |
| CURRENT | 2.0A | 1.5A | | | | | | | | 1.5A |

FREQUENCIES 3.0 0.3

SENDER NO. 9662-S

OPERATOR SS

RECEIVER NO. 20693-R

OPERATOR Bill F.

COMMENTS:

JOB 463, LINE 9E, SPI NI/2, 8/21/70 — 300 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.500 | 0.00 | 151.000 | 0.00 | 3.00 | .30 | 0.0000 | .9934 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 2 | 1 | 51.14 | 4.00 | 78.2 | 4.00 | 78.2 | 0.00 | ** | 4.00 | 2.00 | 2 | 1 | 110.000 | 0.00 |
| 1 | 2 | 123.49 | 3.70 | 30.0 | 3.70 | 30.0 | 0.00 | ** | 3.70 | 1.00 | 1 | 2 | 33.300 | 0.00 |
| 3 | 1 | 114.98 | 1.00 | 8.7 | 1.00 | 8.7 | 0.00 | ** | 1.00 | 1.50 | 3 | 1 | 191.000 | 0.00 |
| 33 | 2 | 25.85 | 4.00 | 154.7 | 4.00 | 154.7 | 0.00 | ** | 4.00 | 2.00 | 33 | 2 | 13.900 | 0.00 |
| 34 | 3 | 79.32 | 2.80 | 35.3 | 2.80 | 35.3 | 0.00 | ** | 2.80 | 1.00 | 34 | 3 | 8.630 | 0.00 |
| 35 | 1 | 57.56 | .50 | 8.7 | .50 | 8.7 | 0.00 | ** | .50 | 1.50 | 35 | 1 | 96.100 | 0.00 |
| 36 | 2 | 89.69 | 1.40 | 15.6 | 1.40 | 15.6 | 0.00 | ** | 1.40 | 1.50 | 36 | 2 | 37.100 | 0.00 |
| 37 | 3 | 21.17 | 4.10 | 193.6 | 3.91 | 184.4 | .19 | ** | 4.10 | 2.00 | 37 | 3 | 4.550 | 0.00 |
| 38 | 4 | 95.48 | 2.30 | 24.1 | 2.30 | 24.1 | 0.00 | ** | 2.30 | 1.00 | 38 | 4 | 5.220 | 0.00 |
| 39 | 1 | 37.83 | .40 | 10.6 | .40 | 10.6 | 0.00 | ** | .40 | 2.00 | 39 | 1 | 84.300 | 0.00 |
| 40 | 2 | 38.26 | .30 | 7.8 | .30 | 7.8 | 0.00 | ** | .30 | 1.50 | 40 | 2 | 16.000 | 0.00 |
| 41 | 3 | 73.20 | 1.50 | 20.5 | 1.50 | 20.5 | 0.00 | ** | 1.50 | 1.50 | 41 | 3 | 12.100 | 0.00 |
| 42 | 4 | 17.04 | 2.95 | 173.2 | 2.45 | 143.9 | .50 | ** | 3.00 | 2.00 | 42 | 4 | 1.850 | .10 |
| 43 | 5 | 84.51 | 2.30 | 27.2 | 2.21 | 26.2 | .09 | ** | 2.30 | 1.00 | 43 | 5 | 2.640 | 0.00 |
| 44 | 1 | 99.93 | .70 | 7.0 | .70 | 7.0 | 0.00 | ** | .70 | 2.00 | 44 | 1 | 222.000 | 0.00 |
| 45 | 2 | 69.48 | .40 | 5.8 | .40 | 5.8 | 0.00 | ** | .40 | 2.00 | 45 | 2 | 38.700 | 0.00 |
| 46 | 3 | 72.86 | .20 | 2.7 | .20 | 2.7 | 0.00 | ** | .20 | 1.50 | 46 | 3 | 12.200 | 0.00 |
| 47 | 4 | 134.70 | 1.75 | 13.0 | 1.75 | 13.0 | 0.00 | ** | 1.80 | 1.50 | 47 | 4 | 11.100 | .10 |
| 48 | 5 | 30.37 | 3.80 | 125.1 | 3.42 | 112.7 | .38 | ** | 3.80 | 2.00 | 48 | 5 | 1.870 | 0.00 |
| 49 | 6 | 147.44 | 1.20 | 8.1 | 1.20 | 8.1 | 0.00 | ** | 1.20 | 1.00 | 49 | 6 | 2.910 | 0.00 |
| 50 | 2 | 130.59 | .60 | 4.6 | .60 | 4.6 | 0.00 | ** | .60 | 2.00 | 50 | 2 | 72.600 | 0.00 |
| 51 | 3 | 105.23 | .60 | 5.7 | .60 | 5.7 | 0.00 | ** | .60 | 2.00 | 51 | 3 | 23.400 | 0.00 |
| 52 | 4 | 103.47 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | ** | 0.00 | 1.50 | 52 | 4 | 8.680 | 0.00 |
| 53 | 5 | 182.55 | 1.40 | 7.7 | 1.40 | 7.7 | 0.00 | ** | 1.40 | 1.50 | 53 | 5 | 8.630 | 0.00 |
| 54 | 6 | 41.02 | 3.70 | 90.2 | 3.32 | 80.9 | .38 | ** | 3.70 | 2.00 | 54 | 6 | 1.580 | 0.00 |
| 55 | 3 | 112.31 | .50 | 4.5 | .50 | 4.5 | 0.00 | ** | .50 | 2.00 | 55 | 3 | 25.000 | 0.00 |
| 56 | 4 | 92.73 | .70 | 7.5 | .70 | 7.5 | 0.00 | ** | .70 | 2.00 | 56 | 4 | 10.300 | 0.00 |
| 57 | 5 | 89.34 | .30 | 3.4 | .22 | 2.4 | .08 | ** | .30 | 1.50 | 57 | 5 | 4.270 | 0.00 |
| 58 | 6 | 155.43 | 2.00 | 12.9 | 2.00 | 12.9 | 0.00 | ** | 1.90 | 1.50 | 58 | 6 | 4.570 | -.20 |
| 59 | 4 | 207.69 | 1.00 | 4.8 | 1.00 | 4.8 | 0.00 | ** | 1.00 | 2.00 | 59 | 4 | 23.000 | 0.00 |
| 60 | 5 | 172.41 | 1.10 | 6.4 | 1.10 | 6.4 | 0.00 | ** | 1.10 | 2.00 | 60 | 5 | 10.900 | 0.00 |
| 61 | 6 | 162.84 | .80 | 4.9 | .80 | 4.9 | 0.00 | ** | .80 | 1.50 | 61 | 6 | 4.840 | 0.00 |

JOB 463, LINE 9E, SP1 S1/2, 8/21/70 — 300 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.500 | 0.00 | 150.000 | 0.00 | 3.00 | .30 | 0.0000 | 1.0000 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 118.98 | 1.30 | 10.9 | 1.30 | 10.9 | 0.00 | ** | 1.30 | 2.00 | 1 | 1 | 261.000 | 0.00 |
| 2 | 2 | 90.08 | 1.10 | 12.2 | 1.10 | 12.2 | 0.00 | ** | 1.10 | 2.00 | 2 | 2 | 49.500 | 0.00 |
| 3 | 1 | 57.60 | 4.00 | 69.5 | 4.00 | 69.5 | 0.00 | ** | 4.00 | 1.50 | 3 | 1 | 92.300 | 0.00 |
| 4 | 2 | 24.71 | 4.00 | 161.9 | 4.00 | 161.9 | 0.00 | ** | 4.00 | 2.00 | 4 | 2 | 13.200 | 0.00 |
| 5 | 3 | 19.39 | 4.10 | 211.4 | 3.88 | 200.1 | .22 | ** | 4.10 | 2.00 | 5 | 3 | 4.140 | 0.00 |
| 6 | 1 | 21.71 | 2.50 | 115.2 | 2.50 | 115.2 | 0.00 | ** | 2.50 | 1.50 | 6 | 1 | 35.300 | 0.00 |
| 7 | 2 | 126.56 | 3.40 | 26.9 | 3.40 | 26.9 | 0.00 | ** | 3.40 | 1.50 | 7 | 2 | 51.000 | 0.00 |
| 8 | 3 | 70.38 | 2.90 | 41.2 | 2.90 | 41.2 | 0.00 | ** | 2.90 | 2.00 | 8 | 3 | 15.200 | 0.00 |
| 9 | 4 | 78.64 | 2.20 | 28.0 | 2.20 | 28.0 | 0.00 | ** | 2.20 | 2.00 | 9 | 4 | 8.550 | 0.00 |
| 10 | 1 | 551.58 | 1.30 | 2.4 | 1.30 | 2.4 | 0.00 | ** | 1.30 | 2.00 | 10 | 1 | 1210.000 | 0.00 |
| 11 | 2 | 457.94 | 3.70 | 8.1 | 3.70 | 8.1 | 0.00 | ** | 3.70 | 1.50 | 11 | 2 | 184.000 | 0.00 |
| 12 | 3 | 298.45 | 3.20 | 10.7 | 3.20 | 10.7 | 0.00 | ** | 3.20 | 1.50 | 12 | 3 | 48.200 | 0.00 |
| 13 | 4 | 184.68 | 2.60 | 14.1 | 2.60 | 14.1 | 0.00 | ** | 2.60 | 2.00 | 13 | 4 | 20.000 | 0.00 |
| 14 | 5 | 217.73 | 2.40 | 11.0 | 2.40 | 11.0 | 0.00 | ** | 2.40 | 2.00 | 14 | 5 | 13.500 | 0.00 |
| 15 | 1 | 361.25 | .60 | 1.7 | .60 | 1.7 | 0.00 | ** | .60 | 1.00 | 15 | 1 | 399.000 | 0.00 |
| 16 | 2 | 44.28 | .40 | 9.0 | .40 | 9.0 | 0.00 | ** | .40 | 2.00 | 16 | 2 | 24.500 | 0.00 |
| 17 | 3 | 54.79 | 3.30 | 60.2 | 3.30 | 60.2 | 0.00 | ** | 3.30 | 1.50 | 17 | 3 | 8.840 | 0.00 |
| 18 | 4 | 32.53 | 2.30 | 70.7 | 2.10 | 64.4 | .20 | ** | 2.30 | 1.50 | 18 | 4 | 2.650 | 0.00 |
| 19 | 5 | 19.16 | 1.40 | 73.1 | .70 | 36.3 | .70 | ** | 1.40 | 2.00 | 19 | 5 | 1.200 | 0.00 |
| 20 | 6 | 25.06 | 2.10 | 83.8 | 1.35 | 54.0 | .75 | ** | 2.10 | 2.00 | 20 | 6 | .974 | 0.00 |
| 21 | 2 | 1214.44 | .70 | .6 | .70 | .6 | 0.00 | ** | .70 | 1.00 | 21 | 2 | 335.000 | 0.00 |
| 22 | 3 | 114.99 | .60 | 5.2 | .60 | 5.2 | 0.00 | ** | .60 | 2.00 | 22 | 3 | 25.400 | 0.00 |
| 23 | 4 | 185.94 | 3.30 | 17.7 | 3.30 | 17.7 | 0.00 | ** | 3.30 | 1.50 | 23 | 4 | 15.000 | 0.00 |
| 24 | 5 | 115.44 | 1.80 | 15.6 | 1.80 | 15.6 | 0.00 | ** | 1.80 | 1.50 | 24 | 5 | 5.400 | 0.00 |
| 25 | 6 | 78.70 | 1.40 | 17.8 | 1.25 | 15.8 | .15 | ** | 1.40 | 2.00 | 25 | 6 | 3.080 | 0.00 |
| 26 | 3 | 1533.17 | .80 | .5 | .80 | .5 | 0.00 | ** | .80 | 1.00 | 26 | 3 | 169.000 | 0.00 |
| 27 | 4 | 135.57 | 1.20 | 8.9 | 1.20 | 8.9 | 0.00 | ** | 1.10 | 2.00 | 27 | 4 | 14.900 | -.20 |
| 28 | 5 | 285.79 | 3.10 | 10.8 | 3.10 | 10.8 | 0.00 | ** | 3.10 | 1.50 | 28 | 5 | 13.200 | 0.00 |
| 29 | 6 | 184.48 | 1.30 | 7.0 | 1.30 | 7.0 | 0.00 | ** | 1.30 | 1.50 | 29 | 6 | 5.420 | 0.00 |
| 30 | 4 | 1088.64 | .80 | .7 | .80 | .7 | 0.00 | ** | .80 | 1.00 | 30 | 4 | 60.000 | 0.00 |
| 31 | 5 | 109.08 | 1.30 | 11.9 | 1.30 | 11.9 | 0.00 | ** | 1.40 | 2.00 | 31 | 5 | 6.830 | .20 |
| 32 | 6 | 329.17 | 2.80 | 8.5 | 2.80 | 8.5 | 0.00 | ** | 2.80 | 1.50 | 32 | 6 | 9.530 | 0.00 |

Job 463, Line 9-E-2, Sp 1 N½, 8/26/70 300.

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9-E-2 HALF N SP. 1 DATE 8-26-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | CAL ① | 0-3N | → | 3-6N | — | → | 6-9N | — | — | → |
| RANGE | 10 | 10 | 1.0 | 1.0 | 1.0 | 0.1 | 10 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.0 | 3.3 | 2.7 | 0.3 | 3.0 | 2.1 | 0.7 | 0.5 | 3.3 | 2.1 |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | 1.0 |
| DC 4 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 5 n | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 150. | 190. | 23.0 | 75.7 | 15.7 | 5.32 | 200. | 47.4 | 12.6 | 5.92 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | 3.0 | | | | | | | | | |
| S.P. | 0.3 | +5.2 | | -2.7 | | | +10.8 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 3k | | 5k | | | 4k | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9-E-2 HALF N SP. I DATE 8-26-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 9-12N | — | — | — | → | 12-15N | — | — | — | → |
| RANGE | 10 | 1.0 | 1.0 | 0.1 | 0.1 | 100 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.9 | 0.7 | 0.7 | 3.2 | 1.9 | 1.1 | 0.7 | 0.3 | 0.5 | 3.1 |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | 1.5 | 1.5 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| DC 4 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 5 m | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 295. | 55.1 | 21.3 | 6.43 | 3.66 | 1240. | 92.3 | 26.7 | 12.7 | 3.86 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +20.0 | | | | | −10.7 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 4K | | | | | 7K | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9-E-2 HALF N SP. 1 DATE 8-26-70

| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 12-15N | 15-18N | → | → | → | → | 18-21N | → | → | → |
| RANGE | 0.1 | 10 | 1.0 | 1.0 | 0.1 | 0.1 | 10 | 1.0 | 0.1 | 0.1 |
| DC 1 | 1.7 | 1.0 | 0.6 | 0.3 | 0.7 | 3.1 | 1.5 | 0.9 | 0.1 | 0.7 |
| DC 2 | | | | | | | | | | |
| DC 3 (sec) | 1.0 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| DC 4 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| DC 5 " | 6 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 2.58 | 358. | 41.0 | 16.1 | 9.69 | 3.35 | 184. | 22.2 | 9.54 | 5.69 |
| AC 2 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 |
| AC AVG. | | | | | | | | | | |
| S.P. | -1.1 → 0 | | | | | | +13.8 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3K → 0 | | | | | 3K | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9-E-2 HALF N SP. 1 DATE 8-26-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 21-24 | N ⟶ | | | | | | | | |
| RANGE | 1.0 | 0.1 | 0.1 | | | | | | | |
| DC 1 | 1.2 | 0.6 | 0.3 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 (Lin | 1.5 | 1.5 | 1.5 | | | | | | | |
| DC 4 # | 20 | 21 | 22 | | | | | | | |
| DC 5 M | 4 | 5 | 6 | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 40.6 | 6.15 | 3.14 | | | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | -25.5 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 5K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 9E-2 HALF N SP. 1 DATE 8-26-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Cal | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 3-4 | 2-3 N | → | 3-6 N | → | → | 6-9 N | → | → | → |
| RANGE | 150X10 | 150X10 | 100X10 | [illegible] | 150X10 | 100X10 | 150X10 | 150X10 | 150X10 | 100X10 |
| VOLTAGE | 240 | 420 | 390 | [illegible] | 420 | 380 | 240 | 340 | 420 | 390 |
| CURRENT | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | 1.0 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 7-12N | → | → | → | → | 12-15N | → | → | → | → |
| RANGE | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 |
| VOLTAGE | 180 | 240 | 340 | 420 | 330 | 190 | 180 | 230 | 340 | 400 |
| CURRENT | 1.5 | 1.5 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |

FREQUENCIES 3 0.3

SENDER NO. 9662-S

OPERATOR STEVE CRUZE

RECEIVER NO. 20693-R

OPERATOR BILL FREEMAN

COMMENTS: SET-UP ON ROAD IN NE CORNER OF SWITCHBACK ON LOWER PART OF ROAD NEXT TO WASH

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire 763 PAGE 2

LINE 9-E-2 HALF N SP. 1 DATE 8/26/..

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 12-15N | 15-18N | → | → | → | → | 18-21N | → | → | → |
| RANGE | 100X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 | 150X10 |
| VOLTAGE | 380 | 180 | 180 | 220 | 340 | 400 | 180 | 180 | 220 | 340 |
| CURRENT | 1.0 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 21-24N | → | → | | | | | | | |
| RANGE | 150X10 | 150X10 | 150X10 | | | | | | | |
| VOLTAGE | 180 | 180 | 220 | | | | | | | |
| CURRENT | 1.5 | 1.5 | 1.5 | | | | | | | |

FREQUENCIES 3.2 2.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

Job 463, Line 9-E-2, Sp 1, 5½, 8/27/70

300.

Bearing N32°W

a = 300'

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PAGE 1

PROJECT EMPIRE 463

LINE 9E2 HALF S SP. 1 DATE 8-27-70

| SEND | 4-5 ② | S.P. ② | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | CAL | [illegible] | 6-9s | → | → | → | [illegible]s | 9-12 | → | → |
| RANGE | 10 | 3-6s | 10 | 1.0 | 0.1 | 0.1 | 10 | 10 | 1.0 | 1.0 |
| DC 1 | 0.0 | | 3.0 | 2.5 | 2.2 | 2.2 | 0.8 | 2.8 | 2.3 | 2.2 |
| DC 2 | | 4K | | | | | | | | |
| DC 3 cur | 1.5 | +16.8 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |
| DC 4 # | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| DC 5 n | | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| DC 6 | | N.B. | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 150. | ① | 202. | 32.2 | 6.87 | 8.07 | 896. | 136. | 33.9 | 11.0 |
| AC 2 | 0.0 | S.P | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | 3.0 | 0-3s | | | | | | | | |
| S.P. | 0.3 | -18.4 | +5.5 | + | | | +8.3 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 2K | 3K | | | | 3K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9-E-2 HALF S SP. 1 DATE 8-27-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 |
| RECEIVE | 8-12 | 12-15 | → | → | → | → | → | 15-18 | → | → |
| RANGE | 1.0 | 10 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 10 | 1.0 | 1.0 |
| DC 1 | 2.1 | 0.7 | 0.7 | 2.3 | 1.5 | 1.4 | 1.2 | 0.8 | 1.0 | 2.5 |
| DC 2 | | | | | | | | | | |
| DC 3 Cm | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 |
| DC 4 # | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| DC 5 n | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 2 | 3 | 4 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 11.5 | 805. | 61.2 | 21.0 | 6.58 | 2.40 | 3.14 | 269. | 24.7 | 11.6 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | −0.0 | | | | | | +6.0 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 3K | | | | | | 2K | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 9-E-2 HALF S SP. L DATE 8-27-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | |
| RECEIVE | 15-18 | → | 18-21 | → | → | → | 21-24 | → | → | |
| RANGE | 0.1 | 0.1 | 10 | 1.0 | 1.0 | 0.1 | 1.0 | 0.1 | 0.1 | |
| DC 1 | 1.2 | 1.2 | 0.7 | 1.4 | 2.2 | 1.1 | 0.9 | 1.5 | 2.0 | |
| DC 2 | | | | | | | | | | |
| DC 3 Cm | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | |
| DC 4 ~~ft~~ | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | |
| DC 5 ft | 5 | 6 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 4.00 | 1.57 | 164. | 19.3 | 12.3 | 5.34 | 57.3 | 8.56 | 7.12 | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | ← | -3.8 | | | +15.6 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | ← | 2K | | | 6K | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PAGE 1

PROJECT Empire #63

LINE ~~[illegible]~~ HALF 5 SP. 1 DATE 8/27

| SEND | Cul | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 4-5 | 6-95 | → | → | → | 9-125 | → | → | → | → |
| RANGE | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 |
| VOLTAGE | 220 | 350 | 220 | 180 | 180 | 410 | 350 | 220 | 180 | 180 |
| CURRENT | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 |

| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 12-155 | → | → | → | → | → | 15-185 | → | → | → |
| RANGE | 100x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 | 150x10 |
| VOLTAGE | 380 | 400 | 350 | 220 | 180 | 180 | 380 | 400 | 350 | 220 |
| CURRENT | 1.0 | 1.5 | 1.5 | 1.5 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 |

FREQUENCIES 3.0 0.3

SENDER NO. 9662-S

OPERATOR Cruz

RECEIVER NO. 20697-R

OPERATOR Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 9-E-2 HALF S SP. 1 DATE 8/22

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | |
| RECEIVE | 15-18S | 18-21S | → | → | → | 21-24S | → | → | | |
| RANGE | 150X10 | 100X10 | 150X10 | 150X10 | 150X10 | 100X10 | 150X10 | 150X10 | | |
| VOLTAGE | 180 | 380 | 400 | 350 | 220 | 380 | 400 | 350 | | |
| CURRENT | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | 1.0 | 1.5 | 1.5 | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 2.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

JOB 463 LINE 9-E-2 SP 1 N 1/2 8/26/70 300 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.500 | 0.00 | 150.000 | 0.00 | 3.00 | .30 | 0.0000 | 1.0000 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 117.76 | 3.30 | 28.0 | 3.30 | 28.0 | 0.00 | ** | 3.30 | 1.50 | 1 | 1 | 190.000 | 0.00 |
| 2 | 2 | 85.04 | 2.70 | 31.8 | 2.70 | 31.8 | 0.00 | ** | 2.70 | 1.00 | 2 | 2 | 23.000 | 0.00 |
| 3 | 1 | 45.56 | .30 | 6.6 | .30 | 6.6 | 0.00 | ** | .30 | 1.50 | 3 | 1 | 75.700 | 0.00 |
| 4 | 2 | 38.81 | 3.00 | 77.3 | 3.00 | 77.3 | 0.00 | ** | 3.00 | 1.50 | 4 | 2 | 15.700 | 0.00 |
| 5 | 3 | 48.89 | 2.10 | 43.0 | 2.10 | 43.0 | 0.00 | ** | 2.10 | 1.00 | 5 | 3 | 5.320 | 0.00 |
| 6 | 1 | 120.84 | .70 | 5.8 | .70 | 5.8 | 0.00 | ** | .70 | 1.50 | 6 | 1 | 200.000 | 0.00 |
| 7 | 2 | 114.33 | .50 | 4.4 | .50 | 4.4 | 0.00 | ** | .50 | 1.50 | 7 | 2 | 47.400 | 0.00 |
| 8 | 3 | 78.09 | 3.30 | 42.3 | 3.30 | 42.3 | 0.00 | ** | 3.30 | 1.50 | 8 | 3 | 12.600 | 0.00 |
| 9 | 4 | 108.80 | 2.10 | 19.3 | 2.10 | 19.3 | 0.00 | ** | 2.10 | 1.00 | 9 | 4 | 5.920 | 0.00 |
| 10 | 1 | 178.59 | .90 | 5.0 | .90 | 5.0 | 0.00 | ** | .90 | 1.50 | 10 | 1 | 295.000 | 0.00 |
| 11 | 2 | 133.17 | .70 | 5.3 | .70 | 5.3 | 0.00 | ** | .70 | 1.50 | 11 | 2 | 55.100 | 0.00 |
| 12 | 3 | 128.69 | .70 | 5.4 | .70 | 5.4 | 0.00 | ** | .70 | 1.50 | 12 | 3 | 21.300 | 0.00 |
| 13 | 4 | 79.63 | 3.20 | 40.2 | 3.20 | 40.2 | 0.00 | ** | 3.20 | 1.50 | 13 | 4 | 6.430 | 0.00 |
| 14 | 5 | 117.48 | 1.90 | 16.2 | 1.90 | 16.2 | 0.00 | ** | 1.90 | 1.00 | 14 | 5 | 3.660 | 0.00 |
| 15 | 1 | 752.18 | 1.10 | 1.5 | 1.10 | 1.5 | 0.00 | ** | 1.10 | 1.50 | 15 | 1 | 1240.000 | 0.00 |
| 16 | 2 | 223.07 | .70 | 3.1 | .70 | 3.1 | 0.00 | ** | .70 | 1.50 | 16 | 2 | 92.300 | 0.00 |
| 17 | 3 | 160.68 | .30 | 1.9 | .30 | 1.9 | 0.00 | ** | .30 | 1.50 | 17 | 3 | 26.700 | 0.00 |
| 18 | 4 | 153.16 | .50 | 3.3 | .50 | 3.3 | 0.00 | ** | .50 | 1.50 | 18 | 4 | 12.700 | 0.00 |
| 19 | 5 | 83.57 | 3.10 | 37.1 | 3.01 | 36.0 | .09 | ** | 3.10 | 1.50 | 19 | 5 | 3.860 | 0.00 |
| 20 | 6 | 132.24 | 1.80 | 13.6 | 1.80 | 13.6 | 0.00 | ** | 1.70 | 1.00 | 20 | 6 | 2.580 | -.20 |
| 21 | 2 | 867.79 | 1.00 | 1.2 | 1.00 | 1.2 | 0.00 | ** | 1.00 | 1.50 | 21 | 2 | 358.000 | 0.00 |
| 22 | 3 | 247.48 | .60 | 2.4 | .60 | 2.4 | 0.00 | ** | .60 | 1.50 | 22 | 3 | 41.000 | 0.00 |
| 23 | 4 | 193.78 | .30 | 1.5 | .30 | 1.5 | 0.00 | ** | .30 | 1.50 | 23 | 4 | 16.100 | 0.00 |
| 24 | 5 | 204.91 | .70 | 3.4 | .70 | 3.4 | 0.00 | ** | .70 | 1.50 | 24 | 5 | 9.690 | 0.00 |
| 25 | 6 | 116.05 | 3.10 | 26.7 | 3.01 | 25.9 | .09 | ** | 3.10 | 1.50 | 25 | 6 | 3.350 | 0.00 |
| 26 | 3 | 1120.56 | 1.50 | 1.3 | 1.50 | 1.3 | 0.00 | ** | 1.50 | 1.50 | 26 | 3 | 184.000 | 0.00 |
| 27 | 4 | 268.80 | .90 | 3.3 | .90 | 3.3 | 0.00 | ** | .90 | 1.50 | 27 | 4 | 22.200 | 0.00 |
| 28 | 5 | 200.54 | .10 | .5 | .10 | .5 | 0.00 | ** | .10 | 1.50 | 28 | 5 | 9.540 | 0.00 |
| 29 | 6 | 192.52 | .70 | 3.6 | .70 | 3.6 | 0.00 | ** | .70 | 1.50 | 29 | 6 | 5.690 | 0.00 |
| 30 | 4 | 493.05 | 1.20 | 2.4 | 1.20 | 2.4 | 0.00 | ** | 1.20 | 1.50 | 30 | 4 | 40.600 | 0.00 |
| 31 | 5 | 129.92 | .60 | 4.6 | .60 | 4.6 | 0.00 | ** | .60 | 1.50 | 31 | 5 | 6.150 | 0.00 |
| 32 | 6 | 105.82 | .30 | 2.8 | .20 | 1.9 | .10 | ** | .30 | 1.50 | 32 | 6 | 3.140 | 0.00 |

JOB 463 LINE 9-E-2 SP1 S 1/2 8/27/70 300 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.500 | 0.00 | 150.000 | 0.00 | 3.00 | .30 | 0.0000 | 1.0000 |

| COMPUTED DATA | | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 124.84 | 3.00 | 24.0 | 3.00 | 24.0 | 0.00 | ** | 3.00 | 1.50 | 1 | 1 | 202.000 | 0.00 |
| 2 | 2 | 79.21 | 2.50 | 31.6 | 2.50 | 31.6 | 0.00 | ** | 2.50 | 1.50 | 2 | 2 | 32.200 | 0.00 |
| 3 | 3 | 42.13 | 2.20 | 52.2 | 2.20 | 52.2 | 0.00 | ** | 2.20 | 1.50 | 3 | 3 | 6.870 | 0.00 |
| 4 | 4 | 98.97 | 2.20 | 22.2 | 2.20 | 22.2 | 0.00 | ** | 2.20 | 1.50 | 4 | 4 | 8.070 | 0.00 |
| 5 | 1 | 541.90 | .80 | 1.5 | .80 | 1.5 | 0.00 | ** | .80 | 1.50 | 5 | 1 | 896.000 | 0.00 |
| 6 | 2 | 335.54 | 2.80 | 8.3 | 2.80 | 8.3 | 0.00 | ** | 2.80 | 1.50 | 6 | 2 | 136.000 | 0.00 |
| 7 | 3 | 208.08 | 2.30 | 11.1 | 2.30 | 11.1 | 0.00 | ** | 2.30 | 1.50 | 7 | 3 | 33.900 | 0.00 |
| 8 | 4 | 134.90 | 2.20 | 16.3 | 2.20 | 16.3 | 0.00 | ** | 2.20 | 1.50 | 8 | 4 | 11.000 | 0.00 |
| 9 | 5 | 246.57 | 2.10 | 8.5 | 2.10 | 8.5 | 0.00 | ** | 2.10 | 1.50 | 9 | 5 | 11.500 | 0.00 |
| 10 | 1 | 729.57 | .70 | 1.0 | .70 | 1.0 | 0.00 | ** | .70 | 1.00 | 10 | 1 | 805.000 | 0.00 |
| 11 | 2 | 147.91 | .70 | 4.7 | .70 | 4.7 | 0.00 | ** | .70 | 1.50 | 11 | 2 | 61.200 | 0.00 |
| 12 | 3 | 128.90 | 2.30 | 17.8 | 2.30 | 17.8 | 0.00 | ** | 2.30 | 1.50 | 12 | 3 | 21.000 | 0.00 |
| 13 | 4 | 80.14 | 1.50 | 18.7 | 1.50 | 18.7 | 0.00 | ** | 1.50 | 1.50 | 13 | 4 | 6.580 | 0.00 |
| 14 | 5 | 51.11 | 1.40 | 27.4 | 1.22 | 23.8 | .18 | ** | 1.40 | 1.50 | 14 | 5 | 2.400 | 0.00 |
| 15 | 6 | 106.77 | 1.20 | 11.2 | 1.10 | 10.3 | .10 | ** | 1.20 | 1.50 | 15 | 6 | 3.140 | 0.00 |
| 16 | 2 | 976.15 | .80 | .8 | .80 | .8 | 0.00 | ** | .80 | 1.00 | 16 | 2 | 269.000 | 0.00 |
| 17 | 3 | 149.68 | 1.00 | 6.7 | 1.00 | 6.7 | 0.00 | ** | 1.00 | 1.50 | 17 | 3 | 24.700 | 0.00 |
| 18 | 4 | 142.68 | 2.50 | 17.5 | 2.50 | 17.5 | 0.00 | ** | 2.50 | 1.50 | 18 | 4 | 11.600 | 0.00 |
| 19 | 5 | 85.01 | 1.20 | 14.1 | 1.11 | 13.1 | .09 | ** | 1.20 | 1.50 | 19 | 5 | 4.000 | 0.00 |
| 20 | 6 | 53.39 | 1.20 | 22.5 | .93 | 17.5 | .27 | ** | 1.20 | 1.50 | 20 | 6 | 1.570 | 0.00 |
| 21 | 3 | 1486.33 | .70 | .5 | .70 | .5 | 0.00 | ** | .70 | 1.00 | 21 | 3 | 164.000 | 0.00 |
| 22 | 4 | 234.84 | 1.40 | 6.0 | 1.40 | 6.0 | 0.00 | ** | 1.40 | 1.50 | 22 | 4 | 19.300 | 0.00 |
| 23 | 5 | 263.98 | 2.20 | 8.3 | 2.20 | 8.3 | 0.00 | ** | 2.20 | 1.50 | 23 | 5 | 12.300 | 0.00 |
| 24 | 6 | 181.40 | 1.10 | 6.1 | 1.10 | 6.1 | 0.00 | ** | 1.10 | 1.50 | 24 | 6 | 5.340 | 0.00 |
| 25 | 4 | 1040.68 | .90 | .9 | .90 | .9 | 0.00 | ** | .90 | 1.00 | 25 | 4 | 57.300 | 0.00 |
| 26 | 5 | 182.46 | 1.50 | 8.2 | 1.50 | 8.2 | 0.00 | ** | 1.50 | 1.50 | 26 | 5 | 8.560 | 0.00 |
| 27 | 6 | 244.02 | 2.00 | 8.2 | 2.00 | 8.2 | 0.00 | ** | 2.00 | 1.50 | 27 | 6 | 7.120 | 0.00 |

Job 463, LINE 9E-3, Sp. 1, N½, 9/3/70

300.

73

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire +63
LINE 9-E-3 HALF N SP. 1 DATE 9/3/20

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 0-3 N | → | 3-6 N | → | → | 6-9 N | → | → | → | 9-12 N |
| RANGE | 10 | 10 | 10 | 10 | 10 | 10.0 | 10 | 10 | 10 | 10.0 |
| DC 1 | 1.2 | 1.1 | 1.3 | 1.8 | 1.7 | .4 | .4 | 2.3 | 2.0 | 1.0 |
| DC 2 | | | | | | 1.5 | 1.9 | | | |
| DC 3 mA | 2.0 | → | → | → | → | → | → | → | → | 2.5 |
| DC 4 # | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| DC 5 " | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | 31.5 | | | |
| AC 1 | 397. | 329. | 119. | 36.4 | 52.7 | 177. | 31.4 | 15.3 | 22.1 | 920. |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -3.5 | +25.8 | | | | +13.4 | | | | +32.0 |
| AC NOISE | | | | | | | | | | |
| POT RES. | 7K | 10K | | | | 45K | | | | 15k |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire 46-7
LINE 9-E-2 HALF N SP. 1 DATE 9/3/76



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 9-12N | | | | 12-15N | | | | | |
| RANGE | 10.0 | 1.0 | ~~0.1~~ 1.0 | 1.0 | 10.0 | 10.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| DC 1 | 1.3 | 1.9 | ~~1.9~~ 2.0 | 1.5 | 1.2 | 1.4 | 1.6 | 1.7 | 2.2 | 1.6 |
| DC 2 | | | | | | | | | | |
| DC 3 | 3.5 | 2.5 | 2.5 | 3.5 | 1.0 | 2.5 | 3.5 | 3.5 | 2.5 | 3.5 |
| DC 4 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| DC 5 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | 10.1 | | | | | | | |
| AC 1 | 113. | 17.5 | ~~0.18~~ | 25.3 | 724. | 376. | 87.8 | 22.4 | 10.5 | 26.2 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | +1.2 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | 10K | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire 463
LINE 9-E-3 HALF N SP. I DATE 9/3/76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Col | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 3-4 | 15-18N | → | → | → | → | 19-21N | → | → | → |
| RANGE | 10.0 | 10.0 | 10.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 1.0 | |
| DC 1 | 0.4 | 1.1 | 1.3 | 1.5 | 1.4 | 2.0 | 1.3 | 1.1 | ~~2.0~~ | |
| DC 2 | | | | | | | | | ~~2.0~~ 1.7 | |
| DC 3 (cm) | | 1.75 | 2.5 | 3.5 | 3.5 | 2.5 | 1.5 | 2.5 | 2.5 | |
| DC 4 # | | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | |
| DC 5 | | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 204 | 269. | 144. | 40.1 | 10.46 | 5.22 | 76.8 | ~~41.0~~ 41.6 | ~~13.0~~ 13.2 | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | |
| AC AVG. | | | | | | | | | | |
| S.P. | -5.0 | | | | | | -15.7 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 15K | | | | | | 15K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire 463
LINE 9-E-3 HALF N SP. 1 DATE 9/3/20



| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | | Cal #2 | | | | | + | − |
| RECEIVE | 21-24 N | → | → | | 6-7 | | | | | 1 | 16 |
| RANGE | | | | | 10 | | | | | 32 | 5 |
| DC 1 | | | | | 0.0 | | | | | 13 | 1 |
| DC 2 Cur | | | | | 2.0 | | | | | 26 | |
| DC 3 # | | | | | | | | | | | 5 |
| DC 4 " | | | | | | | | | | 23 | |
| DC 5 | | | | | | | | | | 23 | |
| DC 6 | | | | | | | | | | | |
| DC 7 | | | | | | | | | | 37 | |
| DC 8 | | | | | | | | | | | |
| DC AVG. | | | | | | | | | | | |
| AC 1 | | | | | 2.0 | | | | | | |
| AC 2 | | | | | 0.0 | | | | | | |
| AC AVG. | | | | | 3.0 | | | | | | |
| S.P. | | | | | 0.3 | | | | | | |
| AC NOISE | | | | | | | | | | | |
| POT RES. | | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 9-E-3 HALF N SP. 1 DATE 9-3-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | CAL | 0-3N | → | 3-6N | — | — | 6-9N | — | — | → |
| RANGE | 5X400 | 5X400 | 5X400 | 5X400 | 5X400 | 5X400 | 5X400 | 5X400 | 5X400 | 5X400 |
| VOLTAGE | 500 | 600 | 500 | 500 | 600 | 500 | 360 | 500 | 600 | 500 |
| CURRENT | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 9-12N | — | — | — | → | CAL | 12-15N | — | — | → |
| RANGE | 10X250 | 10X350 | 10X250 | 10X250 | 10X350 | 5X400 | 5X200 | 10X250 | 10X350 | 10X350 |
| VOLTAGE | 520 | 480 | 560 | 680 | 740 | 880 | 500 | 520 | 500 | 750 |
| CURRENT | 2.5 | 3.5 | 2.5 | 2.5 | 3.5 | 2.0 | 1.0 | 2.5 | 3.5 | 3.5 |

FREQUENCIES 3 0.3

SENDER NO. 22705 S

OPERATOR B. FREEMAN

RECEIVER NO. 20693 R

OPERATOR S. CRUZE

COMMENTS: SHOCKING SENDER!
NEW SENDER + ONAN GENERATOR
SHAKY SIGNAL AT RECEIVER
SLIGHT FLUCUATION IN OUTPUT VOLTAGE

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 9-E-3 HALF N SP. 1 DATE 9-3-76

| SEND | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 12-15N | → | 15-18N | → | → | → | → | 18-21N | → | → |
| RANGE | 10X250 | 10X350 | 5X350 | 10X250 | 10X350 | 10X350 | 10X250 | 5X300 | 10X350 | 10X250 |
| VOLTAGE | 680 | 740 | 800 | 520 | 500 | 740 | 660 | 680 | 680 | 380 |
| CURRENT | 2.5 | 3.5 | 1.75 | 2.5 | 3.5 | 3.5 | 2.5 | 1.5 | 3.5 | 2.5 |

| SEND | 3-4 | 6-7 | 5-6 | 4-5 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 18-21N | 21-24 | N | → | | | | | | |
| RANGE | 10X250 | | | | | | | | | |
| VOLTAGE | 550 | | | | | | | | | |
| CURRENT | 2.5 | | | | | | | | | |

FREQUENCIES 3 0.3

SENDER NO. 22705 S

OPERATOR B. Freeman

RECEIVER NO. 20693R

OPERATOR S. CRUZE

COMMENTS:

Job 463, Line 9E-3, Sp. 1, S½, 9/5/70 300.

Use Cal on N½

(Duplicate Cal Card from N½)

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire 463
LINE 9-E-3 HALF S SP. 1 DATE 9/5/61

PAGE 5

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Cal | | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 |
| RECEIVE | 2-3 | 0-3S | 3-6S | → | → | 6-9S | → | → | → | 9-12S |
| RANGE | 10 | | 10.0 | 1.0 | 1.0 | 10.0 | 10.0 | 1.0 | 1.0 | 10.0 |
| DC 1 | 1.6 | | 0.9 | 1.5 | 2.2 | 0.7 | 1.0 | 1.4 | 2.0 | 1.0 |
| DC 2 | | | 1.1 | | | | | | | |
| DC 3 | | SP | | | | | | | | |
| DC 4 | | | 2.5 | 2.5 | 2.5 | 2.0 | 3.0 | 3.0 | 2.0 | 2.3 |
| DC 5 # | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| DC 6 " | | | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | 514. | | 19.2 | | | | | |
| DC AVG. | | | 513 | | 19.2 | | | | | |
| AC 1 | 10.4 | | 519 | 47.6 | 19.2 | 823. | 495. | 79.3 | 22.5 | 511. |
| AC 2 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -20.5 | +0.5 | | | -15.6 | | | | +12.4 |
| AC NOISE | | 7K | 10K | | | 25K | | | | 3.5K |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire 463
LINE 9-E-3 HALF S SP. 1 DATE 9/6/20



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | 9-12s | → | → | → | 12-15s | → | → | → | → | → |
| RANGE | 1.0 | 1.0 | 1.0 | 0.1 | 100.0 | 10.0 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.6 | 0.7 | 1.8 | 1.1 | 2.2 | 1.6 | 1.1 | 1.2 | 2.0 | 1.1 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cm | 2.0 | 3.0 | 3.5 | 2.5 | 2.5 | 2.5 | 2.5 | 3.5 | 3.5 | 2.5 |
| DC 5 # | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| DC 6 n | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 90.4 | 99.5 | 29.9 | 9.92 | 1270. | 236. | 57.9 | 77.3 | 27.1 | 9.39 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | -8.5 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | 4.5K | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire 463
LINE 9-E-3 HALF S SP. 1 DATE 9/5/74

PAGE 7

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 |
| RECEIVE | 15-18s | → | → | → | → | 18-21s | → | → | → | 21-24s |
| RANGE | 10.0 | 10.0 | 1.0 | 1.0 | 1.0 | 10.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.9 | 1.9 | 1.1 | 1.2 | 1.9 | 1.6 | 1.2 | 2.1 | 1.5 | 1.0 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cm | 2.5 | 2.5 | 2.5 | 3.5 | 3.5 | 2.5 | 2.5 | 2.5 | 3.5 | 2.5 |
| DC 5 # | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| DC 6 " | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 376. | 103. | 34.0 | 56.6 | 29.6 | 152. | 46.4 | 20.0 | 39.7 | 72.9 |
| AC 2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -1.5 | | | | | +0.4 | | | | -3.1 |
| AC NOISE | | | | | | | | | | |
| POT RES. | 4.5K | | | | | 5K | | | | 4.5K |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire 463
LINE 9-E-3 HALF S SP. / DATE 9/5/80

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | | | Cal | Cal | | | | Cal | Cal |
| RECEIVE | 21-20 | → | | | 1-2 | 4-5 ← | | | | 3-4 | 3-4 |
| RANGE | 1.0 | 1.0 | | | 10.0 | 10.0 | | | | 10.0 | 10.0 |
| DC 1 | 1.3 | 1.8 | | | 2.2 | 0.6 | | | | 0.4 | 0.5 |
| DC 2 | | | | | | | | | | | |
| DC 3 | | | | | | | | | | | |
| DC 4 Rec | 2.5 | 2.5 | | | | | | | | | |
| DC 5 # | 29 | 30 | | | | | | | | | |
| DC 6 " | 5 | 6 | | | | | | | | | |
| DC 7 | | | | | | | | | | | |
| DC 8 | | | | | | | | | | | |
| DC AVG. | | | | | | | | | | | |
| AC 1 | 25.2 | 13.1 | | | 104 | 103 | | | | 308 | 103 |
| AC 2 | 0.0 | 0.0 | | | 0.0 | 0.0 | | | | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | | |
| S.P. | | | | | | | | | | | |
| AC NOISE | | | | | | | | | | | |
| POT RES. | | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire 463

LINE 9-E-3 HALF 5 SP. 1 DATE 9/5/20

| SEND | Cal | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 2-3 | 3-6s | → | → | 6-9s | → | → | → | 9-12s | → |
| RANGE | 5x300 | 10X250 | 10x250 | 10x250 | 10x300 | 10x300 | 10x300 | 10x200 | 10x200 | 10x200 |
| VOLTAGE | 350 | 300 | 360 | 660 | 450 | 350 | 430 | 560 | 580 | 440 |
| CURRENT | 1.0 | 2.4 | 2.4 | 2.4 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 |
| SEND | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 |
| RECEIVE | 9-12s | → | → | 12-15s | → | → | → | → | → | 15-18s |
| RANGE | 10X300 | 10X350 | 10X250 | 10X250 | 10X250 | 10X250 | 10X350 | 10X350 | 10X250 | 10X250 |
| VOLTAGE | 330 | 500 | 660 | 520 | 690 | 540 | 560 | 500 | 650 | 510 |
| CURRENT | 3.0 | 3.4 | 2.4 | 2.4 | 2.4 | 2.4 | 3.4 | 3.4 | 2.4 | 2.4 |

FREQUENCIES 3.0 0.7

SENDER NO. 22705-S

OPERATOR F. Heinrichs

RECEIVER NO. 20693-R

OPERATOR S. Cruze

COMMENTS:

45 - 3.5 34 - 3.5-7.5

56 - 3.5 23 - 2.5

67 - 2.5 12 - 2.5

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire 463

LINE 9-E-3 HALF 5 SP. 1 DATE 9/5/24

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 |
| RECEIVE | 15-18 | → | → | → | 18-21 | → | → | → | 21-24 | → |
| RANGE | 10X250 | 10X250 | 10X350 | 10X350 | 10X250 | 10X250 | 10X250 | 10X350 | 10X250 | 10X250 |
| VOLTAGE | 660 | 520 | 380 | 500 | 550 | 680 | 540 | 380 | 540 | 660 |
| CURRENT | 2.4 | 2.4 | 3.4 | 3.5 | 2.4 | 2.4 | 2.4 | 3.4 | 2.5 | 2.4 |
| SEND | 3-4 | | | CAL | CAL | CAL | CAL | | | |
| RECEIVE | 21-24 | | | 1-2 | 4-5 | 3-4 | 3-4 | | | |
| RANGE | 10X250 | | | 5X200 | 5X200 | 5X200 | 10X300 | | | |
| VOLTAGE | 530 | | | 230 | 260 | 300 | 560 | | | |
| CURRENT | 2.5 | | | 1.0 | 1.0 | 1.0 | 3.0 | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 22705-5

OPERATOR F. HEINRICHS

RECEIVER NO. 20692-R

OPERATOR S. CRUZ

COMMENTS:

JOB 463 LINE 9 E-3 SP 1 N1/2 9/3/70 300 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | 0.00 | 202.000 | 0.00 | 3.00 | .30 | 0.0000 | .9901 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 179.00 | 1.20 | 6.7 | 1.20 | 6.7 | 0.00 | ** | 1.20 | 2.00 | 1 | 1 | 397.000 | 0.00 |
| 2 | 2 | 592.79 | 1.10 | 1.9 | 1.10 | 1.9 | 0.00 | ** | 1.10 | 2.00 | 2 | 2 | 329.000 | 0.00 |
| 3 | 1 | 53.71 | 1.30 | 24.2 | 1.30 | 24.2 | 0.00 | ** | 1.30 | 2.00 | 3 | 1 | 119.000 | 0.00 |
| 4 | 2 | 66.04 | 1.80 | 27.3 | 1.80 | 27.3 | 0.00 | ** | 1.80 | 2.00 | 4 | 2 | 36.400 | 0.00 |
| 5 | 3 | 238.79 | 1.70 | 7.1 | 1.70 | 7.1 | 0.00 | ** | 1.70 | 2.00 | 5 | 3 | 52.700 | 0.00 |
| 6 | 1 | 80.04 | 1.50 | 18.7 | 1.50 | 18.7 | 0.00 | ** | 1.50 | 2.00 | 6 | 1 | 177.000 | 0.00 |
| 7 | 2 | 57.21 | 1.90 | 33.2 | 1.90 | 33.2 | 0.00 | ** | 1.90 | 2.00 | 7 | 2 | 31.500 | 0.00 |
| ~~7~~ | ~~2~~ | ~~57.37~~ | ~~2.20~~ | ~~38.3~~ | ~~2.20~~ | ~~38.3~~ | ~~0.00~~ | ~~**~~ | ~~2.20~~ | ~~2.00~~ | ~~7~~ | ~~2~~ | ~~31.500~~ | ~~0.00~~ |
| 8 | 3 | 69.67 | 2.20 | 31.6 | 2.20 | 31.6 | 0.00 | ** | 2.20 | 2.00 | 8 | 3 | 15.300 | 0.00 |
| 9 | 4 | 200.87 | 2.00 | 10.0 | 2.00 | 10.0 | 0.00 | ** | 2.00 | 2.00 | 9 | 4 | 22.100 | 0.00 |
| 10 | 1 | 331.20 | 1.00 | 3.0 | 1.00 | 3.0 | 0.00 | ** | 1.00 | 2.50 | 10 | 1 | 920.000 | 0.00 |
| 11 | 2 | 116.57 | 1.30 | 11.2 | 1.30 | 11.2 | 0.00 | ** | 1.30 | 3.50 | 11 | 2 | 113.000 | 0.00 |
| 12 | 3 | 63.56 | 1.90 | 29.9 | 1.90 | 29.9 | 0.00 | ** | 1.90 | 2.50 | 12 | 3 | 17.500 | 0.00 |
| 13 | 4 | 73.44 | 2.00 | 27.2 | 2.00 | 27.2 | 0.00 | ** | 2.00 | 2.50 | 13 | 4 | 10.100 | 0.00 |
| 14 | 5 | 228.83 | 1.50 | 6.6 | 1.50 | 6.6 | 0.00 | ** | 1.50 | 3.50 | 14 | 5 | 25.300 | 0.00 |
| 15 | 1 | 652.89 | 1.20 | 1.8 | 1.20 | 1.8 | 0.00 | ** | 1.20 | 1.00 | 15 | 1 | 724.000 | 0.00 |
| 16 | 2 | 543.58 | 1.40 | 2.6 | 1.40 | 2.6 | 0.00 | ** | 1.40 | 2.50 | 16 | 2 | 376.000 | 0.00 |
| 17 | 3 | 227.11 | 1.60 | 7.0 | 1.60 | 7.0 | 0.00 | ** | 1.60 | 3.50 | 17 | 3 | 87.800 | 0.00 |
| 18 | 4 | 116.00 | 1.70 | 14.7 | 1.70 | 14.7 | 0.00 | ** | 1.70 | 3.50 | 18 | 4 | 22.400 | 0.00 |
| 19 | 5 | 133.87 | 2.20 | 16.4 | 2.20 | 16.4 | 0.00 | ** | 2.20 | 2.50 | 19 | 5 | 10.500 | 0.00 |
| 20 | 6 | 379.52 | 1.60 | 4.2 | 1.60 | 4.2 | 0.00 | ** | 1.60 | 3.50 | 20 | 6 | 26.200 | 0.00 |
| 21 | 2 | 553.92 | 1.10 | 2.0 | 1.10 | 2.0 | 0.00 | ** | 1.10 | 1.75 | 21 | 2 | 269.000 | 0.00 |
| 22 | 3 | 519.94 | 1.30 | 2.5 | 1.30 | 2.5 | 0.00 | ** | 1.30 | 2.50 | 22 | 3 | 144.000 | 0.00 |
| 23 | 4 | 207.25 | 1.50 | 7.2 | 1.50 | 7.2 | 0.00 | ** | 1.50 | 3.50 | 23 | 4 | 40.100 | 0.00 |
| 24 | 5 | 94.51 | 1.40 | 14.8 | 1.40 | 14.8 | 0.00 | ** | 1.40 | 3.50 | 24 | 5 | 10.460 | 0.00 |
| 25 | 6 | 106.28 | 2.00 | 18.8 | 1.90 | 17.9 | .10 | ** | 2.00 | 2.50 | 25 | 6 | 5.220 | 0.00 |
| 26 | 3 | 462.17 | 1.30 | 2.8 | 1.30 | 2.8 | 0.00 | ** | 1.30 | 1.50 | 26 | 3 | 76.800 | 0.00 |
| 27 | 4 | 211.07 | 1.10 | 5.2 | 1.10 | 5.2 | 0.00 | ** | 1.10 | 3.50 | 27 | 4 | 41.000 | 0.00 |
| 28 | 5 | 164.93 | 1.80 | 10.9 | 1.80 | 10.9 | 0.00 | ** | 1.70 | 2.50 | 28 | 5 | 13.000 | -.20 |

JOB 463 LINE 9E SP 1 S1/2 9/5/70 — 300 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | 0.00 | 202.000 | 0.00 | 3.00 | .30 | 0.0000 | .9901 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 185.22 | 1.10 | 5.9 | 1.10 | 5.9 | 0.00 | ** | 1.10 | 2.50 | 1 | 1 | 514.000 | 0.00 |
| 2 | 2 | 68.88 | 1.50 | 21.8 | 1.50 | 21.8 | 0.00 | ** | 1.50 | 2.50 | 2 | 2 | 47.600 | 0.00 |
| 3 | 3 | 69.94 | 2.20 | 31.5 | 2.20 | 31.5 | 0.00 | ** | 2.20 | 2.50 | 3 | 3 | 19.200 | 0.00 |
| 4 | 1 | 369.25 | .65 | 1.8 | .65 | 1.8 | 0.00 | ** | .70 | 2.00 | 4 | 1 | 823.000 | .10 |
| 5 | 2 | 594.00 | 1.00 | 1.7 | 1.00 | 1.7 | 0.00 | ** | 1.00 | 3.00 | 5 | 2 | 495.000 | 0.00 |
| 6 | 3 | 238.84 | 1.40 | 5.9 | 1.40 | 5.9 | 0.00 | ** | 1.40 | 3.00 | 6 | 3 | 79.300 | 0.00 |
| 7 | 4 | 204.50 | 2.00 | 9.8 | 2.00 | 9.8 | 0.00 | ** | 2.00 | 2.00 | 7 | 4 | 22.500 | 0.00 |
| 8 | 1 | 229.95 | .95 | 4.1 | .95 | 4.1 | 0.00 | ** | 1.00 | 2.00 | 8 | 1 | 511.000 | .10 |
| 9 | 2 | 162.08 | .60 | 3.7 | .60 | 3.7 | 0.00 | ** | .60 | 2.00 | 9 | 2 | 90.400 | 0.00 |
| 10 | 3 | 297.61 | .70 | 2.4 | .70 | 2.4 | 0.00 | ** | .70 | 3.00 | 10 | 3 | 99.500 | 0.00 |
| 11 | 4 | 154.99 | 1.80 | 11.6 | 1.80 | 11.6 | 0.00 | ** | 1.80 | 3.50 | 11 | 4 | 29.900 | 0.00 |
| 12 | 5 | 125.12 | 1.10 | 8.8 | 1.10 | 8.8 | 0.00 | ** | 1.10 | 2.50 | 12 | 5 | 9.920 | 0.00 |
| 13 | 1 | 46.26 | 2.20 | 47.6 | 2.20 | 47.6 | 0.00 | ** | 2.20 | 2.50 | 13 | 1 | 127.000 | 0.00 |
| 14 | 2 | 341.86 | 1.60 | 4.7 | 1.60 | 4.7 | 0.00 | ** | 1.60 | 2.50 | 14 | 2 | 236.000 | 0.00 |
| 15 | 3 | 208.65 | 1.10 | 5.3 | 1.10 | 5.3 | 0.00 | ** | 1.10 | 2.50 | 15 | 3 | 57.900 | 0.00 |
| 16 | 4 | 398.33 | 1.20 | 3.0 | 1.20 | 3.0 | 0.00 | ** | 1.20 | 3.50 | 16 | 4 | 77.300 | 0.00 |
| 17 | 5 | 246.31 | 2.00 | 8.1 | 2.00 | 8.1 | 0.00 | ** | 2.00 | 3.50 | 17 | 5 | 27.100 | 0.00 |
| 18 | 6 | 189.49 | 1.10 | 5.8 | 1.10 | 5.8 | 0.00 | ** | 1.10 | 2.50 | 18 | 6 | 9.390 | 0.00 |
| 19 | 2 | 540.91 | .85 | 1.6 | .85 | 1.6 | 0.00 | ** | .90 | 2.50 | 19 | 2 | 376.000 | .10 |
| 20 | 3 | 374.10 | 1.90 | 5.1 | 1.90 | 5.1 | 0.00 | ** | 1.90 | 2.50 | 20 | 3 | 103.000 | 0.00 |
| 21 | 4 | 172.97 | 1.10 | 6.4 | 1.10 | 6.4 | 0.00 | ** | 1.10 | 2.50 | 21 | 4 | 24.000 | 0.00 |
| 22 | 5 | 510.41 | 1.20 | 2.4 | 1.20 | 2.4 | 0.00 | ** | 1.20 | 3.50 | 22 | 5 | 56.600 | 0.00 |
| 23 | 6 | 430.04 | 1.90 | 4.4 | 1.90 | 4.4 | 0.00 | ** | 1.90 | 3.50 | 23 | 6 | 29.600 | 0.00 |
| 24 | 3 | 550.45 | 1.60 | 2.9 | 1.60 | 2.9 | 0.00 | ** | 1.60 | 2.50 | 24 | 3 | 152.000 | 0.00 |
| 25 | 4 | 334.74 | 1.20 | 3.6 | 1.20 | 3.6 | 0.00 | ** | 1.20 | 2.50 | 25 | 4 | 46.400 | 0.00 |
| 26 | 5 | 254.74 | 2.10 | 8.2 | 2.10 | 8.2 | 0.00 | ** | 2.10 | 2.50 | 26 | 5 | 20.000 | 0.00 |
| 27 | 6 | 574.51 | 1.50 | 2.6 | 1.50 | 2.6 | 0.00 | ** | 1.50 | 3.50 | 27 | 6 | 39.700 | 0.00 |
| 28 | 4 | 560.88 | 1.00 | 1.8 | 1.00 | 1.8 | 0.00 | ** | 1.00 | 2.50 | 28 | 4 | 77.900 | 0.00 |
| 29 | 5 | 318.46 | 1.30 | 4.1 | 1.30 | 4.1 | 0.00 | ** | 1.30 | 2.50 | 29 | 5 | 25.200 | 0.00 |
| 30 | 6 | 266.19 | 1.80 | 6.8 | 1.80 | 6.8 | 0.00 | ** | 1.80 | 2.50 | 30 | 6 | 13.100 | 0.00 |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 4 HALF W SP. 1 DATE 5/1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 1 | 6-7 2 | 4-5 3 | 5-6 4 | 6-7 5 | 3-4 6 | 4-5 7 | 5-6 8 | 6-7 9 | CAL |
| RECEIVE | 0-2.5 1 | → 2 | 0.5 → 1 | → 2 | → 3 | 15-22.5 1 | → 2 | → 3 | → 4 | 6-7 |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| DC 1 | -0.1 | 0.4 | 0.4 | 0.5 | 0.7 | 0.1 | 0.2 | 0.1 | 0.2 | -0.2 |
| DC 2 $K_n$ | 2.25 | 9 | 22.5 | 9 | 22.5 | 2.25 | 9 | 22.5 | 45 | |
| DC 3 | | | | | | | | | 5. | 2. |
| DC 4 | | | | | 6. | 3. | 5. | 5.K | -4.0 | |
| DC 5 | 5. | 6. | 5. | 5. | 20-0K 4.9-1.0 | | | | 25.1 | |
| DC 6 | | | | | | | | | -1.0 | |
| DC 7 $\rho$ | 74 | 112 | 190 | 191 | 293 | 475 | 149 | 134 | 184 | (1.042) |
| DC 8 | 0.1 | 0.6 | 0.6 | 0.7 | 0.9 | 0.3 | 0.5 | 0.4 | 0.5 | (-0.2) |
| DC AVG. | 1 | 5 | 3 | 4 | 3 | 1 | 3 | 3 | 3 | |
| AC 1 | 157 | 71.0 | 40.4 | 101.1 | 74.4 | 606 | 79.1 | 28.5 | 19.5 | 192 |
| AC 2 | +0.1 | 0.0 | +0.1 | 0.0 | 0.0 | 0.0 | -0.1 | -0.2 | -0.2 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +32.7 | | +15.9 | | | -5.3 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MINE
LINE 9 HALF W SP. 1 DATE 5/1

PAGE 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 10 | 3-4 11 | 4-5 12 | 5-6 13 | 6-7 14 | 1-2 15 | 2-3 16 | 3-4 17 | 4-5 18 | 5-6 19 |
| RECEIVE | 20-25-30 1 | 2 | 3 | 4 | 5 | 20-25-30 1 | 2 | 3 | 4 | 5 |
| RANGE | 10 | 10 | 1.0 | 0.1 | 0.1 | 10 | 10 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.6 | 0.4 | 0.5 | 0.2 | 0.6 | 0.9 | 0.9 | 0.9 | 0.9 | 0.6 |
| DC 2 K | 2.25 | 9 | 22.5 | 45 | 78.25 | 2.25 | 9 | 22.5 | 45 | 78.25 |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | 1.5 | 3.0 | 5. | 5. | 6. | 0.5 | 1.5 | 3. | 5. | 5. |
| DC 6 | | | | | | | | | | |
| DC 7 C | 1046 | 418 | 109 | 89 | 115 | 1479 | 1099 | 494 | 126 | 107 |
| DC 8 PF | 0.8 | 0.6 | 0.7 | 0.5 | 0.8 | 1.1 | 1.1 | 1.1 | 1.1 | 0.9 |
| DC AVG. | 1 | 1 | 6 | 6 | 7 | 1 | 1 | 2 | 9 | 8 |
| AC 1 | 664 | 133 | 23.0 | 9.49 | 5.38 | 312 | 174 | 62.6 | 13.3 | 6.48 |
| AC 2 | 0.0 | 0.0 | 0.0 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | +16.9 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

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LINE 4 HALF W SP. 1 DATE 5/1

PAGE 3

| SEND | 6-7 20 | 1-2 21 | 2-3 22 | 3-4 23 | 4-5 24 | 5-6 25 | 1-2 26 | 2-3 27 | 3-4 28 | 4-5 29 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 6 | 37.5 45 2 | 3 | 4 | 5 | 6 | 45-52.5 3 | 4 | 5 | 6 |
| RANGE | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 1.0 | 0.8 | 1.0 | 1.0 | 0.9 | 0.9 | 1.0 | 1.1 | 1.0 | 0.5 |
| DC 2 $K_m$ | 126 | 9 | 22.5 | 45 | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 |
| DC 3 | | | | | | | | | | |
| DC 4 | 6. | 0.5 | 1.5 | 3.0 | 5.0 | 5.0. | 0.5 | 1.5 | 3.0 | 5.0 |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 $\rho$ | 135 | 953 | 1254 | 694 | 229 | 243 | 134 | 313 | 208 | 93 |
| DC 8 PFE | 1.2 | 1.0 | 1.2 | 1.2 | 1.1 | 1.2 | 1.1 | 1.3 | 1.2 | 0.6 |
| DC AVG. MF | 9 | 1 | 1 | 2 | 5 | 5 | 8 | 4 | 6 | 6 |
| AC 1 | 6.12 | 50.3 | 79.3 | 43.9 | 13.8 | 9.15 | 2.83 | 9.89 | 7.50 | 3.51 |
| AC 2 | 0.0 | +0.1 | +0.1 | 0.0 | 0.0 | -0.1 | +0.2 | 0.0 | 0.0 | +0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +33.2 | | | | | +6.0 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

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# I.P. RECEIVER NOTES

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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 30 | 2-3 31 | 3-4 32 | | | | | | | |
| RECEIVE | 525.63 4 | 5 | 6 | | | | | | | |
| RANGE | 0.1 | 0.1 | 0.1 | | | | | | | |
| DC 1 | -0.3 | 1.3 | 1.1 | | | | | | | |
| DC 2 Kn | 45 | 78.75 | 126 | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | 0.5 | 1.5 | 3.0 | | | | | | | |
| DC 6 | 162 | | | | | | | | | |
| DC 7 P | 163 | 390 | 254 | | | | | | | |
| DC 8 PFE | 0.0 | 1.5 | 1.4 | | | | | | | |
| DC AVG. M.A | 0 | 4 | 6 | | | | | | | |
| AC 1 | 1.73 | 7.02 | 5.73 | | | | | | | |
| AC 2 | -0.2 | +0.1 | -0.1 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 4 HALF W SP. 1 DATE 5/1



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6 7 | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 |
| RECEIVE | 0-7.5 | → | 7.5 15. | → | → | 15.-22.5 | → | → | → | 22.5- 3. |
| RANGE | | | | | | | | | | |
| VOLTAGE | 480 | 500 | 440 | 480 | 500 | 700 | 440 | 480 | 400 | 1000 |
| CURRENT | 5.0 | 6.0 | 5.0 | 5.0 | 5.0 | 3.0 | 5.0 | 5.0 | 5.0 | 1.5 |
| SEND | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | → | → | → | → | 3.-3.75 | → | → | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 700 | 440 | 480 | 500 | 640 | 1000 | 680 | 440 | 480 | 500 |
| CURRENT | 3.0 | 5.0 | 5.0 | 6.0 | 0.5 | 1.5 | 3.0 | 5.0 | 5.0 | 6.0 |

FREQUENCIES 3 3.0

SENDER NO. 6644 5

OPERATOR B PAWELCZAK

RECEIVER NO.

OPERATOR TEX

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 3(4) HALF W SP. 1 DATE 5/1



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 |
| RECEIVE | 32.5-45 | → | → | → | → | 45 52.5 | → | → | → | 52.5- 6 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 640 | 1000 | 680 | 440 | 480 | 640 | 1000 | 680 | 440 | 620 |
| CURRENT | 0.5 | 1.5 | 3.0 | 5.0 | 5.0 | 0.5 | 1.5 | 3.0 | 5.0 | 0.5 |
| SEND | 2-3 | 3-4 | | | | | | | | |
| RECEIVE | → | → | | | | | | | Cal | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 1000 | 660 | | | | | | | | |
| CURRENT | 1.5 | 3.0 | | | | | | | 2.0 | |

FREQUENCIES 3 3.0

SENDER NO. 6644 S

OPERATOR B. P

RECEIVER NO.

OPERATOR Tex.

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Empire #463

LINE 4 HALF E SP. 1 DATE 4/30

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | | | 4-5 33 | 3-4 34 | 2-3 35 | 1-2 36 | 5-6 37 | 4-5 38 | 3-4 39 | 2-3 40 |
| RECEIVE | 0-7.5 | 7.5-15 | 15-22.5 1 | 2 | 3 | 4 | 22.5-30 1 | 2 | 3 | 4 |
| RANGE | | | 10 | 1.0 | 1.0 | 0.1 | 10 | 1.0 | 1.0 | 0.1 |
| DC 1 | | | 0.3 | 0.4 | 0.8 | 0.6 | 0.4 | 0.6 | 0.8 | 1.1 |
| DC 2 m | | $K_n$ | 2.25 | 9 | 22.5 | 45 | 2.25 | 9 | 22.5 | 45 |
| DC 3 | | | | | fence 1300' | | Pipeline at 2000 | | 2.0 DC | |
| DC 4 | | | | | | | | | 14.0 + AC + 1.4 | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | 5. | 3. | 1.5 | 0.5 | 4. | 5. | 3.0 | 1.5 |
| DC 7 | P | | 66 | 112 | 298 | 181 | 65 | 61 | 128 | 308 |
| DC 8 | PFE | | 0.5 | 0.6 | 1.0 | 0.8 | 0.6 | 0.8 | 1.0 | 1.3 |
| DC AVG. | MCF | | 8 | 5 | 3 | 4 | 9 | 13 | 8 | 4 |
| AC 1 | | | 140 | 35.7 | 18.9 | 1.92 | 110 | 32.1 | 16.2 | 9.72 |
| AC 2 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | +0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | +15.4 | +11.9 | +0.8 | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Hwy
LINE ___ HALF ___ SP. ___ DATE ___

PAGE 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 #1 | 6-7 #2 | 5-6 #3 | 4-5 #4 | 3-4 #5 | 2-3 #6 | 1-2 #7 | 6-7 #8 | 5-6 #9 | 4-5 #10 |
| RECEIVE | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 2 | 3 | 4 |
| RANGE | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | .01 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.7 | 0.5 | 0.5 | 0.6 | 0.7 | 1.2 | 0.6 | 0.5 | 0.3 | 0.4 |
| DC 2 $K_n$ | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 | 126 | 9 | 22.5 | 45 |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | .5 | 5.0 | 5.0 | 5.0 | 3.0 | 1.5 | 0.5 | 5.0 | 5.0 | 5.0 |
| DC 6 | | | | | | | | | | |
| DC 7 $\rho$ | 181 | 80 | 96 | 100 M.Ω | 164 | 366 | 171 | 95 | 104 | 101 |
| DC 8 PFE | 1.0 | 0.7 | 0.7 | 0.8 | 0.9 | 1.4 | 0.8 | 0.8 | 0.6 | 0.6 |
| DC AVG. | 6 | 9 | 7 | 8 | 5 | 4 | 5 | 8 | 6 | 6 |
| AC 1 | 1.09 | 1.0 | 50.5 | 21.1 | 10.4 | 6.60 | .64E | 50.5 | 22.1 | 10.7 |
| AC 2 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | -0.1 | -0.1 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | 123.6 | | | | | | | | |
| AC NOISE | | | | | | | +9.6 | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PROJECT EMPIRE #463

LINE 4 HALF E SP. 1 DATE 1/30

PAGE 3

| SEND | 3-4 51 | 2-3 52 | 6-7 53 | 5-6 54 | 4-5 55 | 3-4 56 | 8-7 57 | 5-6 58 | 4-5 59 | CAL |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 5 | → 6 | 3 45-52.5 | 4 | 5 | 6 | 4 52.5-60 | 5 | → 6 | 1-2 |
| RANGE | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 10 |
| DC 1 | 0.6 | 1.5 | 0.8 | 0.3 | 0.1 | 0.8 | 0.7 | 0.4 | 0.5 | -0.2 |
| DC 2 $K_m$ | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 | 45 | 78.75 | 126 | |
| DC 3 | | | (at DC 24.5 -0.8) | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | 3.0 | 1.5 | 6.0 | 5.0 | 5.0 | 3.0 | 6.0 | 5.0 | 5.0 | |
| DC 6 | | | | | | | | | | |
| DC 7 ρ | 164 | 354 | 97 | 108 | 99 | 161 | 103 | 105 | 93 | same as W 1/4 (11.04) |
| DC 8 PFE | 0.8 | 1.7 | 1.0 | 0.6 | 0.5 | 0.9 | 1.1 | 0.7 | 0.8 | (-0.2) |
| DC AVG. PCF | 5 | 5 | 10 | 6 | 5 | 6 | 11 | 7 | 9 | |
| AC 1 | 5.95 | 3.98 | 24.5 | 11.4 | 5.98 | 3.65 | 13.0 | 6.35 | 3.52 | 19.2 |
| AC 2 | 0.0 | 0.0 | 0.0 | -0.1 | -0.3 | +0.2 | -0.3 | -0.1 | -0.1 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +19.4 | | | | +11.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 4 HALF E SP. 1 DATE 1/30

PAGE 1

| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | CHL |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 15-22.5 | → | → | → | 22.5-30 | → | → | → | → | 1-2 |
| RANGE | | | | | | | | | | |
| VOLTAGE | | 640 | 1000 | 600 | 360 | 340 | 640 | 1000 | 600 | |
| CURRENT | 5.0 | 3.0 | 1.5 | 0.5 | 4.0 | 5.0 | 3.0 | 1.5 | 0.5 | |
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 30-37.5 | → | → | → | → | → | 37.5-45 | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 400 | 460 | 440 | 640 | 1000 | 620 | 400 | 460 | 420 | 640 |
| CURRENT | 5.0 | 5.0 | 5.0 | 3.0 | 1.5 | 0.5 | 5.0 | 5.0 | 5.0 | 3.0 |

FREQUENCIES 3.0 0.3

SENDER NO. 6644-S

OPERATOR ~~T8641-R~~

RECEIVER NO. 18641-R

OPERATOR AG

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 4 HALF E SP. 1 DATE 4/3/82

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 | | |
| RECEIVE | → | 45 52.5 | — | — | → | 52.5 60 | — | → | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 1000 | 440 | 460 | 420 | 640 | 460 | 460 | 420 | | |
| CURRENT | 1.5 | 6.0 | 5.0 | 5.0 | 3.0 | 6.0 | 5.0 | 5.0 | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 3

SENDER NO. 6644 S

OPERATOR 46

RECEIVER NO. 1f641 R

OPERATOR 5f

COMMENTS:

JOB 463 EMPIRE LINE 4 WEST EAST SPREAD 1 5/1/70 750FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | ACI | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | -.20 | 192.000 | 0.00 | 3.00 | .30 | -.2000 | 1.0417 |

| COMPUTED DATA | | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PT. | N | CUR | PFE | AC1 | AC2 |
| 1 | 1 | 73.67 | .05 | .7 | .05 | .7 | 0.00 | ** | 1 | 1 | 5.00 | -.10 | 157.000 | .10 |
| 2 | 2 | 111.90 | .60 | 5.4 | .50 | 4.4 | .10 | ** | 2 | 2 | 6.00 | .40 | 71.000 | 0.00 |
| 3 | 1 | 190.51 | .55 | 2.9 | .55 | 2.9 | 0.00 | ** | 3 | 1 | 5.00 | .40 | 404.000 | .10 |
| 4 | 2 | 190.89 | .70 | 3.7 | .70 | 3.7 | 0.00 | ** | 4 | 2 | 5.00 | .50 | 101.100 | 0.00 |
| 5 | 3 | 293.24 | .90 | 3.1 | .90 | 3.1 | 0.00 | ** | 5 | 3 | 6.00 | .70 | 74.400 | 0.00 |
| 6 | 1 | 474.86 | .30 | .6 | .30 | .6 | 0.00 | ** | 6 | 1 | 3.00 | .10 | 606.000 | 0.00 |
| 7 | 2 | 148.91 | .45 | 3.0 | .45 | 3.0 | 0.00 | ** | 7 | 2 | 5.00 | .20 | 79.100 | -.10 |
| 8 | 3 | 133.99 | .40 | 3.0 | .21 | 1.6 | .19 | ** | 8 | 3 | 5.00 | .10 | 28.500 | -.20 |
| 9 | 4 | 183.54 | .50 | 2.7 | .26 | 1.4 | .24 | ** | 9 | 4 | 5.00 | .20 | 19.500 | -.20 |
| 10 | 1 | 1045.80 | .80 | .8 | .80 | .8 | 0.00 | ** | 10 | 1 | 1.50 | .60 | 664.000 | 0.00 |
| 11 | 2 | 418.12 | .60 | 1.4 | .60 | 1.4 | 0.00 | ** | 11 | 2 | 3.00 | .40 | 133.000 | 0.00 |
| 12 | 3 | 108.57 | .70 | 6.4 | .44 | 4.1 | .26 | ** | 12 | 3 | 5.00 | .50 | 23.000 | 0.00 |
| 13 | 4 | 89.32 | .50 | 5.6 | -.13 | -1.5 | .63 | ** | 13 | 4 | 5.00 | .20 | 9.490 | -.20 |
| 14 | 5 | 115.49 | .80 | 6.9 | .06 | .5 | .74 | ** | 14 | 5 | 6.00 | .60 | 8.380 | 0.00 |
| 15 | 1 | 1478.59 | 1.10 | .7 | 1.10 | .7 | 0.00 | ** | 15 | 1 | .50 | .90 | 312.000 | 0.00 |
| 16 | 2 | 1099.46 | 1.10 | 1.0 | 1.10 | 1.0 | 0.00 | ** | 16 | 2 | 1.50 | .90 | 174.000 | 0.00 |
| 17 | 3 | 494.44 | 1.10 | 2.2 | 1.10 | 2.2 | 0.00 | ** | 17 | 3 | 3.00 | .90 | 62.600 | 0.00 |
| 18 | 4 | 126.06 | 1.10 | 8.7 | .70 | 5.6 | .40 | ** | 18 | 4 | 5.00 | .90 | 13.300 | 0.00 |
| 19 | 5 | 107.16 | .90 | 8.4 | .08 | .8 | .82 | ** | 19 | 5 | 5.00 | .60 | 6.480 | -.20 |
| 20 | 6 | 135.48 | 1.20 | 8.9 | .29 | 2.2 | .91 | ** | 20 | 6 | 6.00 | 1.00 | 6.120 | 0.00 |
| 21 | 2 | 952.56 | .95 | 1.0 | .95 | 1.0 | 0.00 | ** | 21 | 2 | .50 | .80 | 50.300 | .10 |
| 22 | 3 | 1253.94 | 1.15 | .9 | 1.15 | .9 | 0.00 | ** | 22 | 3 | 1.50 | 1.00 | 79.300 | .10 |
| 23 | 4 | 694.17 | 1.20 | 1.7 | 1.20 | 1.7 | 0.00 | ** | 23 | 4 | 3.00 | 1.00 | 43.900 | 0.00 |
| 24 | 5 | 228.96 | 1.10 | 4.8 | .81 | 3.5 | .29 | ** | 24 | 5 | 5.00 | .90 | 13.800 | 0.00 |
| 25 | 6 | 242.83 | 1.15 | 4.7 | .74 | 3.0 | .41 | ** | 25 | 6 | 5.00 | .90 | 9.150 | -.10 |
| 26 | 3 | 134.25 | 1.10 | 8.2 | .91 | 6.8 | .19 | ** | 26 | 3 | .50 | 1.00 | 2.830 | .20 |
| 27 | 4 | 313.08 | 1.30 | 4.2 | 1.19 | 3.8 | .11 | ** | 27 | 4 | 1.50 | 1.10 | 9.890 | 0.00 |
| 28 | 5 | 267.54 | 1.20 | 5.8 | .87 | 4.2 | .33 | ** | 28 | 5 | 3.00 | 1.00 | 7.550 | 0.00 |
| 29 | 6 | 92.78 | .60 | 6.5 | -.90 | -9.7 | 1.50 | ** | 29 | 6 | 5.00 | .50 | 3.510 | .20 |
| 30 | 4 | 162.03 | .00 | .0 | -.28 | -1.7 | .28 | ** | 30 | 4 | .50 | -.30 | 1.730 | -.20 |
| 31 | 5 | 389.67 | 1.45 | 3.7 | 1.31 | 3.4 | .14 | ** | 31 | 5 | 1.50 | 1.30 | 7.020 | .10 |
| 32 | 6 | 253.94 | 1.35 | 5.3 | .96 | 3.8 | .39 | ** | 32 | 6 | 3.00 | 1.10 | 5.730 | -.10 |
| 33 | 1 | 65.95 | .50 | 7.6 | .50 | 7.6 | 0.00 | ** | 33 | 1 | 5.00 | .30 | 140.000 | 0.00 |
| 34 | 2 | 112.23 | .60 | 5.3 | .50 | 4.4 | .10 | ** | 34 | 2 | 3.00 | .40 | 35.700 | 0.00 |
| 35 | 3 | 298.27 | 1.00 | 3.4 | 1.00 | 3.4 | 0.00 | ** | 35 | 3 | 1.50 | .80 | 18.900 | 0.00 |
| 36 | 4 | 181.44 | .80 | 4.4 | .56 | 3.1 | .24 | ** | 36 | 4 | .50 | .60 | 1.920 | 0.00 |
| 37 | 1 | 64.84 | .60 | 9.3 | .54 | 8.3 | .06 | ** | 37 | 1 | 4.00 | .40 | 110.000 | 0.00 |
| 38 | 2 | 60.67 | .80 | 13.2 | .55 | 9.1 | .25 | ** | 38 | 2 | 5.00 | .60 | 32.100 | 0.00 |
| 39 | 3 | 127.83 | 1.00 | 7.8 | .80 | 6.2 | .20 | ** | 39 | 3 | 3.00 | .80 | 16.200 | 0.00 |
| 40 | 4 | 307.70 | 1.25 | 4.1 | 1.14 | 3.7 | .11 | ** | 40 | 4 | 1.50 | 1.10 | 9.720 | .10 |
| 41 | 5 | 180.44 | .95 | 5.3 | .55 | 3.0 | .40 | ** | 41 | 5 | .50 | .70 | 1.090 | -.10 |
| 42 | 1 | 80.25 | .70 | 8.7 | .70 | 8.7 | 0.00 | ** | 42 | 1 | 5.00 | .50 | 170.000 | 0.00 |
| 43 | 2 | 95.54 | .70 | 7.3 | .57 | 6.0 | .13 | ** | 43 | 2 | 5.00 | .50 | 50.600 | 0.00 |
| 44 | 3 | 99.70 | .80 | 8.0 | .51 | 5.1 | .29 | ** | 44 | 3 | 5.00 | .60 | 21.100 | 0.00 |
| 45 | 4 | 163.96 | .90 | 5.5 | .62 | 3.8 | .28 | ** | 45 | 4 | 3.00 | .70 | 10.400 | 0.00 |
| 46 | 5 | 365.98 | 1.40 | 3.8 | 1.25 | 3.4 | .15 | ** | 46 | 5 | 1.50 | 1.20 | 6.600 | 0.00 |
| 47 | 6 | 170.67 | .80 | 4.7 | .13 | .8 | .67 | ** | 47 | 6 | .50 | .60 | .645 | 0.00 |
| 48 | 2 | 95.38 | .75 | 7.9 | .62 | 6.5 | .13 | ** | 48 | 2 | 5.00 | .50 | 50.500 | -.10 |
| 49 | 3 | 104.11 | .55 | 5.3 | .28 | 2.7 | .27 | ** | 49 | 3 | 5.00 | .30 | 22.100 | -.10 |
| 50 | 4 | 100.91 | .60 | 5.9 | .06 | .6 | .54 | ** | 50 | 4 | 5.00 | .40 | 10.700 | 0.00 |
| 51 | 5 | 164.00 | .80 | 4.9 | .34 | 2.1 | .46 | ** | 51 | 5 | 3.00 | .60 | 5.950 | 0.00 |
| 52 | 6 | 354.17 | 1.70 | 4.8 | 1.45 | 4.1 | .25 | ** | 52 | 6 | 1.50 | 1.50 | 3.980 | 0.00 |
| 53 | 3 | 96.66 | 1.00 | 10.3 | .70 | 7.2 | .30 | ** | 53 | 3 | 6.00 | .80 | 24.500 | 0.00 |
| 54 | 4 | 107.41 | .55 | 5.1 | .09 | .5 | .49 | ** | 54 | 4 | 5.00 | .30 | 11.400 | -.10 |
| 55 | 5 | 98.40 | .45 | 4.6 | -.47 | -4.7 | .92 | ** | 55 | 5 | 5.00 | .10 | 5.980 | -.30 |
| 56 | 6 | 161.29 | .90 | 5.6 | .18 | 1.1 | .72 | ** | 56 | 6 | 3.00 | .80 | 3.650 | .20 |
| 57 | 4 | 102.47 | 1.05 | 10.2 | .53 | 5.1 | .52 | ** | 57 | 4 | 6.00 | .70 | 13.000 | -.30 |
| 58 | 5 | 104.80 | .65 | 6.2 | -.19 | -1.8 | .84 | ** | 58 | 5 | 5.00 | .40 | 6.350 | -.10 |
| 59 | 6 | 93.05 | .75 | 8.1 | -.74 | -8.0 | 1.49 | ** | 59 | 6 | 5.00 | .50 | 3.520 | -.10 |

04/22/70 SYSTEMS BULLETIN NO. 00059

04/20/70 FORTRAN EXTENDED REFERENCE MANUALS

THE CAMPUS BOOKSTORE NOW HAS REVISION PACKET D FOR THE FORTRAN EXTENDED REFERENCE MANUAL. THE ADDITION OF THIS REVISION TO MANUALS REVISED THROUGH C WILL GIVE A MANUAL THAT ACCURATELY DESCRIBES THE CURRENT VERSION OF FORTRAN EXTENDED. CHANGES TO THE MANUAL INCLUDE CORRECTIONS, CLARIFICATIONS, AND AN EXPANDED INDEX.

04/22/70 SCOPE REFERENCE MANUALS

THE CAMPUS BOOKSTORE NOW HAS REVISION PACKETS I, J, AND K FOR THE SCOPE REFERENCE MANUAL. SCOPE MANUALS THAT ARE REVISED THROUGH H OR FURTHER SHOULD BE BROUGHT UP TO DATE. REVISION I IS PARTICULARLY IMPORTANT. SCOPE MANUALS NOT REVISED THROUGH H SHOULD BE DISCARDED.

04/22/70 PLOTTER TAPES

PLOTTER USERS CAN SIGNIFICANTLY REDUCE THEIR PERIPHERAL PROCESSING TIME BY SPECIFYING THE S PARAMETER ON THE PLOT TAPE REQUEST CARD. FOR EXAMPLE...

REQUEST(TAPE1,HI,RI,S) PLOTTER SCRATCH

NO OTHER CHANGES ARE REQUIRED.

A SIMILAR SAVINGS OF TIME CAN BE AFFECTED ON OTHER BINARY SCRATCH TAPES THROUGH THE USE OF THE S PARAMETER ON REQUEST CARDS.

04/22/70 PLOTTER SEMINARS

THE COMPUTER CENTER WILL GIVE TWO SEMINARS FOR THE PUBLIC.

THURSDAY, APRIL 30 INTRODUCTION TO PLOTTING ON THE 6400

THURSDAY, MAY 7 A GRAPHIC SUBROUTINE PACKAGE FOR THE 6400

BOTH SEMINARS WILL BE AT 2:40 PM IN ROOM 319 OF THE COMPUTER CENTER.

```
05/09/70 *SCOPE 3.1.6 VER. B UNIVERSITY OF ARIZONA

15.11.22.IPGEN9X
15.11.22.IPGEN,T20,CM60000.BN99900256.
15.11.22.RUN(S)
15.11.28.LGO.
15.11.31.FL= 060000.   CPU=  001.749.    PPU=  001.054
15.11.33.END    IPGEN
15.11.33.FL= 016400.   CPU=  003.417.    PPU=  001.360
```

IPGEN9X //// END OF LIST ////

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 5 HALF NE SP. 1 DATE 5/11



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 1 | 1-2 2 | 3-4 3 | 2-3 4 | 1-2 5 | 4-5 6 | 3-4 7 | 2-3 8 | 1-2 9 | CAL 1 |
| RECEIVE | 0-1.5 1 | → 2 | 2.5-1.5 1 | 2 | → 3 | 1.5-2.5 4 | 2 | 3 | 4 | 3-4 |
| RANGE | 1.0 2. | 1.0 1.5 | 10 5. | 1.0 2. | 1.0 1.5 | 10 5. | 1.0 5. | 0.1 2. | 0.1 1.5 | 10 2.0 |
| DC 1 | +0.3 | 0.7 | 0.1 | 0.3 | 0.7 | 0.2 | 0.4 | 0.1 | 0.3 | +0.1 |
| DC 2 | | | | | | | | | | |
| DC 3 | Pipeline Inn. W. | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 60.7 | 34.5 | 185 | 21.4 | 6.9 | 163 | 42.3 | 9.58 | 8.86 | 197 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +41.2 | | +17.4 | | | +22.4 | | | | 3. |
| AC NOISE | | | | | | | | | | .3 |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 5 HALF E SP. 1 DATE 5/11



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 10 | 4-5 11 | 3-4 12 | 2-3 13 | 1-2 14 | 6-7 15 | 5-6 16 | 4-5 17 | 3-4 18 | 2-3 19 |
| RECEIVE | 22.5 1 | 2 | 3 | 4 | 5 | 30-37.5 1 | 2 | 3 | 4 | 5 |
| RANGE | 10 S. | 1.0 S. | 1.0 S. | 0.1 2. | 0.1 1.5 | 10 S. | 1.0 S. | 1.0 S. | 0.1 S. | 0.1 2. |
| DC 1 | 0.0 | 0.4 | 0.5 | 0.1 | 0.5 | 0.2 | 0.4 | 0.5 | 0.4 | 0.0 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 179 | 41.1 | 18.0 | 5.43 | 5.51 | 165 | 40.9 | 15.6 | 8.71 | 3.20 |
| AC 2 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | -0.1 | 0.0 | -0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | +3.7 | | | | | +18.3 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 5 HALF E SP. 1 DATE 5/11



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 20 | 6-7 21 | 7-6 22 | 4-5 23 | 3-4 24 | 2-3 25 | 6-7 26 | 5-6 27 | 4-5 28 | 3-4 29 |
| RECEIVE | 6 | 7.5 2 | 3 | 4 | 5 | 6 | 7.5 3 | 4 | 5 | 6 |
| RANGE | 0.1 1.5 | 1.0 5. | 1.0 5. | 0.1 5. | 0.1 5. | 0.1 2. | 1.0 5. | 0.1 5. | 0.1 5. | 0.1 5. |
| DC 1 | 0.7 | 0.6 | 0.5 | 0.2 | 0.6 | 0.6 | 0.5 | 0.3 | 0.2 | 0.5 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 3.3 | 38.3 | 16.7 | 8.29 | 5.29 | 2.15 | 12.3 | 6.94 | 3.97 | 2.70 |
| AC 2 | 0.0 | -0.1 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.0 | 0.0 | -0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +16.7 | | | | | +21.3 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 5 HALF NE SP. 1 DATE 5/21



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 30 | 5-6 31 | 4-5 32 | | | | | | | |
| RECEIVE | 52.5 4 | 60 5 | → 6 | | | | | | | |
| RANGE | 0.1 5. | 0.1 5. | 0.1 5. | | | | | | | |
| DC 1 | 0.3 | 0.5 | 0.6 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 6.38 | 4.16 | 2.57 | | | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +16.2 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 5 HALF W SP. 1 DATE 8/12

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL-2 | | | 3-4 1 | 4-5 2 | 5-6 3 | 6-7 4 | 7-8 5 | 8-9 6 | 9-10 7 |
| RECEIVE | 1-5 | 0-7.5 | 0.5-15 | 15-22.5 1 | 2 | 3 | 4 | 23.5-30 1 | 2 | 3 |
| RANGE | 10 2. | | | 10 5. | 1.0 5. | 1.0 5. | 1.0 5. | 10 2. | 10 5. | 1.0 5. |
| DC 1 | -0.1 | | | 0.4 | 0.8 | 0.7 | 1.2 | 0.1 | -0.1 | 0.1 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | Fence @ | | | | | | |
| DC 4 | | | | 1150' SW | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 19.6 | | | 431 | 100 | 48.5 | 24.7 | 468 | 134 | 40.9 |
| AC 2 | 0.0 | | | -0.4 | -0.1 | -0.2 | +0.2 | +0.1 | 0.0 | -0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | +5.8 | +10.2 | +6.9 | | | | +8.0 | | |
| AC NOISE | .3 | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 5 HALF W SP. 1 DATE 5/12



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 8 | 6-7 9 | 1-2 10 | 2-3 11 | 3-4 12 | 4-5 13 | 5-6 14 | 6-7 15 | 1-2 16 | 2-3 17 |
| RECEIVE | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 2 | 3 |
| RANGE | 1.0 5. | 1.0 5. | 100 1.5 | 10 2. | 10 5. | 1.0 5. | 1.0 5. | 1.0 5. | 10 1.5 | 1.0 2. |
| DC 1 | 0.9 | 0.5 | 0.1 | -0.2 | -0.3 | -0.2 | 0.1 | 0.8 | 0.0 | -0.5 |
| DC 2 | -0.5 DC | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | 29.0 AC | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | -1.2 to 0.3 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 22.9 | 12.7 | 2450 | 273 | 121 | 42.8 | 26.7 | 15.6 | 107 | 20.9 |
| AC 2 | +0.4 | +0.2 | +0.1 | 0.0 | -0.1 | 0.0 | -0.2 | +0.2 | 0.0 | +0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +9.8 | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PROJECT Empire #463

LINE 5 HALF W SP. 1 DATE 5/12

PAGE 3

| SEND | 3-4 18 | 4-5 19 | 5-6 20 | 1-2 21 | 2-3 22 | 3-4 23 | 4-5 24 | 1-2 25 | 2-3 26 | 3-4 27 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 4 | 5 | 6 | 45-52.5 3 | 4 | 5 | 6 | 52.5-60 4 | 5 | 6 |
| RANGE | 1.0 5. | 0.1 5. | 0.1 5. | 1.0 1.5 | 0.1 2. | 0.1 5. | 0.1 5. | 1.0 1.5 | 1.0 2. | 1.0 5. |
| DC 1 | -0.2 | 0.4 | -0.4 | 0.7 | -0.6 | 0.3 | 0.3 | 0.8 | 0.6 | 1.0 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | [illegible] | | | | AC drift | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 11.8 | 4.78 | 3.27 | 40.7 | 9.70 | 5.90 | 2.64 | 38.1 | 13.6 | 10.6 |
| AC 2 | -0.4 | -0.8 | +0.2 | +0.2 | -0.3 | +0.2 | -0.3 | +0.4 | +0.2 | +0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | +17.4 | | | | -35.9 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 5 HALF N SP. 1 DATE 4/12



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3 4 | | | |
| RECEIVE | 45-52S | → | → | → | 52.5-6 | → | → | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 1000 | 940 | 480 | 440 | 1000 | 940 | 480 | | | |
| CURRENT | 1.5 | 2.0 | 5.0 | 5.0 | 1.5 | 2.0 | 5.0 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3. 3.0

SENDER NO. 6645

OPERATOR 46

RECEIVER NO. 1891-R

OPERATOR 58

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 5 HALF W SP. L DATE 4/13

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 |
| RECEIVE | 15-22.5 | → | → | → | 22.5-3 | → | → | → | → | 3-3.25 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 480 | 440 | 460 | 460 | 980 | 480 | 440 | 460 | 460 | 1000 |
| CURRENT | 5.0 | 5.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 5.0 | 5.0 | 1.5 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | → | → | → | → | → | 32.5-45 | → | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 980 | 480 | 440 | 460 | 460 | 1000 | 980 | 480 | 440 | 460 |
| CURRENT | 2.0 | 5.0 | 5.0 | 5.0 | 5.0 | 1.5 | 2.0 | 5.0 | 5.0 | 5.0 |

FREQUENCIES 3 3.0

SENDER NO. 16445

OPERATOR 46

RECEIVER NO. 1891-R

OPERATOR 58

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463
LINE 5 HALF E SP. 1 DATE 5/11

| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | CAL |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-7.5 | → | 7.5-15 | → | → | 15-22.5 | → | → | → | 3-4 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 940 | 1000 | 620 | 940 | 1000 | 560 | 620 | 940 | 1000 | 6 |
| CURRENT | 2.0 | 1.5 | 5.0 | 2.0 | 1.5 | 5.0 | 5.0 | 2.0 | 1.5 | 2.0 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 22.5-30 | → | → | → | → | 30-37.5 | → | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 460 | 560 | 620 | 940 | 1000 | 460 | 460 | 560 | 600 | 940 |
| CURRENT | 5.0 | 5.0 | 5.0 | 2.0 | 1.5 | 5.0 | 5.0 | 5.0 | 5.0 | 2.0 |

FREQUENCIES 3.0 0.3
SENDER NO. 6644-5
OPERATOR 46
RECEIVER NO. 18691-R
OPERATOR 58

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463
LINE 5 HALF E SP. 1 DATE 5/11

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | → | 32.5-45 | | | | → | 45-52.5 | | | → |
| RANGE | | | | 540 | | | | | | |
| VOLTAGE | 1000 | 460 | 460 | ~~440~~ | 600 | 940 | 460 | 460 | 440 | 480 |
| CURRENT | 1.5 | 5.0 | 5.0 | 5.0 | 5.0 | 2.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 52.5-60 | → | → | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 460 | 460 | ~~440~~ | | | | | | | |
| CURRENT | 5.0 | 5.0 | 5.0 | | | | | | | |

FREQUENCIES 3.0 0.1
SENDER NO. 6644-S
OPERATOR 46
RECEIVER NO. 18691-R
OPERATOR 58

COMMENTS:

JOB 463 EMPIRE LINE 5 EAST WEST SPREAD 1 5/11/70 — 750 FEET=DIPOLE LENGTH

CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | .10 | 197.000 | 0.00 | 3.00 | .30 | .1000 | 1.0152 |

| | | COMPUTED DATA | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PT. | N | CUR | PFE | AC1 | AC2 |
| 1 | 1 | 69.47 | .20 | 2.9 | .20 | 2.9 | 0.00 | ** | 1 | 1 | 2.00 | .30 | 60.700 | 0.00 |
| 2 | 2 | 211.41 | .60 | 2.8 | .60 | 2.8 | 0.00 | ** | 2 | 2 | 1.50 | .70 | 34.500 | 0.00 |
| 3 | 1 | 84.52 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | ** | 3 | 1 | 5.00 | .10 | 185.000 | 0.00 |
| 4 | 2 | 97.96 | .20 | 2.0 | .07 | .8 | .13 | ** | 4 | 2 | 2.00 | .30 | 21.400 | 0.00 |
| 5 | 3 | 258.90 | .60 | 2.3 | .52 | 2.0 | .08 | ** | 5 | 3 | 1.50 | .70 | 16.900 | 0.00 |
| 6 | 1 | 74.54 | .10 | 1.3 | .10 | 1.3 | 0.00 | ** | 6 | 1 | 5.00 | .20 | 163.000 | 0.00 |
| 7 | 2 | 77.53 | .30 | 3.9 | .13 | 1.6 | .17 | ** | 7 | 2 | 5.00 | .40 | 42.300 | 0.00 |
| 8 | 3 | 109.42 | 0.00 | 0.0 | -.25 | -2.3 | .25 | ** | 8 | 3 | 2.00 | .10 | 9.580 | 0.00 |
| 9 | 4 | 270.39 | .20 | .7 | .06 | .2 | .14 | ** | 9 | 4 | 1.50 | .30 | 8.860 | 0.00 |
| 10 | 1 | 81.69 | -.05 | -.6 | -.05 | -.6 | 0.00 | ** | 10 | 1 | 5.00 | 0.00 | 179.000 | -.10 |
| 11 | 2 | 75.33 | .30 | 4.0 | .12 | 1.6 | .18 | ** | 11 | 2 | 5.00 | .40 | 41.100 | 0.00 |
| 12 | 3 | 82.56 | .40 | 4.8 | .03 | .3 | .37 | ** | 12 | 3 | 5.00 | .50 | 18.000 | 0.00 |
| 13 | 4 | 124.04 | 0.00 | 0.0 | -.40 | -3.3 | .40 | ** | 13 | 4 | 2.00 | .10 | 5.430 | 0.00 |
| 14 | 5 | 294.85 | .40 | 1.4 | .20 | .7 | .20 | ** | 14 | 5 | 1.50 | .50 | 5.510 | 0.00 |
| 15 | 1 | 75.46 | .15 | 2.0 | .15 | 2.0 | 0.00 | ** | 15 | 1 | 5.00 | .20 | 165.000 | -.10 |
| 16 | 2 | 74.97 | .30 | 4.0 | .12 | 1.6 | .18 | ** | 16 | 2 | 5.00 | .40 | 40.900 | 0.00 |
| 17 | 3 | 71.55 | .45 | 6.3 | -.01 | -.1 | .46 | ** | 17 | 3 | 5.00 | .50 | 15.600 | -.10 |
| 18 | 4 | 79.82 | .30 | 3.8 | -.44 | -5.4 | .74 | ** | 18 | 4 | 5.00 | .40 | 8.710 | 0.00 |
| 19 | 5 | 127.79 | 0.00 | 0.0 | -.64 | -5.0 | .64 | ** | 19 | 5 | 2.00 | 0.00 | 3.200 | -.20 |
| 20 | 6 | 294.56 | .70 | 2.4 | .38 | 1.3 | .32 | ** | 20 | 6 | 1.50 | .80 | 3.430 | 0.00 |
| 21 | 2 | 70.34 | .55 | 7.8 | .35 | 5.0 | .20 | ** | 21 | 2 | 5.00 | .60 | 38.300 | -.10 |
| 22 | 3 | 76.60 | .40 | 5.2 | -.02 | -.2 | .42 | ** | 22 | 3 | 5.00 | .50 | 16.700 | 0.00 |
| 23 | 4 | 75.82 | .10 | 1.3 | -.69 | -9.1 | .79 | ** | 23 | 4 | 5.00 | .20 | 8.290 | 0.00 |
| 24 | 5 | 85.01 | .50 | 5.9 | -.61 | -7.2 | 1.11 | ** | 24 | 5 | 5.00 | .60 | 5.290 | 0.00 |
| 25 | 6 | 138.20 | .50 | 3.6 | -.38 | -2.8 | .88 | ** | 25 | 6 | 2.00 | .60 | 2.150 | 0.00 |
| 26 | 3 | 56.42 | .45 | 8.0 | -.18 | -3.2 | .63 | ** | 26 | 3 | 5.00 | .50 | 12.300 | -.10 |
| 27 | 4 | 63.54 | .20 | 3.1 | -.80 | -12.5 | 1.00 | ** | 27 | 4 | 5.00 | .30 | 6.940 | 0.00 |
| 28 | 5 | 63.54 | .10 | 1.6 | -1.53 | -24.1 | 1.63 | ** | 28 | 5 | 5.00 | .20 | 3.970 | 0.00 |
| 29 | 6 | 69.35 | .45 | 6.5 | -1.73 | -25.0 | 2.18 | ** | 29 | 6 | 5.00 | .50 | 2.700 | -.10 |
| 30 | 4 | 58.41 | .20 | 3.4 | -.91 | -15.7 | 1.11 | ** | 30 | 4 | 5.00 | .30 | 6.380 | 0.00 |
| 31 | 5 | 66.78 | .40 | 6.0 | -1.13 | -16.9 | 1.53 | ** | 31 | 5 | 5.00 | .50 | 4.160 | 0.00 |
| 32 | 6 | 66.08 | .50 | 7.6 | -1.82 | -27.6 | 2.32 | ** | 32 | 6 | 5.00 | .60 | 2.570 | 0.00 |

JOB 463 EMPIRE LINE 5 EAST WEST SPREAD 1 5/11/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | -.10 | 196.000 | 0.00 | 3.00 | .30 | -.1000 | 1.0204 |

| COMPUTED DATA | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | PT. | N | CUR | PFE | AC1 | AC2 |
| 1 | 1 | 198.89 | .70 | 3.5 | .70 | 3.5 | 0.00 ** | 1 | 1 | 5.00 | .40 | 431.000 | -.40 |
| 2 | 2 | 185.33 | .95 | 5.1 | .95 | 5.1 | 0.00 ** | 2 | 2 | 5.00 | .80 | 100.000 | -.10 |
| 3 | 3 | 224.48 | .90 | 4.0 | .81 | 3.6 | .09 ** | 3 | 3 | 5.00 | .70 | 48.500 | -.20 |
| 4 | 4 | 229.79 | 1.20 | 5.2 | 1.03 | 4.5 | .17 ** | 4 | 4 | 5.00 | 1.20 | 24.700 | .20 |
| 5 | 1 | 538.32 | .15 | .3 | .15 | .3 | 0.00 ** | 5 | 1 | 2.00 | .10 | 468.000 | .10 |
| 6 | 2 | 246.12 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 ** | 6 | 2 | 5.00 | -.10 | 134.000 | 0.00 |
| 7 | 3 | 188.18 | .10 | .5 | -.02 | -.1 | .12 ** | 7 | 3 | 5.00 | .10 | 40.900 | .20 |
| 8 | 4 | 211.36 | .30 | 1.4 | .11 | .5 | .19 ** | 8 | 4 | 5.00 | .40 | 22.900 | .40 |
| 9 | 5 | 205.33 | .50 | 2.4 | .16 | .8 | .34 ** | 9 | 5 | 5.00 | .50 | 12.700 | .20 |
| 10 | 1 | 3757.50 | .15 | .0 | .15 | .0 | 0.00 ** | 10 | 1 | 1.50 | .10 | 2450.000 | .10 |
| 11 | 2 | 1252.32 | -.10 | -.1 | -.10 | -.1 | 0.00 ** | 11 | 2 | 2.00 | -.20 | 273.000 | 0.00 |
| 12 | 3 | 554.50 | -.15 | -.3 | -.15 | -.3 | 0.00 ** | 12 | 3 | 5.00 | -.30 | 121.000 | -.10 |
| 13 | 4 | 392.67 | -.10 | -.3 | -.18 | -.5 | .08 ** | 13 | 4 | 5.00 | -.20 | 42.800 | 0.00 |
| 14 | 5 | 429.96 | .30 | .7 | .18 | .4 | .12 ** | 14 | 5 | 5.00 | .10 | 26.700 | -.20 |
| 15 | 4 (6) | ~~144.56~~ 405 | .80 | ~~5.5~~ 2.0 | ~~.47~~ .7 | ~~3.3~~ 1.7 | ~~.33~~ .11 ** | 15 | 4 (6) | 5.00 | .80 | 15.600 | .20 |
| 16 | 2 | 655.76 | .10 | .2 | .10 | .2 | 0.00 ** | 16 | 2 | 1.50 | 0.00 | 107.000 | 0.00 |
| 17 | 3 | 238.96 | -.50 | -2.1 | -.58 | -2.4 | .08 ** | 17 | 3 | 2.00 | -.50 | 20.900 | .20 |
| 18 | 4 | 108.26 | .10 | .9 | -.39 | -3.6 | .49 ** | 18 | 4 | 5.00 | -.20 | 11.800 | -.40 |
| 19 | 5 | 77.21 | .10 | 1.3 | -1.16 | -15.1 | 1.26 ** | 19 | 5 | 5.00 | .40 | 4.780 | .80 |
| 20 | 6 | 83.83 | -.40 | -4.8 | -2.11 | -25.1 | 1.71 ** | 20 | 6 | 5.00 | -.40 | 3.270 | .20 |
| 21 | 3 | 627.95 | .70 | 1.1 | .70 | 1.1 | 0.00 ** | 21 | 3 | 1.50 | .70 | 40.700 | .20 |
| 22 | 4 | 221.59 | -.35 | -1.6 | -.53 | -2.4 | .18 ** | 22 | 4 | 2.00 | -.60 | 9.700 | -.30 |
| 23 | 5 | 95.20 | .30 | 3.2 | -.66 | -6.9 | .96 ** | 23 | 5 | 5.00 | .30 | 5.900 | .20 |
| 24 | 6 | 68.16 | .55 | 8.1 | -1.68 | -24.7 | 2.23 ** | 24 | 6 | 5.00 | .30 | 2.640 | -.30 |
| 25 | 4 | 1176.84 | .70 | .6 | .70 | .6 | 0.00 ** | 25 | 4 | 1.50 | .80 | 38.100 | .40 |
| 26 | 5 | 550.26 | .60 | 1.1 | .52 | .9 | .08 ** | 26 | 5 | 2.00 | .60 | 13.600 | .20 |
| 27 | 6 | 275.57 | 1.00 | 3.6 | .65 | 2.4 | .35 ** | 27 | 6 | 5.00 | 1.00 | 10.600 | .20 |

Job: 463 EMPIRE Line 6 SE 1/2 SP 1

4/14/70 750.

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire 463
LINE 6 HALF SP. 1 DATE 5/14



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 1 | 1-2 2 | 3-4 3 | 2-3 4 | 1-2 5 | 4-5 6 | 3-4 7 | 2-3 8 | 1-2 9 | CH 1 |
| RECEIVE | 4-5 1 | 2 | 5-6 1 | 2 | 3 | 6-7 1 | 2 | 3 | 4 | 3-4 |
| RANGE | 1.0 .5 | 1.0 .4 | 1.0 2. | 0.1 .4 | 0.1 .4 | 10 5. | 1.0 2. | 0.1 .5 | 0.1 .4 | 10 2. |
| DC 1 | 1.2 | 0.7 | 0.4 | 0.9 | 0.2 | -0.4 | 0.6 | 0.7 | 0.4 | -0.2 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 52.0 | 18.2 | 53.3 | 9.76 | 5.78 | 134. | 13.7 | 4.46 | 2.38 | 197. |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | +0.1 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +14.8 | | +29.8 | | | +5.6 | | | | 3. |
| AC NOISE | | | | | | | | | | .3 |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT [illegible]
LINE C HALF E SP. 1 DATE 5/10

PAGE 2

| | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5 6 | 4 5 | 3 4 | 2 3 | 1 2 | 6 7 | 5 6 | 4 5 | 3 4 | 2 3 |
| RECEIVE | 1 | 2 | 3 | 4 | 5 | [illegible] 1 | 2 | 3 | 4 | 5 |
| RANGE | 10 S. | 1.0 S. | 0.1 2. | 0.1 5 | 0.1 4 | 10 S. | 1.0 S. | 1.0 S. | 0.1 2. | 0.1 5 |
| DC 1 | -0.3 | 0.8 | -0.1 | 0.5 | 0.3 | -0.4 | -0.2 | 0.4 | 0.5 | 1.1 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 154. | 38.9 | 6.82 | 2.80 | 1.62 | 106 | 35.5 | 15.8 | 3.55 | 1.56 |
| AC 2 | 0.0 | +0.4 | 0.0 | 0.0 | -0.1 | 0.0 | -0.2 | 0.0 | +0.2 | -0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | +14.4 | | | | | +11.9 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mine
LINE 6 HALF E SP. 1 DATE 5/4

PAGE 4

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 20 | 6-7 21 | 5-6 22 | 4-5 23 | 3-4 24 | 2-3 25 | 6-7 26 | 5-6 27 | 4-5 28 | 3-4 29 |
| RECEIVE | 6 | 5 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 |
| RANGE | .01 4. | 1.0 5. | 1.0 5. | 0.1 5. | 0.1 2. | .01 5. | 0.1 5. | 0.1 5. | 0.1 5. | 0.1 2. |
| DC 1 | 0.6 | 0.4 | 0.4 | -0.1 | 0.5 | 0.4 | -0.1 | 0.2 | 0.6 | 0.4 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | .942 | 23.1 | 12.8 | 7.32 | 1.84 | .869 | 8.58 | 6.37 | 4.13 | 1.11 |
| AC 2 | -0.1 | -0.2 | 0.0 | +0.3 | +0.3 | +0.2 | -0.3 | 0.0 | +0.3 | +0.4 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +17.4 | | | | | +28.6 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 4463
LINE 6 HALF E SP. 1 DATE 5/19



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 30 | 5-6 31 | 4-5 32 | | | | | | | |
| RECEIVE | 5 2.5-6 4 | 5 | 6 | | | | | | | |
| RANGE | 0.15. | 0.15. | 0.15. | | | | | | | |
| DC 1 | -0.1 | -0.4 | 0.3 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 5.93 | 5.01 | 3.54 | | | | | | | |
| AC 2 | -0.4 | -0.5 | +0.2 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

Job: 463 EMPIRE Line 6 NW 1/2 sp 1

4/14/70 750.

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 6 HALF NW SP. 1 DATE 5/14



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CHL 2 | | | 3-4 1 | 4-5 2 | 5-6 3 | 6-7 4 | 2-3 5 | 3-4 6 | 4-5 7 |
| RECEIVE | 4-5 | 0-7.5 | 7.5-15 | 15-22.5 | 2 | 3 | 4 | 22.5-30 1 | 2 | 3 |
| RANGE | 102. | | | 102. | 105. | 105. | 105. | 105. | 102. | 105. |
| DC 1 | -0.2 | | | 0.2 | -0.2 | -0.1 | +0.1 | 0.6 | 0.3 | 0.0 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 195. | | | 202. | 213 | 66.6 | 26.8 | 970. | 235. | 194. |
| AC 2 | 0.0 | | | -0.2 | 0.0 | -0.4 | 0.0 | 0.0 | 0.0 | -0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +2.4 | +9.8 | -18.4 | | | | -30.6 | | |
| AC NOISE | 3. | | | | | | | | | |
| POT RES. | .3 | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 6 HALF NW SP. 1 DATE 5/14

PAGE 3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 8 | 6-7 9 | 1-2 10 | 2-3 11 | 3-4 12 | 4-5 13 | 5-6 14 | 6-7 15 | 1-2 16 | 2-3 17 |
| RECEIVE | 4 | 5 | 30-37.5 | 2 | 3 | 4 | 5 | 6 | 37.5-45 | 3 |
| RANGE | 1.05. | 1.05. | 1.0.4 | 1.0.5. | 1.02. | 1.05. | 0.15. | 0.15. | 1.0.4 | 0.1.4 |
| DC 1 | 0.3 | 0.7 | 0.3 | 0.8 | -0.2 | 0.2 | -0.4 | -0.6 | 0.4 | -1.0 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 68.4 | 28.7 | 248. | 39.2 | 19.3 | 18.6 | 8.25 | 4.00 | 31.8 | 7.72 |
| AC 2 | 0.0 | +0.2 | +0.1 | -0.1 | +0.1 | -0.2 | -0.2 | -0.3 | 0.0 | +0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | -4.0 | | | | | | +18.0 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 6 HALF NW SP. 1 DATE 5/14

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 18 | 4-5 19 | 5-6 20 | 1-2 21 | 2-3 22 | 3-4 23 | 4-5 24 | 1-2 25 | 2-3 26 | 3-4 27 | |
| RECEIVE | 4 | 5 | 6 | 4&5-5&6 3 | 4 | 5 | 6 | 5&6-4&5 | 5 | 6 | |
| RANGE | 0.1 2. | 0.1 5. | 0.1 5. | 1.0 .4 | 0.1 .5 | 0.1 2. | 0.1 5. | 0.1 .4 | 0.1 .5 | | |
| DC 1 | -0.8 | -1.2 | -1.1 | 0.8 | 0.2 | -0.6 | -0.7 | -0.5 | | | |
| DC 2 | | | | | | | | | | | |
| DC 3 | | | | | | | | | | | |
| DC 4 | | | | | | | | | | | |
| DC 5 | | | | | | | | | | | |
| DC 6 | | | | | | | | | | | |
| DC 7 | | | | | | | | | | | |
| DC 8 | | | | | | | | | | | |
| DC AVG. | | | | | | | | | | | |
| AC 1 | 4.97 | 6.09 | 3.05 | 14.6 | 6.48 | 6.10 | 8.15 | 2.54 | 1.41 | | |
| AC 2 | -0.4 | 0.0 | -0.1 | +0.2 | -0.1 | +0.3 | -0.4 | -0.1 | | | |
| AC AVG. | | | | | | | | | | | |
| S.P. | | | | -5.4 | | | | +13.5 | | | |
| AC NOISE | | | | | | | | | | | |
| POT RES. | | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 6 HALF SE SP. 1 DATE 4/14

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 0-7.5 | → | 7.5 15 | → | → | 15-22.5 | → | → | → | 22.5-30 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 640 | 940 | 640 | 520 | 940 | 450 | 640 | 640 | 940 | 520 |
| CURRENT | .5A | .4A | 2A | .4A | .4A | 5A | 2A | .5A | .4A | 5.A |
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | → | → | → | → | 3-3.75 | → | → | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 460 | 640 | 640 | 940 | 500 | 510 | 460 | 640 | 640 | 940 |
| CURRENT | 5.A | 2A | .5A | .4A | 5.A | 5.A | 5.A | 2.A | .5A | .4A |

FREQUENCIES 3. 3.0

SENDER NO. 66445

OPERATOR 46

RECEIVER NO.

OPERATOR 58

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire
LINE 6 HALF SE SP. 1 DATE 4/4

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 |
| RECEIVE | 37.5-45 | → | → | → | → | 45-52.5 | → | → | → | 52.5-6 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 500 | 510 | 450 | 640 | 640 | 500 | 500 | 450 | 640 | 500 |
| CURRENT | 5.A | 5.A | 5.A | 2.A | .5A | 5.A | 5.A | 5.A | 2.A | 5.A |
| SEND | 5-6 | 4 5 | | | | | | | | |
| RECEIVE | → | → | | | | | | | | |
| RANGE | 500 | 450 | | | | | | | | |
| VOLTAGE | 5.A | 5.A | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES .3 3.0
SENDER NO. 6644 S
OPERATOR 46
RECEIVER NO.
OPERATOR 58

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE
LINE 6 HALF NW SP. 1 DATE 4/14

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2 3 | 3 4 | | | |
| RECEIVE | 45-52.5 | → | → | → | 52.5-6 | → | → | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | 1600 | 620 | 660 | 500 | 1640 | 620 | | | | |
| CURRENT | 0.4 | 0.5 | 2.0 | 5.0 | 0.4 | 0.5 | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3. 3.0
SENDER NO. 6644 S
OPERATOR 46
RECEIVER NO.
OPERATOR 58

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire
LINE 6 HALF NW SP. 1 DATE 4/14

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4 5 | 5-6 | 6-7 | 1-2 |
| RECEIVE | 15-22.5 | → | → | → | 22.5-3 | → | → | → | → | 3.-3.75 |
| RANGE | | | | | | | | | | |
| VOLTAGE | 560 | 500 | 560 | 540 | 600 | 540 | 500 | 540 | 540 | ~~600~~ |
| CURRENT | 2.0 | 5.0 | 5.0 | 5.0 | 0.5 | 2.0 | 5.0 | 5.0 | 5.0 | ~~0.5~~ 0.4 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3 4 | 4-5 | 5 6 |
| RECEIVE | → | → | → | → | → | 37.5-45 | → | → | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | 620 | 660 | 500 | 540 | 540 | 760 | 620 | 540 | 500 | 540 |
| CURRENT | 0.5 | 2.0 | 5.0 | 5.0 | 5.0 | 0.4 | 0.5 | 2.0 | 5.0 | 5.0 |

FREQUENCIES 3 3.0
SENDER NO. 6644 5
OPERATOR 46
RECEIVER NO.
OPERATOR 58

COMMENTS:

JOB 463 EMPIRE LINE 6 SE 1/2 SP 1 4/14/70

CAL GROUP NO. 1

750 FEET=DIPOLE LENGTH

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | -.20 | 197.000 | 0.00 | 3.00 | .30 | -.2000 | 1.0152 |

| | COMPUTED DATA | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PT. | N | CUR | PFE | AC1 | AC2 |
| 1 | 1 | 240.89 | 1.40 | 5.8 | 1.40 | 5.8 | 0.00 | ** | 1 | 1 | .50 | 1.20 | 52.000 | 0.00 |
| 2 | 2 | 419.48 | .90 | 2.1 | .90 | 2.1 | 0.00 | ** | 2 | 2 | .40 | .70 | 18.200 | 0.00 |
| 3 | 1 | 61.24 | .60 | 9.8 | .53 | 8.7 | .07 | ** | 3 | 1 | 2.00 | .40 | 53.300 | 0.00 |
| 4 | 2 | 225.40 | 1.10 | 4.9 | 1.10 | 4.9 | 0.00 | ** | 4 | 2 | .40 | .90 | 9.760 | 0.00 |
| 5 | 3 | 331.40 | .35 | 1.1 | .35 | 1.1 | 0.00 | ** | 5 | 3 | .40 | .20 | 5.780 | .10 |
| 6 | 1 | 61.10 | -.10 | -1.6 | -.17 | -2.7 | .07 | ** | 6 | 1 | 5.00 | -.40 | 134.000 | -.20 |
| 7 | 2 | 63.09 | .80 | 12.7 | .57 | 9.0 | .23 | ** | 7 | 2 | 2.00 | .60 | 13.700 | 0.00 |
| 8 | 3 | 205.59 | .90 | 4.4 | .80 | 3.9 | .10 | ** | 8 | 3 | .50 | .70 | 4.460 | 0.00 |
| 9 | 4 | 273.46 | .60 | 2.2 | .47 | 1.7 | .13 | ** | 9 | 4 | .40 | .40 | 2.380 | 0.00 |
| 10 | 1 | 70.28 | -.10 | -1.4 | -.10 | -1.4 | 0.00 | ** | 10 | 1 | 5.00 | -.30 | 154.000 | 0.00 |
| 11 | 2 | 71.80 | .80 | 11.1 | .61 | 8.4 | .19 | ** | 11 | 2 | 5.00 | .80 | 38.900 | .40 |
| 12 | 3 | 77.97 | .10 | 1.3 | -.31 | -3.9 | .41 | ** | 12 | 3 | 2.00 | -.10 | 6.820 | 0.00 |
| 13 | 4 | 257.63 | .70 | 2.7 | .55 | 2.1 | .15 | ** | 13 | 4 | .50 | .50 | 2.800 | 0.00 |
| 14 | 5 | 325.41 | .55 | 1.7 | .37 | 1.1 | .18 | ** | 14 | 5 | .40 | .30 | 1.620 | -.10 |
| 15 | 1 | 48.33 | -.20 | -4.1 | -.29 | -6.0 | .09 | ** | 15 | 1 | 5.00 | -.40 | 106.000 | 0.00 |
| 16 | 2 | 64.87 | .10 | 1.5 | -.12 | -1.9 | .22 | ** | 16 | 2 | 5.00 | -.20 | 35.500 | -.20 |
| 17 | 3 | 72.62 | .60 | 8.3 | .15 | 2.1 | .45 | ** | 17 | 3 | 5.00 | .40 | 15.800 | 0.00 |
| 18 | 4 | 81.66 | .60 | 7.3 | -.11 | -1.4 | .71 | ** | 18 | 4 | 2.00 | .50 | 3.550 | .20 |
| 19 | 5 | 252.68 | 1.35 | 5.3 | 1.10 | 4.3 | .25 | ** | 19 | 5 | .50 | 1.10 | 1.560 | -.10 |
| 20 | 6 | 303.66 | .85 | 2.8 | .55 | 1.8 | .30 | ** | 20 | 6 | .40 | .60 | .942 | -.10 |
| 21 | 2 | 42.47 | .70 | 16.5 | .30 | 7.0 | .40 | ** | 21 | 2 | 5.00 | .40 | 23.100 | -.20 |
| 22 | 3 | 58.83 | .60 | 10.2 | .01 | .1 | .59 | ** | 22 | 3 | 5.00 | .40 | 12.800 | 0.00 |
| 23 | 4 | 66.95 | 0.00 | 0.0 | -.93 | -13.9 | .93 | ** | 23 | 4 | 5.00 | -.10 | 7.320 | .20 |
| 24 | 5 | 74.07 | .55 | 7.4 | -.78 | -10.6 | 1.33 | ** | 24 | 5 | 2.00 | .50 | 1.840 | .30 |
| 25 | 6 | 223.66 | .50 | 2.2 | .04 | .2 | .46 | ** | 25 | 6 | .50 | .40 | .869 | .20 |
| 26 | 3 | 39.24 | .25 | 6.4 | -.77 | -19.7 | 1.02 | ** | 26 | 3 | 5.00 | -.10 | 8.580 | -.30 |
| 27 | 4 | 58.44 | .40 | 6.8 | -.71 | -12.2 | 1.11 | ** | 27 | 4 | 5.00 | .20 | 6.370 | 0.00 |
| 28 | 5 | 66.57 | .65 | 9.8 | -.88 | -13.3 | 1.53 | ** | 28 | 5 | 5.00 | .60 | 4.130 | .30 |
| 29 | 6 | 71.42 | .40 | 5.6 | -1.70 | -23.8 | 2.10 | ** | 29 | 6 | 2.00 | .40 | 1.110 | .40 |
| 30 | 4 | 54.24 | .30 | 5.5 | -.93 | -17.1 | 1.23 | ** | 30 | 4 | 5.00 | -.10 | 5.930 | -.40 |
| 31 | 5 | 79.95 | .05 | .6 | -1.16 | -14.5 | 1.21 | ** | 31 | 5 | 5.00 | -.40 | 5.010 | -.50 |
| 32 | 6 | 91.02 | .40 | 4.4 | -1.13 | -12.5 | 1.53 | ** | 32 | 6 | 5.00 | .30 | 3.540 | .20 |

JOB 463 EMPIRE LINE 6 NW 1/2 SP 1 4/14/70
CAL GROUP NO. 2

750 FEET=DIPOLE LENGTH

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | -.20 | 195.000 | 0.00 | 3.00 | .30 | -.2000 | 1.0256 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PT. | N | CUR | PFE | AC1 | AC2 |
| 1 | 1 | 349.86 | .30 | .9 | .30 | .9 | 0.00 | ** | 1 | 1 | 2.00 | .20 | 302.000 | .20 |
| 2 | 2 | 393.23 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 | ** | 2 | 2 | 5.00 | -.20 | 213.000 | 0.00 |
| 3 | 3 | 307.69 | .30 | 1.0 | .30 | 1.0 | 0.00 | ** | 3 | 3 | 5.00 | -.10 | 66.600 | -.40 |
| 4 | 4 | 248.13 | .30 | 1.2 | .15 | .6 | .15 | ** | 4 | 4 | 5.00 | .10 | 26.800 | 0.00 |
| 5 | 1 | 4512.74 | .80 | .2 | .80 | .2 | 0.00 | ** | 5 | 1 | .50 | .60 | 970.000 | 0.00 |
| 6 | 2 | 1090.04 | .50 | .5 | .50 | .5 | 0.00 | ** | 6 | 2 | 2.00 | .30 | 235.000 | 0.00 |
| 7 | 3 | 897.17 | .25 | .3 | .25 | .3 | 0.00 | ** | 7 | 3 | 5.00 | 0.00 | 194.000 | -.10 |
| 8 | 4 | 634.54 | .50 | .8 | .50 | .8 | 0.00 | ** | 8 | 4 | 5.00 | .30 | 68.400 | 0.00 |
| 9 | 5 | 467.79 | .80 | 1.7 | .69 | 1.5 | .11 | ** | 9 | 5 | 5.00 | .70 | 28.700 | .20 |
| 10 | 1 | 1437.93 | .45 | .3 | .45 | .3 | 0.00 | ** | 10 | 1 | .40 | .30 | 248.000 | .10 |
| 11 | 2 | 730.93 | 1.05 | 1.4 | 1.05 | 1.4 | 0.00 | ** | 11 | 2 | .50 | .80 | 39.200 | -.10 |
| 12 | 3 | 222.69 | -.05 | -.2 | -.14 | -.6 | .09 | ** | 12 | 3 | 2.00 | -.20 | 19.300 | .10 |
| 13 | 4 | 172.38 | .50 | 2.9 | .24 | 1.4 | .26 | ** | 13 | 4 | 5.00 | .20 | 18.600 | -.20 |
| 14 | 5 | 133.00 | -.10 | -.8 | -.71 | -5.3 | .61 | ** | 14 | 5 | 5.00 | -.40 | 8.250 | -.20 |
| 15 | 6 | 102.97 | -.25 | -2.4 | -1.56 | -15.1 | 1.31 | ** | 15 | 6 | 5.00 | -.60 | 4.000 | -.30 |
| 16 | 2 | 738.25 | .60 | .8 | .60 | .8 | 0.00 | ** | 16 | 2 | .40 | .40 | 31.800 | 0.00 |
| 17 | 3 | 441.82 | -.90 | -2.0 | -.90 | -2.0 | 0.00 | ** | 17 | 3 | .40 | -1.00 | 7.720 | .20 |
| 18 | 4 | 102.54 | -.40 | -3.9 | -.92 | -9.0 | .52 | ** | 18 | 4 | 2.00 | -.80 | 4.470 | -.40 |
| 19 | 5 | 97.39 | -1.00 | -10.3 | -1.93 | -19.8 | .93 | ** | 19 | 5 | 5.00 | -1.20 | 6.090 | 0.00 |
| 20 | 6 | 78.12 | -.85 | -10.9 | -2.72 | -34.8 | 1.87 | ** | 20 | 6 | 5.00 | -1.10 | 3.050 | -.10 |
| 21 | 3 | 850.74 | .90 | 1.1 | .90 | 1.1 | 0.00 | ** | 21 | 3 | .40 | .80 | 14.600 | .20 |
| 22 | 4 | 600.55 | .45 | .7 | .45 | .7 | 0.00 | ** | 22 | 4 | .50 | .20 | 6.480 | -.10 |
| 23 | 5 | 245.36 | -.55 | -2.2 | -.81 | -3.3 | .26 | ** | 23 | 5 | 2.00 | -.60 | 6.100 | .30 |
| 24 | 6 | 209.59 | -.30 | -1.4 | -.80 | -3.8 | .50 | ** | 24 | 6 | 5.00 | -.70 | 8.150 | -.40 |
| 25 | 4 | 292.20 | -.25 | -.9 | -.37 | -1.3 | .12 | ** | 25 | 4 | .40 | -.50 | 2.540 | -.10 |
| 26 | 5 | ~~273.78~~ 228 | ~~20.20~~ | ~~73.8~~ | ~~19.97~~ | ~~73.0~~ | ~~.23~~ | ** | 26 | 5 | .50 | ~~20.00~~ Assume 0 | 1.410 | 0.00 |

Job #63, Line 7, S/1 S½ June 10, 1970 750

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 7 HALF S SP. 1 DATE 6/11

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL 1 | 4-5 1 | 3-4 2 | 2-3 3 | 1-2 4 | 3-4 1 | 2-3 2 | 1-2 3 | 2-3 1 | 1-2 2 |
| RECEIVE | 10 | 22.5-15N | → | → | → | 15-7.5N | → | → | 7.5-0N | → |
| RANGE | -0.1 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 1.0 |
| DC 1 | | +0.9 | -0.1 | -25 | 1.4 | 1.0 | -10.0 | 1.2 | -6.1 | 0.6 |
| DC 2 | | | | | | | | | | |
| DC 3 PFE | | 0.8 | -0.2 | -25 | 1.3 | 0.9 | -10 | 1.1 | -6.1 | 0.5 |
| DC 4 $\phi_a$ | | .384 | .474 | .175 | .16 | .7 | .11 | .089 | .615 | .226 |
| DC 5 MCF | 2.0 | .3 | .3 | .3 | 3.0 | .3 | .3 | 3. | .3 | 2.5 |
| DC 6 | 2. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 7 | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 1 | 2 |
| DC 8 I | 2000 | 300 | 300 | 300 | 3000 | 300 | 300 | 3000 | 300 | 2500 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 199 | 19.4 | 15.8 | 3.12 | 10.4 | 92.3 | 4.08 | 11.8 | 87.5 | 62.8 |
| AC 2 | 0.0 | 0.0 | -0.1 | -0.1 | -0.3 | +0.4 | +0.2 | 0.0 | +0.1 | +0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | -103.3 | | | | -102.4 | | | -36.9 | |
| AC NOISE | .3 | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire 463
LINE 7 HALF S SP. 1 DATE 6/11



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | | | 3-4 [1] | 4-5 [2] | 5-6 [3] | 6-7 [4] | 2-3 [1] | 3-1 [2] | 4-5 [3] | 5-6 [4] |
| RECEIVE | 0-7.5 S | 2.5-15 S | 15-22.5 | → | → | → | 22.5-30 | → | → | → |
| RANGE | | | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 |
| DC 1 | | | 0.5 | 0.4 | 0.6 | 1.5 | -25.0 | 0.4 | 0.5 | 1.1 |
| DC 2 | | | | | | | | | | |
| DC 3 PFE | | | 0.4 | 0.3 | 0.5 | 1.4 | -25 | 0.3 | 0.6 | 1.0 |
| DC 4 $P_2$ | | | .27 | .236 | .09 | .15 | .09 | .268 | .182 | .67 |
| DC 5 MCF | | | .3 | .3 | .75 | 2.5 | .35 | .3 | .3 | .75 |
| DC 6 | | | 10 | 9 | 7 | 4 | 14 | 13 | 14 | 17 |
| DC 7 | | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| DC 8 I | | | 300 | 300 | 750 | 2500 | 350 | 300 | 300 | 750 |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | 35.9 | 7.83 | 2.98 | 8.25 | 14.0 | 8.91 | 2.31 | 1.10 |
| AC 2 | | | +0.2 | +0.2 | -0.4 | 0.0 | -1.2 | +0.2 | +0.5 | +0.6 |
| AC AVG. | | | | | | | | | | |
| S.P. | +15.8 | +26.0 | +16.8 | | | | +9.0 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire #463
LINE 7 HALF S SP. 1 DATE 6/11

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 5 | 1-2 1 | 2-3 2 | 3-4 3 | 4-5 4 | 5-6 5 | 6-7 6 | 1-2 2 | 2-3 3 | 3-4 4 |
| RECEIVE | → | 30-32.5 | | | | | → | 32.5-45 | | |
| RANGE | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | .01 | 0.1 | 1.0 | 0.1 | 0.1 |
| DC 1 | 2.1 | 0.4 | 0.0 | 0.1 | 0.3 | 0.2 | 3.0 | 0.6 | -0.4 | 0.9 |
| DC 2 | | | | | | Drift | | | | |
| DC 3 PFE | 2.0 | 0.3 | -0.1 | 0.0 | 0.2 | -2.0 to 2.9 | 2.9 | 0.5 | -0.5 | 0.8 |
| DC 4 | .127 | .093 | .182 | .352 | .199 | .77 | .167 | .105 | .244 | .358 |
| DC 5 MCF | 2. | 2.5 | .3 | .3 | .3 | .75 | 2. | 2.5 | .35 | .3 |
| DC 6 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| DC 7 | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 3 | 4 |
| DC 8 I | 2000 | 2500 | 300 | 300 | 300 | 750 | 2000 | 2500 | 350 | 300 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 3.17 | 103.6 | 6.07 | 4.70 | 1.32 | .734 | 2.45 | 28.9 | 3.28 | 2.37 |
| AC 2 | -0.3 | 0.0 | +0.2 | +0.2 | +0.2 | ~ | -0.6 | +0.3 | -0.6 | +0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +13.6 | | | | | | +34.0 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #4632
LINE 7 HALF S SP. 1 DATE 6/11

PAGE 4

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 5 | 5-6 6 | 1-2 3 | 2-3 4 | 3-4 5 | 4-5 6 | 1-2 1 | 2-3 2 | 3-4 3 | |
| RECEIVE | → | → | 45-52.5 | → | → | → | 52.5-60 | → | → | |
| RANGE | .01 | .01 | 1.0 | 0.1 | 0.1 | .01 | 0.1 | .01 | .01 | |
| DC 1 | 1.5 | -2.0 | 0.5 | 0.2 | 1.4 | -1.9 | -0.2 | -1.5 | 1.1 | |
| DC 2 | | | | | | | | | | |
| DC 3 PFE | 1.4 | -2.1 | 0.4 | 0.1 | 1.3 | -2.0 | -0.3 | -1.6 | 1.0 | |
| DC 4 PS | .077 | .077 | .114 | .247 | .357 | .183 | .109 | .252 | .386 | |
| DC 5 MCF | 5 | 6 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | |
| DC 6 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | |
| DC 7 | .3 | .75 | 2.5 | .3 | .3 | .3 | 2.5 | .3 | .3 | |
| DC 8 I | 300 | 750 | 2500 | 300 | 300 | 300 | 2500 | 300 | 300 | |
| DC AVG. | | | | | | | | | | |
| AC 1 | .717 | .467 | 12.6 | 1.50 | 1.34 | .443 | 1.32 | .987 | .910 | |
| AC 2 | ← | ← | +0.1 | -0.3 | +0.5 | ↓ | +0.2 | -1.6 | → | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | -3.3 | | | | +2.2 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 7 HALF S SP. 1 DATE 6/11

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 4-5 | 3-4 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 2-3 | 1-2 |
| RECEIVE | | 22.5-15N | | | | 15-7.5N | | | 7.5-ON | |
| RANGE LOW | 200x10 | 100x3 | 100x3 | 100x3 | 300x10 | 100x3 | 100x3 | 300x10 | 100x3 | 250x10 |
| VOLTAGE | 660 | 660 | 900 | 660 | 570 | 910 | 440 | 580 | 440 | 470 |
| CURRENT | 2.0 | .30 | .30 | .30 | 3.0 | 0.3 | 0.3 | 3.0 | .30 | 2.5 |
| SEND | | | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 0-7.5S | 7.5-15S | 15-22.5 | | | | 22.5-30 | | | |
| RANGE | | | 300x1 | 100x3 | 250x3 | 250x10 | 350x1 | 100x3 | 100x3 | 250x3 |
| VOLTAGE | | | 870 | 660 | 670 | 820 | 500 | 890 | 660 | 660 |
| CURRENT | | | 0.3 | 0.3 | .75 | 2.5 | 0.35 | 0.3 | 0.3 | .75 |

FREQUENCIES 3.0 0.3

SENDER NO. 6644 S

OPERATOR WALT WRIGHT

RECEIVER NO. 1869I-R

OPERATOR TEX TERRELL

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE # 463
LINE 7 HALF S SP. 1 DATE 6/11

| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 | 30-37.5 | ← | ← | ← | ← | → | 37.5-45 | → | → |
| RANGE LOW | 200x10 | 250x10 | 100x3 | 100x3 | 100x3 | 250x3 | 200x10 | 250x10 | 350x1 | 300x1 |
| VOLTAGE | 650 | 460 | 430 | 900 | 650 | 660 | 640 | 460 | 490 | 850 |
| CURRENT | 2.0 | 2.5 | 0.3 | 0.3 | 0.3 | .75 | 2.0 | 2.5 | 0.35 | 0.3 |
| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | |
| RECEIVE | 37.5-45 | → | 45-52.5 | ← | ← | → | 52.5-60 | ← | → | |
| RANGE | 300x1 | 250x3 | 250x10 | 300x1 | 300x1 | 300x1 | 250x10 | 300x1 | 300x1 | |
| VOLTAGE | 630 | 650 | 460 | 420 | 850 | 630 | 450 | 405 | 850 | |
| CURRENT | 0.3 | .75 | 2.5 | 0.3 | 0.3 | 0.3 | 2.5 | 0.3 | 0.3 | |

FREQUENCIES 3.0 0.3
SENDER NO. 6644 S
OPERATOR WALT WRIGHT
RECEIVER NO. 18691-R
OPERATOR TEX TERRELL

COMMENTS:

Job. 463, Line 7, Spl N1/2, June 13, 1974

750

20

71

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 7 HALF N SP. 1 DATE 6-13

PAGE 1

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 6-7 | 22.5-30N | | | | → | 30-37.5N | → | | → |
| RANGE | 10 | 1.0 | 0.1 | .01 | 0.01 | 0.1 | 1.0 | 0.1 | 0.01 | 0.01 |
| DC 1 | 0.0 | 1.2 | 1.7 | 0.8 | ≈ ? 0 | ≈3.0 ± | 0.9 | 1.3 | ≈3.5 | ≈2.3 |
| DC 2 | | | | | TOO | | | | NOISY | |
| DC 3 PFE | | 1.2 | 1.7 | 0.7 | NOISY | 3.0 | 0.9 | 1.3 | 3.5 | 2.1 |
| DC 4 $P_2$ | 2. | 1. | .3 | .3 | .6 | 3. | 2. | .6 | .3 | .3 |
| DC 5 MCF | | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 |
| DC 6 | | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 I | 2000 | 1000 | 300 | 300 | 600 | 3000 | 2000 | 600 | 300 | 300 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 195 | 19.3 | 1.47 | .963 | ≈ 3.0 | 1.81 | 100.7 | 3.44 | .730 | .620 |
| AC 2 | 0.0 | 0.1 | 0.1 | 0.3 | ± 0 | 0.1 | 0.1 | 0.1 | 0.1 | -0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -0.6 | | | +5.9 | | +15.5 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 0.5K | | | | | 0.5K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 763
LINE 7 HALF N SP. 1 DATE 6-13

| SEND | 2-3[5] | 1-2[6] | 6-7[2] | 5-6[3] | 4-5[4] | 3-4[5] | 2-3[6] | 6-7[3] | 5-6[4] | 4-5[5] |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-37.5 | 3 → | 37.5-45N | ~ | ~ | ~ | ~ | 45-52.5N | ~ | ~ |
| RANGE | | 0.1 | 1.0 | 0.1 | .01 | .01 | | 1.0 | 0.01 | 0.01 |
| DC 1 | 0 | 4.0 | 1.2 | 1.5 | 1.6 | ≈5.4 | 0 | 1.5 | 1.7 | 2.1 |
| DC 2 | OFF | | | | | | SIGNAL | | | |
| DC 3 PFE | SCALE | 3.9 | 1.2 | 1.4 | 1.4 | 5.2 | TOO | 1.5 | 1.7 | 2.2 |
| DC 4 $P_2$ | TOO .6 | 3. | 2. | .6 | .3 | .3 | BLOW! | 2. | .6 | .3 |
| DC 5 MCF | LOW 4.6 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 |
| DC 6 | 5 | 6 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 |
| DC 7 | | | | | | | | | | |
| DC 8 I | 600 | 3000 | 2000 | 600 | 300 | 300 | 600 | 2000 | 600 | 300 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0 | 1.49 | 33.7 | 1.61 | .458 | .455 | | 16.6 | .943 | ~.324 |
| AC 2 | 0 | 0.2 | 0.0 | -0.2 | -0.4 | -0.4 | | 0.0 | 0.1 | -0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +15.2 | | | | +3.7 | +12.2 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | 0.35K | | | | | 0.4K | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 7 HALF N SP. 1 DATE 6-13



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4[6] | 6-7 4 | 5-6[5] | 4-5[6] | | | | | | |
| RECEIVE | | 52.5-60N | | | | | | | | |
| RANGE | 0.01 | 0.1 | 0.01 | 0.01 | | | | | | |
| DC 1 | ~7.7 | 1.5 | 3.5 | ≈5.4 | | | | | | |
| DC 2 | NOISY | | | 4.5 - 8.0 | | | | | | |
| DC 3 PFE | 7.6 | 1.5 | 3.5 | 5.1 | | | | | | |
| DC 4 $\rho_a$ | .3 | 2. | .6 | .3 | | | | | | |
| DC 5 MCF | 56 | 57 | 58 | 59 | | | | | | |
| DC 6 | 4 | 4 | 5 | 4 | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 I | 300 | 2000 | 600 | 300 | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | .360 | 7.99 | .523 | .214 | | | | | | |
| AC 2 | 0.2 | 0.0 | 0.1 | -0.6 | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | 29.6 | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 0.35K | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463
LINE 7 HALF N SP. 1 DATE 6-13

| SEND | CAL | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 6-7 | 22.5-30N | → | → | → | → | 30-37.5N | → | → | → |
| RANGE | 200×10 | 100×10 | 100×3 | 100×3 | 200×3 | 300×10 | 200×10 | 200×3 | 100×3 | 100×3 |
| VOLTAGE | 630 | 730 | 480 | 590 | 550 | 560 | 630 | 430 | 490 | 590 |
| CURRENT | 2.0 | 1.0 | 0.3 | 0.3 | 0.6 | 3.0 | 2.0 | 0.6 | 0.3 | 0.3 |

| SEND | 2-3 | 1-2* | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | → | → | 37.5-45 | → | → | → | → | 45-52.5 | → | → |
| RANGE | 200×3 | 300×10 | 200×10 | 200×3 | 100×3 | 100×3 | 200×3 | 200×10 | 200×3 | 100×3 |
| VOLTAGE | 550 | 550 | 630 | 420 | 480 | 590 | 550 | 630 | 420 | 480 |
| CURRENT | 0.6 | 3.0 | 2.0 | 0.6 | 0.3 | 0.3 | 0.6 | 2.0 | 0.6 | 0.3 |

FREQUENCIES 3 0.3
SENDER NO. 6644-5
OPERATOR TOM FREEMAN
RECEIVER NO.
OPERATOR

COMMENTS:
* 300×10
550
3.0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 2 HALF N SP. 1 DATE 6-13

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 6-7 | 5-6 | 4-5 | | | | | | |
| RECEIVE | 45-52.5 | 52.5-60 | → | → | | | | | | |
| RANGE | 100×3 | 200×10 | 200×3 | 100×3 | | | | | | |
| VOLTAGE | 590 | 630 | 420 | 480 | | | | | | |
| CURRENT | 0.3 | 2.0 | 0.6 | 0.3 | | | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3 0.3

SENDER NO. 66445

OPERATOR TOM FREEMAN

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE
LINE 7 HALF N SP. 1 DATE 6-12

| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | CAL | 22.5-30N | → | → | → | → | 30-45N | → | → | → |
| RANGE | 200x10 | 250x3 | 100x3 | 100x3 | 100x3 | 300x10 | | | | |
| VOLTAGE | 640 | 690 | 630 | 840 | 410 | 540 | | | | |
| CURRENT | 2.0 | .75 | 0.30 | 0.30 | 0.30 | 3.00 | | | | |

| SEND | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | → | → | 45-52.5 | → | → | → | → | 52.5-60N | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3 0.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

Sub 46 Line 7, Sec 5 1/2 Sept 12, 1970 750

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 7 HALF S SP. 1 DATE 6-12

PAGE 1

| SEND 2 | CAL | 4-5 1 | 3-4 2 | 2-3 3 | 1-2 4 | 3-4 1 | 2-3 2 | 1-2 3 | 2-3 1 | 1-2 2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 6-7 | 22.5-16N | ——— | ——— | ——→ | 15-7.5N | ——— | ——→ | 7.5-0A | ——→ |
| RANGE | 10.0 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.0 | 0.7 | 0.1 | -25 | 1.8 | 0.8 | -10 | 1.3 | 0.6 | 0.8 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 PFE | | 0.7 | 0.1 | -25 | 1.8 | 0.8 | -10 | 1.3 | 0.6 | 0.8 |
| DC 5 $P_2$ | 2. | .3 | .3 | .3 | 3.0 | .3 | .3 | 3.0 | .3 | .3 |
| DC 6 MCF | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 7 | | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 1 | 2 |
| DC 8 I | 2000 | 300 | 300 | 300 | 3000 | 300 | 300 | 3000 | 300 | 300 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 200 | 49.5 | 15.9 | 3.03 | 10.4 | 89.2 | 3.96 | 11.7 | 88.7 | 75.1 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 7 HALF S SP. 1 DATE 6-17



| SEND | 6-7 3 | 5-6 2 | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 2-3 | 2-3 5 | 15-22.5 | → | → | → | 22.5-30 | → | → | → |
| RANGE | 1.0 | 0.1 | | | | | | | | |
| DC 1 | -25 | -10 | | | | | | | | |
| DC 2 I | 20A | .75A | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 PFE | -25 | -10 | | | | | | | | |
| DC 5 ~~PE~~ | 3 | 6 | | | | | | | | |
| DC 6 MCF | 3 | 2 | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | 2000 | 750 | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 19.7 | 9.88 | | | | | | | | |
| AC 2 | 0.0 | 0.0 | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 7 HALF N SP. 1 DATE 6-12

| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30N | | | DEIKT | | 30-37.5 | | | | |
| RANGE | 1.0 | 0.1 | .01 | .01 | 0.1 | | | | | |
| DC 1 | 1.3 | 1.5 | +3.0 (1) | -0 | +3.0 | | | | | |
| DC 2 | | | NOISY ! | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 PFE | 1.2 | 1.4 | 3.0 | | 2.9 | | | | | |
| DC 5 A | .75 | .3 | .3 | .3 | .3 | | | | | |
| DC 6 MCF | 37 | 38 | 39 | 40 | 41 | | | | | |
| DC 7 | 1 | 2 | 3 | 4 | 5 | | | | | |
| DC 8 I | 750 | 300 | 300 | 300 | 300 | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 14.6 | 14.7 | .956 | .323 | 1.83 | | | | | |
| AC 2 | +0.2 | +0.2 | +0.1 | ±0.5 | -0.2 | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +29.6 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 10K | 10K | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 7 HALF S SP. 1 DATE 6/10

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 4-5 | 3-4 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 2-3 | 1-2 |
| RECEIVE | 1-2 | 22.5-15N | → | → | → | 15-7.5N | → | → | 7.5-0N | → |
| RANGE | 10 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 1.0 | | |
| DC 1 | -0.5 | +0.2 | +0.2 | -4.5 | -0.4 | -2.1 | -84.0 | -52 | | |
| DC 2 | | | | | | | ? | ? | | |
| DC 3 | CAL | | | | | | | | | |
| DC 4 | 6-7 | | | | DC | -0.4 | -76 | -47 | | |
| DC 5 | 196 | | | | | | | | | |
| DC 6 | 0.0 | | | | | | | | | |
| DC 7 DC4 | -0.0 | | | | AC1 | 84.9 | 42.4 | +8.8 | | |
| DC 8 | -0.3 | | | | AC2 | -0.4 | -2.0 | = | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 2.03 | 55.4 | 14.1 | 3.38 | 6.97 | 75.0 | 85.0 | 17.7 | | |
| AC 2 | 0.0 | -0.1 | -0.2 | -0.4 | -0.4 | -0.1 | 0.0 | -1.4 | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | +31.4 | | | | +37.1 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 7 HALF S SP. 1 DATE 6/10



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 4-5 | 3-4 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 3-4 | 2-3 |
| RECEIVE | 1-2 | 22.5-15N | ← | ← | ← | 15-7.5N | ← | → | 2.5-0N | → |
| RANGE | 200x10 | 350x1 | 280x1 | 150x3 | 200x10 | 250x1 | 150x3 | 200x10 | | |
| VOLTAGE | 430 | 800 | 850 | 700 | 440 | 760 | 700 | 430 | | |
| CURRENT | 2.0 | .35 | .28 | .45 | 2.0 | .25 | .450 | 2.0 | | |
| SEND | | | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 0-7.5S | 7.5-15S | 15-22.5 | ← | ← | → | 22.5-30 | ← | ← | ← |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3 0.3

SENDER NO. 17691S

OPERATOR Walt Wright - FREEMAN

RECEIVER NO. 18691-R

OPERATOR TEX Terrell

COMMENTS: FUSE SEEMS TO BLOW RATHER EASILY (20A)

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 7 HALF S SP. 1 DATE 6/10

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 |
| RECEIVE | → | 30-37.5 | → | → | → | → | → | 37.5-45 | → | → |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |
| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | |
| RECEIVE | → | → | 45-52.5 | → | → | → | 52.5-60 | → | → | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 7 HALF S SP. 1 DATE 6/10/80



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 3-4 | 2-3 | 1-2 | 2-3 | 1-2 | | | | |
| RECEIVE | 6-7 | 15-7.5N | → | → | (OVER) | → | | | | |
| RANGE | LOW | LOW | LOW | LOW | 100 x 3 | 200 x 10 | | | | |
| VOLTAGE | 640 | 850 | 650 | 460 | 420 | 460 | | | | |
| CURRENT | 2.0 | 0.3 | 0.45 | 2.5 | 0.30 | 2.5 | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3. 0.3

SENDER NO. 6645

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS: Changed Senders to check negative PFE's

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE
LINE 7 HALF S SP. / DATE 6-12



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 4-5 | 3-4 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 2-3 | 1-2 |
| RECEIVE | 6-7 | 22.5-15N | ← | ← | → | 15-7.5N | ← | → | 7.5-0 N | → |
| RANGE | 200×10 | 100×3 | 100×3 | 100×3 | 300×10 | 100×3 | 100×3 | 300×10 | 100×3 | 300×10 |
| VOLTAGE | 640 | 660 | 880 | 430 | 540 | 850 | 410 | 540 | 410 | 540 |
| CURRENT | 2.0 | 0.3 | 0.3 | 0.3 | 3.0 | 0.3 | 0.3 | 3.0 | 0.3 | 3.0 |
| SEND | 6-7 | 5-6 | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 7.5-15S | 7.5-15S | 15-22.5S | ← | | → | 22.5-30S | | | |
| RANGE | 200×10 | 250×3 | | | | | | | | |
| VOLTAGE | 620 | 646 | | | | | | | | |
| CURRENT | 2.0 | .75 | | | | | | | | |

FREQUENCIES 3 0.3
SENDER NO. 6644 - S
OPERATOR
RECEIVER NO. 20693 R
OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 7 HALF S SP. / DATE 6-12



| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 | 30-37.5 | → | → | → | → | → | 37.5-45 | → | → |
| RANGE | | | | | | | | | | |
| DC 1 | | | | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | | | | | | | | |
| AC 2 | | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 7 HALF S SP. 1 DATE 6-12

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | |
| RECEIVE | 37.5-45 | → | 45-52.5 | → | → | → | 52.5-60 | → | → | |
| RANGE | | | | | | | | | | |
| DC 1 | | | | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | | | | | | | | |
| AC 2 | | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 7 HALF N SP. 1 DATE 6-12

| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-37.5N | 37.5-45N | → | → | → | → | 45-52.5N | → | → | → |
| RANGE | | | | | | | | | | |
| DC 1 | | | | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | | | | | | | | |
| AC 2 | | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 7 HALF N SP. 1 DATE 6-12



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 52.5-60N | → | → | | | | | | | |
| RANGE | | | | | | | | | | |
| DC 1 | | | | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | | | | | | | | |
| AC 2 | | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 7 HALF 5 SP. 1 DATE 6-12

| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 s | 30-37.5 s | | | | | | 37.5-45 s | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 37.5-45 s | | 45-52.5 s | | | | 52.5-60 | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES _____ _____

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

JOB 463 LINE 7 SP1 S 1/2 6/12/70 — 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | 0.00 | 200.000 | 0.00 | 3.00 | .30 | 0.0000 | 1.0000 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 373.85 | .70 | 1.9 | .70 | 1.9 | 0.00 | ** | .70 | .30 | 1 | 1 | 49.500 | 0.00 |
| 2 | 2 | 477.48 | .10 | .2 | .10 | .2 | 0.00 | ** | .10 | .30 | 2 | 2 | 15.900 | 0.00 |
| 3 | 3 | 170.41 | -25.05 | -147.0 | -25.19 | -147.8 | .14 | ** | -25.00 | .30 | 3 | 3 | 3.030 | .10 |
| 4 | 4 | 158.81 | 1.75 | 11.0 | 1.46 | 9.2 | .29 | ** | 1.80 | 3.00 | 4 | 4 | 10.400 | .10 |
| 5 | 1 | 674.35 | .80 | 1.2 | .80 | 1.2 | 0.00 | ** | .80 | .30 | 5 | 1 | 89.200 | 0.00 |
| 6 | 2 | 106.92 | -10.00 | -93.5 | -10.11 | -94.6 | .11 | ** | -10.00 | .30 | 6 | 2 | 3.960 | 0.00 |
| 7 | 3 | 88.89 | 1.30 | 14.6 | .96 | 10.8 | .34 | ** | 1.30 | 3.00 | 7 | 3 | 11.700 | 0.00 |
| 8 | 1 | 631.52 | .60 | 1.0 | .60 | 1.0 | 0.00 | ** | .60 | .30 | 8 | 1 | 83.700 | 0.00 |
| 9 | 2 | 2271.02 | .80 | .4 | .80 | .4 | 0.00 | ** | .80 | .30 | ~~9~~ | 2 | 75.100 | 0.00 |
| 3 | 6 | ~~930~~.82 (166) | -25.00 | -26.9 | -25.00 | -26.9 | 0.00 | ** | -25.00 | 2.00 | 3 | ~~6~~ 3 | 19.700 | 0.00 |
| 37 | 1 | 44.37 | 1.20 | 27.0 | 1.10 | 24.7 | .10 | ** | 1.30 | .75 | 37 | 1 | 14.600 | .20 |
| 38 | 2 | 44.76 | 1.40 | 31.3 | 1.03 | 22.9 | .37 | ** | 1.50 | .30 | 38 | 2 | 1.470 | .20 |
| 39 | 3 | 73.85 | 2.95 | 39.9 | 2.51 | 34.0 | .44 | ** | 3.00 | .30 | 39 | 3 | .956 | .10 |
| 40 | 4 | 48.45 | -.25 | -5.2 | -1.68 | -34.6 | 1.43 | ** | 0.00 | .30 | 40 | 4 | .323 | .50 |
| 41 | 5 | 49.48 | 3.1 | | | | | | 3.0 | 0.3 | 41 | 5 | 1.83 | -0.2 |
| 6 | 2 | 106.70 | -10.00 | -93.7 | -10.11 | -94.8 | .11 | ** | -10.00 | .75 | 6 | 2 | 9.880 | 0.00 |

JOB 463 LINE 7 SP 1 N 1/2 6/13/70 — 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | 0.00 | 195.000 | 0.00 | 3.00 | .30 | 0.0000 | 1.0256 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 37 | 1 | 45.07 | 1.15 | 25.5 | 1.05 | 23.3 | .10 | ** | 1.20 | 1.00 | 37 | 1 | 19.300 | .10 |
| 38 | 2 | 46.00 | 1.65 | 35.9 | 1.29 | 28.0 | .36 | ** | 1.70 | .30 | 38 | 2 | 1.470 | .10 |
| 39 | 3 | 74.67 | .65 | 8.7 | .22 | 2.9 | .43 | ** | .80 | .30 | 39 | 3 | .963 | .30 |
| ~~40~~ | ~~4~~ | ~~76923.08~~ | ~~0.00~~ | ~~0.0~~ | ~~0.00~~ | ~~0.0~~ | ~~0.00~~ | ~~**~~ | ~~0.00~~ | ~~.60~~ | ~~40~~ | ~~4~~ | ~~1000.000~~ | ~~0.00~~ |
| 41 | 5 | 50.19 | 2.95 | 58.8 | .74 | 14.7 | 2.21 | ** | 3.00 | 3.00 | 41 | 5 | 1.810 | .10 |
| 42 | 1 | 117.24 | .85 | 7.3 | .85 | 7.3 | 0.00 | ** | .90 | 2.00 | 42 | 1 | 100.700 | .10 |
| 43 | 2 | 53.61 | 1.25 | 23.3 | .96 | 17.9 | .29 | ** | 1.30 | .60 | 43 | 2 | 3.440 | .10 |
| 44 | 3 | 58.12 | 3.45 | 59.4 | 2.85 | 49.0 | .60 | ** | 3.50 | .30 | 44 | 3 | .730 | .10 |
| 45 | 4 | 97.58 | 2.40 | 24.6 | 1.84 | 18.9 | .56 | ** | 2.30 | .30 | 45 | 4 | .620 | -.20 |
| ~~46~~ | ~~5~~ | ~~134615.38~~ | ~~0.00~~ | ~~0.0~~ | ~~0.00~~ | ~~0.0~~ | ~~0.00~~ | ~~**~~ | ~~0.00~~ | ~~.60~~ | ~~46~~ | ~~5~~ | ~~1000.000~~ | ~~0.00~~ |
| 47 | 6 | 66.75 | 3.90 | 58.4 | 1.61 | 24.1 | 2.29 | ** | 4.00 | 3.00 | 47 | 6 | 1.490 | .20 |
| 48 | 2 | 157.40 | 1.20 | 7.6 | 1.20 | 7.6 | 0.00 | ** | 1.20 | 2.00 | 48 | 2 | 33.700 | 0.00 |
| 49 | 3 | 62.85 | 1.60 | 25.5 | 1.06 | 16.8 | .54 | ** | 1.50 | .60 | 49 | 3 | 1.610 | -.20 |
| 50 | 4 | 71.59 | 1.80 | 25.1 | .95 | 13.3 | .85 | ** | 1.60 | .30 | 50 | 4 | .458 | -.40 |
| 51 | 5 | 129.10 | 5.60 | 43.4 | 4.96 | 38.4 | .64 | ** | 5.40 | .30 | 51 | 5 | .455 | -.40 |
| ~~52~~ | ~~6~~ | ~~215384.62~~ | ~~0.00~~ | ~~0.0~~ | ~~0.00~~ | ~~0.0~~ | ~~0.00~~ | ~~**~~ | ~~0.00~~ | ~~.60~~ | ~~52~~ | ~~6~~ | ~~1000.000~~ | ~~0.00~~ |
| 53 | 3 | 194.41 | 1.50 | 7.7 | 1.39 | 7.1 | .11 | ** | 1.50 | 2.00 | 53 | 3 | 16.600 | 0.00 |
| 54 | 4 | 73.77 | 1.65 | 22.4 | .83 | 11.3 | .82 | ** | 1.70 | .60 | 54 | 4 | .943 | .10 |
| 55 | 5 | 89.06 | 2.20 | 24.7 | 1.15 | 13.0 | 1.05 | ** | 2.10 | .30 | 55 | 5 | .324 | -.20 |
| 56 | 6 | 167.03 | 7.60 | 45.5 | 6.91 | 41.4 | .69 | ** | 7.70 | .30 | 56 | 6 | .360 | .20 |
| 57 | 4 | 187.15 | 1.50 | 8.0 | 1.27 | 6.8 | .23 | ** | 1.50 | 2.00 | 57 | 4 | 7.990 | 0.00 |
| 58 | 5 | 72.87 | 3.45 | 47.3 | 2.09 | 28.7 | 1.36 | ** | 3.50 | .60 | 58 | 5 | .523 | .10 |
| 59 | 6 | 97.15 | 5.70 | 58.7 | 4.29 | 44.2 | 1.41 | ** | 5.40 | .30 | 59 | 6 | .214 | -.60 |

skip

skip

skip

JOB 463 LINE 7 SP1 S 1/2 6/16/70
CAL GROUP NO. 1

750 FEET=DIPOLE LENGTH

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 2.000 | -.10 | 199.000 | 0.00 | 3.00 | .30 | -.1000 | 1.0050 |

| COMPUTED DATA | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 376.09 | 1.00 | 2.7 | 1.00 | 2.7 | 0.00 ** | .90 | .30 | 1 | 1 | 49.400 | 0.00 |
| 2 | 2 | 476.38 | .05 | .1 | .05 | .1 | 0.00 ** | -.10 | .30 | 2 | 2 | 15.800 | -.10 |
| 3 | 3 | 176.65 | -24.85 | -140.7 | -24.98 | -141.4 | .13 ** | -25.00 | .30 | 3 | 3 | 3.120 | -.10 |
| 4 | 4 | 159.13 | 1.65 | 10.4 | 1.36 | 8.6 | .29 ** | 1.40 | 3.00 | 4 | 4 | 10.400 | -.30 |
| 5 | 1 | 703.39 | .90 | 1.3 | .90 | 1.3 | 0.00 ** | 1.00 | .30 | 5 | 1 | 92.300 | .40 |
| 6 | 2 | 110.82 | -10.00 | -90.2 | -10.11 | -91.2 | .11 ** | -10.00 | .30 | 6 | 2 | 4.080 | .20 |
| 7 | 3 | 90.10 | 1.30 | 14.4 | .97 | 10.7 | .33 ** | 1.20 | 3.00 | 7 | 3 | 11.800 | 0.00 |
| 8 | 1 | 619.95 | -6.05 | -9.8 | -6.05 | -9.8 | 0.00 ** | -6.10 | .30 | 8 | 1 | 87.500 | .10 |
| 9 | 2 | 228.81 | .65 | 2.8 | .65 | 2.8 | 0.00 ** | .60 | 2.50 | 9 | 2 | 62.800 | .10 |
| 10 | 1 | 272.23 | .50 | 1.8 | .50 | 1.8 | 0.00 ** | .50 | .30 | 10 | 1 | 35.900 | .20 |
| 9 | 2 | 237.26 | .40 | 1.7 | .40 | 1.7 | 0.00 ** | .40 | .30 | 9 | 2 | 7.830 | .20 |
| 7 | 3 | 90.48 | .90 | 9.9 | .57 | 6.3 | .33 ** | .60 | .75 | 7 | 3 | 2.980 | -.40 |
| 4 | 4 | 160.82 | 1.60 | 9.9 | 1.32 | 8.2 | .28 ** | 1.50 | 2.50 | 4 | 4 | 8.750 | 0.00 |
| 14 | 1 | 68.06 | -24.30 | -357.0 | -24.30 | -357.0 | 0.00 ** | -25.00 | .35 | 14 | 1 | 14.000 | -1.20 |
| 15 | 2 | 269.99 | .40 | 1.5 | .40 | 1.5 | 0.00 ** | .40 | .30 | 15 | 2 | 8.910 | .20 |
| 16 | 3 | 175.52 | .55 | 3.1 | .42 | 2.4 | .13 ** | .70 | .30 | 16 | 3 | 2.310 | .50 |
| 17 | 4 | 67.13 | .90 | 13.4 | -.03 | -.4 | .93 ** | 1.10 | .75 | 17 | 4 | 1.100 | .60 |
| 18 | 5 | 128.20 | 2.35 | 18.3 | 1.71 | 13.3 | .64 ** | 2.10 | 2.00 | 18 | 5 | 3.170 | -.30 |
| 19 | 1 | 94.18 | .50 | 5.3 | .50 | 5.3 | 0.00 ** | .40 | 2.50 | 19 | 1 | 103.600 | 0.00 |
| 20 | 2 | 183.20 | 0.00 | 0.0 | 0.00 | 0.0 | 0.00 ** | 0.00 | .30 | 20 | 2 | 6.070 | .20 |
| 21 | 3 | 354.98 | .10 | .3 | .10 | .3 | 0.00 ** | .10 | .30 | 21 | 3 | 4.700 | .20 |
| 22 | 4 | 199.79 | .30 | 1.5 | .09 | .5 | .21 ** | .30 | .30 | 22 | 4 | 1.320 | .20 |
| 23 | 5 | 77.69 | .30 | 3.9 | -.95 | -12.3 | 1.25 ** | .20 | .75 | 23 | 5 | .734 | 0.00 |
| 24 | 6 | 159.92 | 3.40 | 21.3 | 2.67 | 16.7 | .73 ** | 3.00 | 2.00 | 24 | 6 | 2.450 | -.60 |
| 25 | 2 | 105.30 | .55 | 5.2 | .44 | 4.1 | .11 ** | .60 | 2.50 | 25 | 2 | 28.900 | .30 |
| 26 | 3 | 211.28 | .00 | .0 | -.10 | -.5 | .10 ** | -.40 | .35 | 26 | 3 | 3.280 | -.60 |
| 35 | 5 | 256.76 | -.60 | -2.3 | -.85 | -3.3 | .25 ** | -1.50 | .30 | 35 | 5 | .987 | -1.60 |
| 36 | 6 | 388.73 | 1.20 | 3.1 | .98 | 2.5 | .22 ** | 1.10 | .30 | 36 | 6 | .910 | 0.00 |
| 33 | 6 | 183.63 | -1.80 | -9.8 | -2.40 | -13.1 | .60 ** | -1.90 | .30 | 33 | 6 | .443 | 0.00 |
| 34 | 4 | 132.29 | -.20 | -1.5 | -.57 | -4.3 | .37 ** | -.20 | 2.50 | 34 | 4 | 7.320 | .20 |
| 31 | 4 | 226.81 | .45 | 2.0 | .27 | 1.2 | .18 ** | .20 | .30 | 31 | 4 | 1.500 | -.30 |
| 32 | 5 | 358.83 | 1.25 | 3.5 | 1.09 | 3.1 | .16 ** | 1.40 | .30 | 32 | 5 | 1.340 | .50 |
| 29 | 6 | 77.35 | -1.90 | -24.6 | -3.80 | -49.1 | 1.90 ** | -2.00 | .75 | 29 | 6 | .467 | 0.00 |
| 30 | 3 | 114.65 | .55 | 4.8 | .31 | 2.7 | .24 ** | .50 | 2.50 | 30 | 3 | 12.600 | .10 |
| 27 | 4 | 360.86 | .90 | 2.5 | .81 | 2.2 | .09 ** | .90 | .30 | 27 | 4 | 2.370 | .20 |
| 28 | 5 | 192.18 | 1.60 | 8.3 | 1.23 | 6.4 | .37 ** | 1.50 | .30 | 28 | 5 | .717 | 0.00 |

BUSINESS FORMS PRINTING COMPANY BLUE SPACE BAR ENGINEERED FOR HIGH SPEED PRINTERS

Job 463, Line 8, SP 1 W/2 Sunk, 70

750

Pracka 6

6/17/75

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 8 HALF W SP. 1 DATE 6-16

| SEND | CAL 2 | 5-6 | 6-7 | 4-5 | 6-5 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 3-4 | 0-7.5W | → | 7.5→15W | → | → | 15-22.5W | → | → | → |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.0 | 1.1 | 1.5 | 0.7 | 1.7 | 1.7 | 0.7 | 1.1 | 2.0 | 2.0 |
| DC 2 | | | | | | | | | | |
| DC 3 cur | 1.5 | 2.0 | 3.0 | 2.0 | 2.0 | 3.0 | 1.5 | 2.0 | 3.0 | 3.0 |
| DC 4 # | | 1 | 2 | 3 | 4 | | | | | |
| DC 5 | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 147 | 112 | 6.90 | 6.01 | 29.0 | 28.4 | 75.8 | 30.3 | 27.1 | 19.7 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.1 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | +9.1 | | -11.6 | | | +7.3 | | | |
| AC NOISE | 0.3 | | | | | | | | | |
| POT RES. | | 11K | | 17K | | | 26K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 8 HALF W SP. 1 DATE 6-16

| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30V | | | | | 30-37.5 | | | | |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 10 | 1.0 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.7 | 1.0 | 1.9 | 2.3 | 2.0 | 0.9 | 1.3 | 1.7 | 2.5 | 2.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | 2.0 | 1.5 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 1.5 | 2.0 | 2.0 |
| DC 4 | | | | | | | | | | |
| DC 5 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 76.8 | 32.9 | 19.7 | 21.3 | 18.8 | 166 | 38.1 | 24.5 | 18.4 | 15.0 |
| AC 2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.1 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -2.1 | | | | | +21.4 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 50K | | | | | 23K | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 8 HALF W SP. 1 DATE 6-16



| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-32.5 | 32.5-45 | → | → | → | → | 45-52.5 | | | |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | |
| DC 1 | 2.2 | 1.4 | 1.7 | 2.1 | 2.7 | 2.5 | 1.3 | 1.9 | 2.3 | 2.6 |
| DC 2 | | | | | | | | | | 1.5 |
| DC 3 | 3. | 2.0 | 2.0 | 1.5 | 2.0 | 3.0 | 2. | 2. | 1.5 | 3.3 2.0 |
| DC 4 | | | | | | | | | | D.C. |
| DC 5 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 22.2 | 61.1 | 21.7 | 16.0 | 14.7 | 19.7 | 7.14 | 3.49 | 2.88 | 3.04 |
| AC 2 | 0.0 | 0.3 | 0.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -6.0 | | | | | +8.0 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 8K | | | | | .8K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 46 3
LINE 8 HALF W SP. 1 DATE 6-16



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | CA 4 | | | | | |
| RECEIVE | 52.5-60 W | | | | 4-5 | | | | | |
| RANGE | 0.1 | 0.1 | .01 | | 10 | | | | | |
| DC 1 | 1.5 | 1.0 | 2.6 | | 0.0 | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | 2. | 2. | 1.5 | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | 4 | 5 | 6 | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.89 | 1.15 | .980 | | 195 | | | | | |
| AC 2 | 0.0 | -0.4 | 0.3 | | 0.0 | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | -3.0 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 45k | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT_____

LINE____ HALF____ SP.____ DATE____



| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | | 37.5-45 | | | | | 45-52.5 | | | |
| RANGE | 300×10 | 200×10 | 200×10 | 150×10 | 200×10 | 300×10 | 200×10 | 200×10 | 150×10 | 200×10 |
| VOLTAGE | 680 | 820 | 690 | 720 | 830 | 580 | 820 | 690 | 710 | 820 |
| CURRENT | 3.0 | 2.0 | 2.0 | 1.5 | 2.0 | 3.0 | 2.0 | 2.0 | 1.5 | 2.0 |

| SEND | 1-2 | 2-3 | 3-4 | CAL | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 52.5-60 | → | → | 4-5 | | | | | | |
| RANGE | 200×10 | 200×10 | 150×10 | 200×10 | | | | | | |
| VOLTAGE | 820 | 680 | 700 | 800 | | | | | | |
| CURRENT | 2.0 | 2.0 | 1.5 | 2.0 | | | | | | |

FREQUENCIES 3 0.3

SENDER NO. 6644 S

OPERATOR TOM FREEMAN

RECEIVER NO. 20693 R

OPERATOR BILL FREEMAN

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463
LINE 8 HALF W SP. 1 DATE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | 4-5 | 0-7.5W | → | 7.5-15W | → | → | 15-22.5W | → | → | → |
| RANGE | LOW | 200×10 | 300×10 | 200×10 | 200×10 | 300×10 | 150×10 | 200×10 | 300×10 | 300×10 |
| VOLTAGE | 630 | 390 | 700 | 850 | 390 | 690 | 740 | 850 | 590 | 690 |
| CURRENT | 1.5a | 2.0 | 3.0 | 2.0 | 2.0 | 3.0 | 1.5 | 2.0 | 3.0 | 3.0 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 22.5-30W | → | → | → | → | 30-37.5W | → | → | → | → |
| RANGE | 200×10 | 150×10 | 200×10 | 300×10 | 300×10 | 200×10 | 200×10 | 150×10 | 200×10 | 200×10 |
| VOLTAGE | 700 | 730 | 840 | 580 | 680 | 820 | 700 | 730 | 830 | 380 |
| CURRENT | 2.0 | 1.5 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 1.5 | 2.0 | 2.0 |

FREQUENCIES 3 0.3
SENDER NO. 6644 S
OPERATOR TOM FREEMAN
RECEIVER NO. 20693-R
OPERATOR BILL FREEMAN

COMMENTS:

Job 463, Line 8, SP 1 E½.

June 15, 70

~~$~~ 750

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 8 HALF E SP. 1 DATE 6-15-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 3-4 | 0-7.5E | → | 7.5-15E | → | → | 15-22.5E | → | → | → |
| RANGE | 10 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 10 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.0 | 0.8 | 1.3 | 1.1 | 1.6 | 2.0 | 1.3 | 1.6 | 1.6 | 2.1 |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | 1.5 | 1.5 | 1.5 | 1.5 | 2. | 2. | 1.5 | 1.5 | 2.0 | 2.0 |
| DC 4 # | | 1 | 2 | 3 | | | | | | |
| DC 5 N | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 147 | 43.5 | 21.7 | 86.0 | 29.6 | 18.4 | 109. | 34.6 | 18.6 | 13.3 |
| AC 2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | -0.3 | -0.2 | -0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | -24.9 | -1.1 | → 0 | | | -13.6 | | | |
| AC NOISE | 0.3 | | | | | | | | | |
| POT RES. | | 10 K | 18 K | → 0 | | 6 | 65 K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 403
LINE 8 HALF E SP. 1 DATE 6-13



| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 225-30E | ——— | ——— | ——— | ——→ | 30-375E | ——— | ——— | ——— | ——→ |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.7 | 1.5 | 1.4 | 1.5 | 2.1 | 0.8 | 1.0 | 2.0 | 1.6 | 1.6 |
| DC 2 | | | | | | | | | | |
| DC 3 CAV | 2.0 | 1.5 | 1.5 | 2.0 | 2.0 | 2.0 | 2.0 | 1.5 | 1.5 | 2.0 |
| DC 4 # | | | | | | | | | | |
| DC 5 N | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 170.5 | 43.1 | 21.5 | 13.1 | 9.96 | 338 | 57.6 | 21.0 | 12.8 | 8.46 |
| AC 2 | 0.0 | 0.0 | 0.1 | 0.0 | −0.1 | 0.0 | 0.0 | 0.1 | 0.0 | −0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | −56.0 | | | | | | +4.1 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 30K | | | | | | 40K | | | |

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 8 HALF E SP. 1 DATE 6-15

PAGE 3

| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | | 37.5-45E | → | → | → | → | 45-52.5 | → | → | → |
| RANGE | 0.1 | 10 | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | 2.2 | 0.8 | 1.5 | 2.2 | 1.7 | 2.0 | 0.9 | 1.6 | 2.4 | 2.0 |
| DC 2 | | | | | | | | | | |
| DC 3 | 2.0 | 3.0 | 3.0 | 1.5 | 1.5 | 2.5 | 3.0 | 3.0 | 1.5 | 1.5 |
| DC 4 | | | | | | | | | | |
| DC 5 | 6 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 6.79 | 114 | 25.4 | 7.09 | 4.66 | 4.09 | 77.4 | 19.0 | 5.76 | 4.00 |
| AC 2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | ~~[illegible]~~ | ~~[illegible]~~ | +7.4 | | | | -34.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 100k | | | | | 40k | | | |

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE

LINE 8 HALF E SP. 1 DATE 6-15



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | CAL | | | | | | |
| RECEIVE | 52.5-64 | → | → | 4-5 | | | | | | |
| RANGE | 1.0 | 1.0 | 0.1 | 10 | | | | | | |
| DC 1 | 1.1 | 1.8 | 2.8 | 0.0 | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | 3.0 | 3.0 | 2.0 | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | 4 | 5 | 6 | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 41.3 | 1.05 | 4.48 | 195 | | | | | | |
| AC 2 | 0.2 | 0.0 | 0.0 | 0.0 | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +7.4 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 10K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE B HALF E SP. 1 DATE 6-15-

| SEND | CAL | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 3-4 | 0-7.5E | → | 7.5-15E | — | → | 15-22.5E | — | — | → |
| RANGE | 150 x10 | 150 x10 | 150 x10 | 150 x10 | 200 x10 | 200 x10 | 150 x10 | 150 x10 | 200 x10 | 200 x10 |
| VOLTAGE | 890 | 560 | 650 | 910 | 740 | 850 | 800 | 900 | 720 | 840 |
| CURRENT | 1.5 | 1.5 | 1.5 | 1.5 | 2.0 | 2.0 | 1.5 | 1.5 | 2.0 | 2.0 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | *5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 22.5-30E | — | — | — | → | 30-37.5E | — | — | — | → |
| RANGE | 200 x10 | 150 x10 | 150 x10 | 200 x10 | 200 x10 | 200 x10 | 200 x10 | 150 x10 | 150 x10 | 200 x10 |
| VOLTAGE | 410 | 780 | 900 | 710 | 840 | 490 | 410 | 780 | 890 | 700 |
| CURRENT | 2.0 | 1.5 | 1.5 | 2.0 | 2.0 | 2.0 | 2.0 | 1.5 | 1.5 | 2.0 |

FREQUENCIES 3 0.3

SENDER NO. 66445

OPERATOR TOM FREEMAN

RECEIVER NO.

OPERATOR BILL FREEMAN

COMMENTS: *Motor Generator missed a few strokes

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463
LINE 8 HALF E SP. 1 DATE 6-15

| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-37.5E | 37.5-45E | ← | ← | ← | → | 45-52.5E | ← | ← | → |
| RANGE | 200×10 | 300×10 | 300×10 | 150×10 | 150×10 | 250×10 | 300×10 | 300×10 | 150×10 | 150×10 |
| VOLTAGE | 830 | 740 | 630 | 770 | 880 | 880 | 740 | 630 | 770 | 880 |
| CURRENT | 2.0 | 3.0 | 3.0 | 1.5 | 1.5 | 2.5 | 3.0 | 3.0 | 1.5 | 1.5 |

| SEND | 6-7 | 5-6 | 4-5 | CAL | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 52.5-60E | ← | → | 4-5 | | | | | | |
| RANGE | 300×10 | 300×10 | 200×10 | 200×10 | | | | | | |
| VOLTAGE | 740 | 620 | 830 | 820 | | | | | | |
| CURRENT | 3.0 | 3.0 | 2.0 | 2.0 | | | | | | |

FREQUENCIES 3.0 0.3
SENDER NO. 6644 S
OPERATOR Tom FREEMAN
RECEIVER NO.
OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 8 SP1 E 1/2 6/15/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.500 | 0.00 | 147.000 | 0.00 | 3.00 | .30 | 0.0000 | 1.0204 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 67.11 | .75 | 11.2 | .75 | 11.2 | 0.00 | ** | .80 | 1.50 | 1 | 1 | 43.500 | .10 |
| 2 | 2 | 134.58 | 1.30 | 9.7 | 1.22 | 9.1 | .08 | ** | 1.30 | 1.50 | 2 | 2 | 21.700 | 0.00 |
| 3 | 1 | 133.08 | 1.10 | 8.3 | 1.10 | 8.3 | 0.00 | ** | 1.10 | 1.50 | 3 | 1 | 86.000 | 0.00 |
| 4 | 2 | 138.09 | 1.60 | 11.6 | 1.52 | 11.0 | .08 | ** | 1.60 | 2.00 | 4 | 2 | 29.600 | 0.00 |
| 5 | 3 | 215.45 | 1.95 | 9.1 | 1.85 | 8.6 | .10 | ** | 2.00 | 2.00 | 5 | 3 | 18.400 | .10 |
| 6 | 1 | 169.01 | 1.30 | 7.7 | 1.30 | 7.7 | 0.00 | ** | 1.30 | 1.50 | 6 | 1 | 109.000 | 0.00 |
| 7 | 2 | 215.22 | 1.75 | 8.1 | 1.75 | 8.1 | 0.00 | ** | 1.60 | 1.50 | 7 | 2 | 34.600 | -.30 |
| 8 | 3 | 216.93 | 1.70 | 7.8 | 1.60 | 7.4 | .10 | ** | 1.60 | 2.00 | 8 | 3 | 18.600 | -.20 |
| 9 | 4 | 311.77 | 2.15 | 6.9 | 2.04 | 6.5 | .11 | ** | 2.10 | 2.00 | 9 | 4 | 13.300 | -.10 |
| 10 | 1 | 196.52 | .70 | 3.6 | .70 | 3.6 | 0.00 | ** | .70 | 2.00 | 10 | 1 | 170.000 | 0.00 |
| 11 | 2 | 267.84 | 1.50 | 5.6 | 1.50 | 5.6 | 0.00 | ** | 1.50 | 1.50 | 11 | 2 | 43.100 | 0.00 |
| 12 | 3 | 333.69 | 1.35 | 4.0 | 1.35 | 4.0 | 0.00 | ** | 1.40 | 1.50 | 12 | 3 | 21.500 | .10 |
| 13 | 4 | 305.28 | 1.50 | 4.9 | 1.38 | 4.5 | .12 | ** | 1.50 | 2.00 | 13 | 4 | 13.100 | 0.00 |
| 14 | 5 | 408.58 | 2.15 | 5.3 | 2.02 | 4.9 | .13 | ** | 2.10 | 2.00 | 14 | 5 | 9.960 | -.10 |
| 15 | 1 | 391.11 | .80 | 2.0 | .80 | 2.0 | 0.00 | ** | .80 | 2.00 | 15 | 1 | 338.000 | 0.00 |
| 16 | 2 | 267.13 | 1.00 | 3.7 | 1.00 | 3.7 | 0.00 | ** | 1.00 | 2.00 | 16 | 2 | 57.600 | 0.00 |
| 17 | 3 | 327.86 | 1.95 | 5.9 | 1.95 | 5.9 | 0.00 | ** | 2.00 | 1.50 | 17 | 3 | 21.000 | .10 |
| 18 | 4 | 398.11 | 1.60 | 4.0 | 1.52 | 3.8 | .08 | ** | 1.60 | 1.50 | 18 | 4 | 12.800 | 0.00 |
| 19 | 5 | 345.35 | 1.65 | 4.8 | 1.49 | 4.3 | .16 | ** | 1.60 | 2.00 | 19 | 5 | 8.460 | -.10 |
| 20 | 6 | 446.10 | 2.20 | 4.9 | 2.02 | 4.5 | .18 | ** | 2.20 | 2.00 | 20 | 6 | 6.790 | 0.00 |
| 21 | 2 | 351.77 | .75 | 2.1 | .75 | 2.1 | 0.00 | ** | .80 | 3.00 | 21 | 2 | 114.000 | .10 |
| 22 | 3 | 197.30 | 1.50 | 7.6 | 1.39 | 7.0 | .11 | ** | 1.50 | 3.00 | 22 | 3 | 25.400 | 0.00 |
| 23 | 4 | 221.82 | 2.20 | 9.9 | 2.02 | 9.1 | .18 | ** | 2.20 | 1.50 | 23 | 4 | 7.090 | 0.00 |
| 24 | 5 | 253.89 | 1.70 | 6.7 | 1.45 | 5.7 | .25 | ** | 1.70 | 1.50 | 24 | 5 | 4.660 | 0.00 |
| 25 | 6 | 214.55 | 2.00 | 9.3 | 1.51 | 7.0 | .49 | ** | 2.00 | 2.50 | 25 | 6 | 4.090 | 0.00 |
| 26 | 3 | 597.68 | .90 | 1.5 | .90 | 1.5 | 0.00 | ** | .90 | 3.00 | 26 | 3 | 77.400 | 0.00 |
| 27 | 4 | 295.47 | 1.60 | 5.4 | 1.48 | 5.0 | .12 | ** | 1.60 | 3.00 | 27 | 4 | 19.000 | 0.00 |
| 28 | 5 | 315.97 | 2.50 | 7.9 | 2.31 | 7.3 | .19 | ** | 2.40 | 1.50 | 28 | 5 | 5.760 | -.20 |
| 29 | 6 | 349.72 | 1.90 | 5.4 | 1.65 | 4.7 | .25 | ** | 2.00 | 1.50 | 29 | 6 | 4.000 | .20 |
| 30 | 4 | 639.10 | 1.00 | 1.6 | 1.00 | 1.6 | 0.00 | ** | 1.10 | 3.00 | 30 | 4 | 41.300 | .20 |
| 31 | 5 | 28.63 | 1.80 | 62.9 | -2.69 | -94.0 | 4.49 | ** | 1.80 | 3.00 | 31 | 5 | 1.050 | 0.00 |
| 32 | 6 | 296.06 | 2.80 | 9.5 | 2.49 | 8.4 | .31 | ** | 2.80 | 2.00 | 32 | 6 | 4.480 | 0.00 |

BUSINESS FORMS PRINTING COMPANY ENGINEERED FOR HIGH SPEED PRINTERS

JOB 463 LINE 8 SP 1 W 1/2 6/16/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.500 | 0.00 | 147.000 | 0.00 | 3.00 | .30 | 0.0000 | 1.0204 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR PT. | N | | AC1 | AC2 |
| 1 | 1 | 129.99 | 1.10 | 8.5 | 1.10 | 8.5 | 0.00 | ** | 1.10 | 2.00 | 1 | 1 | 112.000 | 0.00 |
| 2 | 2 | 214.39 | 1.50 | 7.0 | 1.50 | 7.0 | 0.00 | ** | 1.50 | 3.00 | 2 | 2 | 69.000 | 0.00 |
| 3 | 1 | 69.48 | .65 | 9.4 | .65 | 9.4 | 0.00 | ** | .70 | 2.00 | 3 | 1 | 60.100 | .10 |
| 4 | 2 | 135.43 | 1.60 | 11.8 | 1.52 | 11.2 | .08 | ** | 1.70 | 2.00 | 4 | 2 | 29.000 | .20 |
| 5 | 3 | 221.04 | 1.70 | 7.7 | 1.61 | 7.3 | .09 | ** | 1.70 | 3.00 | 5 | 3 | 28.400 | 0.00 |
| 6 | 1 | 116.83 | .65 | 5.6 | .65 | 5.6 | 0.00 | ** | .70 | 1.50 | 6 | 1 | 75.800 | .10 |
| 7 | 2 | 140.66 | 1.10 | 7.8 | 1.02 | 7.3 | .08 | ** | 1.10 | 2.00 | 7 | 2 | 30.300 | 0.00 |
| 8 | 3 | 211.55 | 2.00 | 9.5 | 1.90 | 9.0 | .10 | ** | 2.00 | 3.00 | 8 | 3 | 27.100 | 0.00 |
| 9 | 4 | 307.56 | 2.00 | 6.5 | 1.89 | 6.1 | .11 | ** | 2.00 | 3.00 | 9 | 4 | 19.700 | 0.00 |
| 10 | 1 | 88.78 | .65 | 7.3 | .65 | 7.3 | 0.00 | ** | .70 | 2.00 | 10 | 1 | 76.800 | .10 |
| 11 | 2 | 203.44 | 1.00 | 4.9 | 1.00 | 4.9 | 0.00 | ** | 1.00 | 1.50 | 11 | 2 | 32.900 | 0.00 |
| 12 | 3 | 230.44 | 1.90 | 8.2 | 1.81 | 7.9 | .09 | ** | 1.90 | 2.00 | 12 | 3 | 19.700 | 0.00 |
| 13 | 4 | 333.52 | 2.30 | 6.9 | 2.20 | 6.6 | .10 | ** | 2.30 | 3.00 | 13 | 4 | 21.300 | 0.00 |
| 14 | 5 | 513.64 | 2.00 | 3.9 | 1.91 | 3.7 | .09 | ** | 2.00 | 3.00 | 14 | 5 | 18.800 | 0.00 |
| 15 | 1 | 192.28 | .85 | 4.4 | .85 | 4.4 | 0.00 | ** | .90 | 2.00 | 15 | 1 | 166.000 | .10 |
| 16 | 2 | 177.22 | 1.30 | 7.3 | 1.30 | 7.3 | 0.00 | ** | 1.30 | 2.00 | 16 | 2 | 38.100 | 0.00 |
| 17 | 3 | 381.38 | 1.65 | 4.3 | 1.65 | 4.3 | 0.00 | ** | 1.70 | 1.50 | 17 | 3 | 24.500 | .10 |
| 18 | 4 | 433.01 | 2.50 | 5.8 | 2.50 | 5.8 | 0.00 | ** | 2.50 | 2.00 | 18 | 4 | 18.400 | 0.00 |
| 19 | 5 | 618.95 | 2.70 | 4.4 | 2.70 | 4.4 | 0.00 | ** | 2.70 | 2.00 | 19 | 5 | 15.000 | 0.00 |
| 20 | 6 | 972.36 | 2.20 | 2.3 | 2.20 | 2.3 | 0.00 | ** | 2.20 | 3.00 | 20 | 6 | 22.200 | 0.00 |
| 21 | 2 | 284.49 | 1.25 | 4.4 | 1.25 | 4.4 | 0.00 | ** | 1.40 | 2.00 | 21 | 2 | 61.100 | .30 |
| 22 | 3 | 253.34 | 1.65 | 6.5 | 1.57 | 6.2 | .08 | ** | 1.70 | 2.00 | 22 | 3 | 21.700 | .10 |
| 23 | 4 | 500.08 | 2.10 | 4.2 | 2.10 | 4.2 | 0.00 | ** | 2.10 | 1.50 | 23 | 4 | 16.000 | 0.00 |
| 24 | 5 | 606.59 | 2.60 | 4.3 | 2.60 | 4.3 | 0.00 | ** | 2.70 | 2.00 | 24 | 5 | 14.700 | .20 |
| 25 | 6 | 865.39 | 2.50 | 2.9 | 2.50 | 2.9 | 0.00 | ** | 2.50 | 3.00 | 25 | 6 | 19.700 | 0.00 |
| 26 | 3 | 83.03 | 1.30 | 15.7 | .93 | 11.2 | .37 | ** | 1.30 | 2.00 | 26 | 3 | 7.140 | 0.00 |
| 27 | 4 | 81.65 | 1.90 | 23.3 | 1.19 | 14.5 | .71 | ** | 1.90 | 2.00 | 27 | 4 | 3.490 | 0.00 |
| 28 | 5 | 157.84 | 2.20 | 13.9 | 1.72 | 10.9 | .48 | ** | 2.30 | 1.50 | 28 | 5 | 2.880 | .20 |
| 29 | 6 | 200.51 | 2.60 | 13.0 | 2.06 | 10.3 | .54 | ** | 2.60 | 2.00 | 29 | 6 | 3.040 | 0.00 |
| 30 | 4 | 44.04 | 1.50 | 34.1 | -.11 | -2.6 | 1.61 | ** | 1.50 | 2.00 | 30 | 4 | 1.890 | 0.00 |
| 31 | 5 | 46.67 | 1.20 | 25.7 | -1.23 | -26.3 | 2.43 | ** | 1.00 | 2.00 | 31 | 5 | 1.150 | -.40 |
| 32 | 6 | 86.19 | 2.45 | 28.4 | .80 | 9.3 | 1.65 | ** | 2.60 | 1.50 | 32 | 6 | .980 | .30 |

ENGINEERED FOR HIGH SPEED PRINTERS BUSINESS FORMS PRINTING COMPANY BLUE SPACE BAR

HEINRICHS GEOEXPLORATION CO.

LINES 9, 10, 11 & 12

I.P. RECEIVER NOTES 2

PROJECT Empire

LINE 9 HALF S SP. 1 DATE 2/25/70

PAGE 1

| | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | | | | | | | | | | |
| RECEIVE | 0-9.8 | → | 9-18.5 | → | → | 18-27.5 | → | → | → | |
| RANGE | 100 | 30 | 30 | 10 | 3 | 30 | 10 | 3 | 1 | |
| DC 1 | | | | | | | | | | |
| DC 2 | .7 | 2.0 | 0.4 | 0.9 | 2.8 | 0.8 | 1.0 | 1.6 | 3.4 | |
| DC 3 I | 1.0 | 1.5 | 1.5 | 1.0 | 1.5 | 1.0 | 1.5 | 1.0 | 1.5 | |
| DC 4 K | 2.7 | 10.8 | 2.7 | 10.8 | 27 | 2.7 | 10.8 | 27 | 54 | |
| DC 5 | | | | | | | | | | |
| DC 6 R | 428 | 269 | 100 | 174 | 123 | 125 | 96 | 159 | 110 | |
| DC 7 ρ | 0.8 | 2.2 | 0.4 | 0.9 | 2.7 | 1.0 | 1.1 | 1.7 | 3.4 | |
| DC 8 MΩ | 2 | 8 | 4 | 5 | 22 | 8 | 11 | 11 | 31 | |
| DC AVG. | 160.8 | 36.6 | 55.2 | 16.39 | 6.65 | 459 | 13.18 | 5.78 | 2.95 | |
| AC 1 | .622 | .820 | .542 | .614 | .451 | .654 | .759 | .519 | .339 | |
| AC 2 | 0.0 | -0.2 | +0.2 | +0.1 | +0.3 | -0.2 | 0.0 | -0.1 | +0.1 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 9 HALF N SP. 1 DATE 7/25/20

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 27-36 S | — | — | — | → | 36-45 | — | — | — | → |
| RANGE | 30 | 10 | 10 | 3 | 3 | 10 | 3 | 3 | 1 | 1 |
| DC 1 | | | | | | | | | | |
| DC 2 | 0.9 | 1.4 | 1.4 | 2.2 | 3.8 | 0.5 | 1.2 | 0.6 | 1.5 | 1.8 |
| DC 3 I | 1.5 | 1.0 | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | 1.0 | 1.5 | 1.0 |
| DC 4 $K_m$ | 2.7 | 10.8 | 27 | 54 | 94.5 | 2.7 | 10.8 | 27 | 54 | 94.5 |
| DC 5 | | | | | | | | | | |
| DC 6 $\rho$ | 234 | 216 | 261 | 381 | 243 | AX | 58 | 119 | 106 | 150 |
| DC 7 $\rho_a$ | 1.2 | 1.5 | 1.3 | 2.3 | 3.8 | 0.6 | 1.2 | 0.8 | 1.5 | 1.9 |
| DC 8 MV | 4 | 5 | 5 | 6 | 16 | 12 | 21 | 7 | 14 | 13 |
| DC AVG. V | 128.7 | 28.8 | 16.31 | 6.90 | 3.71 | 26.6 | 7.94 | 4.37 | 2.89 | 1.56 |
| AC 1 | .235 | .347 | .699 | .435 | .808 | .376 | .378 | .686 | .346 | .639 |
| AC 2 | −0.1 | 0.0 | +0.3 | 0.0 | +0.1 | 0.0 | +0.2 | −0.2 | +0.1 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES.

PROJECT Empire
LINE 9 HALF 2 SP. 1 DATE 7/25/30

PAGE 3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 36-45 | 45-54 | → | → | → | → | 54-63 | → | → | → |
| RANGE | .3 | 1.0 | 3 | 3 | .3 | .3 | 3 | 1 | 1 | 1 |
| DC 1 | | | | | | | | | | |
| DC 2 | 3.5 | 0.5 | 0.6 | 1.0 | 1.4 | 2.7 | 1.0 | 1.1 | 1.9 | 1.3 |
| DC 3 I | 1.5 | 1.5 | 1.0 | 1.0 | 0.5 | 0.5 | 1.5 | 1.0 | 1.0 | 1.0 |
| DC 4 $K_a$ | 151.2 | 10.8 | 27 | 54 | 94.5 | 151.2 | 27 | 54 | 94.5 | 151.2 |
| DC 5 | | | | | | | | | | |
| DC 6 C | 101 | 81 | 90 | 193 | 166 | 234 | 10A | 108 | 239 | 199 |
| DC 7 $R_E$ | 3.6 | 0.4 | 0.6 | 1.0 | 1.5 | 2.6 | 0.4 | 1.2 | 2.0 | 1.4 |
| DC 8 $R_{MA}$ | 36 | 5 | 7 | 5 | 9 | 11 | 9 | 11 | 8 | 7 |
| DC AVG. V | 0.965 | 11.19 | 3.31 | 3.34 | 0.865 | 0.754 | 5.70 | 1.976 | 2.48 | 1.295 |
| AC 1 | .311 | .894 | .907 | .847 | .347 | .398 | .526 | .506 | .404 | .772 |
| AC 2 | 0.0 | +0.4 | +0.1 | +0.1 | −0.1 | +0.4 | +0.4 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 9 HALF S SP. 1 DATE 7/25/70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | | | Cal. | | | |
| RECEIVE | 63-72 | → | → | | | | | | | |
| RANGE | 1 | 1 | 1 | | | | 30 | | | |
| DC 1 | | | | | | | | | | |
| DC 2 | 1.4 | 1.2 | 2.0 | | | | +0.1 | | | |
| DC 3 I | 1.5 | 1.0 | 1.0 | | | | 1000 | | | |
| DC 4 $K_a$ | 54 | 94.5 | 151.2 | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 ρ | 113 | 117 | 262 | | | | | 1.000 | | |
| DC 7 ρE | 1.3 | 1.3 | 2.0 | | | | | -.005 | | |
| DC 8 MF | 11 | 11 | 8 | | | | | | | |
| DC AVG V | 3.10 | 1.222 | 1.698 | | | | 100 | | | |
| AC 1 | .323 | .818 | .589 | | | | .300 | | | |
| AC 2 | +0.4 | 0.0 | +0.1 | | | | -0.1 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT_____ PAGE

LINE____ HALF____ SP.____ DATE____

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | CAL. |
| RECEIVE | 9-95 | → | 9-165 | ——— | → | 18-27 | ——— | ——— | → | 5-6 |
| RANGE | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 |
| VOLTAGE | 580 | 540 | 680 | 580 | 540 | 550 | 680 | 580 | 540 | 580 |
| CURRENT | 1.0 | 1.5 | 1.5 | 1.0 | 1.5 | 1.0 | 1.5 | 1.0 | 1.5 | 1.0 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 27-36 | ——— | ——— | ——— | → | 36-45 | ——— | ——— | ——— | ——— |
| RANGE | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 |
| VOLTAGE | 680 | 550 | 680 | 580 | 540 | 230 | 670 | 550 | 670 | 670 |
| CURRENT | 1.5 | 1.0 | 1.5 | 1.0 | 1.5 | 1.5 | 1.5 | 1.0 | 1.5 | 1.0 |

FREQUENCIES 3 3

SENDER NO. 9662

OPERATOR HIX

RECEIVER NO. GeoScience

OPERATOR BILL R.

COMMENTS:

6-7 ~~0.7~~ 1.5 2-3 ~~0.4~~ 1.5

5-6 ~~0.7~~ 1.0 1-2 ~~0.45~~ 1.5 could be more

4-5 ~~0.7~~ 1.5

3-4 1.0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT_____

LINE____ HALF____ SP.____ DATE____

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 36-45 | 45-54 | → | → | → | → | 54-63 | → | → | → |
| RANGE | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | B-2 | C-2 | C-2 | C-2 |
| VOLTAGE | 540 | 230 | 440 | 540 | 230 | 290 | 230 | 440 | 540 | 440 |
| CURRENT | 1.5 | 1.5 | 1.0 | 1.0 | 0.5 | 0.5 | 1.5 | 1.0 | 1.0 | 1.0 |
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 63-72 | → | → | | | | | | | |
| RANGE | C-2 | C-2 | C-2 | | | | | | | |
| VOLTAGE | 225 | 430 | 540 | | | | | | | |
| CURRENT | 1.5 | 1.0 | 1.0 | | | | | | | |

FREQUENCIES____ ____

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO. PROJECT Empire

I.P. RECEIVER NOTES LINE 9 HALF N SP. 1 DATE 6/30/70

PAGE 1

| | 1 | 2 | 3 | 4 | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | |
| RECEIVE | 18-27N | → | → | → | 27-36N | → | → | → | → | |
| RANGE | 30 | 10 | 3 | 1 | 10 | 3 | 3 | 1 | 1 | |
| DC 1 | | | | | | | | | | |
| DC 2 | 2.0 | 2.6 | 2.5 | 3.7 | 2.6 | 1.6 | 1.8 | 2.0 | 2.7 | |
| DC 3 I | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | → | → | → | 2.0 | |
| DC 4 $K_n$ | 2.7 | 10.8 | 27 | 54 | 2.7 | 10.8 | 27 | 54 | 94.5 | |
| DC 5 | | | | | | | | | | |
| DC 6 $\rho$ | 172 | 269 | 121 | 112 | 118 | 147 | 282 | 124 | 112 | |
| DC 7 PFE | 2.1 | 2.7 | 2.5 | 3.7 | 2.7 | 1.6 | 1.8 | 2.0 | 2.7 | |
| DC 8 MCH | 12 | 10 | 21 | 33 | 23 | 11 | 6 | 16 | 24 | |
| DC AVG. | 63.2 | 34.6 | 4.05 | 2.028 | 43.3 | 13.57 | 10.42 | 2.28 | 2.35 | |
| AC 1 | .473 | .407 | .674 | .493 | .231 | .221 | .288 | .439 | .425 | |
| AC 2 | −0.1 | −0.1 | 0.0 | +0.1 | −0.1 | 0.0 | 0.0 | 0.0 | 0.0 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 9 HALF N SP. 1 DATE 6/30/70

PAGE 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 36-45N | ——— | ——— | ——— | ——— | → | 45-34N | ——— | ——— | → |
| RANGE | 10 | 10 | 3 | 3 | 1 | 1 | 10 | 10 | 3 | 3 |
| DC 1 | | | | | | | | | | |
| DC 2 | 2.5 | 1.5 | 1.6 | 1.6 | 1.5 | 2.5 | 2.3 | 1.3 | 1.7 | 1.9 |
| DC 3 I | 1.0 | ——— | ——— | ——— | → | 2.0 | 1.0 | ——— | ——— | → |
| DC 4 $R_a$ | 2.7 | 10.8 | 27 | 54 | 94.5 | 151.2 | 10.8 | 27 | 54 | 94.5 |
| DC 5 | | | | | | | | | | |
| DC 6 F | 86 | 159 | 219 | 409 | 173 | 155 | 158 | 315 | 400 | 691 |
| DC 7 PFE | 2.5 | 1.5 | 1.6 | 1.6 | 1.5 | 2.5 | 2.2 | 1.1 | 1.6 | 1.9 |
| DC 8 MCF | 29 | 9 | 7 | 4 | 9 | 16 | 14 | 3 | 4 | 3 |
| DC AVG. | 31.4 | 14.13 | 5.4 | 7.56 | 1.852 | 2.328 | 14.47 | 11.71 | 7.39 | 7.28 |
| AC 1 | .318 | .679 | .371 | .397 | .546 | .493 | .691 | .854 | 406 | .412 |
| AC 2 | +0.1 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | +0.3 | +0.4 | +0.2 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire
LINE 9 HALF N SP. 1 DATE 6/30/70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 | | CAL. |
| RECEIVE | 45-54N | 54-63N | → | → | → | 63-72N | → | → | | |
| RANGE | 1 | 10 | 10 | 10 | 3 | 3 | 3 | 3 | | 30 |
| DC 1 | | | | | | | | | | |
| DC 2 | 2.0 | 2.4 | 1.9 | 1.0 | 2.0 | 1.9 | 1.5 | 1.0 | → | 1,000 |
| DC 3 I | 1.0 | → | → | → | → | → | → | → | | 0.0 |
| DC 4 $K_n$ | 151.2 | 27 | 54 | 94.5 | 151.2 | 54 | 94.5 | 151.2 | | |
| DC 5 | | | | | | | | | | |
| DC 6 P | 284 | 522 | 968 | 1106 | 1871 | 285 | 434 | 476 | | .986 |
| DC 7 PFE | 2.0 | 2.3 | 1.9 | 1.0 | 2.0 | 1.9 | 1.5 | 1.0 | | 0.0 |
| DC 8 MCF | 7 | 4 | 2 | 1 | 1 | 8 | 3 | 2 | | |
| DC AVG. | 1.869 | 19.16 | 17.83 | 11.75 | 12.30 | 4.52 | 4.50 | 3.16 | | 10.4 |
| AC 1 | .535 | .522 | .561 | .851 | .244 | .664 | .654 | .949 | | .296 |
| AC 2 | 0.0 | +0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE mtc

LINE 9 HALF N SP. ___ DATE 6-30

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 56 | 4-5 | 3-4 | 2-3 | 1-2 | CAL- |
| RECEIVE | 18-27N | → | → | → | 27-36N | → | ~~2-B~~ | → | → | 5-6 |
| RANGE | 2-C | 2-B | 2-C | 2-C | 2-B | 2-Q | 2-B | 2-C | 2-C | 2-B |
| VOLTAGE | 520 | 680 | 540 | 200 | 640 | 520 | 680 | 540 | 360 | 640 |
| CURRENT | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.0 | 1.0 |
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 36-45 | → | → | → | → | → | 45-54 | → | → | → |
| RANGE | 2-C | 2-B | 2-C | 2-B | 2-C | 2-C | 2-C | 2-B | 2-C | 2-B |
| VOLTAGE | 420 | 640 | 520 | 640 | 520 | 360 | 420 | 640 | 520 | 650 |
| CURRENT | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 2.0 | 1.0 | 1.0 | 1.0 | 1.0 |

FREQUENCIES 1.3 3.0

SENDER NO. 17691

OPERATOR Hix

RECEIVER NO. Geo Science

OPERATOR BILL R.

COMMENTS:

1-2 1-0-2-C

2-3 1-0-2-C

3-21 1-0-2-B

4-5 — 1.0-2C

5-6-2B 1.0

6-7-2-C 1.0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE
LINE 9 HALF N SP. ___ DATE ___



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 | | |
| RECEIVE | 45-54 | 61-63 | → | → | → | 63-72-N | → | → | | |
| RANGE | 2-C | 2-C | 2-B | 2-C | 2-B | 2-C | 2-B | 2-C | | |
| VOLTAGE | 540 | 430 | 650 | 510 | 650 | 430 | 630 | 510 | | |
| CURRENT | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES .3 3.0
SENDER NO.
OPERATOR Hix
RECEIVER NO. Geo Science
OPERATOR Bill R.

COMMENTS:

1-2 1.0 2-C
2-3 1.0 2C
3-4 1.0 2B
4-5 1.0 2-C
5-6 1.0 2-B
6-7 1.0 2-C

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MTS
LINE 10 HALF S SP. 1 DATE 7-2



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | Re |
| RECEIVE | 0-7.5 | 5 → | 7.5-15 | 5 → | | 15-22.5 | | | → | |
| RANGE | 30 | 3 | 30 | 10 | 3 | 30 | 10 | 3 | 1 | |
| DC 1 | | | | | | | | | | |
| DC 2 PFE | 1.0 | 1.8 | 0.5 | 0.5 | 1.2 | .6 | 1.0 | 1.4 | 2.0 | |
| DC 3 I | .6 | .6 | .9 | .6 | .6 | 1.0 | 1.0 | .6 | .6 | |
| DC 4 Km | 2.25 | 9 | 2.25 | .9 | 22.5 | 2.25 | 9 | 22.5 | 45 | |
| DC 5 D | 330 | 166 | 219 | 400 | 175 | 94 | 115 | 280 | 123 | |
| DC 6 PFE | 1.0 | 1.9 | 0.6 | 0.7 | 1.3 | 0.6 | 1.0 | 1.4 | 2.2 | |
| DC 7 MCF | 3 | 11 | 3 | 7 | 7 | 6 | 9 | 5 | 18 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | 87.209 | 10.870 | 87.2 | 26.525 | 4.622 | 41.783 | 12.658 | 7.371 | 1.610 | |
| AC 1 | .344 | .276 | .344 | .377 | .649 | .718 | .790 | .407 | .621 | |
| AC 2 | +0.2 | 0.0 | 0.0 | −0.2 | 0.0 | 0.2 | 0.2 | 0.1 | −0.1 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT
LINE 10 HALF S SP. DATE 7-2

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 22.5-30.5 | → | → | → | → | 30-37.5 | → | → | → | → |
| RANGE | 30 | 10 | 3 | 3 | 3 | 30 | 10 | 3 | 3 | 3 |
| DC 1 | | | | | | | | | | |
| DC 2 PFE | 0.9 | 1.0 | 2.0 | 1.9 | 3.1 | 1.4 | 1.2 | 1.5 | 2.0 | 2.2 |
| DC 3 I | 0.9 | 1.0 | 1.0 | 0.6 | 0.6 | 1.5 | 0.9 | 1.0 | 1.0 | 0.6 |
| DC 4 Kh | 2.25 | 9 | 22.5 | 45 | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 |
| DC 5 ρ | 102 | 97 | 128 | 313 | 135 | 185 | 286 | 210 | 282 | 519 |
| DC 6 PFE | 1.0 | 1.1 | 2.1 | 1.9 | 3.2 | 1.5 | 1.2 | 1.2 | 2.0 | 1.3 |
| DC 7 MCF | 10 | 11 | 16 | 6 | 24 | 8 | 4 | 6 | 7 | 3 |
| DC 8 | 40.430 | | | | | | | | | |
| DC AVG. | 31.847 | 10.730 | 5.576 | 4.098 | .997 | 12.457 | 23.474 | 9.259 | 6.148 | 3.911 |
| AC 19 or 20 | .742 | .932 | .538 | .732 | .301 | .247 | .426 | .324 | .488 | .767 |
| AC 2 | -0.1 | -0.1 | 0.0 | 0.2 | 0.1 | 0.1 | 0.2 | 0.8 | 0.2 | 2.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE
LINE 10 HALF S SP. 1 DATE 7-3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 22.5 | 30.5 | → | → | → | 30-37.5 | S | (3.0) | → | → |
| RANGE | 30 | 10 | 3 | 3 | 300 | 100 | 10 | 10 | 3.0 | 3.0 |
| DC 1 | | | | | | | | | | |
| DC 2 PFE | 1.0 | 1.1 | 2.1 | 1.8 | 3.0 | 0.6 | 1.0 | 1.4 | 2.1 | 1.6 |
| DC 3 I | 1.0 | 1.0 | 1.0 | .6 | .6 | 2.0 | 1.0 | 1.0 | 1.0 | 0.6 |
| DC 4 Kn | 2.25 | 9 | 22.5 | 45 | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 |
| DC 5 P | 101 | 96 | 125 | 307 | 132 | 178 | 233 | 208 | 275 | 660 |
| DC 6 PFE | 0.9 | 0.9 | 1.9 | 1.6 | 2.7 | 0.5 | 0.8 | 1.3 | 1.9 | 1.4 |
| DC 7 MCF | 9 | 9 | 15 | 5 | 20 | 3 | 3 | 6 | 7 | 2 |
| DC 8 | | | | | | | | | | |
| DC AVG. | 44.843 | 10.672 | 5.525 | 4.065 | .990 | 15.892 | 25.974 | 91.202 | 6.048 | 5.008 |
| AC 1 | .669 | .937 | .543 | .738 | .303 | .629 | .385 | .326 | .496 | .599 |
| AC 2 | -0.2 | 0.1 | 0.0 | 0.1 | 0.2 | -0.1 | -0.1 | -0.2 | 0.1 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MT
LINE 10 HALF S SP. 1 DATE 7-3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 30-37.5 | 37.5- | 45- | → | → | → | 45-52.5 | → | → | → |
| RANGE (a) | 1 | 10 | 3 | 1 | 1 | 1 | 3 | 1 | 1 | 1 |
| DC 1 | | | | | | | | | | |
| DC 2 PFE | 2.8 | 0.7 | 0.2 | 0.8 | 1.2 | 1.6 | 0.4 | 1.0 | 0.4 | 1.0 |
| DC 3 I | .6 | 2.0 | 1.0 | 1.0 | 1.0 | 0.6 | 2.0 | 1.0 | 1.0 | 1.0 |
| DC 4 Kn | 126 | 9 | 22.5 | 45 | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 |
| DC 5 ρ | 1144 | 102 | 127 | 111 | 153 | 359 | 101 | 131 | 121 | 77 |
| DC 6 PFE | 2.5 | 0.5 | 0.1 | 0.7 | 1.0 | 1.4 | 0.2 | 0.9 | ~~0.3~~ 0.1 | 0.7 |
| DC 7 MIF | 17 | 5 | 1 | 6 | 7 | 4 | 2 | 7 | ~~3~~ 1 | 4 |
| DC 8 | 1.294 | | | | | | | | | |
| DC AVG. | .674 | 22.727 | 5.682 | 2.469 | 1.946 | 1.701 | 9.009 | 2.915 | 1.548 | 1.408 |
| AC 1 (b) | .773 | .440 | .528 | .405 | .514 | .588 | .333 | .343 | .646 | .710 |
| AC 2 | 0.2 | 0.0 | -0.2 | -0.2 | 0.1 | 0.0 | 0.0 | -0.2 | 0.2 | 0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | ✓ |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE
LINE 10 HALF S SP. 1 DATE 2-3



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | Cal 7/2/70 | Recal 7/13/70 | | | | |
| RECEIVE | 525-60.5 | → | | | | | | | | |
| RANGE | 3 | 1 | .300 | | 30 | 30 | | | | |
| DC 1 | | | | | 600 | | | | | |
| DC 2 PFE | 0.2 | 0.6 | 0.8 | | +0.1 | | | | | |
| DC 3 I | 2.0 | 1.0 | 1.0 | | | | | | | |
| DC 4 Kn | 45 | 78.25 | 126 | | -0.1 | 0.2 | | | | |
| DC 5 PE | 93 | 123 | 121 | | | | | | | |
| DC 6 PPE | 0.0 | 0.4 | 0.5 | | | | | | | |
| DC 7 MCF | 0 | 3 | 4 | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | 4.167 | 1.570 | .965 | | 60.120 | 101.01 | | | | |
| AC 1 | .720 | .637 | .311 | | .499 | .297 | | | | |
| AC 2 | 0.1 | 0.0 | 0-2 | | -0.1 | 0.0 | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 10 HALF S SP. 1 DATE 7-2



| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | CAL |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-7.5 S → | | 7.5-15 S → | | | 15-22.5 | | | | (5-6) |
| RANGE | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B | 2B |
| VOLTAGE | 840 | 820 | 760 | 840 | 820 | 700 | 820 | 840 | 820 | 840 |
| CURRENT | 0.6 | 0.6 | 0.9 | 0.6 | 0.6 | 1.0 | 1.0 | 0.6 | 0.6 | 0.6 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 22.5 | | 30 → | | | 30-37.5 | | | | |
| RANGE | 2C | 2B | 2B | 2B | 2B | 4B | 2C | 2B | 2B | 2B |
| VOLTAGE | 560 | 690 | 820 | 830 | 810 | 310 | 560 | 680 | 810 | 820 |
| CURRENT | 0.9 | 1.0 | 1.0 | 0.6 | 0.6 | 1.5 | 0.9 | 1.0 | 1.0 | 0.6 |

FREQUENCIES 0.3 3.0

SENDER NO. 17691 S

OPERATOR Wheatley

RECEIVER NO. Geo Science

OPERATOR B. Rasmussen

COMMENTS:

1-2 2B 1.5
2-3 2C 0.9
3-4 2B 1.0
4-5 2B 1.0
5-6 2B 0.6
6-7 2B 0.6

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PAGE 1

PROJECT EMPIRE

LINE 10 HALF 5 SP. 1 DATE 7-3

| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | CAL |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 → | | | | | 30-37.5 → | | | | (1-2) |
| RANGE | 2B | 2B | 2B | 2B | 2B | 4B | 2B | 2B | 2B | 4B |
| VOLTAGE | 410 | 550 | 570 | 620 | 670 | 380 | 410 | 550 | 570 | 200 |
| CURRENT | 1.0 | 1.0 | 1.0 | 0.6 | 0.6 | 2.0 | 1.0 | 1.0 | 1.0 | 1.0 |

| SEND | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 36-37.5 (cont) → | | 37.5-45 → | | | | | 45-52.5 → | | |
| RANGE | 2B | 2B | 4B | 2B | 2B | 2B | 2B | 4B | 2B | 2B |
| VOLTAGE | 620 | 670 | 360 | 490 | 520 | 520 | 590 | 360 | 490 | 520 |
| CURRENT | 0.6 | 0.6 | 2.0 | 1.0 | 1.0 | 1.0 | 0.6 | 2.0 | 1.0 | 1.0 |

FREQUENCIES 0.3 3.0

SENDER NO. 176915

OPERATOR Wheatley

RECEIVER NO. Geo Science

OPERATOR G. Hix

COMMENTS: Had ONAN TROUBLE

1-2 4B 2.0
2-3 2B 1.0
3-4 2B 1.0
4-5 2B 1.0
5-6 2B 0.6
6-7 2B 0.6

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 10 HALF S SP. 1 DATE 7-3

PAGE 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 1-2 | 2-3 | 3-4 | | | | | | |
| RECEIVE | 4.5-5.5 | 5-2.5 | 1.5-60 | → | | | | | | |
| RANGE | 2B | 4B | 2B | 2B | | | | | | |
| VOLTAGE | 530 | 360 | 490 | 520 | | | | | | |
| CURRENT | 1.0 | 2.0 | 1.0 | 1.0 | | | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 0.3 3.0

SENDER NO. 17695

OPERATOR Wheatley

RECEIVER NO. Geo Science

OPERATOR G. Hix

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PAGE 1

PROJECT EMPIRE MT

LINE 10 HALF N SP. 1 DATE 7-6-70

| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | CAL |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 15.-22.5 N → | | | | 22.5-30 N → | | | | | 5-6 |
| RANGE | 100 | 10 | 3 | 3 | 300 | 30 | 3 | 3 | 3 | 30 |
| DC 1 | | | | | | | | | | |
| DC 2 PFE | 1.4 | 0.8 | 1.4 | 1.0 | 1.4 | 1.9 | 1.3 | 1.3 | 1.8 | -0.2 |
| DC 3 I | 1 | 1 | 1.5 | 2 | .6 | 1 | 1 | 1.5 | 2 | .6 |
| DC 4 Kn | 2.25 | 9 | 22.5 | 45 | 2.25 | 9 | 22.5 | 45 | 78.75 | |
| DC 5 ρ | 468 | 163 | 175 | 123 | 2 210 03 | 55 458 | 229 | 264 | 187 | (1.000) |
| DC 6 PFE | 1.8 | 1.0 | 1.6 | 1.3 | 1.6 | 2.1 | 1.6 | 1.6 | 1.9 | (-0.2) |
| DC 7 HCF | 4 | 6 | 9 | 11 | 800 1 | 38 5 | 7 | 6 | 10 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | 204.5 | 17.889 | 11.494 | 5.386 | .552 | 49.834 | 10.033 | 8.746 | 4.673 | |
| AC 1 | .489 | .559 | .261 | .557 | .543 | .602 | .299 | .343 | .642 | -60.00 |
| AC 2 | -0.4 | 0.0 | 0.0 | -0.2 | 0.0 | 0.0 | -0.2 | -0.3 | 0.2 | .500 |
| AC AVG. | | | | | | | | | | -0.0 |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE
LINE 10 HALF N SP. 1 DATE 7-82

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 30-37.5 N → | | | | | | 37.5-45 N → | | | |
| RANGE | 30 | 10 | 3 | 1 | 1 | 1 | 3 | 3 | 1 | 3 |
| DC 1 | | | | | | | | | | |
| DC 2 | 0.5 | 1.6 | 2.4 | 1.8 | 1.6 | 2.0 | 1.5 | 2.2 | 2.5 | 1.4 |
| DC 3 I | .6 | .6 | 1 | 1 | 1.5 | 2. | .6 | .6 | 1 | 1 |
| DC 4 Kn | 2.75 | 9 | 22.5 | 45 | 78.75 | 126 | 9 | 22.5 | 45 | 78.75 |
| DC 5 ρ | 363 | 543 | 153 | 91 | 115 | 93 | 84 | 229 | 88 | 62 |
| DC 6 PFE | 0.8 | 1.8 | 2.7 | 1.9 | 1.8 | 2.3 | 1.7 | 2.4 | 2.8 | 1.5 |
| DC 7 MCF | 5 | 3 | 18 | 21 | 16 | 25 | 20 | 10 | 32 | 24 |
| DC 8 | | | | | | | | | | |
| DC AVG. | 96.154 | 35.387 | 6.608 | 1.976 | 2.146 | 1.447 | 5.525 | 5.964 | 1.898 | .781 |
| AC 1 | .312 | .281 | .454 | .506 | .466 | .691 | .542 | .502 | .527 | .384 |
| AC 2 | -0.3 | 0.1 | -0.2 | 0.2 | -0.1 | -0.2 | -0.1 | 0.1 | -0.2 | 0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MT.
LINE 10 HALF N SP. 1 DATE 7-12-



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | | 6-7 | 5-6 | 4-5 | 3-4 | 6-8 | 5-6 | 4-5 | |
| RECEIVE | 37.5-45 N | | 45-52.5 → | | | | 52.5-60 N → | | | |
| RANGE | 1 | | 3 | 3 | 3 | 1 | 3 | 10 | 3 | |
| DC 1 | | | | | | | | | | |
| DC 2 PFE | 0.2 | | 0.9 | 1.6 | 0.6 | 1.4 | 0.7 | -0.1 | 78 | |
| DC 3 I | 1.5 | | .6 | .6 | 1 | 1 | .6 | .6 | 1 | |
| DC 4 Kn | 126 | | 22.5 | 45 | 78.75 | 126 | 45 | 78.75 | 126 | |
| DC 5 ρ | 89 | | 220 | 666 | 295 | 250 | 550 | 1598 | 770 | |
| DC 6 PFE | 0-4 | | 1.2 | 1.9 | 0.9 | 1.5 | 1.0 | 0.2 | 2.3 | |
| DC 7 MCF | 45 | | 5 | 3 | 3 | 6 | 2 | X0 | 3 | |
| DC 8 | | | | | | | | | | |
| DC AVG. | 1.050 | | 5.791 | 8.721 | 3.717 | 1.953 | 7.264 | 12.157 | 5.976 | |
| AC 1 | .952 | | .518 | .344 | .807 | .512 | .413 | .823 | .502 | |
| AC 2 | 0.1 | | -0.2 | -0.2 | -0.2 | 0.2 | -0.2 | -0.2 | -0.2 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 10 HALF N SP. 1 DATE 7-6-

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | CAL |
| RECEIVE | 15-22.5 N | → | → | → | 22.5-30 N | → | → | → | → | 5-6 |
| RANGE | 2B | 2C | 2B | 4B | 2B | 2B | 2C | 2B | 4B | 2B |
| VOLTAGE | 560 | 500 | 700 | 700 | 610 | 560 | 500 | 680 | 700 | 620 |
| CURRENT | 1 | 1 | 1.5 | 2 | .6 | 1 | 1 | 1.5 | 2 | .6 |
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 30-37.5 N | → | → | → | → | → | 37.5-45 N | → | → | → |
| RANGE | 2B | 2B | 2B | 2C | 2B | 4B | 2B | 2B | 2B | 2C |
| VOLTAGE | 630 | 610 | 550 | 500 | 680 | 700 | 630 | 600 | 550 | 490 |
| CURRENT | .6 | .6 | 1 | 1 | 1.5 | 2 | .6 | .6 | 1 | 1 |

FREQUENCIES 3 3.0

SENDER NO. 9662

OPERATOR Mc CLURE

RECEIVER NO. Geo Science

OPERATOR HIX

COMMENTS:

6-7 — 2B
5-6 — 2B
4-5 — 2B
3-4 — 2C
2-3 — 2B

.6
.6
1
1
1.5

1-2 4-B ?

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 10 HALF N SP. 1 DATE 2-6

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 | |
| RECEIVE | 37.5-45N | | 45-52.5 | → | → | → | 52.5-60N | → | → | |
| RANGE | 2B | | 2B | 2B | 2B | 2C | 2B | 2B | 2B | |
| VOLTAGE | 680 | | 620 | 600 | 540 | 480 | 620 | 600 | 540 | |
| CURRENT | 1.5 | | .6 | .6 | 1 | 1 | .6 | .6 | 1 | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES .30 3.0

SENDER NO. 9662-5

OPERATOR Mc Clure

RECEIVER NO. Geo Science

OPERATOR Hix

COMMENTS:

6-7 2B .6
5-6 2B .6
4-5 2B 1
3-4 2C 1

2-3 2B 1.5
1-2 4B 2

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MT.
LINE 11 HALF S SP. 1 DATE 7-8-82

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | CAL |
| RECEIVE | 0-.755 | → | .75-1.55 | → | | 1.5- | 2.255 | → | → | 5-6 |
| RANGE | 30 | 10 | 30 | 10 | 3 | 30 | 10 | 3 | 3 | 30 |
| DC 13 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| DC 21 PFE | 0.4 | 0.5 | 0.6 | 0.2 | 0.6 | 0.2 | 0.4 | 0.8 | 0.7 | 0.0 |
| DC 3 T | 2. | 2. | 2. | 2.5 | 2. | 2.5 | 2.5 | 2.5 | 2.3 | 1.0 |
| DC 4 K | 2.25 | 9 | 2.25 | 9 | 22.5 | 2.25 | 9 | 22.5 | 45 | 2.25 |
| DC 5 ρ | 86 | 98 | 83 | 39 | 61 | 34 | 88 | 59 | 97 | |
| DC 6 PFF | 0.4 | 0.6 | 0.6 | 0.1 | 0.6 | 0.2 | 0.5 | 0.7 | 0.7 | |
| DC 7 M.F | 5 | 6 | 7 | 3 | 10 | 6 | 6 | 12 | 7 | |
| DC 8 M-N | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 | |
| DC AVG. | 76.336 | 21.786 | 73.529 | 10.834 | 5.405 | 38.314 | 24.450 | 6.565 | 4.934 | 100.334 |
| AC 1 | .393 | .459 | .408 | .932 | .555 | .783 | .409 | .457 | .608 | .299 |
| AC 2 | -0.1 | -0.2 | 0.1 | 0.2 | -0.1 | 0.0 | -0.2 | 0.2 | 0.1 | -0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | * | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MT
LINE 11 HALF S SP. 1 DATE 7-7-



| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | CAL |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-.75 S | → | .75-1.5 | → | → | 1.5-2.25 | → | → | → | 5-6 |
| RANGE | 30 | 10 | 30 | 3 | 3 | | | | | |
| DC 1 | | | | 155 | 155 | | | | | 30 |
| DC 2 | -0.2 | -0.5 | 0.0 | -0.2 | -0.2 | | | | | |
| DC 3 | | | | | | | | | | -0.3 |
| DC 4 | | | | | | | | | | |
| DC 5 | | | Repeated | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | Ignore | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | -0.1 |
| AC 1 | .396 | .617 | .409 | .346 | .670 | | | | | .299 |
| AC 2 | -0.1 | -0.1 | -0.2 | 0.1 | 0.2 | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | — | # | — | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 11 HALF S SP. L DATE 7-7

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | | | | | CAL |
| RECEIVE | .75 → | | .75 | -1.5 → | | | | | | 5-6 |
| RANGE | 4B | 2B | 4B | 4B | 2B | | | | | 4B |
| VOLTAGE | 350 | 620 | 320 | 350 | 680 | | | | | 180 |
| CURRENT | 2.0 | 1.5 | 2.0 | 2.0 | 1.66 | | | | | 1.0 |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 0.3 3.0

SENDER NO. 9662-5 (ON S-7)

OPERATOR Wheatley

RECEIVER NO. Geo Sci. Ltd.

OPERATOR HIX

COMMENTS:

6-7 - 2-B - 1.5
5-6 - 4-B - 2.0
4-5 4B - 2.0
3-4 4B - 2.0

2-7 - 4-B - 3.0
1-2 - 4-B - 3.0

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MTS
LINE 11 HALF S SP. 1 DATE 2-8-2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 2.75 - | 3.0 S - | → | | → | 3.0 - 3 | 75 - | → | → | → |
| RANGE | 30 | 10 | 10 | 3 | 3 | 30 | 10 | 10 | 3 | 1 |
| DC 1 3 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 2 PFE | 0.1 | 0.4 | 0.6 | 0.8 | 0.9 | 0.4 | -0.2 | -0.6 | 0.8 | 1.0 |
| DC 23 I | 3.0 | 2.5 | 2.5 | 2.5 | 2.4 | 3.0 | 3.0 | 2.5 | 2.5 | 2.5 |
| DC 4 K | 2.25 | 9.0 | 22.5 | 45.0 | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 |
| DC 5 P | 159 | 171 | 263 | 151 | 212 | 54 | 51 | 100 | 186 | 105 |
| DC 6 PFE | 0.2 | 0.4 | 0.5 | 0.8 | 0.9 | 0.4 | -0.3 | -0.6 | 0.8 | 1.0 |
| DC 7 MCP | 1 | 2 | 2 | 5 | 4 | 7 | -6 | -6 | 4 | 10 |
| DC 8 N | 1 | 2 | 3 | 4 | 5 | 7 | 2 | 3 | 4 | 5 |
| DC AVG. S | 52.356 | 18.975 | 14.577 | 4.777 | 4.011 | 72.289 | 16.920 | 11.038 | 10.274 | 3.311 |
| AC 1 | .573 | .527 | .686 | .628 | .748 | .415 | .591 | .906 | .292 | .302 |
| AC 2 6 | -0.2 | 0.0 | 0.2 | 0.0 | -0.1 | -0.1 | 0.2 | 0.1 | 0.0 | -0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | *1 | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MTS
LINE 11 HALF S SP. / DATE



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 3.0-3.75 | 7.75-4 | 5.5 → | | | → | 4.5-5 | 2.5 → | | → |
| RANGE | 1 | 10 | 3 | 3 | 3 | 1 | 3 | 3 | 3 | 3 |
| DC 1 3 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| DC 2 PFE | 1.4 | 0.2 | 0.0 | 0.2 | 0.8 | 1.0 | 0.6 | -0.6 | -0.3 | 0.4 |
| DC 3 I | 2.5 | 3.0 | 3.0 | 2.5 | 2.5 | 3.0 | 3.0 | 3.0 | 2.5 | 3.0 |
| DC 4 Kn | 126 | 9 | 22.5 | 45 | 78.75 | 126 | 22.5 | 45 | 78.75 | 126 |
| DC 5 P | 156 | 70 | 65 | 138 | 253 | 132 | 53 | 46 | 103 | 205 |
| DC 6 PFE | 1.4 | 0.1 | 0 | 0.1 | 0.8 | 1.0 | 0.5 | -0.7 | -0.3 | 0.4 |
| DC 7 MLF | 9 | 1 | 0 | 1 | 3 | 8 | 9 | -15 | -3 | 2 |
| DC 8 4 | 4 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 |
| DC AVG. 5 | 3.058 | 23.148 | 8.746 | 7.673 | 8.043 | 3.115 | 7.026 | 3.074 | 3.268 | 4.878 |
| AC 1 | .327 | .432 | .343 | .391 | .373 | .321 | .427 | .976 | .918 | .615 |
| AC 2 6 | 0.1 | 0.2 | 0.0 | 0.2 | -0.1 | 0.0 | 0.3 | 0.2 | 0.1 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MTS.
LINE 11 HALF 5 SP. 1 DATE 7-8-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 52.5- | 6.0 5 | → | | | | | | | |
| RANGE | 3 | 1 | 1 | | | | | | | |
| DC 1 3 | 30 | 31 | 32 | | | | | | | |
| DC 2 PFE | -0.2 | 0.3 | 1.1 | | | | | | | |
| DC 3 I | 3.0 | 3.0 | 3.0 | | | | | | | |
| DC 4 Rx | 45 | 77.75 | 126 | | | | | | | |
| DC 5 P | 62 | 50 | 104 | | | | | | | |
| DC 6 PFE | -0.2 | 0.2 | 1.1 | | | | | | | |
| DC 7 MCP | -3 | 4 | 11 | | | | | | | |
| DC 8 M | 4 | 5 | 6 | | | | | | | |
| DC AVG 5 | 4.172 | 1.894 | 2.457 | | | | | | | |
| AC 1 | .719 | .528 | .407 | | | | | | | |
| AC 2 6 | 0.0 | 0.0 | 0.1 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 11 HALF S SP. L DATE 7-8

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | CAL |
| RECEIVE | 0-7.5 → | | 7.5-1.5 | → | | 1.5-2.25 | → | | | 5-6 |
| RANGE | 4B | 2B | 4B | 4B | 2B | 4B | 4B | 4B | 2B | 4B |
| VOLTAGE | 280 | 640 | 270 | 350 | 640 | 350 | 340 | 350 | 740 | 140 |
| CURRENT | 2.0 | 2.0 | 2.0 | 2.5 | 2.0 | 2.5 | 2.5 | 2.5 | 2.3 | 1.0 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 2.25-3.0 | | | | → | 3.0-3.75 | | | | |
| RANGE | 4B | 4B | 4B | 4B | 2B | 4B | 4B | 4B | 4B | 4B |
| VOLTAGE | 310 | 350 | 340 | 350 | 760 | 220 | 310 | 350 | 340 | 350 |
| CURRENT | 3.0 | 2.5 | 2.5 | 2.5 | 2.4 | 3.0 | 3.0 | 2.5 | 2.5 | 2.5 |

FREQUENCIES 0.3 3.0

SENDER NO. 9662-5 (MK5-2)

OPERATOR Wheatley

RECEIVER NO. Geo Science

OPERATOR HIX

COMMENTS:

6-7 2B 2.0
5-6 4B 2.0
4-5 4B 2.0
3-4 4B 2.0
2-3 4B 3.0
1-2 4B 3.0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 11 HALF 5 SP. 1 DATE 2-8



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 3.0-3.75 | 3.75-4.5 | → | → | → | → | 4.5-5.25 | → | → | → |
| RANGE | 2B | 4B | 4B | 4B | 4B | 4B | 4B | 4B | 4B | 4B |
| VOLTAGE | 790 | 220 | 310 | 345 | 330 | 420 | 220 | 310 | 340 | 390 |
| CURRENT | 2.5 | 3.0 | 3.0 | 2.5 | 2.5 | 3.0 | 3.0 | 3.0 | 2.5 | 3.0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 5.25-6.0 | → | → | | | | | | | |
| RANGE | 4B | 4B | 4B | | | | | | | |
| VOLTAGE | 225 | 310 | 410 | | | | | | | |
| CURRENT | 3.0 | 3.0 | 3.0 | | | | | | | |

FREQUENCIES 0.3 3.0

SENDER NO. 9662-S (mk 5-2)

OPERATOR Wheatley

RECEIVER NO. Geo Science

OPERATOR Hix

COMMENTS:

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MTS
LINE 11 HALF N SP. 1 DATE 7-9-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | CH2 |
| RECEIVE | 1.5-2.25 | → | → | → | 2.25-3.0 | → | → | → | → | 2-3 |
| RANGE | 100 | 10 | 3 | 3 | 100 | 30 | 10 | 3 | 3 | " |
| DC 1 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | ~~30~~ |
| DC 2 PFE | 0.7 | 0.6 | 0.7 | 1.0 | 0.1 | 0.2 | 0.4 | 0.5 | 0.8 | 0.0 |
| DC 3 | 2.5 | 2.5 | 3.0 | 3.0 | 2.5 | 2.5 | 2.5 | 3.0 | 4.0 | 4.0 |
| DC 4 KM | 2.25 | 9 | 22.5 | 45 | ~~30.25~~ | 9 | 22.25 | 45 | 78.75 | |
| DC 5 P | 163 | 98 | 60 | 96 | 97 | 166 | 14 | 91 | 136 | |
| DC 6 PPE | 0.7 | 0.6 | 0.7 | 1.0 | 0.0 | 0.2 | 0.4 | 0.5 | 0.9 | 0.0 |
| DC 7 MCF | 4 | 6 | 12 | 10 | 0 | 1 | 29 | 5 | 7 | |
| DC 8 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 | 5 | |
| DC AVG. | 180.505 | 27.100 | 7.979 | 6.342 | 108.342 | 46.296 | 15.175 | 6.061 | 6.849 | 100.334 |
| AC 1 | .554 | .369 | .376 | .473 | .923 | .648 | .659 | .495 | .438 | .299 |
| AC 2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.3 | -0.1 | 0.1 | -0.1 | -0.2 | -0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE mts
LINE 11 HALF N SP. 1 DATE 7-82



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 3.0 - 3.75 | | | | | | 3.75 - | 4.50 | | |
| RANGE | 100 | 30 | 30 | 10 | 3 | 3 | 30 | 10 | 10 | 3 |
| DC 1 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 |
| DC 2 PFE | 0.5 | -0.1 | 0.4 | -0.4 | 0.8 | 1.2 | 0.6 | 0.4 | 1.3 | 1.8 |
| DC 3 I | 2.5 | | | | 3.5 | 4.0 | 2.5 | | | 3.0 |
| DC 4 K | 2.25 | 9 | 22.5 | 45 | 78.75 | 126 | 9 | 22.5 | 45 | 78.75 |
| DC 5 ρ | 268 | 159 | 284 | 199 | 136 | 208 | 360 | 207 | 407 | 246 |
| DC 6 PFE | 0.5 | -0.1 | 0.4 | -0.4 | 0.8 | 1.2 | 0.7 | 0.4 | 1.3 | 1.8 |
| DC 7 MCF | 2 | -1 | 1 | -2 | 6 | 6 | 2 | 2 | 3 | 7 |
| DC 8 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 3 | 4 | 5 |
| DC AVG. | 297.619 | 44.183 | 31.546 | 11.074 | 6.000 | 6.550 | 99.668 | 22.936 | 22.371 | 9.231 |
| AC 1 | .326 | .679 | .951 | .903 | .500 | .458 | .301 | .436 | .447 | .325 |
| AC 2 | 0.1 | -0.1 | 0.1 | -0.1 | 0.1 | 0.0 | -0.3 | 0.0 | 0.1 | 0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE MTY
LINE 11 HALF N SP. 1 DATE 2-9-10

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 | | |
| RECEIVE | 3.75-4.5 N | 4.5-5.25 | → | → | → | 5.25-6.0 N | → | → | | |
| RANGE | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | |
| DC 1 | 52 | 53 | 54 | 56 | 54 | 57 | 58 | 59 | | |
| DC 2 PFE | 1.5 | 0.4 | 0.9 | 1.5 | 1.6 | 0.4 | -0.4 | 0.8 | | |
| DC 3 I | 3.8 | 2.5 | 2.8 | 3.0 | → | 2.0 | 2.8 | 3.0 | | |
| DC 4 Rn | 126 | 22.5 | 45 | 78.75 | 126 | 45 | 78.75 | 126 | | |
| DC 5 P | 175 | 201 | 114 | 216 | 140 | 172 | 98 | 157 | | |
| DC 6 PFE | 1.5 | 0.3 | 0.9 | 1.6 | 1.5 | 0.4 | -0.4 | 0.8 | | |
| DC 7 MCF | 9 | 1 | 8 | 7 | 11 | 2 | -4 | 5 | | |
| DC 8 | 50 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | |
| DC AVG. | 5.217 | 22.371 | 7.026 | 8.108 | 3.289 | 7.614 | 3.440 | 3.722 | | |
| AC 1 | .575 | .447 | .427 | .370 | .304 | .314 | .872 | .606 | | |
| AC 2 | 0.1 | 0.2 | 0.1 | -0.2 | 0.2 | .394 | 0.0 | 0.1 | | |
| AC AVG. | | | | | | 0.1 | | | | |
| S.P. | | | | | ☆ | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE

LINE 11 HALF N SP. 1 DATE 7-9

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | CAL |
| RECEIVE | ← 1.5 | - 2.25 | ——— | ——— | ← 2.25 | - 3.0 | ——— | ——— | ——— | 2-3 |
| RANGE | 4B | 4B | 4B | 4B | 4B | 4B | 4B | 4B | 4B | 4B |
| VOLTAGE | 340 | 350 | 310 | 230 | 355 | 340 | 350 | 310 | 300 | 100 |
| CURRENT | 2.5 | 2.5 | 3.0 | 3.0 | 2.5 | 2.5 | 2.5 | 3.0 | 4.0 | 1.0 |
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | ← 3.0 | - 3.75 | ——— | ——— | ——— | ——— | → 3.75 | - 4.5 | ——— | ——— |
| RANGE | 2B | 4B | 4B | 4B | 4B | 4B | *2B | 4B | 4B | 4B |
| VOLTAGE | 800 | 360 | 340 | 350 | 370 | 310 | 790 | 355 | 340 | 420 |
| CURRENT | 2.5 | 2.5 | 2.5 | 2.5 | 3.5 | 4.0 | 2.5 | 2.5 | 2.5 | 3.0 |

FREQUENCIES 0.3 3.0

SENDER NO. 9662-5 (MK 5-7)

OPERATOR Wheatley

RECEIVER NO. Geo Science

OPERATOR Hix

COMMENTS:

*FUSE BLEW (20 AMP on POWER BOX)

HEINRICHS GEOEXPLORATION CO.

## I. P. SENDER NOTES

PROJECT EMPIRE

LINE 11 HALF N SP. 1 DATE 7-9

PAGE 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 | | |
| RECEIVE | 2.75 | 4.5 | 5.25 | | | 5.25 | 6.0 | | | |
| RANGE | 4B | 2B | 4B | 4B | 4B | 2B X | 4B | 4B | | |
| VOLTAGE | 400 | 790 | 400 | 400 | 420 | 620 | 390 | 400 | | |
| CURRENT | 3.8 | 2.5 | 2.8 | 3.0 | 3.0 | 2.0 | 2.8 | 3.0 | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 0.3 3.0

SENDER NO. 9662-S (MK5-7)

OPERATOR Wheatley

RECEIVER NO. Geo Science

OPERATOR Hix

COMMENTS: X FUSE (2) BLEW (SAME)

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mts.
LINE 12 HALF N SP. 1 DATE 7-13



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | |
| RECEIVE | 0-7.5 | → | 7.5-15 | → | → | 15-22.5 | → | → | → | |
| RANGE | 100 | 30 | 106 | 10 | 3 | 30 | 10 | 10 | 3 | |
| DC 1 | | | | | | | | | | |
| DC 2 T | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | |
| DC 3 $K_n$ | 2.25 | 9 | 2.25 | 9 | 22.5 | 2.25 | 9 | 22.5 | 45 | |
| DC 4 | | | | | | | | | | |
| DC 5 ρ | 119 | 122 | 118 | 93 | 85 | 94 | 145 | 96 | 83 | |
| DC 6 PFE | 0.3 | 0.2 | 0.1 | 0.6 | 1.0 | 0.6 | 0.7 | 0.5 | 0.9 | |
| DC 7 MFE | 3 | 2 | 1 | 6 | 12 | 6 | 5 | 5 | 11 | |
| DC 8 | 156.7 | 40.2 | 104.0 | 30.6 | 11.07 | 86.5 | 31.6 | 12.63 | 5.44 | |
| DC AVG. | 0.0 | 0.0 | -0.1 | 0.2 | 0.9 | 0.3 | 0.4 | 0.3 | 0.6 | |
| AC 1 | .638 | .747 | .962 | .327 | .271 | .347 | .316 | .792 | .551 | |
| AC 2 | -0.2 | 0.0 | +0.1 | -0.3 | +0.2 | -0.1 | -0.2 | 0.0 | -0.2 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mk.
LINE 12 HALF N SP. 1 DATE 7-14



| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 | | | | → | 30-37.5 | | | | → |
| RANGE | 100 | 30 | 10 | 3 | 3 | 100 | 10 | 10 | 3 | 3 |
| DC 1 | | | | | | | | | | |
| DC 2 I | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 |
| DC 3 K | 2.25 | 9 | 22.5 | 45 | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.25 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 105 | 180 | 208 | 138 | 110 | 176 | 98 | 213 | 205 | 141 |
| DC 6 PFE | 0.3 | 0.6 | 0.6 | 0.7 | 0.6 | 0.3 | 0.7 | 0.0 | 0.9 | 0.4 |
| DC 7 MFE | 3 | 3 | 3 | 5 | 5 | 2 | 7 | 0 | 4 | 3 |
| DC 8 | 138.3 | 39.4 | 18.21 | 8.77 | 4.11 | 231.5 | 32.2 | 18.76 | 8.93 | 5.29 |
| DC AVG. | 0.0 | 0.3 | 0.2 0.15 | 0.4 | 0.4 | 0.0 | 0.5 | -0.2 | 0.6 | 0.2 |
| AC 1 | .723 | .762 | .549 | .342 | .730 | .432 | .311 | .533 | .336 | .567 |
| AC 2 | -0.2 | -0.2 | -0.4 | -0.2 | 0.0 | -0.2 | 0.0 | 0.0 | -0.2 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mtn.
LINE 12 HALF N SP. 2 DATE 7-14

PAGE 3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 |
| RECEIVE | 30-37.5 | 37.5-45 | → | → | → | → | → | 45-52.5 | → | → |
| RANGE | 1 | 10 | 10 | 3 | 3 | 3 | 1 | 10 | 10 | 10 |
| DC 1 | | | | | | | | | | |
| DC 2 I | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 |
| DC 3 $K_n$ | 126 | 9 | 22.5 | 45 | 78.75 | 126 | 189 | 22.5 | 45 | 78.75 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 125 | 98 | 106 | 227 | 245 | 171 | 151 | 208 | 224 | 470 |
| DC 6 | 1.4 | 0.4 | -0.3 | 0.8 | 0.2 | 0.2 | 1.1 | 0.4 | 0.1 | 0.0 |
| DC 7 MCF | 11 | 4 | -3 | 4 | 1 | 1 | 7 | 2 | 0 | 0 |
| DC 8 | 2.91 | 32.1 | 14.04 | 9.90 | 6.13 | 4.02 | 2.34 | 27.3 | 14.75 | 11.81 |
| DC AVG. | ~~1.2~~ | 0.2 | -0.6 | 0.6 | 0.0 | 0.0 | 0.9 | ~~0.8~~ 0.1 | -0.1 | -0.2 |
| AC 1 | .344 | .312 | .712 | .303 | .489 | .746 | .427 | .366 | .678 | .847 |
| AC 2 | 0.6 | 0.1 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.1 | 0.1 | 0.1 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mts.
LINE 12 HALF N SP. 1 DATE 7-14

PAGE 4

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | | | CAL | |
| RECEIVE | 45-505 | → | 525-60 | | | → | | | 6-7 | |
| RANGE | 3 | 3 | 3 | 1 | 3 | 1 | | | 100 | |
| DC 1 | | | | | | | | | | |
| DC 2 I | 2 | 3 | 3 | 3 | 2 | 2 | | | 3000 | |
| DC 3 $K_m$ | 126 | 189 | 45 | 78.75 | 126 | 189 | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 $\rho$ | 509 | 346 | 100 | 105 | 211 | 220 | | | (1.011) | |
| DC 6 PFE | 52 | noisy | 0.6 | 1.5 | 0.2 | 0.6 | | | | |
| DC 7 MCH | -2 | 4 | 6 | 14 | >1 | 3 | | | (-0.2) | |
| DC 8 | 7.89 | 5.36 | 6.56 | 3.89 | 3.31 | 2.29 | | | 296.7 | |
| DC AVG. | 1.0 | 1.1 | 0.5 | 1.3 | 0.0 | 0.4 | | | -0.1 | |
| AC 1 | .380 | .560 | .159 | .257 | .905 | .437 | | | .337 | |
| AC 2 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | | | +0.2 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 12 HALF ___ SP. ___ DATE ___

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 0-7.5 | → | 25-15 | → | → | 15-22.5 | → | → | → | 22.5-30 |
| RANGE | 4B | 4B | 2C | 4B | 4B | 2C | 2C | 4B | 4B | 4B |
| VOLTAGE | 360 | 345 | 500 | 360 | 345 | 490 | 500 | 360 | 345 | 340 |
| CURRENT | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 3 | 3 |
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 22.5-30 | → | → | → | 30-37.5 | → | → | → | → | → |
| RANGE | 2C | 2C | 4B | 4B | 4B | 4B | 2C | 2C | 4B | 4B |
| VOLTAGE | 490 | 500 | 360 | 345 | 370 | 340 | 485 | 495 | 360 | 350 |
| CURRENT | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2? | 3 | 3 |

FREQUENCIES DC AC

SENDER NO. GGG 2-5

OPERATOR McCLURE

RECEIVER NO.

OPERATOR

COMMENTS:

| | | |
|---|---|---|
| 1-2 | 3 | 4B |
| 2-3 | 3 | 4B |
| 3-4 | 2 | 2B |
| 4-5 | 2 | 2C |
| 5-6 | 3 | 4B |
| 6-7 | 3 | 4B |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE ____ HALF I SP. ____ DATE ____

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | ~~37.5-45~~ | 37.5-45 | ——— | ——— | ——— | ——— | 45-52.5 | ——— | ——— | → |
| RANGE | 4B | 4B | 2C | 2C | 4B | 4B | 4B | 4B | 2C | 2C |
| VOLTAGE | 370 | 340 | 490 | 490 | 360 | 350 | 370 | 340 | 470 | 480 |
| CURRENT | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 |
| SEND | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | | | | | |
| RECEIVE | 45-52.5 | 52.5-60 | ——— | ——— | → | | | | | |
| RANGE | 4B | 4B | 4B | 2C | 2C | | | | | |
| VOLTAGE | 355 | 370 | 340 | 470 | 480 | | | | | |
| CURRENT | 3 | 3 | 3 | 2 | 2 | | | | | |

FREQUENCIES DC AC

SENDER NO. Geo 2-3

OPERATOR McClure

RECEIVER NO.

OPERATOR

COMMENTS:

| | | | | | | |
|---|---|---|---|---|---|---|
| 1-2 | 3 | 4B | 5-6 | 3 | 4B |
| 2-3 | 3 | 4B | 6-7 | 3 | 4B |
| 3-4 | 2 | 2C | | | |
| 4-5 | 2 | 2C | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mtn.
LINE 12 HALF ~~E~~ S SP. 1 DATE 7-14



| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | CAL |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-7.5 → | → | 7.5-15 → | → | → | 15-22.5 → | → | → | → | 1-2 |
| RANGE | | | | | | 30 | 10 | 10 | 3 | 100 |
| DC 1 | | | | | | | | | | |
| DC 2 I | | | | | | 2 | 2 | 3 | 3 | 3000 |
| DC 3 $K_n$ | | | | | | 2.25 | 9 | 22.5 | 45 | |
| DC 4 | | | | | | | | | | |
| DC 5 $\rho$ | | | | | | 79 | 12.4 | 81 | 82 | (1.011) |
| DC 6 PFE | | | | | | 0.6 | 0.5 | -0.1 | 0.5 | (-0.2) |
| DC 7 MCF | | | | | | 8 | 4 | -1 | 6 | |
| DC 8 | | | | | | 69.3 | 27.1 | 10.68 | 5.41 | 296.7 |
| DC AVG. | | | | | | 0.4 | 0.4 | -0.2 | 0.2 | -0.3 |
| AC 1 | | | | | | .433 | .369 | .936 | .554 | .337 |
| AC 2 | | | | | | 0.0 | 0.2 | 0.3 | -0.2 | -0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mt.
LINE 12 HALF S SP. 1 DATE 7-14



| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 20.5-30 | → | → | → | → | 30-37.5 | → | → | → | → |
| RANGE | 30 | 10 | 10 | 3 | 3 | 30 | 10 | 10 | 3 | 3 |
| DC 1 | | | | | | | | | | |
| DC 2 I | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 |
| DC 3 K | 2.25 | 9 | 22.5 | 45 | 78.75 | 2.25 | 9 | 22.5 | 45 | 78.75 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 66 | 102 | 153 | 97 | 95 | 52 | 76 | 121 | 180 | 112 |
| DC 6 PFE | 0.7 | 0.10 | -0.2 | 0.4 | 0.1 | 0.2 | 0.4 | -0.8-8.6 | 0.5 | 0.1 |
| DC 7 MFA | 11 | 6 | -1 | 4 | 1 | 4 | 5 | .933-5 | 3 | 1 |
| DC 8 | 86.0 | 22.73 | 13.44 | 6.38 | 3.58 | 68.0 | 24.8 | 10.72 | 7.89 | 4.23 |
| DC AVG. | 0.4 | 0.3 | -0.4 | 0.0 | 0.0 | -0.1 | 0.0 | 0.2 | 0.2 | +0.0 |
| AC 1 | .349 | .440 | .744 | .470 | .838 | .441 | .404 | .610 | .380 | .710 |
| AC 2 | -0.1 | -0.1 | 0.0 | -0.3 | +0.2 | -0.2 | -0.3 | 0. | -0.2 | 0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mts.
LINE 12 HALF S SP. 1 DATE 7-14

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|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 |
| RECEIVE | 30-37.5 | 37.5-45 | | | | | → | 45-52.5 | → | → |
| RANGE | 1 | 10 | 10 | 3 | 3 | 1 | 1 | 3 | 3 | 3 |
| DC 1 | | | | | | | | | | |
| DC 2 I | 3 | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 |
| DC 3 $K_m$ | 126 | 9 | 22.5 | 45 | 78.75 | 126 | 189 | 22.5 | 45 | 78.75 |
| DC 4 | | | | | | | | | | |
| DC 5 P | 116 | 57 | 82 | 136 | 185 | 110 | 107 | 61 | 84 | 128 |
| DC 6 PFE | 0.8 | 0.1 | -0.4 | 0.4 | 0.3 | 1.0 | 1.5 | 0.2 | 0.3 | 0.1 |
| DC 7 MCE | 7 | 2 | -5 | 3 | 2 | 9 | bad noise 14 | 3 | 1 | 1 |
| DC 8 | 2.70 | 18.90 | 10.92 | 5.95 | 4.64 | 2.56 | 1.661 | 8.09 | 5.55 | 3.22 |
| DC AVG. | 0.6 | -0.1 | -0.6 | 0.2 | 0.1 | 0.8 | 1.4 | 0.0 | 0.1 | 0.0 |
| AC 1 | .370 | .529 | .916 | .504 | .647 | .391 | .602 | .371 | .541 | .933 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.2 | 0.1 | 0.1 | 0.2 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT Empire Mts.
LINE 12 HALF S SP. 1 DATE 7-14



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | | | | |
| RECEIVE | 45-52.5 → | | 52.5 → | | | | | | | |
| RANGE | 1 | 1 | 3 | 3 | 1 | 1 | | | | |
| DC 1 | | | | | | | | | | |
| DC 2 I | 2 | 3 | 3 | 3 | 2 | 2 | | | | |
| DC 3 KW | 126 | 189 | 45 | 78.75 | 126 | 189 | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 F | 172 | 100 | 64 | 87 | 132 | 169 | | | | |
| DC 6 PFE | 0.3 | 0.4 | 0.0 | 0.2 | 0.2 | 0.2 | | | | |
| DC 7 MCH | 2 | 4 | 0 | 2 | 2 | 1 | | | | |
| DC 8 | 2.69 | 1.558 | 4.21 | 3.29 | 2,062 | 1,770 | | | | |
| DC AVG. | 0.0 | 0.3 | -0.2 | 0.0 | 0.0 | 0.0 | | | | |
| AC 1 | .372 | .642 | .712 | .912 | .485 | .565 | | | | |
| AC 2 | -0.2 | 0.2 | 6.0 | 0.0 | 0.1 | 0.0 | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE ____ HALF ____ SP. ____ DATE ____

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 | 2-3 |
| RECEIVE | | | | | | 15-22.5 | | | | 22.5-30 |
| RANGE | | | | | | 2B | 2C | 4B | 4B | 4B |
| VOLTAGE | | | | | | 500 | 490 | 340 | 365 | 360 |
| CURRENT | | | | | | 2 | 2 | 3 | 3 | 3 |
| SEND | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | 22.5-30 | | | | 30-37.5 | | | | | |
| RANGE | 2B | 2C | 4B | 4B | 4B | 4B | 2B | 2C | 4B | 4B |
| VOLTAGE | 500 | 490 | 340 | 365 | 350 | 360 | 500 | 490 | 340 | 365 |
| CURRENT | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 | 3 | 3 |

FREQUENCIES DC AC

SENDER NO. GGG2-5

OPERATOR M°CLURE

RECEIVER NO.

OPERATOR

COMMENTS:

| | | | | | |
|---|---|---|---|---|---|
| 1-2 | 3 | 4B | 4-5 | 2 | 2C |
| 2-3 | 3 | 4B | 5-6 | 3 | 4B |
| 3-4 | 2 | 2B | 6-7 | 3 | 4B |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE ____ HALF ____ SP. ____ DATE ____

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 37.5-45 | | | | | → | 45-52.5 | → | → | → |
| RANGE | 4B | 4B | 2B | 2C | 4B | 4B | 4B | 4B | 2B | 2C |
| VOLTAGE | 350 | 360 | 500 | 490 | 340 | 345 | 350 | 360 | 500 | 480 |
| CURRENT | 3 | 3 | 2 | 2 | 3 | 3 | 3 | 3 | 2 | 2 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | | | | | |
| RECEIVE | 45-52.5 | 52.5-60 | → | → | → | | | | | |
| RANGE | 4B | 4B | 4B | 2B | 2C | | | | | |
| VOLTAGE | 340 | 350 | 360 | 500 | 480 | | | | | |
| CURRENT | 3 | 3 | 3 | 2 | 2 | | | | | |

FREQUENCIES DF AF

SENDER NO. 9662-S

OPERATOR McCLURE

RECEIVER NO.

OPERATOR

COMMENTS:

| | | | | | |
|---|---|---|---|---|---|
| 1-2 | 3 | 4B | 4-5 | 2 | 2C |
| 2-3 | 3 | 4B | 5-6 | 3 | 4B |
| 3-4 | 2 | 2B | 6-7 | 3 | 4B |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

a = 1000'

PROJECT EMPIRE #463
LINE 13 HALF N SP. 1 DATE 10-15-70

PAGE 1

| SEND | CAL | S.P | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 2-3 | 0-10N | 10-20N | → | 20-30N | → | → | 30-40N | → | → |
| RANGE | 1.0 | | 1.0 | 0.1 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.0 | | 1.9 | 1.1 | 1.2 | 2.0 | 1.7 | 0.7 | 2.2 | 2.4 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 1.0 | | 3.0 | 0.3 | 3.0 | 3.0 | 0.5 | 3.0 | 3.0 | 3.0 |
| DC 5 # | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| DC 6 # | | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.6 | | 44.8 | 2.81 | 57.8 | 15.4 | 2.05 | 96.1 | 17.8 | 8.71 |
| AC 2 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -3.7 | +11.3 | | +8.0 | | | +26.0 | | |
| AC NOISE | 1.0 | | | | | | | | | |
| POT RES. | 0.1 | 2K | 3K | | 3K | | | 3K | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 13 HALF N SP. 1 DATE 10-15-20



| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-40N | 40-50N | ← | ← | ← | → | 50-60N | ← | ← | → |
| RANGE | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | 0.01 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | 2.8 | 1.2 | 1.7 | 1.2 | 2.3 | 2.7 | 1.6 | 1.6 | 2.6 | 2.9 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cur | 0.5 | 3.0 | 3.0 | 3.0 | 3.0 | 0.5 | 3.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| DC 6 # | 4 | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.32 | 67.8 | 21.8 | 6.67 | 3.41 | 0.769 | 24.8 | 11.9 | 3.88 | 3.00 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +18.3 | | | | | +8.7 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 1K | | | | | 2K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 13 HALF N SP. 1 DATE 10-15-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | |
| RECEIVE | 50-60N | 60-70N | → | → | → | 70-80N | → | → | | |
| RANGE | 0.01 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.01 | | |
| DC 1 | 1.8 | 1.7 | 1.7 | 2.6 | 3.3 | 1.6 | 3.0 | 2.7 | 0.0 | 0.0 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CHR | 0.5 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 0.0 | 0.0 |
| DC 5 # | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| DC 6 # | 6 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | 0.0 | 0.0 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.577 | 6.93 | 3.79 | 1.49 | 1.17 | 3.40 | 1.93 | 0.968 | 0.0 | 0.0 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +6.7 | | | | +13.3 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 2K | | | | 2K | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 13 HALF N SP. 1 DATE 10-15-74

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 10-20N | → | 20-30N | → | → | 30-40N | → | → | → | 40-50N |
| RANGE | 30X100 | 3X100 | 30X100 | 30X100 | 3X166 | 30X100 | 30X100 | 30X100 | 3X166 | 30X100 |
| VOLTAGE | 340 | 460 | 280 | 340 | 7.90 | 340 | 280 | 360 | 790 | 280 |
| CURRENT | 3.0 | .3 | 3.0 | 3.0 | .5 | 3.0 | 3.0 | 3.0 | .5 | 3.0 |
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 40-50N | → | → | → | 50-60N | → | → | → | → | 60-70N |
| RANGE | 30X100 | 30X100 | 30X100 | 3X166 | 30X100 | 30X100 | 30X100 | 30X100 | 3X166 | 30X100 |
| VOLTAGE | 340 | 280 | 340 | 770 | 280 | 340 | 280 | 340 | 780 | 280 |
| CURRENT | 3.0 | 3.0 | 3.0 | 0.5 | 3.0 | 3.0 | 3.0 | 3.0 | 0.5 | 3.0 |

FREQUENCIES 1 0.1

SENDER NO. 66 445

OPERATOR Pat McManus

RECEIVER NO. 20693R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #469

LINE 42 HALF W SP. 1 DATE 10-15-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 5-1 | 4-5 | 3-4 | | | | |
| RECEIVE | ← | ← | → | 70-80m | ← | → | | | | |
| RANGE | 30X100 | 30X100 | 30X100 | 30X100 | 30X100 | 30X100 | | | | |
| VOLTAGE | 340 | 280 | 340 | 280 | 340 | 280 | | | | |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | | |
| SEND | 2-3 | " | " | | | | | | | |
| RECEIVE | CAL | | | | | | | | | |
| RANGE | 10X100 | | | | | | | | | |
| VOLTAGE | 110 | | | | | | | | | |
| CURRENT | 1.0 | | | | | | | | | |

FREQUENCIES 1 D.1

SENDER NO. 66445

OPERATOR PAT M°ANUS

RECEIVER NO. 20693R

OPERATOR BILL FREEMAN

COMMENTS:

Supplemental Data

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 13 HALF N SP. 1 DATE 10-15-2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | | | | | | | | | |
| RECEIVE | 70-80N | | | | | | | | | |
| RANGE | | | | | | | | | | |
| DC 1 3Hz | 0.938 | | | | | | | | | |
| DC 2 1Hz | 3.0 | | | | | | | | | |
| DC 3 0.3Hz | 4.6 | | | | | | | | | |
| DC 4 0.1Hz | 4.6 | 5.6" | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | | | | | | | | |
| AC 2 | | | | | | | | | | |
| AC AVG. | 0.0 | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

OVER!!

PAGE 1

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 13 HALF S SP. 1 DATE 11-12-76

| SEND | 3-4 | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | CAL | 0-10S | → | 10-20S | ——— | ——→ | 20-30S | ——— | ——— | ——→ |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 10 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.0 | 1.6 | 2.1 | 0.9 | 1.1 | 1.6 | 0.8 | 0.4 | 6.2 | 5.1 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cur | 1.0 | 3.0 | 3.0 | 3.333 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| DC 5 # | | 1 | 4 | 7 | 2 | 5 | 28 | 24 | 30 | 31 |
| DC 6 # | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.7 | 44.5 | 15.2 | 85.0 | 37.7 | 16.4 | 128. | 44.2 | 19.8 | 15.7 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +8.0 | | +17.2 | | | 120.2 | | | |
| AC NOISE | 1.0 | | | | | | | | | |
| POT RES. | 0.1 | 2K | | 8K | | | 20K | | | |

CIENEGA @ 47

RADIO TROUBLE

PAGE 2

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 13 HALF S SP. 1 DATE 10-14-2

| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-40S | → | → | → | → | 40-50S | → | → | → | → |
| RANGE | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.01 |
| DC 1 | 0.6 | 4.2 | 22.5 | -6.1 | -10.2 | 0.6 | 2.6 | 2.7 | 4.1 | 5.5 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Coil | 1.6 | 4.0 | 4.0 | 4.0 | 4.0 | 0.6 | 3.0 | 4.0 | 3. | 4. |
| DC 5 # | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 |
| DC 6 # | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 6.68 | 22.2 | 2.42 | 9.47 | 2.01 | 2.18 | 2.32 | 1.56 | 1.08 | 1.023 |
| AC 2 | 0.2 | -0.2 | -0.3 | 0.0 | 0.0 | -0.3 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -20.1 | | | | | +14.6 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 12K | | | | | 6K | | | | |

GENERATOR SHUT DOWN

PAGE 3

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 13 HALF 5 SP. 1 DATE 10-14-76

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | 3-4 | |
| RECEIVE | 50-60 | — | — | → | 60-70 | — | → | | | 60-70 | |
| RANGE | 0.1 | 0.01 | 0.1 | 0.01 | 0.01 | 0.1 | 0.1 | | | 1.12 | 3HZ |
| DC 1 | 0.1 | 5.1 | 2.9 | 9.0 | 0.9 | 3.3 | 3.4 | | | 4.2 | 1 HZ |
| DC 2 | | | | | | | | | | 8.1 | 0.3 HZ |
| DC 3 | | | | | | | | | | 9.5 | 0.1 HZ |
| DC 4 Cm | 0.6 | 3.0 | 4.0 | 3.0 | 0.6 | 3.0 | 4.0 | | | | |
| DC 5 # | 42 | 43 | 44 | 45 | 46 | 47 | 48 | | | | |
| DC 6 " | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | | |
| DC 7 | | | | | | | | | | SK 1 | |
| DC 8 | | | | | | | | | | | |
| DC AVG. | | | | | | | | | | | |
| AC 1 | 1.28 | 0.984 | 1.31 | 0.707 | 0.771 | 1.07 | 1.17 | | | | |
| AC 2 | 0.1 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | 0.0 | |
| AC AVG. | | | | | | | | | | | |
| S.P. | +26.3 | | | | -1.4 | | | | | | |
| AC NOISE | | | | | | | | | | | |
| POT RES. | 2K | | | | 1K | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE # 463

LINE 13 HALF S SP. 1 DATE 10-14-74



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | CAL | 0-10s | → | 10-20s | → | → | 20-30s | → | → | → |
| RANGE | 10X100 | 10X300 | 10X300 | 10X333 | 30X133 | 30X133 | 30X133 | 30X133 | 30X133 | 30X133 |
| VOLTAGE | 100 | 340 | 280 | 340 | 460 | 380 | 480 | 400 | 460 | 370 |
| CURRENT | 1.0 | 3.0 | 3.0 | 3.333 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 | 4.0 |
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 30-40s | → | → | → | → | 40-50s | → | → | → | → |
| RANGE | 3X200 | 30X133 | 30X133 | 30X133 | 30X133 | 3X200 | 30X100 | 30X133 | 30X100 | 30X133 |
| VOLTAGE | 940 | 480 | 400 | 460 | 370 | 900 | 350 | 390 | 330 | 360 |
| CURRENT | .6 | 4.0 | 4.0 | 4.0 | 4.0 | 0.6 | 3.0 | 4.0 | 3.0 | 4.0 |

FREQUENCIES 1. 0.1

SENDER NO. 66445

OPERATOR PAT MCMANUS

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire # 463

LINE 13 HALF 5 SP. 1 DATE 10-14-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | |
| RECEIVE | 50-60s | → | → | → | 60-70s | → | → | | | |
| RANGE | 3X200 | 30X100 | 30X133 | 30X100 | 3X200 | 30X100 | 30X133 | | | |
| VOLTAGE | 900 | 340 | 380 | 330 | 900 | 340 | 380 | | | |
| CURRENT | 0.6 | 3.0 | 4.0 | 3.0 | 0.6 | 3.0 | 4.0 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 1 0.1

SENDER NO. 66445

OPERATOR PAT Mc MANUS

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

LIMESTONE

PAGE 28

HEINRICHS GEOEXPLORATION CO. Supplemental Data

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 13 HALF S SP. 1 DATE 10-14-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 3-4 | 4-5 | | | 4-5 | | 5-6 |
| RECEIVE | 30-40s | | | | | | | | | |
| RANGE (I) | 0.3 amp | 4.0 | 4.0 | @ 40s V | 4.0 amp | | | 3.0 amp | | 3.0 amp |
| DC 1 3Hz | 3.33 | 21.8 | 2.37 | 2.31 | 9.50 | | | 7.12 | | 1.51 |
| DC 2 1Hz | 0.4 | 1.5 | 1.8 | 1.6 | -0.4 | | | -0.6 | | 0.8 |
| DC 3 0.3 | 0.8 | 3.5 | 9.5 | 10.0 | -2.0 | | | -3.1 | | -2.6 |
| DC 4 0.1 | 1.4 | 5.9 | — | 25.0 | | | | -7.5 | | -10.5 |
| DC 5 DC | 1.0 | 6.5 12.0<br>12.0 6.5 | 18.0 21.0<br>60.0 64.0 | | — | 0.1 DC | ← | -30.0 -37.0<br>+2.0 +5.0 | 0.3 | +16.0 +12.0<br>-36.0 -18.0 |
| DC 6 DC | 2.3 0.3 | 7.0 7.0<br>10.5 10.5 | 16.0 16.0<br>62.0 62.0 | | — | | | -27.0 -22.0<br>+6.0 +5.0 | | +18.0 +30.0<br>-37.0 -36.0 |
| DC 7 DC | 0.8 | 2.7 6.7<br>6.3 2.3 | 12.0 15.0<br>16.0 13.0 | | — | 0.3 DC | ← | -34.0 -28.0<br>+20.0 +18.0 | | -20.0 -16.0<br>-35.0 -37.0 |
| DC 8 DC | 3.1 0.3 | 2.0 2.3<br>7.0 6.7 | 18.0 13.0<br>10.0 17.0 | | — | | | -36.0 +18.0<br>+18.0 -36.0 | 0.1 | -16.0 -36.0<br>-23.0 -31.0 |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.0 | 0.0 | | | HAD TO | | | | | 0.0 |
| AC 2 | | | | | Drop | | | | | |
| AC AVG. | | | | | Current | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

JOB 463 LINE 13 1/2 N SP1 10/15/70
CAL GROUP NO. 1

1000 FEET=DIPOLE LENGTH

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.600 | 0.00 | 1.00 | .10 | 0.0000 | 1.0246 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 46.77 | 1.90 | 40.6 | 1.90 | 40.6 | 0.00 | ** | 1.90 | 3.00 | 1 | 1 | 44.800 | 0.00 |
| 2 | 2 | 116.43 | 1.10 | 9.4 | 1.10 | 9.4 | 0.00 | ** | 1.10 | .30 | 2 | 2 | 2.810 | 0.00 |
| 3 | 1 | 59.93 | 1.20 | 20.0 | 1.20 | 20.0 | 0.00 | ** | 1.20 | 3.00 | 3 | 1 | 57.800 | 0.00 |
| 4 | 2 | 64.38 | 2.00 | 31.1 | 1.89 | 29.4 | .11 | ** | 2.00 | 3.00 | 4 | 2 | 15.400 | 0.00 |
| 5 | 3 | 128.17 | 1.70 | 13.3 | 1.60 | 12.5 | .10 | ** | 1.70 | .50 | 5 | 3 | 2.050 | 0.00 |
| 6 | 1 | 99.15 | .70 | 7.1 | .70 | 7.1 | 0.00 | ** | .70 | 3.00 | 6 | 1 | 96.100 | 0.00 |
| 7 | 2 | 74.56 | 2.20 | 29.5 | 2.11 | 28.3 | .09 | ** | 2.20 | 3.00 | 7 | 2 | 17.800 | 0.00 |
| 8 | 3 | 91.38 | 2.40 | 26.3 | 2.24 | 24.5 | .16 | ** | 2.40 | 3.00 | 8 | 3 | 8.710 | 0.00 |
| 9 | 4 | 166.84 | 2.80 | 16.8 | 2.67 | 16.0 | .13 | ** | 2.80 | .50 | 9 | 4 | 1.320 | 0.00 |
| 10 | 1 | 70.30 | 1.20 | 17.1 | 1.20 | 17.1 | 0.00 | ** | 1.20 | 3.00 | 10 | 1 | 67.800 | 0.00 |
| 11 | 2 | 90.86 | 1.70 | 18.7 | 1.70 | 18.7 | 0.00 | ** | 1.70 | 3.00 | 11 | 2 | 21.800 | 0.00 |
| 12 | 3 | 69.16 | 1.20 | 17.4 | .97 | 14.0 | .23 | ** | 1.20 | 3.00 | 12 | 3 | 6.670 | 0.00 |
| 13 | 4 | 71.48 | 2.30 | 32.2 | 1.88 | 26.3 | .42 | ** | 2.30 | 3.00 | 13 | 4 | 3.410 | 0.00 |
| 14 | 5 | 169.93 | 2.70 | 15.9 | 2.49 | 14.6 | .21 | ** | 2.70 | .50 | 14 | 5 | .769 | 0.00 |
| 15 | 2 | 103.27 | 1.60 | 15.5 | 1.60 | 15.5 | 0.00 | ** | 1.60 | 3.00 | 15 | 2 | 24.800 | 0.00 |
| 16 | 3 | 123.88 | 1.60 | 12.9 | 1.50 | 12.1 | .10 | ** | 1.60 | 3.00 | 16 | 3 | 11.900 | 0.00 |
| 17 | 4 | 81.58 | 2.50 | 30.6 | 2.15 | 26.4 | .35 | ** | 2.60 | 3.00 | 17 | 4 | 3.880 | .20 |
| 18 | 5 | 110.70 | 2.90 | 26.2 | 2.52 | 22.7 | .38 | ** | 2.90 | 3.00 | 18 | 5 | 3.000 | 0.00 |
| 19 | 6 | 202.21 | 1.80 | 8.9 | 1.54 | 7.6 | .26 | ** | 1.80 | .50 | 19 | 6 | .577 | 0.00 |
| 20 | 3 | 72.21 | 1.70 | 23.5 | 1.48 | 20.5 | .22 | ** | 1.70 | 3.00 | 20 | 3 | 6.930 | 0.00 |
| 21 | 4 | 78.98 | 1.70 | 21.5 | 1.33 | 16.9 | .37 | ** | 1.70 | 3.00 | 21 | 4 | 3.790 | 0.00 |
| 22 | 5 | 54.82 | 2.60 | 47.4 | 1.61 | 29.3 | .99 | ** | 2.60 | 3.00 | 22 | 5 | 1.490 | 0.00 |
| 23 | 6 | 69.35 | 3.30 | 47.6 | 2.20 | 31.7 | 1.10 | ** | 3.30 | 3.00 | 23 | 6 | 1.170 | 0.00 |
| 24 | 4 | 70.79 | 1.60 | 22.6 | 1.17 | 16.6 | .43 | ** | 1.60 | 3.00 | 24 | 4 | 3.400 | 0.00 |
| 25 | 5 | 71.29 | 3.00 | 42.1 | 2.30 | 32.3 | .70 | ** | 3.00 | 3.00 | 25 | 5 | 1.930 | 0.00 |
| 26 | 6 | 57.04 | 2.70 | 47.3 | 1.27 | 22.3 | 1.43 | ** | 2.70 | 3.00 | 26 | 6 | .968 | 0.00 |

JOB 463 LINE 13 1/2 S SP1 10/14/70 1000 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.700 | 0.00 | 1.00 | .10 | 0.0000 | 1.0235 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 46.28 | 1.60 | 34.6 | 1.60 | 34.6 | 0.00 | ** | 1.60 | 3.00 | 1 | 1 | 44.500 | 0.00 |
| 4 | 2 | 63.54 | 2.10 | 33.1 | 1.99 | 31.3 | .11 | ** | 2.10 | 3.00 | 4 | 2 | 15.200 | 0.00 |
| 27 | 1 | 79.01 | .90 | 11.4 | .90 | 11.4 | 0.00 | ** | .90 | 3.33 | 27 | 1 | 85.000 | 0.00 |
| 2 | 2 | 117.04 | 1.10 | 9.4 | 1.10 | 9.4 | 0.00 | ** | 1.10 | 4.00 | 2 | 2 | 37.700 | 0.00 |
| 5 | 3 | 127.91 | 1.60 | 12.5 | 1.50 | 11.7 | .10 | ** | 1.60 | 4.00 | 5 | 3 | 16.400 | 0.00 |
| 28 | 1 | 99.05 | .80 | 8.1 | .80 | 8.1 | 0.00 | ** | .80 | 4.00 | 28 | 1 | 128.000 | 0.00 |
| 29 | 2 | 136.26 | .40 | 2.9 | .40 | 2.9 | 0.00 | ** | .40 | 4.00 | 29 | 2 | 44.200 | 0.00 |
| 30 | 3 | 161.42 | 6.20 | 38.4 | 6.20 | 38.4 | 0.00 | ** | 6.20 | 4.00 | 30 | 3 | 19.800 | 0.00 |
| 31 | 4 | 253.34 | 5.10 | 20.1 | 5.10 | 20.1 | 0.00 | ** | 5.10 | 4.00 | 31 | 4 | 15.700 | 0.00 |
| 32 | 1 | 34.39 | .50 | 14.5 | .43 | 12.5 | .07 | ** | .60 | .60 | 32 | 1 | 6.680 | .20 |
| 33 | 2 | 71.03 | 4.30 | 60.5 | 4.21 | 59.2 | .09 | ** | 4.20 | 4.00 | 33 | 2 | 22.200 | -.20 |
| 34 | 3 | 22.75 | 22.65 | 995.6 | 21.60 | 949.3 | 1.05 | ** | 22.50 | 4.00 | 34 | 3 | 2.420 | -.30 |
| 35 | 4 | 136.53 | -6.10 | -44.7 | -6.27 | -45.9 | .17 | ** | -6.10 | 4.00 | 35 | 4 | 9.470 | 0.00 |
| 36 | 5 | 48.50 | -10.20 | -210.3 | -11.37 | -234.4 | 1.17 | ** | -10.20 | 4.00 | 36 | 5 | 2.010 | 0.00 |
| 37 | 2 | 44.89 | .75 | 16.7 | .57 | 12.7 | .18 | ** | .60 | .60 | 37 | 2 | 2.180 | -.30 |
| 38 | 3 | 24.36 | 2.60 | 106.7 | 1.64 | 67.3 | .96 | ** | 2.60 | 3.00 | 38 | 3 | 2.320 | 0.00 |
| 39 | 4 | 24.60 | 2.70 | 109.8 | .96 | 38.9 | 1.74 | ** | 2.70 | 4.00 | 39 | 4 | 1.560 | 0.00 |
| 40 | 5 | 40.28 | 4.10 | 101.8 | 2.61 | 64.8 | 1.49 | ** | 4.10 | 3.00 | 40 | 5 | 1.080 | 0.00 |
| 41 | 6 | 46.40 | 5.50 | 118.5 | 3.63 | 78.3 | 1.87 | ** | 5.50 | 4.00 | 41 | 6 | 1.023 | 0.00 |
| 42 | 3 | 65.57 | .05 | .8 | -.20 | -3.0 | .25 | ** | .10 | .60 | 42 | 3 | 1.280 | .10 |
| 43 | 4 | 21.17 | 4.85 | 229.1 | 2.73 | 129.1 | 2.12 | ** | 5.10 | 3.00 | 43 | 4 | .984 | .50 |
| 44 | 5 | 36.22 | 2.90 | 80.1 | 1.19 | 32.8 | 1.71 | ** | 2.90 | 4.00 | 44 | 5 | 1.310 | 0.00 |
| 45 | 6 | 44.17 | 9.00 | 203.8 | 7.01 | 158.7 | 1.99 | ** | 9.00 | 3.00 | 45 | 6 | .707 | 0.00 |
| 46 | 4 | 79.63 | .90 | 11.3 | .54 | 6.8 | .36 | ** | .90 | .60 | 46 | 4 | .771 | 0.00 |
| 47 | 5 | 39.60 | 3.30 | 83.3 | 1.77 | 44.8 | 1.53 | ** | 3.30 | 3.00 | 47 | 5 | 1.070 | 0.00 |
| 48 | 6 | 52.01 | 3.40 | 65.4 | 1.79 | 34.4 | 1.61 | ** | 3.40 | 4.00 | 48 | 6 | 1.170 | 0.00 |

WATCH SIGN ON S.P.! NOISY!

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE #463

LINE 13 HALF N SP. 2 DATE 11-2-70

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 |
| RECEIVE | 4-5 | 20-30S | 10-20S | → | 0-10S | → | 0-10N | → | 10-20N | → |
| RANGE | 1.0 | 10 | 1.0 | 1.0 | 0.1 | 0.1 | 0.01 | 0.1 | 0.1 | 0.1 |
| DC 1 3Hz | 97.8 | 310. | 17.6 | 11.0 | 7.75 | 2.34 | .901 | 1.14 | 3.23 | 1.06 |
| DC 2 1Hz | −0.1 | 0.3 | 0.5 | 0.6 | 1.8 | 1.9 | 5.4 | 3.3 | −0.5 | 3.3 |
| DC 3 0.3Hz | −0.1 | 0.7 | 0.9 | 1.1 | 3.8 | 3.3 | 16.5 | 4.5 | −2.7 | 6.4 |
| DC 4 0.1Hz | 0.0 | 1.2 | 1.3 | 1.4 | 6.4 | 4.8 | 33.0 | 5.9 | −8.4 | 8.0 |
| DC 5 Ku | | 3.0 | 3.0 | 12.0 | 12.0 | 30.0 | 30.0 | 60.0 | 60.0 | 105.0 |
| DC 6 K | | 1 | 1 | 2 | 2 | 3 | 3 | 4 | 4 | 5 |
| DC 7 CUR | 1.0 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.8 | 310. | 17.6 | 11.0 | 7.75 | 2.34 | 0.901 | 1.14 | 3.23 | 1.06 |
| AC 2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | −7.5 | +5.7 | | +14.4 | | +5.4 | | +14.1 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 26K | 17K | | 14K | | 30K | | 20K | |

New Electrodes:

$$\text{Receiving stations} = \frac{\text{Sending stations}}{10}$$

Like 50s = 5 for sending sta.

VERY NOISY!

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #163
LINE 13 HALF N SP. 2 DATE 19-2-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 4-5 | | | | | | | | |
| RECEIVE | 20-30N | → | | | | | | | | |
| RANGE | 0.01 | 0.01 | | | | | | | | |
| DC 1 3Hz | 0.322 | 0.691 | | | | | | | | |
| DC 2 1 Hz | -2.1 | 5.5 | | | | | | | | |
| DC 3 0.3Hz | -9.0 | 11.0 | | | | | | | | |
| DC 4 0.1Hz | -21.5 | 12.5 | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 Kω | 105.0 | 168.0 | | | | | | | | |
| DC 7 ∿ | 5 | 6 | | | | | | | | |
| DC 8 CUR | 1.5 | 3.0 | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.322 | 0.691 | | | | | | | | |
| AC 2 | 0.0 | 0.0 | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +30.7 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 40K | | | | | | | | | |

70

15 | 1050
90
150

70
15 | 1050
105

56.0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463 LINE 13 HALF N SP. 2 DATE 11-2-74



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 |
| RECEIVE | 4-5 | 20-30S | 10-20S | → | 0-10S | → | 0-10N | → | 10-20N | → |
| RANGE | 10x100 | 10x30 | 10x150 | 10x300 | 10x150 | 10x300 | 10x150 | 10x300 | 10x150 | 10x300 |
| VOLTAGE | 120 | 360 | 750 | 360 | 750 | 360 | 750 | 360 | 750 | 360 |
| CURRENT | 1.0 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 |
| SEND | 3-4 | 4-5 | 3-4 | | | | | | | |
| RECEIVE | 20-30N | → | 30-40N | | | | | | | |
| RANGE | 10x150 | 10x300 | | | | | | | | |
| VOLTAGE | 750 | 360 | | | | | | | | |
| CURRENT | 1.5 | 3.0 | | | | | | | | |

FREQUENCIES 3.0, 1.0, 0.3, 0.1

SENDER NO. 66445

OPERATOR AL GOTMER

RECEIVER NO. 20693-R

OPERATOR BILL FREEMAN

COMMENTS: Check on Line 13 CDP

EMPIRE # 463. 2nd November 1970.

LINE 13.

SPR II

N1/2

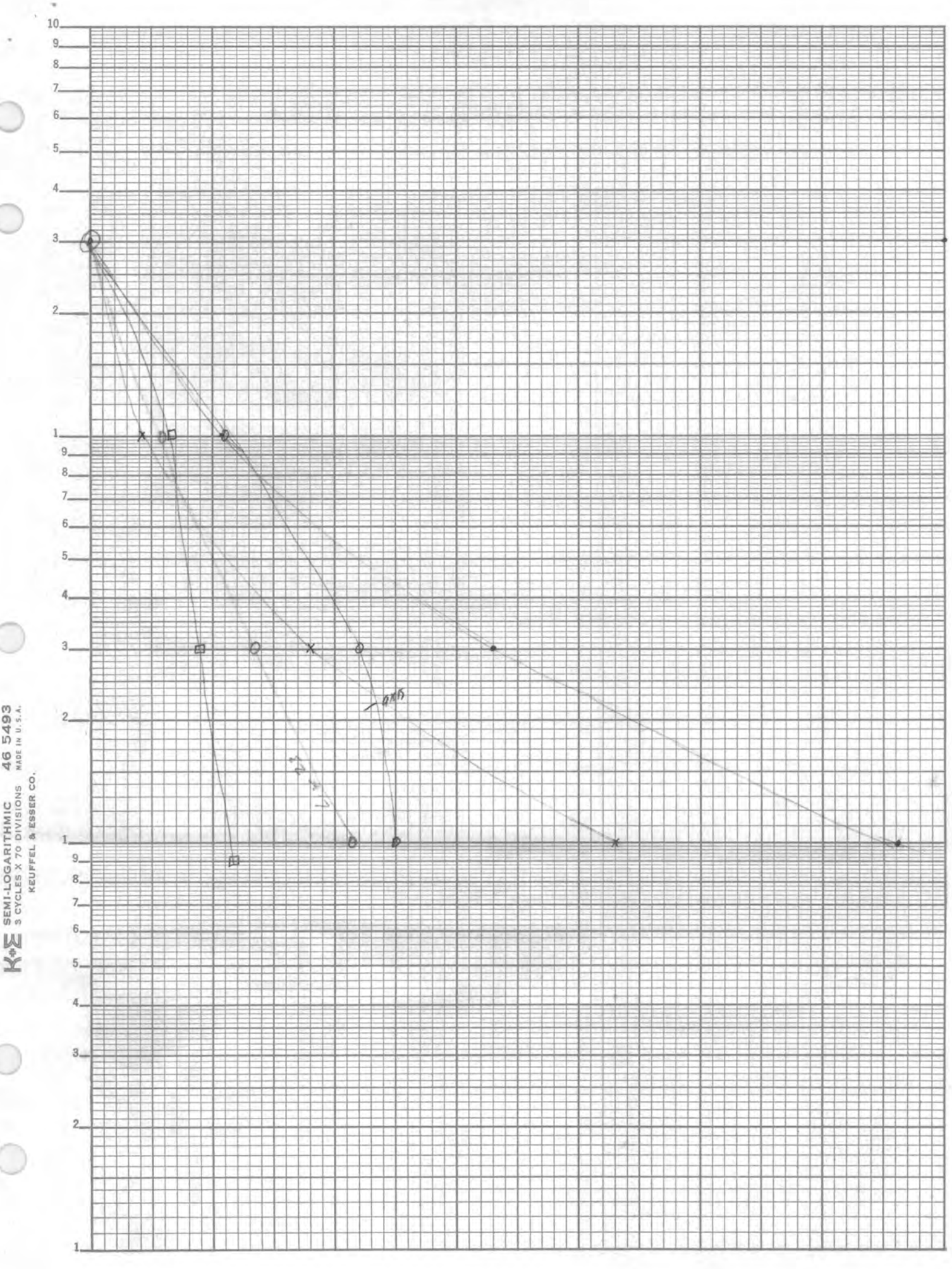
$\rho_{dc}/2\pi = \left(\frac{K_u}{I}\right) \cdot (cal) \cdot (V_{dc})$

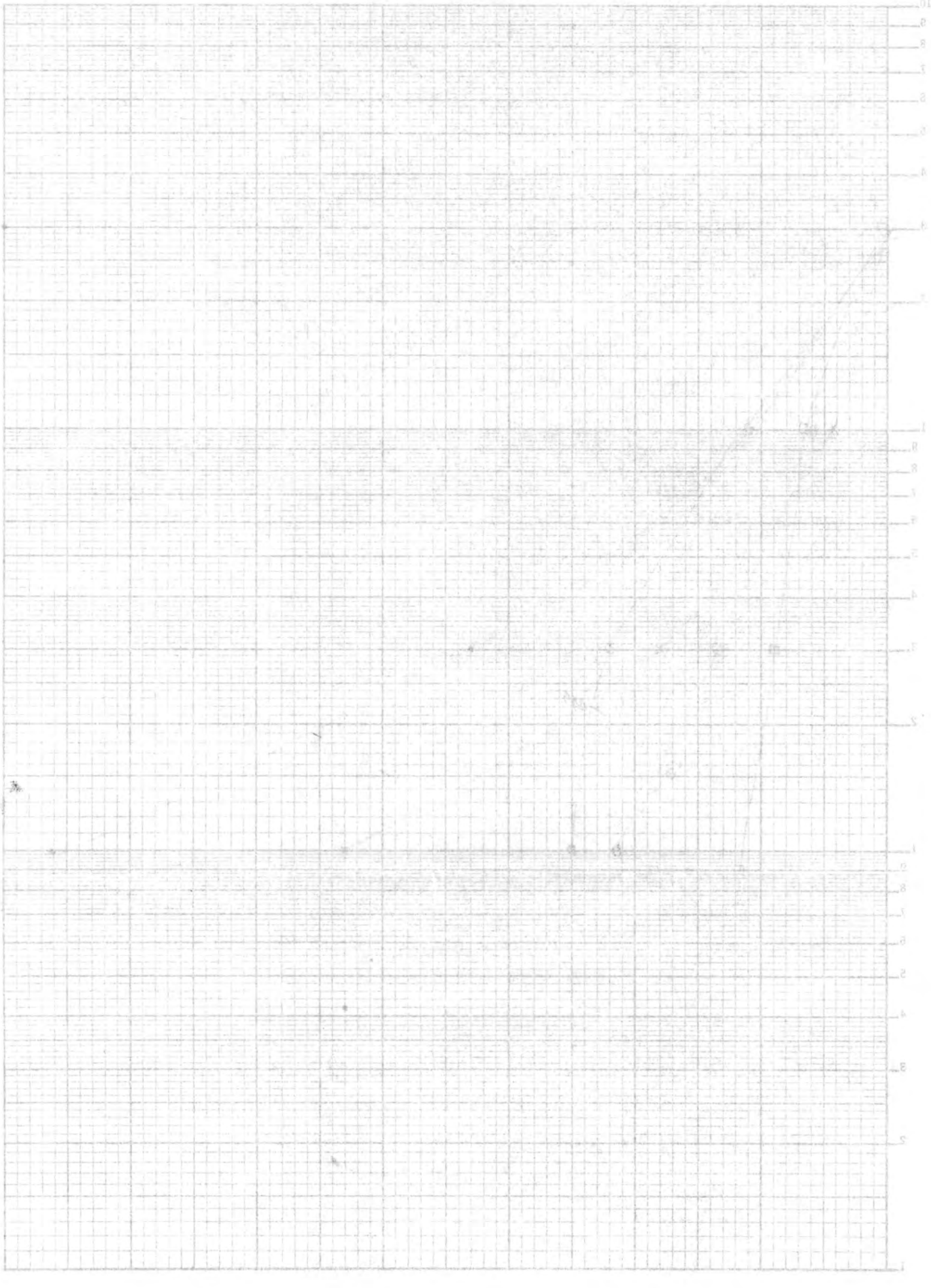
| | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 20-30 | 10S → | 20S. | 10S → | 0 | 0 → | 10N | 10N → | 20N | 20N → | 30N |
| P.F.E. 0.1/1.0 | 0.9 | 0.8 | 0.8 | 4.6 | 2.9 | 27.6 | 2.6 | -7.9 | 4.7 | -19.4 | 7.0 |
| $V_{30}$ | 310 | 17.6 | 11.0 | 7.75 | 2.34 | 0.901 | 1.14 | 3.23 | 1.06 | 0.322 | 0.641 |
| $V_{0.1}$ | 313.7 | 17.83 | 11.15 | 8.25 | 2.45 | 1.20 | 1.21 | 2.96 | 1.15 | 0.25 | 0.78 |
| $K_u$ | 3.0 | 3.0 | 12.0 | 12.0 | 30.0 | 30.0 | 60.0 | 60.0 | 105.0 | 105.0 | 168.0 |
| I | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 | 1.5 | 3.0 |
| $\rho_{dc}/2\pi$ | 321 | 37 | 46 | 68 | 25 | 25 | 25 | 121 | 41 | 18 | 45 |
| M.C.F. | 2.8 | 22 | 17 | 68 | 116 | 1104 | 104 | -65 | 115 | -1078 | 156. |

A.C. cal $= \frac{100}{97.8}$

$= 1.02249$

M.C.F. $= \frac{PFE}{\rho/2\pi} \cdot 1000$

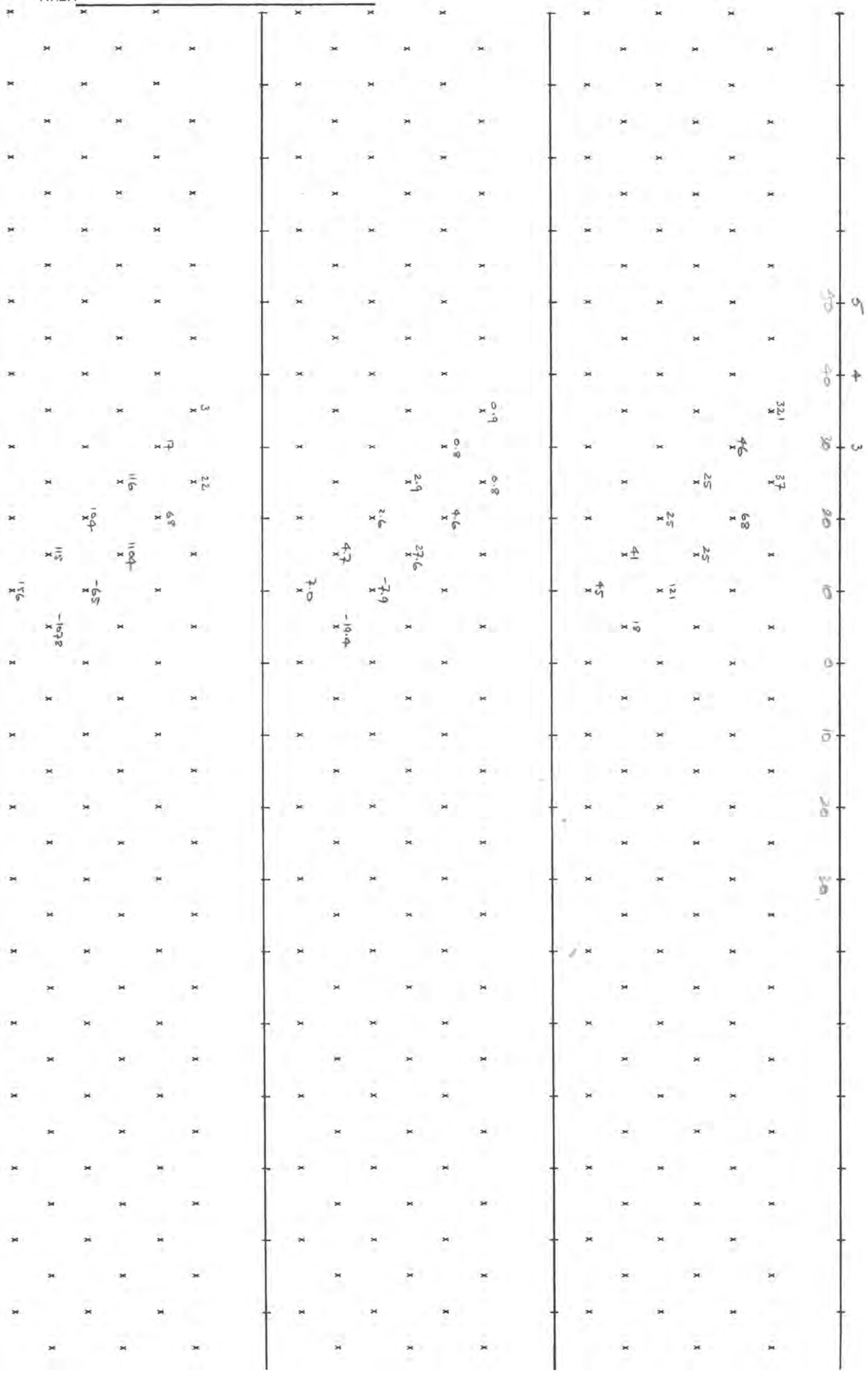

SEMI-LOGARITHMIC
3 CYCLES X 70 DIVISIONS
KEUFFEL & ESSER CO.
46 5493
MADE IN U.S.A.



JOB# _____ LINE# 3 SP II a = 1050 LOOKING _____

CLIENT _____ DATE _____ FREQUENCIES _____ & _____ Hz

AREA _____



Job. 463, Line 14, Sp 1 5½, 8/25/70 750.

a=750'

BEARING: N

PAGE 1

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE
LINE 14 HALF S SP. 1 DATE 8-25-2

| SEND | 4-5 | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | CAL | 0-7.5s | → | 7.5-15s | — | → | 15-22.5 | — | — | → |
| RANGE | ~~10~~ | 1.0 | ~~1.0~~ | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | 0.0 | 1.5 | 2.2 | 1.4 | 2.0 | 2.3 | 1.7 | 1.9 | 2.1 | 2.6 |
| DC 2 | | | | | | | | | | |
| DC 3 | 3.5 | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 |
| DC 4 | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. | 9. |
| DC 5 | | 1. | 2. | 1" | 2. | 3. | 1' | 2. | 3' | 4' |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 350. | 24.3 | 10.9 | 46.5 | 14.1 | 8.30 | 36.1 | 16.7 | 7.50 | 4.96 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | 3.0 | | | | | | | | | |
| S.P. | 0.3 | +9.7 | | +0.0 | | | +6.9 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 2K | | 0.8K | | | 9K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

GROUNDED FENCE ℄ ≈ 20'

PROJECT EMPIRE 463
LINE 14 HALF 5 SP. 1 DATE 8-25-70



| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5 — | 30 s | — | — | → | 30-37.5 s | — | — | — | → |
| RANGE | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 |
| DC 1 | 2.0 | 2.0 | 2.3 | 2.1 | 2.4 | 1.1 | 2.2 | 1.9 | 1.6 | 2.3 |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.0 |
| DC 4 # | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. | 19. |
| DC 5 n | 1. | 2. | 3. | 4. | 5. | 1. | 2. | 3. | 4. | 5. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 36.9 | 17.9 | 10.18 | 5.31 | 3.71 | 55.7 | 16.3 | 9.89 | 6.64 | 3.53 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.0 | 0.0 | -0.2 | -0.2 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +8.0 | | | | | +3.5 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 1K | | | | | 1K | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 14 HALF S SP. 1 DATE 8-25-76

| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-37.5 | 37.5-45 | 5 | → | → | → | 45-52.5 | → | → | → |
| RANGE | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 |
| DC 1 | 3.2 | 1.4 | 2.0 | 1.9 | 2.5 | 2.7 | 2.1 | 1.9 | 1.6 | 1.8 |
| DC 2 | | | | | | | | | | |
| DC 3 Cut | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 |
| DC 4 # | 20. | 21 | 22. | 23. | 24. | 25. | 26. | 27. | 28. | 29. |
| DC 5 n | 6. | 2. | 3. | 4. | 5. | 6. | 3. | 4. | 5. | 6. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 2.58 | 19.6 | 9.48 | 6.33 | 4.63 | 2.61 | 12.2 | 8.34 | 6.04 | 4.86 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | + | | | | | | | | |
| S.P. | | + 10.0 | | | | | -2.8 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 1K | | | | | 2K | | | |

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 14 HALF S SP. 1 DATE 8-25-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 52.5-60 | " | → | | | | | | | |
| RANGE | ~~0.1~~ | 0.1 | ~~0.1~~ | | | | | | | |
| DC 1 | 2.3 | 2.5 | 2.9 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | 3.5 | 3.5 | 3.5 | | | | | | | |
| DC 4 | 30. | 31 | 32. | | | | | | | |
| DC 5 | 4' | 5' | 6' | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 7.19 | 5.08 | 3.82 | | | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +11.7 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 2K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 14 HALF S SP. 1 DATE 8/25/

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | 4-5 | 0-7.5 S | → | 0-15 S | → | → | 15→22.5 S | → | → | → |
| RANGE | 350X10 | 300X10 | 350X10 | 350X10 | 300X10 | 350X10 | 350X10 | 350X10 | 300X10 | 350X10 |
| VOLTAGE | 170 | 190 | 200 | 165 | 190 | 200 | 150 | 165 | 190 | 200 |
| CURRENT | 3.5 | 3.0 | 3.5 | 3.5 | 3.0 | 3.5 | 2.5 | 3.5 | 3.0 | 3.5 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 22.5→30 S | → | → | → | → | 30→37.5 S | → | → | → | → |
| RANGE | 350X10 | 350X10 | 350X10 | 300X10 | 350X10 | 350X10 | 350X10 | 350X10 | 350X10 | 300X10 |
| VOLTAGE | 150 | 150 | 165 | 190 | 200 | 155 | 165 | 150 | 165 | 190 |
| CURRENT | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.0 |

FREQUENCIES 3.0 0.3

SENDER NO. 9662-5

OPERATOR E.M.B.

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 14 HALF S SP. 1 DATE 8/28/72

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 30→37.5 | 37.5→45 | → | → | → | → | 45→52.5 | → | → | → |
| RANGE | 350X10 | 350X10 | 350X10 | 350X10 | 350X10 | 300X10 | 350X10 | 350X10 | 350X10 | 350X10 |
| VOLTAGE | 200 | 153 | 155 | 150 | 165 | 190 | 153 | 155 | 150 | 165 |
| CURRENT | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 |
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 52.5→60 | → | → | | | | | | | |
| RANGE | 350X10 | 350X10 | 350X10 | | | | | | | |
| VOLTAGE | 153 | 155 | 150 | | | | | | | |
| CURRENT | 3.5 | 3.5 | 3.5 | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

Job 463, Line 14, Sp 1 N½, 8/25/70 750.

Use S½ Calibration

STA 22.5 directly W OF WINDMILL ≈ 400'

PAGE 5

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 14 HALF N SP. 1 DATE 8-25-76

| SEND | S.P. | S.P. | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-7.5N | 7.5-15N | 15-22.5N | — | — | → | 22.5-30 N | — | — | — |
| RANGE | | | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | | | 1.3 | 2.3 | 2.3 | 2.5 | 1.0 | 1.9 | 2.8 | 2.6 |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | | | 3.5 | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 |
| DC 4 # | | | 1. | 2. | 3. | 4. | 5. | 6. | 7. | 8. |
| DC 5 M | | | 1. | 2. | 3. | 4. | 1. | 2. | 3. | 4. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | 28.1 | 10.8 | 8.26 | 5.48 | 3.12 | 11.7 | 7.03 | 6.05 |
| AC 2 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +20.6 | -16.7 | +5.7 | | | | +12.4 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 1.5K | 1.2 K | 1.1 K | | | | 2.3K | | | |

STA 37.5N SHORT OF ROAD 200'

A BIT NOISY

PAGE 6

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 14 HALF N SP. 1 DATE 8-25-20

| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30N | 30-37.5N | — | — | — | — | → | 37.5-45N | → | → |
| RANGE | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 2.9 | 1.1 | 1.8 | 2.0 | 2.9 | 3.8 | 4.2 | 1.1 | 2.1 | 2.6 |
| DC 2 | | | | | | | | | | |
| DC 3 Cur | 3.5 | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 |
| DC 4 # | 9. | 10. | 11. | 12. | 13. | 14. | 15. | 16. | 17. | 18. |
| DC 5 n | 5. | 1. | 2. | 3. | 4. | 5. | 6. | 2. | 3. | 4. |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 4.38 | 32.2 | 10.4 | 6.78 | 4.84 | 4.34 | 3.30 | 9.84 | 5.00 | 3.96 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | 0.0 | 0.2 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +1.5 | | | | | | +11.6 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 2K | | | | | | 3K | | |

DRIFT + NOISY

STA. 45N ON ROAD TO RIGHT ON MAP LOOKING NORTH

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 14 HALF N SP. 1 DATE 8-25-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 | |
| RECEIVE | 37.5-45N → | | 45-52.5 N — | | | → | 52.5-60 | N — | → | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | |
| DC 1 | 2.9 | 3.7 | 1.0 | 2.1 | 3.6 | 4.2 | 2.7 | 3.2 | 3.0 | |
| DC 2 | | | | | 3.2-4.5 | 3.9-4.5 | | 2.7-4.0 | 2.4-3.6 | |
| DC 3 CHN | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 CONSTANT | 3.5 | 3.5 | 3.0 | 3.5 | |
| DC 4 # | 19. | 20. | 21. | 22. | 23. | 24. | 25. | 26. | 27. | |
| DC 5 M | 5. | 6. | 2. | 4. | 5. | 6. | 4. | 5. | 6. | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 3.06 | 2.82 | 6.29 | 3.72 | 3.16 | 2.55 | 4.62 | 2.98 | 2.72 | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.4 | 0.0 | 0.0 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +11.6 | | | | +6.1 | | | |
| AC NOISE | | | AS SAME AS BEFORE | | | | | | | |
| POT RES. | | | 2K | | | | 4K | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 14 HALF N SP. 1 DATE 8/25/20

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 |
| RECEIVE | 15-22.5N | → | → | → | 22.5-30N | → | → | → | → | 30-37.5N |
| RANGE | 350X10 | 350X10 | 350X10 | 350X10 | 300X10 | 350X10 | 350X10 | 350X10 | 350X10 | 350X10 |
| VOLTAGE | 165 | 150 | 153 | 150 | 190 | 165 | 150 | 153 | 150 | 195 |
| CURRENT | 3.5 | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 30-37.5N | → | → | → | → | 37.5-45N | → | → | → | → |
| RANGE | 300X10 | 350X10 | 350X10 | 350X10 | 350X10 | 350X10 | 300X10 | 350X10 | 350X10 | 350X10 |
| VOLTAGE | 190 | 165 | 150 | 150 | 150 | 195 | 190 | 165 | 147 | 150 |
| CURRENT | 3.0 | 3.5 | 3.5 | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 |

FREQUENCIES 3.0 0.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire

LINE 14 HALF N SP. 1 DATE 8/25/2



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 | | | |
| RECEIVE | 45-52.5 | S N → | | | 52.5-60 N → | | | | | |
| RANGE | 350X10 | 300X10 | 350X10 | 350X10 | 350X10 | 300X10 | 350X16 | | | |
| VOLTAGE | 195 | 190 | 165 | 147 | 195 | 190 | 165 | | | |
| CURRENT | 3.5 | 3.0 | 3.5 | 3.5 | 3.5 | 3.0 | 3.5 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

JOB 463, LINE 14, SP1 S1/2 8/25/70
CAL GROUP NO. 1

750 FEET=DIPOLE LENGTH

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 3.500 | 0.00 | 350.000 | 0.00 | 3.00 | .30 | 0.0000 | 1.0000 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 18.50 | 1.50 | 81.1 | 1.15 | 62.1 | .35 | ** | 1.50 | 3.00 | 1 | 1 | 24.300 | 0.00 |
| 2 | 2 | 28.65 | 2.20 | 76.8 | 1.51 | 52.8 | .69 | ** | 2.20 | 3.50 | 2 | 2 | 10.900 | 0.00 |
| 3 | 1 | 30.31 | 1.40 | 46.2 | 1.22 | 40.3 | .18 | ** | 1.40 | 3.50 | 3 | 1 | 46.500 | 0.00 |
| 4 | 2 | 43.15 | 2.00 | 46.4 | 1.61 | 37.2 | .39 | ** | 2.00 | 3.00 | 4 | 2 | 14.100 | 0.00 |
| 5 | 3 | 54.58 | 2.30 | 42.1 | 1.64 | 30.1 | .66 | ** | 2.30 | 3.50 | 5 | 3 | 8.300 | 0.00 |
| 6 | 1 | 23.60 | 1.70 | 72.0 | 1.45 | 61.4 | .25 | ** | 1.70 | 3.50 | 6 | 1 | 36.100 | 0.00 |
| 7 | 2 | 43.76 | 1.90 | 43.4 | 1.51 | 34.6 | .39 | ** | 1.90 | 3.50 | 7 | 2 | 16.700 | 0.00 |
| 8 | 3 | 57.43 | 2.10 | 36.6 | 1.49 | 25.9 | .61 | ** | 2.10 | 3.00 | 8 | 3 | 7.500 | 0.00 |
| 9 | 4 | 65.43 | 2.60 | 39.7 | 1.64 | 25.1 | .96 | ** | 2.60 | 3.50 | 9 | 4 | 4.960 | 0.00 |
| 10 | 1 | 24.20 | 2.00 | 82.7 | 1.76 | 72.6 | .24 | ** | 2.00 | 3.50 | 10 | 1 | 36.900 | 0.00 |
| 11 | 2 | 46.95 | 2.00 | 42.6 | 1.65 | 35.1 | .35 | ** | 2.00 | 3.50 | 11 | 2 | 17.900 | 0.00 |
| 12 | 3 | 71.03 | 2.30 | 32.4 | 1.84 | 25.9 | .46 | ** | 2.30 | 3.50 | 12 | 3 | 10.800 | 0.00 |
| 13 | 4 | 81.32 | 2.10 | 25.8 | 1.38 | 17.0 | .72 | ** | 2.10 | 3.00 | 13 | 4 | 5.310 | 0.00 |
| 14 | 5 | 85.48 | 2.50 | 29.2 | 1.40 | 16.3 | 1.10 | ** | 2.40 | 3.50 | 14 | 5 | 3.710 | -.20 |
| 15 | 1 | 36.20 | 1.10 | 30.4 | .96 | 26.6 | .14 | ** | 1.10 | 3.50 | 15 | 1 | 55.700 | 0.00 |
| 16 | 2 | 42.84 | 2.20 | 51.4 | 1.80 | 42.1 | .40 | ** | 2.20 | 3.50 | 16 | 2 | 16.300 | 0.00 |
| 17 | 3 | 64.79 | 2.00 | 30.9 | 1.48 | 22.8 | .52 | ** | 1.90 | 3.50 | 17 | 3 | 9.890 | -.20 |
| 18 | 4 | 86.74 | 1.70 | 19.6 | 1.04 | 12.0 | .66 | ** | 1.60 | 3.50 | 18 | 4 | 6.640 | -.20 |
| 19 | 5 | 94.79 | 2.30 | 24.3 | 1.34 | 14.1 | .96 | ** | 2.30 | 3.00 | 19 | 5 | 3.530 | 0.00 |
| 20 | 6 | 95.85 | 3.20 | 33.4 | 1.77 | 18.4 | 1.43 | ** | 3.20 | 3.50 | 20 | 6 | 2.580 | 0.00 |
| 21 | 2 | 51.11 | 1.40 | 27.4 | 1.09 | 21.3 | .31 | ** | 1.40 | 3.50 | 21 | 2 | 19.600 | 0.00 |
| 22 | 3 | 62.16 | 2.00 | 32.2 | 1.45 | 23.3 | .55 | ** | 2.00 | 3.50 | 22 | 3 | 9.480 | 0.00 |
| 23 | 4 | 82.93 | 1.90 | 22.9 | 1.20 | 14.5 | .70 | ** | 1.90 | 3.50 | 23 | 4 | 6.330 | 0.00 |
| 24 | 5 | 106.78 | 2.50 | 23.4 | 1.68 | 15.7 | .82 | ** | 2.50 | 3.50 | 24 | 5 | 4.630 | 0.00 |
| 25 | 6 | 112.58 | 2.70 | 24.0 | 1.54 | 13.7 | 1.16 | ** | 2.70 | 3.00 | 25 | 6 | 2.610 | 0.00 |
| 26 | 3 | 80.08 | 2.10 | 26.2 | 1.71 | 21.3 | .39 | ** | 2.10 | 3.50 | 26 | 3 | 12.200 | 0.00 |
| 27 | 4 | 109.27 | 1.90 | 17.4 | 1.42 | 13.0 | .48 | ** | 1.90 | 3.50 | 27 | 4 | 8.340 | 0.00 |
| 28 | 5 | 138.07 | 1.60 | 11.6 | 1.02 | 7.4 | .58 | ** | 1.60 | 3.50 | 28 | 5 | 6.040 | 0.00 |
| 29 | 6 | 178.11 | 1.80 | 10.1 | 1.17 | 6.6 | .63 | ** | 1.80 | 3.50 | 29 | 6 | 4.860 | 0.00 |
| 30 | 4 | 94.57 | 2.30 | 24.3 | 1.72 | 18.1 | .58 | ** | 2.30 | 3.50 | 30 | 4 | 7.190 | 0.00 |
| 31 | 5 | 117.16 | 2.50 | 21.3 | 1.77 | 15.2 | .73 | ** | 2.50 | 3.50 | 31 | 5 | 5.080 | 0.00 |
| 32 | 6 | 141.51 | 2.90 | 20.5 | 2.04 | 14.4 | .86 | ** | 2.90 | 3.50 | 32 | 6 | 3.820 | 0.00 |

JOB 563, LINE 14, SP1 N1/2,8/25/70

750 FEET=DIPOLE LENGTH

CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 3.500 | 0.00 | 350.000 | 0.00 | 3.00 | .30 | 0.0000 | 1.0000 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 18.30 | 1.30 | 71.0 | .94 | 51.5 | .36 | ** | 1.30 | 3.50 | 1 | 1 | 28.100 | 0.00 |
| 2 | 2 | 28.41 | 2.30 | 81.0 | 1.61 | 56.5 | .69 | ** | 2.30 | 3.50 | 2 | 2 | 10.800 | 0.00 |
| 3 | 3 | 54.32 | 2.30 | 42.3 | 1.64 | 30.2 | .66 | ** | 2.30 | 3.50 | 3 | 3 | 8.260 | 0.00 |
| 4 | 4 | 72.22 | 2.50 | 34.6 | 1.66 | 23.0 | .84 | ** | 2.50 | 3.50 | 4 | 4 | 5.480 | 0.00 |
| 5 | 1 | 23.63 | 1.00 | 42.3 | .75 | 31.7 | .25 | ** | 1.00 | 3.00 | 5 | 1 | 31.200 | 0.00 |
| 6 | 2 | 30.66 | 2.00 | 65.2 | 1.37 | 44.8 | .63 | ** | 1.90 | 3.50 | 6 | 2 | 11.700 | -.20 |
| 7 | 3 | 46.46 | 2.80 | 60.3 | 1.98 | 42.7 | .82 | ** | 2.80 | 3.50 | 7 | 3 | 7.030 | 0.00 |
| 8 | 4 | 79.81 | 2.60 | 32.6 | 1.86 | 23.4 | .74 | ** | 2.60 | 3.50 | 8 | 4 | 6.050 | 0.00 |
| 9 | 5 | 101.41 | 2.90 | 28.6 | 2.02 | 19.9 | .88 | ** | 2.90 | 3.50 | 9 | 5 | 4.380 | 0.00 |
| 10 | 1 | 20.93 | 1.10 | 52.6 | .80 | 38.4 | .30 | ** | 1.10 | 3.50 | 10 | 1 | 32.200 | 0.00 |
| 11 | 2 | 31.76 | 1.80 | 56.7 | 1.20 | 37.9 | .60 | ** | 1.80 | 3.00 | 11 | 2 | 10.400 | 0.00 |
| 12 | 3 | 44.46 | 2.00 | 45.0 | 1.13 | 25.5 | .87 | ** | 2.00 | 3.50 | 12 | 3 | 6.780 | 0.00 |
| 13 | 4 | 64.03 | 2.90 | 45.3 | 1.91 | 29.9 | .99 | ** | 2.90 | 3.50 | 13 | 4 | 4.840 | 0.00 |
| 14 | 5 | 101.37 | 3.60 | 35.5 | 2.72 | 26.8 | .88 | ** | 3.80 | 3.50 | 14 | 5 | 4.340 | .40 |
| 15 | 6 | 123.79 | 4.20 | 33.9 | 3.18 | 25.7 | 1.02 | ** | 4.20 | 3.50 | 15 | 6 | 3.300 | 0.00 |
| 16 | 2 | 25.58 | 1.00 | 39.1 | .20 | 7.9 | .80 | ** | 1.10 | 3.50 | 16 | 2 | 9.840 | .20 |
| 17 | 3 | 38.29 | 2.10 | 54.8 | 1.04 | 27.3 | 1.06 | ** | 2.10 | 3.00 | 17 | 3 | 5.000 | 0.00 |
| 18 | 4 | 52.24 | 2.60 | 49.8 | 1.31 | 25.1 | 1.29 | ** | 2.60 | 3.50 | 18 | 4 | 3.960 | 0.00 |
| 19 | 5 | 70.85 | 2.90 | 40.9 | 1.49 | 21.0 | 1.41 | ** | 2.90 | 3.50 | 19 | 5 | 3.060 | 0.00 |
| 20 | 6 | 105.28 | 3.70 | 35.1 | 2.43 | 23.1 | 1.27 | ** | 3.70 | 3.50 | 20 | 6 | 2.820 | 0.00 |
| 21 | 3 | 40.84 | 1.00 | 24.5 | .03 | .8 | .97 | ** | 1.00 | 3.50 | 21 | 3 | 6.290 | 0.00 |
| 22 | 4 | 56.97 | 2.10 | 36.9 | .95 | 16.6 | 1.15 | ** | 2.10 | 3.00 | 22 | 4 | 3.720 | 0.00 |
| 23 | 5 | 73.66 | 3.60 | 48.9 | 2.26 | 30.6 | 1.34 | ** | 3.60 | 3.50 | 23 | 5 | 3.160 | 0.00 |
| 24 | 6 | 95.66 | 4.10 | 42.9 | 2.66 | 27.8 | 1.44 | ** | 4.20 | 3.50 | 24 | 6 | 2.550 | .20 |
| 25 | 4 | 61.01 | 2.50 | 41.0 | 1.45 | 23.7 | 1.05 | ** | 2.70 | 3.50 | 25 | 4 | 4.620 | .40 |
| 26 | 5 | 80.73 | 3.20 | 39.6 | 2.01 | 24.9 | 1.19 | ** | 3.20 | 3.00 | 26 | 5 | 2.980 | 0.00 |
| 27 | 6 | 100.86 | 3.00 | 29.7 | 1.66 | 16.4 | 1.34 | ** | 3.00 | 3.50 | 27 | 6 | 2.720 | 0.00 |

J56 463, Line 15, sp. 1, 5½, 8/31/70 750.

Diane:

Please Punch

Chris

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 15 HALF S SP. / DATE

PAGE /

| SEND | 5-6 | 6-7 | 4-3 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-7.5s | → | CAL | 7.5-15s | | → | 15-22.5 | S | → | |
| RANGE | 1.0 | 1.0 | 1.0 | 10 | 1.0 | 0.1 | 10 | 1.0 | 0.1 | 0.1 |
| DC 1 | 1.1 | 1.2 | 0.0 | 0.8 | 1.3 | 2.3 | 0.6 | 0.7 | 1.5 | 2.5 |
| DC 2 | | | | | | | | | | |
| DC 3 (Gain) | 1.0 | 2.0 | 0.5 | 0.9 | 1.0 | 2.0 | 0.8 | 0.9 | 1.0 | 2.0 |
| DC 4 # | 1 | 2 | | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 5 # | 1 | 2 | | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 51.3 | 12.4 | 49.8 | 174. | 10.8 | 6.97 | 154. | 24.6 | 4.27 | 3.94 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -12.7 | | 3.0 | -33.5 | | | +11.5 | | | |
| AC NOISE | | | 0.3 | | | | | | | |
| POT RES. | 4K | | | 3K | | | 10K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 15 HALF S SP. / DATE 8-31-70

| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 S | → | → | → | → | 30-37.5 S | → | → | → | → |
| RANGE | 1.0 | 0.1 | 0.1 | 0.01 | 0.01 | 1.0 | 1.0 | 0.1 | 0.1 | 0.01 |
| DC 1 | 0.9 | 0.4 | 0.9 | 2.3 | 3.1 | 0.7 | 1.1 | 0.7 | 1.3 | 4.1 |
| DC 2 | | | | | | | | | | 2.0-6.5 |
| DC 3 Low | 1.0 | 0.8 | 0.9 | 1.0 | 2.0 | 1.5 | 1.0 | 0.8 | 0.9 | 1.0 |
| DC 4 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 5 " | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 151. | 9.39 | 2.97 | .656 | 0.738 | 81.8 | 34.3 | 3.67 | 1.51 | 0.393 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +11.7 | | | | | +28.2 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 6K | | | | | 10K | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 15 HALF S SP. / DATE 8-31-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 30-37.5 | 37.5-45 S | | | | | 45-52.5 | | | |
| RANGE | 0.01 | 1.0 | 1.0 | 0.1 | 0.1 | 0.01 | 0.1 | 0.1 | 0.01 | 0.01 |
| DC 1 | 5.3 | 0.7 | 0.9 | 0.8 | 2.1 | 2.6 | 0.7 | 1.3 | 0.7 | 5.2 |
| DC 2 | 3-6 ft | | | | | | | | | 4-6 |
| DC 3 | | | | | | | | | | |
| DC 4 Cm | 2.0 | 1.5 | 1.0 | 0.8 | 0.9 | 1.0 | 1.5 | 1.0 | 0.8 | 0.9 |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| DC 6 n | 6 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.506 | 37.7 | 19.3 | 2.67 | 1.29 | 0.390 | 9.78 | 5.01 | 0.632 | 0.321 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -22.9 | | | | | +30.3 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 4K | | | | | 12K | | | |

Over !!

STA. 52.5 S
NEAR STA 67.5 SE ON LINE 1

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 15 HALF S SP. 1 DATE 8-31-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | | | | | + | - |
| RECEIVE | 52.5-60S | → | | | | | | | | |
| RANGE | 1.0 | 0.1 | 0.1 | | | | | | | |
| DC 1 | 1.2 | 1.0 | 1.4 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 (cm) | 1.5 | 1.0 | 0.8 | | | | | | | |
| DC 4 # | 30 | 31 | 32 | | | | | | | |
| DC 5 " | 4 | 5 | 6 | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 10.6 | 6.32 | 1.20 | | | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +6.5 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 9K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE 463

LINE 15 HALF S SP. 1 DATE 8-24-70



| SEND | 3-4 | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | CAL | 0-7.5s | → | 7.5-15s | → | → | 15-22.5s | → | → | → |
| RANGE | 166x3 | 100x10 | 200x10 | 300x3 | 100x10 | 200x10 | 266x3 | 300x3 | 100x10 | 200x10 |
| VOLTAGE | | 335 | 265 | 600 | 340 | 265 | 680 | 600 | 340 | 265 |
| CURRENT | 0.5 | 1.0 | 2.0 | 0.9 | 1.0 | 2.0 | 0.8 | 0.9 | 1.0 | 2.0 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 22.5-30s | → | → | → | → | 30-37.5s | → | → | → | → |
| RANGE | 100x10 | 266x3 | 300x3 | 100x10 | 200x10 | 150x10 | 100x10 | 266x3 | 300x3 | 100x10 |
| VOLTAGE | 520 | 680 | 600 | 320 | 265 | 210 | 520 | 680 | 600 | 320 |
| CURRENT | 1.0 | 0.8 | 0.9 | 1.0 | 2.0 | 1.5 | 1.0 | 0.8 | 0.9 | 1.0 |

FREQUENCIES 3.0 0.3

SENDER NO. 9062-S

OPERATOR 20693-R

RECEIVER NO. CRUSE

OPERATOR FREEMAN

COMMENTS:

1-2

2-3

3-4

4-5 RB-1

5-6 RB-1

6-7 RB-2

2.666 2.66

7.998 7.98

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire 463

LINE 15 HALF 5 SP. 1 DATE 3/31/70

PAGE 2

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 30-32.5 s | 32.5-45 s | → | → | → | → | 45-52.5 s | → | → | → |
| RANGE | 200X10 | 150X10 | 100X10 | 266X3 | 300X3 | 100X10 | 150X10 | 100X10 | 266X3 | 300X3 |
| VOLTAGE | 265 | 210 | 520 | 680 | 600 | 320 | 210 | 520 | 680 | 600 |
| CURRENT | 2.0 | 1.5 | 1.0 | 0.8 | 0.9 | 1.0 | 1.5 | 1.0 | 0.8 | 0.9 |
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 52.5-60 s | → | → | | | | | | | |
| RANGE | 150X10 | 100X10 | 266X3 | | | | | | | |
| VOLTAGE | 210 | 520 | 680 | | | | | | | |
| CURRENT | 1.5 | 1.0 | 0.8 | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

Job. 463, LINE 15, Sp. 1, N½, 9/1/70

750.

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

GROUNDED FENCE ⊥ @ ≈ 70' N OF STA. 7.5N

PROJECT EMPIRE 463

LINE 15 HALF N SP. 1 DATE 9-1-70

PAGE 1

| SEND | S.P. | S.P. | 4-5 | 3-4 | 2-3 | 1-2 | | 5-6 | | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-7.5N | 7.5-15N | 15-22.5 | ← | ← | → | | CA (2) | | 22.5-30N |
| RANGE | | | 1.0 | 0.1 | 0.1 | 0.1 | | 1.0 | | 1.0 |
| DC 1 | | | 1.3 | 1.2 | 2.1 | 2.4 | | 0.0 | | 0.6 |
| DC 2 | | | | | | | | | | |
| DC 3 (μA) | | | 0.9 | 0.8 | 1.0 | 1.5 | | 1.0 | | 1.0 |
| DC 4 # | | | 1 | 2 | 3 | 4 | | | | 5 |
| DC 5 M | | | 1 | 2 | 3 | 4 | | | | 1 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | 32.6 | 5.10 | 3.48 | 3.00 | | 100.2 | | 27.0 |
| AC 2 | | | 0.0 | 0.0 | 0.0 | 0.0 | | 0.0 | | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -14.1 | +46.6 | +10.0 | | | | | 3.0 | | +23.7 |
| AC NOISE | | | | | | | | 0.3 | | |
| POT RES. | 4K | 5K | 3K | | | | | | | 1K |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 15 HALF N SP. 1 DATE 9-1-70



| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 N ← | | | | 30-37.5 N → | | | | | |
| RANGE | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 1.6 | 2.0 | 3.1 | 3.0 | 1.3 | 0.6 | 2.1 | 2.0 | 3.4 | 3.7 |
| DC 2 | | | | | | | | | | |
| DC 3 (ms) | 0.9 | 0.8 | 1.0 | 1.5 | 2.0 | 1.0 | 0.9 | 0.8 | 1.0 | 1.5 |
| DC 4 # | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| DC 5 M | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 6 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 12.0 | 3.19 | 2.82 | 2.63 | 91.6 | 9.49 | 6.07 | 1.99 | 2.06 | 2.05 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | -6.3 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | 4K | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 15 HALF N SP. 1 DATE 8-1-20



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 |
| RECEIVE | 37.5-42.5 N | → | → | → | → | 45-52.5 N | → | → | → | 52.5-60 |
| RANGE | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.01 | 0.1 |
| DC 1 | 1.0 | 1.1 | 2.3 | 2.7 | 5.4 | 1.0 | 1.6 | 2.8 | 4.1 | 0.7 |
| DC 2 | | | | | | | | | | |
| DC 3 Gain | 2.0 | 1.0 | 0.9 | 0.8 | 1.0 | 2.0 | 1.0 | 0.9 | 0.8 | 2.0 |
| DC 4 # | 16 | 17 | 18 | 19 | 2- | 21 | 22 | 23 | 24 | 25 |
| DC 5 n | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 | 4 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 20.4 | 3.87 | 3.28 | 1.34 | 1.60 | 7.40 | 2.07 | 1.91 | 0.898 | 4.44 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +19.0 | | | | | +7.8 | | | | -13.3 |
| AC NOISE | | | | | | | | | | |
| POT RES. | 2K | | | | | 3K | | | | 2K |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 15 HALF N SP. 1 DATE 9-1-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5·6 | 4·5 | | | | | | | | |
| RECEIVE | 52 5·60 | → | | | | | | | | |
| RANGE | 0·1 | 0.1 | | | | | | | | |
| DC 1 | 1.3 | 3.4 | | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | 1.0 | 0.9 | | | | | | | | |
| DC 4 | 26 | 27 | | | | | | | | |
| DC 5 | 5 | 6 | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.50 | 1.45 | | | | | | | | |
| AC 2 | 0.0 | 0.0 | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire 463

LINE 15 HALF N SP. 1 DATE 9/1/70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | Cal |
| RECEIVE | 15-22.5N | → | → | → | 22.5-30N | → | → | → | → | 5-6 |
| RANGE | 300X3 | 266X3 | 100X10 | 150X10 | 100X10 | 300X3 | 266X3 | 100X10 | 150X10 | 100X10 |
| VOLTAGE | 600 | 680 | 540 | 220 | 310 | 580 | 680 | 540 | 220 | 310 |
| CURRENT | 0.9 | 0.8 | 1.0 | 1.5 | 1.0 | 0.9 | 0.8 | 1.0 | 1.5 | 1.0 |
| SEND | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 30-37.5N | → | → | → | → | → | 37.5-45N | → | → | → |
| RANGE | 200X10 | 100X10 | 300X3 | 266X3 | 100X10 | 150X10 | 200X10 | 100X10 | 300X3 | 266X3 |
| VOLTAGE | 230 | 320 | 580 | 680 | 520 | 210 | 230 | 325 | 580 | 680 |
| CURRENT | 2.0 | 1.0 | 0.9 | 0.8 | 1.0 | 1.5 | 2.0 | 1.0 | 0.9 | 0.8 |

FREQUENCIES 3.0 0.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire 463

LINE 15 HALF N SP. 1 DATE 7/1

PAGE 4

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 | 6-7 | 5-6 | 4-5 | | |
| RECEIVE | 37.5-45N | 45-52.5N | → | → | → | 52.5-60 | N | → | | |
| RANGE | 100X10 | 200X10 | 100X10 | 300X3 | 266X3 | 200X10 | 100X10 | 300X3 | | |
| VOLTAGE | 530 | 230 | 320 | 590 | 680 | 230 | 330 | 590 | | |
| CURRENT | 1.0 | 2.0 | 1.0 | 0.9 | 0.8 | 2.0 | 1.0 | 0.9 | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 9662-5

OPERATOR Steve C.

RECEIVER NO. 20693-R

OPERATOR Bill F.

COMMENTS:

JOB 463 LINE 15 SP1 S 1/2  8/31/70
CAL GROUP NO. 1

750 FEET=DIPOLE LENGTH

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| .500 | 0.00 | 49.800 | 0.00 | 3.00 | .30 | 0.0000 | 1.0040 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 117.16 | 1.10 | 9.4 | 1.10 | 9.4 | 0.00 | ** | 1.10 | 1.00 | 1 | 1 | 51.300 | 0.00 |
| 2 | 2 | 56.70 | 1.20 | 21.2 | .93 | 16.4 | .27 | ** | 1.20 | 2.00 | 2 | 2 | 12.400 | 0.00 |
| 3 | 1 | 440.24 | .80 | 1.8 | .80 | 1.8 | 0.00 | ** | .80 | .90 | 3 | 1 | 174.000 | 0.00 |
| 4 | 2 | 98.86 | 1.30 | 13.2 | 1.18 | 11.9 | .12 | ** | 1.30 | 1.00 | 4 | 2 | 10.800 | 0.00 |
| 5 | 3 | 80.54 | 2.30 | 28.6 | 1.91 | 23.7 | .39 | ** | 2.30 | 2.00 | 5 | 3 | 6.970 | 0.00 |
| 6 | 1 | 437.47 | .60 | 1.4 | .60 | 1.4 | 0.00 | ** | .60 | .80 | 6 | 1 | 154.000 | 0.00 |
| 7 | 2 | 248.72 | .70 | 2.8 | .70 | 2.8 | 0.00 | ** | .70 | .90 | 7 | 2 | 24.600 | 0.00 |
| 8 | 3 | 97.91 | 1.50 | 15.3 | 1.20 | 12.3 | .30 | ** | 1.50 | 1.00 | 8 | 3 | 4.270 | 0.00 |
| 9 | 4 | 91.23 | 2.50 | 27.4 | 1.89 | 20.7 | .61 | ** | 2.50 | 2.00 | 9 | 4 | 3.940 | 0.00 |
| 10 | 1 | 344.18 | .90 | 2.6 | .90 | 2.6 | 0.00 | ** | .90 | 1.00 | 10 | 1 | 151.000 | 0.00 |
| 11 | 2 | 106.49 | .40 | 3.8 | .29 | 2.7 | .11 | ** | .40 | .80 | 11 | 2 | 9.390 | 0.00 |
| 12 | 3 | 75.22 | .90 | 12.0 | .47 | 6.3 | .43 | ** | .90 | .90 | 12 | 3 | 2.970 | 0.00 |
| 13 | 4 | 30.32 | 2.30 | 75.9 | -.31 | -10.2 | 2.61 | ** | 2.30 | 1.00 | 13 | 4 | .656 | 0.00 |
| 14 | 5 | 30.08 | 3.10 | 103.1 | -1.12 | -37.4 | 4.22 | ** | 3.10 | 2.00 | 14 | 5 | .738 | 0.00 |
| 15 | 1 | 124.06 | .70 | 5.6 | .70 | 5.6 | 0.00 | ** | .70 | 1.50 | 15 | 1 | 81.800 | 0.00 |
| 16 | 2 | 313.35 | 1.10 | 3.5 | 1.10 | 3.5 | 0.00 | ** | 1.10 | 1.00 | 16 | 2 | 34.300 | 0.00 |
| 17 | 3 | 104.36 | .70 | 6.7 | .43 | 4.1 | .27 | ** | .70 | .80 | 17 | 3 | 3.670 | 0.00 |
| 18 | 4 | 76.79 | 1.30 | 16.9 | .53 | 6.8 | .77 | ** | 1.30 | .90 | 18 | 4 | 1.510 | 0.00 |
| 19 | 5 | 32.35 | 4.10 | 126.8 | .24 | 7.5 | 3.86 | ** | 4.10 | 1.00 | 19 | 5 | .393 | 0.00 |
| 20 | 6 | 33.70 | 5.30 | 157.3 | -.11 | -3.4 | 5.41 | ** | 5.30 | 2.00 | 20 | 6 | .506 | 0.00 |
| 21 | 2 | 228.70 | .70 | 3.1 | .70 | 3.1 | 0.00 | ** | .70 | 1.50 | 21 | 2 | 37.700 | 0.00 |
| 22 | 3 | 439.92 | .90 | 2.0 | .90 | 2.0 | 0.00 | ** | .90 | 1.00 | 22 | 3 | 19.300 | 0.00 |
| 23 | 4 | 152.00 | .80 | 5.3 | .49 | 3.3 | .31 | ** | .80 | .80 | 23 | 4 | 2.670 | 0.00 |
| 24 | 5 | 115.71 | 2.10 | 18.1 | 1.36 | 11.8 | .74 | ** | 2.10 | .90 | 24 | 5 | 1.290 | 0.00 |
| 25 | 6 | 50.62 | 2.60 | 51.4 | -.66 | -13.0 | 3.26 | ** | 2.60 | 1.00 | 25 | 6 | .390 | 0.00 |
| 26 | 3 | 148.32 | .70 | 4.7 | .53 | 3.6 | .17 | ** | .70 | 1.50 | 26 | 3 | 9.780 | 0.00 |
| 27 | 4 | 229.30 | 1.30 | 5.7 | 1.13 | 4.9 | .17 | ** | 1.30 | 1.00 | 27 | 4 | 5.010 | 0.00 |
| 28 | 5 | 62.90 | .70 | 11.1 | -.95 | -15.1 | 1.65 | ** | .70 | .80 | 28 | 5 | .632 | 0.00 |
| 29 | 6 | 47.47 | 5.20 | 109.6 | 1.67 | 35.1 | 3.53 | ** | 5.20 | .90 | 29 | 6 | .321 | 0.00 |
| 30 | 4 | 323.11 | 1.20 | 3.7 | 1.09 | 3.4 | .11 | ** | 1.20 | 1.50 | 30 | 4 | 10.600 | 0.00 |
| 31 | 5 | 504.70 | 1.00 | 2.0 | .90 | 1.8 | .10 | ** | 1.00 | 1.00 | 31 | 5 | 6.320 | 0.00 |
| 32 | 6 | 192.42 | 1.40 | 7.3 | .83 | 4.3 | .57 | ** | 1.40 | .80 | 32 | 6 | 1.200 | 0.00 |

JOB 463 LINE 15 SP1 N 1/2 9/1/70
CAL GROUP NO. 2

750 FEET=DIPOLE LENGTH

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 100.200 | 0.00 | 3.00 | .30 | 0.0000 | .9980 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 82.39 | 1.30 | 15.8 | 1.30 | 15.8 | 0.00 | ** | 1.30 | .90 | 1 | 1 | 32.600 | 0.00 |
| 2 | 2 | 57.95 | 1.20 | 20.7 | .94 | 16.2 | .26 | ** | 1.20 | .80 | 2 | 2 | 5.100 | 0.00 |
| 3 | 3 | 79.78 | 2.10 | 26.3 | 1.71 | 21.4 | .39 | ** | 2.10 | 1.00 | 3 | 3 | 3.480 | 0.00 |
| 4 | 4 | 91.98 | 2.40 | 26.1 | 1.79 | 19.5 | .61 | ** | 2.40 | 1.50 | 4 | 4 | 3.000 | 0.00 |
| 5 | 1 | 60.99 | .60 | 9.8 | .53 | 8.8 | .07 | ** | .60 | 1.00 | 5 | 1 | 27.000 | 0.00 |
| 6 | 2 | 121.68 | 1.60 | 13.1 | 1.51 | 12.4 | .09 | ** | 1.60 | .90 | 6 | 2 | 12.000 | 0.00 |
| 7 | 3 | 91.33 | 2.00 | 21.9 | 1.67 | 18.3 | .33 | ** | 2.00 | .80 | 7 | 3 | 3.190 | 0.00 |
| 8 | 4 | 130.57 | 3.10 | 23.7 | 2.72 | 20.9 | .38 | ** | 3.10 | 1.00 | 8 | 4 | 2.820 | 0.00 |
| 9 | 5 | 141.93 | 3.00 | 21.1 | 2.44 | 17.2 | .56 | ** | 3.00 | 1.50 | 9 | 5 | 2.630 | 0.00 |
| 10 | 1 | 104.18 | 1.30 | 12.5 | 1.30 | 12.5 | 0.00 | ** | 1.30 | 2.00 | 10 | 1 | 91.600 | 0.00 |
| 11 | 2 | 85.75 | .60 | 7.0 | .45 | 5.2 | .15 | ** | .60 | 1.00 | 11 | 2 | 9.490 | 0.00 |
| 12 | 3 | 154.63 | 2.00 | 12.9 | 1.84 | 11.9 | .16 | ** | 2.10 | .90 | 12 | 3 | 6.070 | .20 |
| 13 | 4 | 113.95 | 2.00 | 17.6 | 1.55 | 13.6 | .45 | ** | 2.00 | .80 | 13 | 4 | 1.990 | 0.00 |
| 14 | 5 | 167.41 | 3.40 | 20.3 | 2.95 | 17.6 | .45 | ** | 3.40 | 1.00 | 14 | 5 | 2.060 | 0.00 |
| 15 | 6 | 178.21 | 3.70 | 20.8 | 3.07 | 17.2 | .63 | ** | 3.70 | 1.50 | 15 | 6 | 2.050 | 0.00 |
| 16 | 2 | 92.53 | 1.00 | 10.8 | .86 | 9.3 | .14 | ** | 1.00 | 2.00 | 16 | 2 | 20.400 | 0.00 |
| 17 | 3 | 87.86 | 1.10 | 12.5 | .76 | 8.6 | .34 | ** | 1.10 | 1.00 | 17 | 3 | 3.870 | 0.00 |
| 18 | 4 | 167.44 | 2.30 | 13.7 | 2.03 | 12.1 | .27 | ** | 2.30 | .90 | 18 | 4 | 3.280 | 0.00 |
| 19 | 5 | 135.20 | 2.70 | 20.0 | 2.10 | 15.5 | .60 | ** | 2.70 | .80 | 19 | 5 | 1.340 | 0.00 |
| 20 | 6 | 212.06 | 5.40 | 25.5 | 4.90 | 23.1 | .50 | ** | 5.40 | 1.00 | 20 | 6 | 1.600 | 0.00 |
| 21 | 3 | 83.91 | 1.00 | 11.9 | .63 | 7.6 | .37 | ** | 1.00 | 2.00 | 21 | 3 | 7.400 | 0.00 |
| 22 | 4 | 94.45 | 1.60 | 16.9 | 1.01 | 10.7 | .59 | ** | 1.60 | 1.00 | 22 | 4 | 2.070 | 0.00 |
| 23 | 5 | 171.46 | 2.80 | 16.3 | 2.37 | 13.8 | .43 | ** | 2.80 | .90 | 23 | 5 | 1.910 | 0.00 |
| 24 | 6 | 138.76 | 4.10 | 29.5 | 3.22 | 23.2 | .88 | ** | 4.10 | .80 | 24 | 6 | .848 | 0.00 |
| 25 | 4 | 100.40 | .70 | 7.0 | .16 | 1.6 | .54 | ** | .70 | 2.00 | 25 | 4 | 4.440 | 0.00 |
| 26 | 5 | 119.42 | 1.30 | 10.9 | .59 | 5.0 | .71 | ** | 1.30 | 1.00 | 26 | 5 | 1.500 | 0.00 |
| 27 | 6 | 209.48 | 3.40 | 16.2 | 2.90 | 13.8 | .50 | ** | 3.40 | .90 | 27 | 6 | 1.450 | 0.00 |

JOB 463 LINE 16 BEARING N-S.

N½. SPR I 10-19-70

1000.

Job 463

HEINRICHS GEOEXPLORATION CO. 1000

PROJECT EMPIRE 463

I.P. RECEIVER NOTES

LINE 16 HALF N SP. 1 DATE 10-19-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 1-2 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 2-3 | 0-10N | 10-20N | → | 20-30N | → | → | 30-40N | → | → |
| RANGE | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 |
| DC 1 ① | 0.1 | 0.8 | 0.7 | 0.5 | 0.5 | 0.6 | 1.0 | 0.6 | 0.8 | 0.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 1.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 n | | 1 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.5 | 12.1 | 12.4 | 3.08 | 14.2 | 3.53 | 1.37 | 16.1 | 5.22 | 2.30 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -4.7 | +5.2 | | +3.4 | | | +21.4 | | |
| AC NOISE | 1.0 | | | | | | | | | |
| POT RES. | 0.1 | 8K | 7K | | 3K | | | 1.5K | | |

Creek @ 4200'N

PAGE 2

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 16 HALF N SP. 1 DATE 10-19-2

| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-40N | 40-50N | → | → | → | → | 50-60N | → | → | → |
| RANGE | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.01 | 0.1 | 0.1 | 0.1 | 0.01 |
| DC 1 | 1.3 | 0.7 | 0.9 | 0.9 | 1.2 | 2.0 | 0.7 | 0.8 | 1.4 | 1.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR. | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 ∿ | 4 | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.10 | 10.7 | 4.31 | 2.22 | 1.22 | 0.645 | 3.68 | 2.13 | 1.30 | 0.768 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +4.9 | | | | | +9.0 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 2K | | | | | 3K | | | |

GROUNDED FENCE @ 6300'N ≈1

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 16 HALF N SP. 1 DATE 10-15-

| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 50-60N | 60-70N | ← | ← | → | 2-80N | ← | → | | |
| RANGE | 0.01 | 0.1 | 0.1 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | | |
| DC 1 | 1.9 | 0.8 | 0.8 | 1.1 | 1.2 | 0.9 | 1.3 | 2.1 | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR. | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | |
| DC 6 % | 6 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.449 | 2.09 | 1.36 | 0.904 | 0.567 | 0.672 | 0.468 | 0.331 | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | +20.0 | | | | H 8.5 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 2K | | | | 1.5K | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE # 463

LINE 16 HALF N SP. 1 DATE 10-19-70



| SEND | CAL | 1-2 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 2-3 | 0-10N | 10-20N | → | 20-30N | → | → | 30-40N | → | → |
| RANGE | 10X100 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 |
| VOLTAGE | 320 | 530 | 640 | 520 | 620 | 640 | 520 | 740 | 620 | 620 |
| CURRENT | 1.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 30-40N | 40-50N | → | → | → | → | 50-60N | → | → | → |
| RANGE | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 |
| VOLTAGE | 520 | 460 | 720 | 620 | 620 | 520 | 460 | 720 | 600 | 620 |
| CURRENT | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |

FREQUENCIES 1 0.1

SENDER NO. 66445

OPERATOR Bob SHIPP

RECEIVER NO. 20693-R

OPERATOR Bill FREEMAN

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE # 463

LINE 16 HALF N SP. 1 DATE 10-19-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-R | | |
| RECEIVE | 50-60N | 60-70N | → | → | → | 70-80N | → | → | | |
| RANGE | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | | |
| VOLTAGE | 600 | 440 | 700 | 600 | 600 | 440 | 700 | 580 | | |
| CURRENT | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 1 0.1

SENDER NO. 66445

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill FREEMAN

COMMENTS:

JOB 463 LINE 16 BEARING N-S.

5½. SPR I 10-19-70

1000.

Job 463 STA. 30 IN WASH

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE # 463

LINE 16 HALF S SP. 1 DATE 8-19-2



| SEND | S.P. | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-10s | 10-20s | → | → | 20-30s | → | → | → | 30-40s | → |
| RANGE | | 1.0 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.01 | 1.0 | 0.1 |
| DC 1 | | 0.8 | 0.5 | 0.8 | 0.8 | 0.8 | 0.8 | 0.9 | 1.0 | 0.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 ↖ | | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 | 2 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | 12.1 | 3.07 | 1.38 | 13.3 | 3.02 | 1.28 | 0.691 | 12.7 | 3.26 |
| AC 2 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +10.6 | +2.7 | | | +16.0 | | | | +7.6 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 8K | 10K | | | 3K | | | | 2K | |

WOODEN FENCE @ 3700's

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Empire #463

LINE 16 HALF S SP. 1 DATE 10-19-70



| SEND | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-40s | → | → | 40-50s | → | → | → | → | 50-60s | → |
| RANGE | 0.1 | 0.01 | 0.01 | 0.1 | 0.1 | 0.01 | 0.01 | 0.01 | 0.1 | 0.01 |
| DC 1 | 0.8 | 1.2 | 1.3 | 1.1 | 1.2 | 1.9 | 1.9 | 1.4 | 1.3 | 1.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CHR | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 ∩ | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.29 | 0.651 | 0.394 | 2.91 | 1.33 | 0.629 | 0.360 | 0.230 | 1.04 | 0.595 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | +11.8 | | | | | +13.5 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | 2K | | | | | 2K | |

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 16 HALF S SP. 1 DATE 16-19-20



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | CAN | | 3-4 | | |
| RECEIVE | 50-60s | → | 60-70s | | → | | | 60-70s | | |
| RANGE | 0.01 | 0.01 | | | | | | | 3 Hz | |
| DC 1 | 1.8 | 2.3 | | | ① | 0.1 | | | 1 Hz | |
| DC 2 | | | | | | | | | 0.3 Hz | |
| DC 3 | | | | | | | | | 0.1 Hz | |
| DC 4 CUR | 2.0 | 2.0 | | | | 1.0 | | | Dev. | |
| DC 5 # | 20 | 21 | | | | | | | | |
| DC 6 R | 5 | 6 | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.317 | 0.192 | | | | 97.5 | | | | |
| AC 2 | 0.0 | 0.0 | | | | 0.0 | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +13.4 | | | | | | | |
| AC NOISE | | | | | | 1.0 | | | | |
| POT RES. | | | 2K | | | 0.1 | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 16 HALF S SP. 1 DATE 10-19-76



| SEND | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 10X20S | | | 20-30 | | | | 30-40 | | |
| RANGE | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 |
| VOLTAGE | 580 | 680 | 420 | 600 | 580 | 660 | 420 | 500 | 580 | 580 |
| CURRENT | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 |
| RECEIVE | 30-40 | | 40-50 | | | | | 50-60 | | |
| RANGE | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 | 10X200 |
| VOLTAGE | 660 | 420 | 500 | 580 | 580 | 660 | 420 | 500 | 580 | 560 |
| CURRENT | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |

FREQUENCIES 1 0.1

SENDER NO. 6645

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #163

LINE 16 HALF S SP. 1 DATE 10-19-76

PAGE 4

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | | | | | | | | | |
| RECEIVE | 50-60S | | | | | | | | | |
| RANGE | 10X20 | | | | | | | | | |
| VOLTAGE | 660 | | | | | | | | | |
| CURRENT | 2.0 | | | | | | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 1 0.1

SENDER NO. 66445

OPERATOR Bob Shipp

RECEIVER NO. 2069-R

OPERATOR Bill FREEMAN

COMMENTS:

JOB 483 LINE 16 BEARING N-S N 1/2 SP1 10/19/7/ 1000 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | .10 | 97.500 | 0.00 | 1.00 | .10 | .1000 | 1.0256 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 18.75 | .70 | 37.3 | .53 | 28.4 | .17 | ** | .80 | 2.00 | 1 | 1 | 12.100 | 0.00 |
| 2 | 1 | 19.19 | .60 | 31.3 | .44 | 22.8 | .16 | ** | .70 | 2.00 | 2 | 1 | 12.400 | 0.00 |
| 3 | 2 | 19.03 | .40 | 21.0 | -.19 | -9.9 | .59 | ** | .50 | 2.00 | 3 | 2 | 3.080 | 0.00 |
| 4 | 1 | 21.93 | .40 | 18.2 | .27 | 12.1 | .13 | ** | .50 | 2.00 | 4 | 1 | 14.200 | 0.00 |
| 5 | 2 | 21.83 | .50 | 22.9 | .01 | .5 | .49 | ** | .60 | 2.00 | 5 | 2 | 3.530 | 0.00 |
| 6 | 3 | 21.27 | .90 | 42.3 | -.25 | -11.8 | 1.15 | ** | 1.00 | 2.00 | 6 | 3 | 1.370 | 0.00 |
| 7 | 1 | 24.89 | .50 | 20.1 | .39 | 15.6 | .11 | ** | .60 | 2.00 | 7 | 1 | 16.100 | 0.00 |
| 8 | 2 | 32.35 | .70 | 21.6 | .42 | 12.8 | .28 | ** | .80 | 2.00 | 8 | 2 | 5.220 | 0.00 |
| 9 | 3 | 35.60 | .60 | 16.9 | .02 | .6 | .58 | ** | .70 | 2.00 | 9 | 3 | 2.300 | 0.00 |
| 10 | 4 | 34.25 | 1.20 | 35.0 | .07 | 2.0 | 1.13 | ** | 1.30 | 2.00 | 10 | 4 | 1.100 | 0.00 |
| 11 | 1 | 16.56 | .60 | 36.2 | .40 | 24.2 | .20 | ** | .70 | 2.00 | 11 | 1 | 10.700 | 0.00 |
| 12 | 2 | 26.74 | .80 | 29.9 | .43 | 16.1 | .37 | ** | .90 | 2.00 | 12 | 2 | 4.310 | 0.00 |
| 13 | 3 | 34.43 | .80 | 23.2 | .20 | 5.7 | .60 | ** | .90 | 2.00 | 13 | 3 | 2.220 | 0.00 |
| 14 | 4 | 37.95 | 1.10 | 29.0 | .11 | 3.0 | .99 | ** | 1.20 | 2.00 | 14 | 4 | 1.220 | 0.00 |
| 15 | 5 | 35.39 | 1.90 | 53.7 | .13 | 3.8 | 1.77 | ** | 2.00 | 2.00 | 15 | 5 | .645 | 0.00 |
| 16 | 2 | 22.78 | .60 | 26.3 | .14 | 6.1 | .46 | ** | .70 | 2.00 | 16 | 2 | 3.680 | 0.00 |
| 17 | 3 | 33.00 | .70 | 21.2 | .06 | 1.8 | .64 | ** | .80 | 2.00 | 17 | 3 | 2.130 | 0.00 |
| 18 | 4 | 40.52 | 1.30 | 32.1 | .40 | 9.8 | .90 | ** | 1.40 | 2.00 | 18 | 4 | 1.300 | 0.00 |
| 19 | 5 | 42.02 | 1.60 | 38.1 | .19 | 4.5 | 1.41 | ** | 1.70 | 2.00 | 19 | 5 | .768 | 0.00 |
| 20 | 6 | 39.38 | 1.80 | 45.7 | -.51 | -12.8 | 2.31 | ** | 1.90 | 2.00 | 20 | 6 | .449 | 0.00 |
| 21 | 3 | 32.38 | .70 | 21.6 | .04 | 1.3 | .66 | ** | .80 | 2.00 | 21 | 3 | 2.090 | 0.00 |
| 22 | 4 | 42.14 | .70 | 16.6 | -.16 | -3.8 | .86 | ** | .80 | 2.00 | 22 | 4 | 1.360 | 0.00 |
| 23 | 5 | 51.12 | 1.00 | 19.6 | -.09 | -1.8 | 1.09 | ** | 1.10 | 2.00 | 23 | 5 | .940 | 0.00 |
| 24 | 6 | 49.39 | 1.10 | 22.3 | -.62 | -12.6 | 1.72 | ** | 1.20 | 2.00 | 24 | 6 | .567 | 0.00 |
| 25 | 4 | 20.84 | .80 | 38.4 | -1.36 | -65.2 | 2.16 | ** | .90 | 2.00 | 25 | 4 | .672 | 0.00 |
| 26 | 5 | 25.50 | 1.20 | 47.1 | -1.49 | -58.4 | 2.69 | ** | 1.30 | 2.00 | 26 | 5 | .468 | 0.00 |
| 27 | 6 | 29.09 | 2.00 | 68.8 | -1.39 | -47.7 | 3.39 | ** | 2.10 | 2.00 | 27 | 6 | .331 | 0.00 |

JOB 463 LINE 16 BEARING N-S S 1/2 SP1 10/19/70 1000 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | .10 | 97.500 | 0.00 | 1.00 | .10 | .1000 | 1.0256 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 18.75 | .70 | 37.3 | .53 | 28.4 | .17 | ** | .80 | 2.00 | 1 | 1 | 12.100 | 0.00 |
| 2 | 2 | 18.97 | .40 | 21.1 | -.19 | -10.1 | .59 | ** | .50 | 2.00 | 2 | 2 | 3.070 | 0.00 |
| 3 | 3 | 21.38 | .70 | 32.7 | -.44 | -20.7 | 1.14 | ** | .80 | 2.00 | 3 | 3 | 1.380 | 0.00 |
| 4 | 1 | 20.60 | .70 | 34.0 | .55 | 26.9 | .15 | ** | .80 | 2.00 | 4 | 1 | 13.300 | 0.00 |
| 5 | 2 | 18.71 | .70 | 37.4 | .10 | 5.2 | .60 | ** | .80 | 2.00 | 5 | 2 | 3.020 | 0.00 |
| 6 | 3 | 19.83 | .70 | 35.3 | -.56 | -28.3 | 1.26 | ** | .80 | 2.00 | 6 | 3 | 1.280 | 0.00 |
| 7 | 4 | 21.43 | .80 | 37.3 | -1.28 | -59.9 | 2.08 | ** | .90 | 2.00 | 7 | 4 | .691 | 0.00 |
| 8 | 1 | 19.71 | .90 | 45.7 | .74 | 37.7 | .16 | ** | 1.00 | 2.00 | 8 | 1 | 12.700 | 0.00 |
| 9 | 2 | 20.18 | .60 | 29.7 | .06 | 2.8 | .54 | ** | .70 | 2.00 | 9 | 2 | 3.260 | 0.00 |
| 10 | 3 | 19.99 | .70 | 35.0 | -.55 | -27.4 | 1.25 | ** | .80 | 2.00 | 10 | 3 | 1.290 | 0.00 |
| 11 | 4 | 20.25 | 1.10 | 54.3 | -1.14 | -56.3 | 2.24 | ** | 1.20 | 2.00 | 11 | 4 | .651 | 0.00 |
| 12 | 5 | 21.47 | 1.20 | 55.9 | -2.15 | -99.9 | 3.35 | ** | 1.30 | 2.00 | 12 | 5 | .394 | 0.00 |
| 13 | 2 | 18.09 | 1.00 | 55.3 | .37 | 20.4 | .63 | ** | 1.10 | 2.00 | 13 | 2 | 2.910 | 0.00 |
| 14 | 3 | 20.69 | 1.10 | 53.2 | -.09 | -4.5 | 1.19 | ** | 1.20 | 2.00 | 14 | 3 | 1.330 | 0.00 |
| 15 | 4 | 19.70 | 1.80 | 91.4 | -.52 | -26.4 | 2.32 | ** | 1.90 | 2.00 | 15 | 4 | .629 | 0.00 |
| 16 | 5 | 19.73 | 1.80 | 91.2 | -1.92 | -97.3 | 3.72 | ** | 1.90 | 2.00 | 16 | 5 | .360 | 0.00 |
| 17 | 6 | 20.07 | 1.30 | 64.8 | -4.08 | -203.2 | 5.38 | ** | 1.40 | 2.00 | 17 | 6 | .230 | 0.00 |
| 18 | 3 | 16.19 | 1.20 | 74.1 | -.44 | -27.4 | 1.64 | ** | 1.30 | 2.00 | 18 | 3 | 1.040 | 0.00 |
| 19 | 4 | 18.60 | 1.60 | 86.0 | -.90 | -48.3 | 2.50 | ** | 1.70 | 2.00 | 19 | 4 | .595 | 0.00 |
| 20 | 5 | 17.36 | 1.70 | 97.9 | -2.67 | -153.5 | 4.37 | ** | 1.80 | 2.00 | 20 | 5 | .317 | 0.00 |
| 21 | 6 | 16.91 | 2.20 | 130.1 | -4.44 | -262.7 | 6.64 | ** | 2.30 | 2.00 | 21 | 6 | .192 | 0.00 |

JOB 463 LINE 17 BEARING N-S.

N½. SPR I. 10-21-70.

1000.

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 12 HALF N SP. 1 DATE 10-21-70

| SEND | CAL | S.P. | S.P. | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 2-3 | 0-10N | 10-20N | 20-30N | → | → | 30-40N | → | → | → |
| RANGE | 1.0 | | | 1.0 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.01 |
| DC 1 | 0.0 | ① | | 0.9 | 0.7 | 1.3 | 0.8 | 0.7 | 0.8 | 1.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 1.0 | | | 3.0 | 2.0 | 1.0 | 3.0 | 3.0 | 2.0 | 1.0 |
| DC 5 # | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| DC 6 n | | | | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.3 | | | 35.7 | 5.37 | 1.03 | 20.8 | 7.71 | 2.10 | 0.500 |
| AC 2 | 0.0 | | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -13.5 | +5.5 | +19.6 | | | -5.8 | | | |
| AC NOISE | 1.0 | | | | | | | | | |
| POT RES. | 0.1 | 3K | 3.5K | 6K | | | 4K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 17 HALF N SP. 1 DATE 10-21-70



| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 40-50N | → | → | → | → | 50-60N | → | → | → | → |
| RANGE | 1.0 | 0.1 | 0.1 | 0.01 | 0.01 | 0.1 | 0.1 | 0.1 | 0.01 | 0.01 |
| DC 1 | 0.9 | 0.7 | 1.0 | 1.0 | 1.4 | 0.8 | 0.9 | 1.4 | 2.1 | 2.3 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR. | 3.0 | 3.0 | 3.0 | 2.0 | 1.0 | 3.0 | 3.0 | 3.0 | 2.0 | 1.0 |
| DC 5 # | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| DC 6 n | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 23.4 | 6.00 | 2.95 | 0.996 | 0.264 | 6.68 | 2.44 | 1.38 | 0.508 | 0.146 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +6.2 | | | | | -8.7 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3K | | | | | 4K | | | | |

GROUNDED FENCE ⊥ @ 5980'N

PAGE 6

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 17 HALF N SP. 1 DATE 10-21-74

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | 3-4 | |
| RECEIVE | 60-70N | → | → | → | 70-80N | → | → | | 70-80N | |
| RANGE | 0.1 | 0.1 | 0.01 | 0.01 | 0.1 | 0.1 | 0.01 | | 0.759 | 3 HZ |
| DC 1 | 1.4 | 2.2 | 2.1 | 2.0 | 1.6 | 2.1 | 2.7 | | 5.1% | 1 HZ |
| DC 2 | | | | | | | | | 7.2% | 0.3 HZ |
| DC 3 | | | | | | | | | 8.1% | 0.1 HZ |
| DC 4 CUR | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | 3.0 | 3.0 | | 0.0 | DEV. |
| DC 5 # | 18 | 19 | 20 | 21 | 22 | 23 | 24 | | | |
| DC 6 N | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 3.48 | 1.47 | 0.907 | 0.357 | 2.65 | 1.22 | 0.793 | | | |
| AC 2 | 6.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.4 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +6.6 | | | | +9.3 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 2K | | | | 5K | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 17 HALF N SP. 1 DATE 12-21-70

PAGE 1

| SEND | CAL. | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 2-3 | 20-30N | → | → | 30-40N | → | → | → | 40-50N | |
| RANGE | 10X100 | 10X300 | 10X200 | 10X100 | 10X300 | 10X300 | 10X200 | 10X100 | 10X300 | 10X300 |
| VOLTAGE | 320 | 370 | 660 | 610 | 340 | 370 | 650 | 610 | 340 | 340 |
| CURRENT | 1.0 | 3.0 | 2.0 | 1.0 | 3.0 | 3.0 | 2.0 | 1.0 | 3.0 | 3.0 |
| SEND | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 |
| RECEIVE | 40-50 | → | → | 50-60 | → | → | → | → | 60-70 | |
| RANGE | 10X300 | 10X200 | 10X100 | 10X300 | 10X300 | 10X300 | 10X200 | 10X100 | 10X300 | 10X300 |
| VOLTAGE | 370 | 650 | 600 | 340 | 340 | 370 | 650 | 600 | 340 | 340 |
| CURRENT | 3.0 | 2.0 | 1.0 | 3.0 | 3.0 | 3.0 | 2.0 | 1.6 | 3.0 | 3.0 |

FREQUENCIES 1.0 0.1

SENDER NO. 66445

OPERATOR Bob Shipp

RECEIVER NO. 20693 L/R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 17 HALF X SP. 1 DATE 8-21-70

PAGE 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | | | |
| RECEIVE | 60-70N | → | 70-80N | ~ | → | | | | | |
| RANGE | 10X300 | 10X200 | 10X300 | 10X300 | 10X300 | | | | | |
| VOLTAGE | 370 | 640 | 340 | 340 | 370 | | | | | |
| CURRENT | 3.0 | 2.0 | 3.0 | 3.0 | 3.0 | | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 1.0 0.1

SENDER NO. 66445

OPERATOR Bob Shipp

RECEIVER NO. 20693LR

OPERATOR Bill Freeman

COMMENTS:

JOB 463. LINE 17 BEARING N-S.

S1/2. SPR I 10-20-70

1000.

GROUNDED FENCE @ 1800'S ⊥ Job 463 1000

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 17 HALF S SP. 1 DATE 10-20-7



| SEND | CAL | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 3-4 | 0-10s | → | 10-20s | → | → | 20-30s | → | → | → |
| RANGE | 1.0 | 1.0 | 0.1 | 1.0 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 |
| DC 1 (2) | 0.1 | 0.7 | 0.7 | 1.1 | 0.8 | 1.0 | 0.8 | 0.6 | 1.1 | 1.3 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR. | 1.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 ∩ | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.8 | 22.6 | 8.11 | 22.1 | 5.65 | 3.11 | 18.6 | 6.16 | 2.66 | 1.81 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -52.6 | | +36.7 | | | +10.4 | | | |
| AC NOISE | 1.0 | | | | | | | | | |
| POT RES. | 0.1 | 20 K | | 10 K | | | 11 K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #63
LINE 17 HALF 5 SP. 1 DATE 10-20-70



| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-40s | → | → | → | → | 40-50s | → | → | → | → |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.01 | 0.01 |
| DC 1 | 1.1 | 0.8 | 0.9 | 1.1 | 1.3 | 1.1 | 0.8 | 1.2 | 1.5 | 1.6 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 1.0 | 2.0 | 3.0 | 3.0 | 3.0 | 1.0 | 2.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 N | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 8.01 | 4.22 | 2.64 | 1.44 | 1.08 | 1.65 | 1.57 | 1.30 | 0.794 | 0.643 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +5.6 | | | | | +18.8 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 9K | | | | | 3K | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 17 HALF S SP. 1 DATE 10-20-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | ~~3-4~~ | |
| RECEIVE | 50-60s | | | → | 60-70s | | | | 60-70 | |
| RANGE | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | | | 3 HZ |
| DC 1 | 1.0 | 1.3 | 1.6 | 2.3 | 1.3 | 1.6 | 2.1 | | | 1 HZ |
| DC 2 | | | | | | | | | | 0.3 HZ |
| DC 3 | | | | | | | | | | 0 HZ |
| DC 4 CUR. | 1.0 | 2.0 | 3.0 | 3.0 | 1.0 | 2.0 | 3.0 | | | DEM |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | |
| DC 6 " | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.640 | 0.766 | 0.733 | 0.483 | 0.303 | 0.411 | 0.434 | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +1.7 | | | | +18.5 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 2K | | | | 2K | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire # 468

LINE 12 HALF S SP. 1 DATE 10-20-70

PAGE 1

| SEND | CAL. | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 3-4 | 0-10S | → | 10-20S | → | → | 20-30S | → | → | → |
| RANGE | 10X100 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X200 | 10X300 | 10X300 | 10X300 |
| VOLTAGE | 130 | 360 | 370 | 400 | 360 | 370 | 760 | 390 | 360 | 360 |
| CURRENT | 1.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 2.0 | 3.0 | 3.0 | 3.0 |
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 30-40S | → | → | → | → | 40-50 | → | → | → | → |
| RANGE | 10X100 | 10X200 | 10X300 | 10X300 | 10X300 | 10X100 | 10X200 | 10X300 | 10X300 | 10X300 |
| VOLTAGE | 720 | 750 | 380 | 350 | 360 | 700 | 740 | 380 | 350 | 360 |
| CURRENT | 1.0 | 2.0 | 3.0 | 3.0 | 3.0 | 1.0 | 2.0 | 3.0 | 3.0 | 3.0 |

FREQUENCIES 1.0 0.1

SENDER NO. 6645

OPERATOR Bob Shipp

RECEIVER NO. 2069S-R

OPERATOR Bill FREEMAN

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

## I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 12 HALF S SP. 1 DATE 10-20-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | |
| RECEIVE | 50-60S | ——— | ——— | ——> | 60-70S | ——— | ——> | | | |
| RANGE | 10X100 | 10X200 | 10X300 | 10X300 | 10X100 | 10X200 | 10X300 | | | |
| VOLTAGE | 690 | 720 | 380 | 350 | 680 | 720 | 380 | | | |
| CURRENT | 1.0 | 2.0 | 3.0 | 3.0 | 1.0 | 2.0 | 3.0 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 1.0 0.1

SENDER NO. 66445

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 17 BEARING N-S N 1/2 SP1 10/21/70 1000 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.300 | 0.00 | 1.00 | .10 | 0.0000 | 1.0277 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 37.02 | .90 | 24.3 | .84 | 22.6 | .06 | ** | .90 | 3.00 | 1 | 1 | 35.700 | 0.00 |
| 2 | 2 | 33.35 | .70 | 21.0 | .43 | 12.8 | .27 | ** | .70 | 2.00 | 2 | 2 | 5.370 | 0.00 |
| 3 | 3 | 32.17 | 1.30 | 40.4 | .64 | 19.8 | .66 | ** | 1.30 | 1.00 | 3 | 3 | 1.030 | 0.00 |
| 4 | 1 | 21.55 | .80 | 37.1 | .66 | 30.7 | .14 | ** | .80 | 3.00 | 4 | 1 | 20.800 | 0.00 |
| 5 | 2 | 31.92 | .70 | 21.9 | .41 | 12.8 | .29 | ** | .70 | 3.00 | 5 | 2 | 7.710 | 0.00 |
| 6 | 3 | 32.63 | .80 | 24.5 | .15 | 4.6 | .65 | ** | .80 | 2.00 | 6 | 3 | 2.100 | 0.00 |
| 7 | 4 | 31.36 | 1.70 | 54.2 | .43 | 13.7 | 1.27 | ** | 1.70 | 1.00 | 7 | 4 | .500 | 0.00 |
| 8 | 1 | 24.27 | .90 | 37.1 | .78 | 32.3 | .12 | ** | .90 | 3.00 | 8 | 1 | 23.400 | 0.00 |
| 9 | 2 | 24.84 | .70 | 28.2 | .29 | 11.7 | .41 | ** | .70 | 3.00 | 9 | 2 | 6.000 | 0.00 |
| 10 | 3 | 30.62 | 1.00 | 32.7 | .29 | 9.5 | .71 | ** | 1.00 | 3.00 | 10 | 3 | 2.950 | 0.00 |
| 11 | 4 | 31.02 | 1.00 | 32.2 | -.29 | -9.3 | 1.29 | ** | 1.00 | 2.00 | 11 | 4 | .996 | 0.00 |
| 12 | 5 | 28.89 | 1.40 | 48.5 | -.89 | -31.0 | 2.29 | ** | 1.40 | 1.00 | 12 | 5 | .264 | 0.00 |
| 13 | 2 | 27.68 | .80 | 28.9 | .45 | 16.1 | .35 | ** | .80 | 3.00 | 13 | 2 | 6.680 | 0.00 |
| 14 | 3 | 25.30 | .90 | 35.6 | -.01 | -.5 | .91 | ** | .90 | 3.00 | 14 | 3 | 2.440 | 0.00 |
| 15 | 4 | 28.76 | 1.40 | 48.7 | -.02 | -.8 | 1.42 | ** | 1.40 | 3.00 | 15 | 4 | 1.380 | 0.00 |
| 16 | 5 | 27.99 | 2.10 | 75.0 | -.29 | -10.3 | 2.39 | ** | 2.10 | 2.00 | 16 | 5 | .508 | 0.00 |
| 17 | 6 | 25.79 | 2.30 | 89.2 | -1.64 | -63.6 | 3.94 | ** | 2.30 | 1.00 | 17 | 6 | .146 | 0.00 |
| 18 | 3 | 36.27 | 1.40 | 38.6 | .84 | 23.1 | .56 | ** | 1.40 | 3.00 | 18 | 3 | 3.480 | 0.00 |
| 19 | 4 | 30.88 | 2.20 | 71.2 | .90 | 29.3 | 1.30 | ** | 2.20 | 3.00 | 19 | 4 | 1.470 | 0.00 |
| 20 | 5 | 33.31 | 2.10 | 63.0 | .19 | 5.7 | 1.91 | ** | 2.10 | 3.00 | 20 | 5 | .907 | 0.00 |
| 21 | 6 | 31.44 | 2.00 | 63.6 | -1.07 | -34.1 | 3.07 | ** | 2.00 | 2.00 | 21 | 6 | .357 | 0.00 |
| 22 | 4 | 55.34 | 1.60 | 28.9 | 1.01 | 18.2 | .59 | ** | 1.60 | 3.00 | 22 | 4 | 2.650 | 0.00 |
| 23 | 5 | 44.81 | 2.10 | 46.9 | .80 | 17.9 | 1.30 | ** | 2.10 | 3.00 | 23 | 5 | 1.220 | 0.00 |
| 24 | 6 | 46.87 | 2.50 | 53.3 | .66 | 14.0 | 1.84 | ** | 2.70 | 3.00 | 24 | 6 | .793 | .40 |

JOB 463 LINE 17 BEARING N-S S 1/2 SP1 10/20/70 1000 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | .10 | 97.800 | 0.00 | 1.00 | .10 | .1000 | 1.0225 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 23.25 | .60 | 25.8 | .48 | 20.5 | .12 | ** | .70 | 3.00 | 1 | 1 | 22.600 | 0.00 |
| 2 | 2 | 33.37 | .60 | 18.0 | .33 | 9.8 | .27 | ** | .70 | 3.00 | 2 | 2 | 8.110 | 0.00 |
| 3 | 1 | 22.82 | 1.00 | 43.8 | .87 | 38.2 | .13 | ** | 1.10 | 3.00 | 3 | 1 | 22.100 | 0.00 |
| 4 | 2 | 23.27 | .70 | 30.1 | .25 | 10.8 | .45 | ** | .80 | 3.00 | 4 | 2 | 5.650 | 0.00 |
| 5 | 3 | 32.09 | .90 | 28.0 | .24 | 7.3 | .66 | ** | 1.00 | 3.00 | 5 | 3 | 3.110 | 0.00 |
| 6 | 1 | 28.73 | .70 | 24.4 | .61 | 21.2 | .09 | ** | .80 | 2.00 | 6 | 1 | 18.600 | 0.00 |
| 7 | 2 | 25.32 | .50 | 19.7 | .10 | 4.0 | .40 | ** | .60 | 3.00 | 7 | 2 | 6.160 | 0.00 |
| 8 | 3 | 27.47 | 1.00 | 36.4 | .18 | 6.6 | .82 | ** | 1.10 | 3.00 | 8 | 3 | 2.660 | 0.00 |
| 9 | 4 | 37.46 | 1.20 | 32.0 | .20 | 5.2 | 1.00 | ** | 1.30 | 3.00 | 9 | 4 | 1.810 | 0.00 |
| 10 | 1 | 24.82 | 1.00 | 40.3 | .89 | 35.7 | .11 | ** | 1.10 | 1.00 | 10 | 1 | 8.010 | 0.00 |
| 11 | 2 | 26.07 | .70 | 26.8 | .32 | 12.1 | .38 | ** | .80 | 2.00 | 11 | 2 | 4.220 | 0.00 |
| 12 | 3 | 27.21 | .80 | 29.4 | -.03 | -1.1 | .83 | ** | .90 | 3.00 | 12 | 3 | 2.640 | 0.00 |
| 13 | 4 | 29.74 | 1.00 | 33.6 | -.36 | -12.1 | 1.36 | ** | 1.10 | 3.00 | 13 | 4 | 1.440 | 0.00 |
| 14 | 5 | 39.11 | 1.20 | 30.7 | -.35 | -9.0 | 1.55 | ** | 1.30 | 3.00 | 14 | 5 | 1.080 | 0.00 |
| 15 | 2 | 20.47 | 1.10 | 53.7 | .57 | 27.7 | .53 | ** | 1.20 | 1.00 | 15 | 2 | 1.650 | 0.00 |
| 16 | 3 | 24.25 | .70 | 28.9 | -.27 | -11.0 | .97 | ** | .80 | 2.00 | 16 | 3 | 1.570 | 0.00 |
| 17 | 4 | 26.88 | 1.10 | 40.9 | -.45 | -16.9 | 1.55 | ** | 1.20 | 3.00 | 17 | 4 | 1.300 | 0.00 |
| 18 | 5 | 28.81 | 1.40 | 48.6 | -.90 | -31.3 | 2.30 | ** | 1.50 | 3.00 | 18 | 5 | .794 | 0.00 |
| 19 | 6 | 37.37 | 1.50 | 40.1 | -.97 | -25.8 | 2.47 | ** | 1.60 | 3.00 | 19 | 6 | .643 | 0.00 |
| 20 | 3 | 19.81 | .90 | 45.4 | -.36 | -18.3 | 1.26 | ** | 1.00 | 1.00 | 20 | 3 | .640 | 0.00 |
| 21 | 4 | 23.78 | 1.20 | 50.5 | -.62 | -26.1 | 1.82 | ** | 1.30 | 2.00 | 21 | 4 | .766 | 0.00 |
| 22 | 5 | 26. | 1.50 | 58 | 1.21 | 8.9 | .29 | ** | 1.60 | 3.00 | 22 | 5 | .733 | 0.00 * |
| 23 | 6 | 28.26 | 2.20 | 77.8 | -1.31 | -46.5 | 3.51 | ** | 2.30 | 3.00 | 23 | 6 | .483 | 0.00 |
| 24 | 4 | 18.81 | 1.20 | 63.8 | -1.26 | -67.1 | 2.46 | ** | 1.30 | 1.00 | 24 | 4 | .303 | 0.00 |
| 25 | 5 | 22.39 | 1.50 | 67.0 | -1.67 | -74.7 | 3.17 | ** | 1.60 | 2.00 | 25 | 5 | .411 | 0.00 |
| 26 | 6 | 25.35 | 2.00 | 78.9 | -2.03 | -80.0 | 4.03 | ** | 2.10 | 3.00 | 26 | 6 | .434 | 0.00 |

N=5. $K_n$ = 105

JOB 463. LINE 18 BEARING N-S.

N½. SPR I. 10-23-70

750.

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

Road @ 18N
WASH @ 22N

Job 463 750. # 463

PROJECT EMPIRE

LINE 18 HALF N SP. 1 DATE 10-23-76

PAGE 1

| SEND | CAL | S.P. | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 2-3 | 0-7.5N | 7.5-15N | → | 15-22.5 | N ← | → | 22.5- | 30N | ~ |
| RANGE | 1.0 | | 1.0 | 0.1 | 1.0 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 |
| DC 1 ① | -0.1 | | 0.9 | 1.1 | 0.6 | 0.9 | 1.2 | 0.7 | 0.7 | 1.5 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CHR: | 1.0 | | 3.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 3.0 | 3.0 |
| DC 5 # | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| DC 6 ∩ | | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 98.1 | | 12.6 | 4.85 | 37.3 | 4.64 | 2.37 | 20.3 | 9.57 | 2.28 |
| AC 2 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +11.4 | -20.8 | | +27.6 | | | -2.7 | | |
| AC NOISE | 3.0 | | | | | | | | | |
| POT RES. | 0.3 | 6K | 6K | | 2K | | | 7K | | |

GROUNDED FENCE @ 25N @ ∠30° OVER

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 18 HALF N SP. DATE 10-23-71

| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30N | 30-37.5 | N ← | ← | ← | → | 37.5-45N | ← | ← | → |
| RANGE | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 |
| DC 1 | 2.2 | 0.9 | 1.3 | 1.4 | 2.2 | 2.7 | 1.2 | 1.4 | 1.8 | 2.2 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR. | 2.0 | 2.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 3.0 | 3.0 |
| DC 5 # | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| DC 6 n | 4 | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.41 | 32.8 | 7.31 | 5.55 | 1.72 | 1.10 | 10.8 | 4.02 | 3.93 | 1.43 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +6.0 | | | | | +8.3 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 4K | | | | | 3K | | | |

| | 1-2 | 1-2 |
|---|---|---|
| | 22.5 30 N | 30 37.5 |
| | 0.1 | 0.1 |
| 1 Hz | 1.41 | 1.11 |
| 0.1 Hz | 1.12 | 2.0 |
| | 0.0 | 0.0 |

OVER!

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 18 HALF N SP. 1 DATE 10-23-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | |
| RECEIVE | 37.5-45N | 45-52.5N | → | | → | 52.5- | 60N | → | | |
| RANGE | 0.01 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | |
| DC 1 | 3.8 | 1.1 | 1.6 | 2.6 | 3.0 | 1.1 | 2.2 | 2.7 | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 2.0 | 2.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 3.0 | | |
| DC 5 # | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | |
| DC 6 N | 6 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.925 | 6.25 | 3.05 | 3.45 | 1.38 | 1.90 | 1.11 | 1.41 | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | +8.3 | | | | -7.5 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 3K | | | | 3K | | | | |

| | 1-2 | 2-3 | 3-4 |
|---|---|---|---|
| | 37.5-45 | 45 52.5 | 52.5-60 |
| | 0 0' | 0.1 | 0.1 |
| 1 Hz | 0.942 | 1.42 | 1.43 |
| 0.1 Hz | 2.8 | 3.0 | 2.6 |
| | 0.0 | 0.0 | 0.0 |

! — No coupling?

Profusion of C. mon. to cubes in solution!

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 18 HALF N SP. 1 DATE 10-23-70

PAGE 3

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 7.5-15 N → | | 15-22.5 | — | → | 22.5-30 | N | — | → | 30-37.5 N |
| RANGE | 10X300 | 10X200 | 10X300 | 10X300 | 10X200 | 10X200 | 10X300 | 10X300 | 10X200 | 10X200 |
| VOLTAGE | 270 | 350 | 240 | 270 | 350 | 340 | 240 | 270 | 350 | 370 |
| CURRENT | 10X300 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 |
| SEND | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 |
| RECEIVE | 30-37.5 | N | — | → | 37.5-45 | N | — | — | → | 45-52.5 |
| RANGE | 10X200 | 10X300 | 10X300 | 10X200 | 10X200 | 10X200 | 10X300 | 10X300 | 10X200 | 10X200 |
| VOLTAGE | 340 | 240 | 270 | 350 | 370 | 340 | 240 | 270 | 340 | 370 |
| CURRENT | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 |

FREQUENCIES 31 , 3

SENDER NO. 66445

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 12 HALF N SP. 1 DATE 10-23-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | CAL | |
| RECEIVE | 45-52.5 | → | → | 52.5-60 | N | → | | | 2-3 | |
| RANGE | 10x200 | 10x300 | 10x300 | 10x200 | 10x200 | 10x300 | | | 104/00 | |
| VOLTAGE | 340 | 230 | 270 | 270 | 330 | 230 | | | 90 | |
| CURRENT | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 3.0 | | | 1.0 | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3. .3

SENDER NO. 66445

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 18 BEARING N-S.

5½. SPR I 10-22-70

750.

GROUNDED FENCE OVER #

a = 750' @ 750/

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES JOB 463/

PROJECT EMPIRE 463

LINE 18 HALF 5 SP. 1 DATE 10-22-

PAGE 1

| SEND | CAL | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 3-4 | 0-7.5s | → | 7.5-15s | → | → | 15-22.5s | → | → | → |
| RANGE | 1.0 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 (2) | -0.1 | 0.7 | 0.8 | 0.7 | 0.9 | 1.3 | 0.7 | 1.1 | 1.5 | 1.8 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR. | 1.0 | 2.0 | 2.0 | 3.0 | 2.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 n | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.9 | 8.49 | 3.04 | 54.6 | 4.89 | 2.35 | 31.7 | 16.0 | 2.47 | 1.41 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +2.3 | | +14.3 | | | +6.3 | | | |
| AC NOISE | 3.0 | | | | | | | | | |
| POT RES. | 0.3 | 5K | | 2K | | | 3K | | | |

| | 5-6 |
| --- | --- |
| | 15-22.5 |
| 1Hz | 1.42 |
| 0.1 Hz | 0.8 |

Dev

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

OVER!

PROJECT EMPIRE 463
LINE 18 HALF S SP. / DATE 10-22-76

PAGE 2

| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 | " | " | " | → | 30-37.5 | " | " | " | → |
| RANGE | 1.0 | 0.1 | 0.1 | 0.01 | 0.01 | 0.1 | 0.1 | 0.1 | 0.01 | 0.01 |
| DC 1 | 1.0 | 0.9 | 1.2 | 2.2 | 3.1 | 0.8 | 1.2 | 1.3 | 2.2 | 4.0 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR. | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 n | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 21.2 | 6.88 | 5.07 | 0.983 | 0.600 | 7.23 | 3.75 | 3.26 | 0.728 | 0.474 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +11.2 | | | | | +5.9 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 4K | | | | | 2K | | | | |

| | 4-5 | 5-6 | 5-6 | |
|---|---|---|---|---|
| | 22.5-30<br>0.01 | 22.5-30<br>0.01 | 30-37.5<br>0.01 | BAD RADIO TRANSMISSION. NOT SURE IF Bob understood what I wanted |
| 1Hz | 10.02 | 0.612 | 0.487 | |
| 0.1 | 1.1 | 2.1 | ? — ? | |
| Dev. | -0.2 | 0.0 | | |

OVER!!

PAGE 3

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 18 HALF S SP. / DATE 10-22-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | |
| RECEIVE | 37.5-4 | 5s | → | → | 45-52.5 | → | → | | | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.01 | 0.1 | 0.1 | 0.1 | | | |
| DC 1 | 1.1 | 1.6 | 1.8 | 3.2 | 1.5 | 2.3 | 2.5 | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 3.0 | 3.0 | | | |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | |
| DC 6 N | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 2.59 | 1.66 | 1.55 | 0.382 | 1.47 | 1.03 | 1.05 | | | |
| AC 2 | 0.2 | 0.0 | 0.2 | 0.0 | 0.2 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +9.5 | | | | +21.4 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3K | | | | 5K | | | | | |

| | 4-5 | 1-2 | 2-3 | 3-4 |
|---|---|---|---|---|
| | 37.5-45 | 45-52.5 | → | |
| | 0.01 | 0.1 | | |
| 1 Hz. | 0.394 | 1.48 | 1.04 | 1.06 |
| 0.1 Hz | 1.8 | 1.1 | 1.7 | 2.1 |
| Dev. | 0.0 | 0.0 | 0.0 | 0.0 |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 18 HALF S SP. 1 DATE 10-22-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL. | 4-5 | -56 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 3-4 | 7.5-15 | → | 15-22.5 | S | → | 22.5-30 | S | | → |
| RANGE | 10X100 | 10X200 | 10X200 | 10X300 | 10X200 | 10X200 | 10X300 | 10X300 | 10X200 | 10X200 |
| VOLTAGE | 80 | 370 | 400 | 240 | 360 | 400 | 300 | 240 | 260 | 400 |
| CURRENT | 1.0 | 2.0 | 2.0 | 3.0 | 2.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 |
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 30-37.5 | | | | → | 37.5-45 | | | | → |
| RANGE | 10X200 | 10X300 | 10X300 | 10X200 | 10X200 | 10X200 | 10X300 | 10X300 | 10X200 | 10X200 |
| VOLTAGE | 380 | 280 | 240 | 350 | 400 | 380 | 280 | 240 | 340 | 380 |
| CURRENT | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 |

FREQUENCIES 3 13

SENDER NO. 6645

OPERATOR Bob Shipp

RECEIVER NO. 2069 3-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire # 463

LINE 18 HALF S SP. 1 DATE 9-22-74

PAGE 5

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | |
| RECEIVE | 45-52.5 S | | | → | 52.5-60 | S | → | | | |
| RANGE | 10X200 | 10X300 | 10X300 | 10X200 | 10X200 | 10X300 | 10X300 | | | |
| VOLTAGE | 370 | 280 | 230 | 340 | 370 | 280 | 230 | | | |
| CURRENT | 2.0 | 3.0 | 3.0 | 2.0 | 2.0 | 3.0 | 3.0 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3 .3

SENDER NO. 6642S

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill FREEMAN

COMMENTS:

JOB 463 LINE 18 BEARING N-S N 1/2 SP1 10/23/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | -.10 | 98.100 | 0.00 | 3.00 | .30 | -.1000 | 1.0194 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 9.73 | 1.00 | 102.8 | .16 | 16.7 | .84 | ** | .90 | 3.00 | 1 | 1 | 12.600 | 0.00 |
| 2 | 2 | 22.51 | 1.20 | 53.3 | .25 | 11.2 | .95 | ** | 1.10 | 2.00 | 2 | 2 | 4.850 | 0.00 |
| 3 | 1 | 28.72 | .70 | 24.4 | .51 | 17.7 | .19 | ** | .60 | 3.00 | 3 | 1 | 37.300 | 0.00 |
| 4 | 2 | 14.33 | 1.00 | 69.8 | -.71 | -49.7 | 1.71 | ** | .90 | 3.00 | 4 | 2 | 4.640 | 0.00 |
| 5 | 3 | 27.53 | 1.30 | 47.2 | -.33 | -11.9 | 1.63 | ** | 1.20 | 2.00 | 5 | 3 | 2.370 | 0.00 |
| 6 | 1 | 23.47 | .80 | 34.1 | .55 | 23.3 | .25 | ** | .70 | 2.00 | 6 | 1 | 20.300 | 0.00 |
| 7 | 2 | 29.50 | .80 | 27.1 | .14 | 4.7 | .66 | ** | .70 | 3.00 | 7 | 2 | 9.570 | 0.00 |
| 8 | 3 | 17.71 | 1.60 | 90.3 | -1.27 | -71.6 | 2.87 | ** | 1.50 | 3.00 | 8 | 3 | 2.280 | 0.00 |
| 9 | 4 | 33.08 | 2.30 | 69.5 | -.04 | -1.1 | 2.34 | ** | 2.20 | 2.00 | 9 | 4 | 1.410 | 0.00 |
| 10 | 1 | 37.99 | 1.00 | 26.3 | .87 | 22.9 | .13 | ** | .90 | 2.00 | 10 | 1 | 32.800 | 0.00 |
| 11 | 2 | 34.00 | 1.40 | 41.2 | .86 | 25.2 | .54 | ** | 1.30 | 2.00 | 11 | 2 | 7.310 | 0.00 |
| 12 | 3 | 43.07 | 1.50 | 34.8 | .60 | 13.9 | .90 | ** | 1.40 | 3.00 | 12 | 3 | 5.550 | 0.00 |
| 13 | 4 | 26.90 | 2.30 | 85.5 | -.74 | -27.4 | 3.04 | ** | 2.20 | 3.00 | 13 | 4 | 1.720 | 0.00 |
| 14 | 5 | 45.39 | 2.80 | 61.7 | .29 | 6.3 | 2.51 | ** | 2.70 | 2.00 | 14 | 5 | 1.100 | 0.00 |
| 15 | 2 | 50.19 | 1.30 | 25.9 | .98 | 19.5 | .32 | ** | 1.20 | 2.00 | 15 | 2 | 10.800 | 0.00 |
| 16 | 3 | 46.79 | 1.50 | 32.1 | .69 | 14.8 | .81 | ** | 1.40 | 2.00 | 16 | 3 | 4.020 | 0.00 |
| 17 | 4 | 61.23 | 1.90 | 31.0 | .85 | 13.9 | 1.05 | ** | 1.80 | 3.00 | 17 | 4 | 3.930 | 0.00 |
| 18 | 5 | 39.14 | 2.30 | 58.8 | -.73 | -18.7 | 3.03 | ** | 2.20 | 3.00 | 18 | 5 | 1.430 | 0.00 |
| 19 | 6 | 61.72 | 3.90 | 63.2 | 1.37 | 22.1 | 2.53 | ** | 3.80 | 2.00 | 19 | 6 | .925 | 0.00 |
| 20 | 3 | 72.53 | 1.20 | 16.5 | .75 | 10.4 | .45 | ** | 1.10 | 2.00 | 20 | 3 | 6.250 | 0.00 |
| 21 | 4 | 71.14 | 1.70 | 23.9 | .84 | 11.8 | .86 | ** | 1.60 | 2.00 | 21 | 4 | 3.050 | 0.00 |
| 22 | 5 | 94.81 | 2.70 | 28.5 | 1.74 | 18.3 | .96 | ** | 2.60 | 3.00 | 22 | 5 | 3.450 | 0.00 |
| 23 | 6 | 60.91 | 3.10 | 50.9 | .52 | 8.6 | 2.58 | ** | 3.00 | 3.00 | 23 | 6 | 1.380 | 0.00 |
| 24 | 4 | 44.10 | 1.20 | 27.2 | -.41 | -9.3 | 1.61 | ** | 1.10 | 2.00 | 24 | 4 | 1.900 | 0.00 |
| 25 | 5 | 45.58 | 2.30 | 50.5 | -.20 | -4.4 | 2.50 | ** | 2.20 | 2.00 | 25 | 5 | 1.110 | 0.00 |
| 26 | 6 | 62.06 | 2.80 | 45.1 | .28 | 4.6 | 2.52 | ** | 2.70 | 3.00 | 26 | 6 | 1.410 | 0.00 |

JOB 463 LINE 18 BEARING N-S S 1/2 SP1 10/22/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | -.10 | 97.900 | 0.00 | 3.00 | .30 | -.1000 | 1.0215 |

| | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 9.83 | .80 | 81.3 | -.03 | -2.7 | .83 | ** | .70 | 2.00 | 1 | 1 | 8.490 | 0.00 |
| 2 | 2 | 14.10 | .90 | 63.8 | -.85 | -60.2 | 1.75 | ** | .80 | 2.00 | 2 | 2 | 3.040 | 0.00 |
| 3 | 1 | 42.16 | .80 | 19.0 | .69 | 16.3 | .11 | ** | .70 | 3.00 | 3 | 1 | 54.600 | 0.00 |
| 4 | 2 | 22.70 | 1.00 | 44.0 | .06 | 2.8 | .94 | ** | .90 | 2.00 | 4 | 2 | 4.890 | 0.00 |
| 5 | 3 | 27.38 | 1.40 | 51.1 | -.24 | -8.7 | 1.64 | ** | 1.30 | 2.00 | 5 | 3 | 2.350 | 0.00 |
| 6 | 1 | 24.48 | .80 | 32.7 | .56 | 22.9 | .24 | ** | .70 | 3.00 | 6 | 1 | 31.700 | 0.00 |
| 7 | 2 | 49.62 | 1.20 | 24.2 | .87 | 17.6 | .33 | ** | 1.10 | 3.00 | 7 | 2 | 16.000 | 0.00 |
| 8 | 3 | 28.84 | 1.60 | 55.5 | .07 | 2.3 | 1.53 | ** | 1.50 | 2.00 | 8 | 3 | 2.470 | 0.00 |
| 9 | 4 | 33.02 | 1.90 | 57.5 | -.44 | -13.3 | 2.34 | ** | 1.80 | 2.00 | 9 | 4 | 1.410 | 0.00 |
| 10 | 1 | 24.63 | 1.10 | 44.7 | .86 | 35.0 | .24 | ** | 1.00 | 2.00 | 10 | 1 | 21.200 | 0.00 |
| 11 | 2 | 21.29 | 1.00 | 47.0 | -.02 | -.9 | 1.02 | ** | .90 | 3.00 | 11 | 2 | 6.880 | 0.00 |
| 12 | 3 | 39.35 | 1.30 | 33.0 | .28 | 7.2 | 1.02 | ** | 1.20 | 3.00 | 12 | 3 | 5.070 | 0.00 |
| 13 | 4 | 23.11 | 2.30 | 99.5 | -1.38 | -59.6 | 3.68 | ** | 2.20 | 2.00 | 13 | 4 | .983 | 0.00 |
| 14 | 5 | 24.90 | 3.20 | 128.5 | -2.14 | -85.8 | 5.34 | ** | 3.10 | 2.00 | 14 | 5 | .600 | 0.00 |
| 15 | 2 | 33.53 | .90 | 26.8 | .34 | 10.3 | .56 | ** | .80 | 2.00 | 15 | 2 | 7.230 | 0.00 |
| 16 | 3 | 29.10 | 1.30 | 44.7 | -.21 | -7.4 | 1.51 | ** | 1.20 | 3.00 | 16 | 3 | 3.750 | 0.00 |
| 17 | 4 | 50.65 | 1.40 | 27.6 | .06 | 1.1 | 1.34 | ** | 1.30 | 3.00 | 17 | 4 | 3.260 | 0.00 |
| 18 | 5 | 29.95 | 2.30 | 76.8 | -1.95 | -65.0 | 4.25 | ** | 2.20 | 2.00 | 18 | 5 | .728 | 0.00 |
| 19 | 6 | 31.75 | 4.10 | 129.1 | -1.72 | -54.3 | 5.82 | ** | 4.00 | 2.00 | 19 | 6 | .474 | 0.00 |
| 20 | 3 | 30.12 | 1.10 | 36.5 | -.35 | -11.5 | 1.45 | ** | 1.10 | 2.00 | 20 | 3 | 2.590 | .20 |
| 21 | 4 | 25.87 | 1.70 | 65.7 | -1.49 | -57.7 | 3.19 | ** | 1.60 | 3.00 | 21 | 4 | 1.660 | 0.00 |
| 22 | 5 | 42.35 | 1.80 | 42.5 | -.95 | -22.3 | 2.75 | ** | 1.80 | 3.00 | 22 | 5 | 1.550 | .20 |
| 23 | 6 | 25.39 | 3.30 | 130.0 | -4.35 | -171.4 | 7.65 | ** | 3.20 | 2.00 | 23 | 6 | .382 | 0.00 |
| 24 | 4 | 34.33 | 1.50 | 43.7 | -.73 | -21.2 | 2.23 | ** | 1.50 | 2.00 | 24 | 4 | 1.470 | .20 |
| 25 | 5 | 28.28 | 2.40 | 84.9 | -2.16 | -76.4 | 4.56 | ** | 2.30 | 3.00 | 25 | 5 | 1.030 | 0.00 |
| 26 | 6 | 46.22 | 2.60 | 56.3 | -1.06 | -22.8 | 3.66 | ** | 2.50 | 3.00 | 26 | 6 | 1.050 | 0.00 |

JOB 463 LINE 19

BEARING E—W

E½. SPR I 10-26-70

750.

Job 463. 750.

PAGE 1

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 19 HALF E SP. 1 DATE 10-26-74

| SEND | CAL | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 3-4 | 0-7.5E | → | 7.5-15E | ——— | → | 15-22.5 | E | ——— | → |
| RANGE | 1.0 | 10 | 1.0 | 10 | 1.0 | 1.0 | 10 | 1.0 | 1.0 | 0.1 |
| DC 1 ① | 0.0 | 0.7 | 1.7 | 0.7 | 1.0 | 2.0 | 0.7 | 0.9 | 1.3 | 1.7 |
| DC 2 | | | | | | 1.6 | | | | 1.8 |
| DC 3 | | | | | | (1.5) | | | | (1.8) |
| DC 4 CURR. | 1.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 M | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.6 | 235. | 29.0 | 281. | 46.3 | 11.9 | 262. | 47.2 | 13.3 | 4.36 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -4.7 | | +7.0 | | | -11.6 | | | |
| AC NOISE | 3.0 | | | | | | | | | |
| POT RES. | 0.3 | 8K | | 5K | | | 3K | | | |

1-2

7.5-15 ε

1.0

| | |
|---|---|
| 3 Hz | 11.9 |
| 1 Hz | 0.6 |
| 0.3 Hz | 2.0 |
| 0.1 Hz | 2.2 |
| 3 Hz | 0.0 |

1-2

15-22.5

| | |
|---|---|
| 3 Hz | 4.36 · 0 |
| 1 Hz | 0.8 |
| 0.3 Hz | 1.7 |
| 0.1 Hz | 2.6 |
| 3 Hz | 0.0 |

FREQ. CHECK

OVER !

PAGE 2

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 19 HALF E SP. 1 DATE 10-26-72

| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30E | → | → | → | → | 30-37.5E | → | → | → | → |
| RANGE | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | 0.01 |
| DC 1 | 0.5 | 0.6 | 1.1 | 1.8 | 2.7 | 0.4 | 0.7 | 1.3 | 2.0 | 5.3 |
| DC 2 | | | | | 3.3 | | | | | 4.5 |
| DC 3 | | | | | (3.5) | | | | | 3.8 |
| DC 4 CURR | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 Δ | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 117. | 37.2 | 11.8 | 4.43 | 1.37 | 28.6 | 13.9 | 5.82 | 2.66 | 0.830 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +16.1 | | | | | +13.0 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3K | | | | | 6K | | | | |

1 - 2

22.5 - 30

1.37

3Hz

1Hz 1.6

0.3Hz 2.8

0.1 Hz 4.9

3 Hz -0.2 Dev.

1 - 2

30 - 37.5

3Hz 0.830

1Hz 2.6

0.3Hz 5.3

0.1 Hz 6.8

3Hz -0.2

1Hz 0.854

0.1 Hz 4.3

Dev. 0.0

Re-check ON

1 & 0.1

SAME STATION

WASH @ 47.5 E

PAGE 3

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE " 463
LINE 19 HALF E SP. 1 DATE 10-26-2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 37.5-45 | → | → | → | 45-52.5 E | → | → | | | |
| RANGE | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | | |
| DC 1 | 0.3 | 0.7 | 1.6 | 2.3 | 0.4 | 1.1 | 2.4 | | | |
| DC 2 | | | | 1.3 | | | 1.6 | | | |
| DC 3 | | | | (1.0) | | | (1.3) | | | |
| DC 4 CHR | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | |
| DC 6 N | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 10.3 | 5.82 | 2.86 | 1.43 | 9.97 | 6.31 | 3.43 | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +18.3 | | | | +20.1 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 5K | | | | 7K | | | | | |

2-3

37.5-45

0.1

1Hz 1.45

0.1Hz 1.3 Ω

0.0 Dev.

Check with

1 ∓ 0.1

3-4

45-52.5

0.1

1Hz 3.49

0.1Hz 1.6 Ω

0.0 Dev.

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 12 HALF E SP. 1 DATE 10-26-7

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL. | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 3-4 | 0-7.5E | → | 7.5-15E | → | → | 15-22.5E | → | → | → |
| RANGE | 10X100 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 |
| VOLTAGE | 110 | 350 | 330 | 330 | 350 | 320 | 400 | 330 | 350 | 320 |
| CURRENT | 1.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 22.5-30E | → | → | → | → | 30-37.5E | → | → | → | → |
| RANGE | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 |
| VOLTAGE | 340 | 400 | 330 | 340 | 320 | 340 | 400 | 330 | 340 | 320 |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |

FREQUENCIES 3 .3

SENDER NO. 6644-S

OPERATOR Bob Shipp

RECEIVER NO. 26693-K

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 19 HALF E SP. 1 DATE 8-26-80



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 37.5-45 | E → | | | 45-52.5 | E → | | | | |
| RANGE | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | | | |
| VOLTAGE | 340 | 400 | 330 | 340 | 340 | 400 | 330 | | | |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3 .3

SENDER NO. 6644-S

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463

LINE 19

BEARING E-W.

W½ SPR I

10-26-70

750

HEINRICHS GEOEXPLORATION CO. QUER! Job 463 750 PROJECT EMPIRE 463 PAGE 4

I.P. RECEIVER NOTES LINE 12 HALF W SP. 1 DATE 10-26-70

| SEND | S.P. | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-7.5W | 7.5-15W | → | 15-22.5 | → | → | 22.5-30 | W | → | → |
| RANGE | CAL. | 10 | 1.0 | 10 | 1.0 | 1.0 | 10 | 1.0 | 1.0 | 0.1 |
| DC 1 ① | 0.0 | 0.6 | 0.8 | 2.2 | 1.9 | 1.6 | 1.2 | 2.3 | 2.0 | 1.9 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | (1.8) |
| DC 4 CUR. | 1.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 N | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | 97.6 | | | | | | | | | |
| AC 1 | 0.0 | 250 | 46.1 | 128 | 26.8 | 10.6 | 109. | 38.3 | 13.2 | 5.99 |
| AC 2 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | 0.3 | | | | | | | | | |
| S.P. | +2.3 | +4.3 | | +8.2 | | | -10.3 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 4.5K | 2K | | 3K | | | 4K | | | |

5-6
22.5-30

1Hz 6.05

0.1Hz 1.8

0.0

HEINRICHS GEOEXPLORATION CO.

GROUNDED FENCE @ 32W

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 19 HALF W SP. 1 DATE 10-24-78

| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-37.5W | → | → | → | → | 37.5-45W | → | → | → | → |
| RANGE | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 0.1 | 1.2 | 2.3 | 2.0 | 2.1 | 0.0 | 1.4 | 2.6 | 2.7 | 2.9 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | 2.1 | | | | | |
| DC 4 CUR: | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 N | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 73.7 | 24.2 | 12.1 | 5.35 | 2.71 | 11.5 | 6.53 | 3.99 | 2.04 | 1.11 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +19.6 | | | | | +2.2 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 2K | | | | | 2.5K | | | | |

5-6

30-37.5

0.1

1 Hz 2.74

0.1 Hz 2.12

0.0

Looks like drill site — OLD DRILLING (?) Rd @ 50 W

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 19 HALF W SP. 1 DATE 10-26-2

PAGE 6

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | |
| RECEIVE | 45-52.5W | ——— | ——— | ——— | 52.5-60W | ——— | ——— | | | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | | |
| DC 1 | -0.3 | 1.9 | 3.2 | 2.7 | -0.1 | 2.3 | 3.4 | | | |
| DC 2 | | | 2.5 | | | | 3.1 | | | |
| DC 3 | | | (2.3) | | | | (3.0) | | | |
| DC 4 CUR: | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | |
| DC 6 N | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 5.23 | 3.61 | 2.44 | 1.34 | 2.70 | 2.10 | 1.53 | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +15.9 | | | | +3.5 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 2 K | | | | 2.5 K | | | | | |

3-4

45-52.5

0.1

1 Hz 2.47

0.1 Hz 2.5%

0.0

3-4

52.5-60

0.1

1 Hz 1.57

0.1 Hz 3.1

Dev. 0.0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire # 463

LINE 19 HALF W SP. / DATE 10-26-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 |
| RECEIVE | 7.5-15 | → | 15-22.5W | → | → | 22.5-30W | → | → | → | 30-37.5W |
| RANGE | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 |
| VOLTAGE | 400 | 340 | 320 | 400 | 340 | 340 | 320 | 400 | 340 | 320 |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 |
| RECEIVE | — | — | — | → | 37.5-45W | — | — | — | → | 45-52.5W |
| RANGE | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 |
| VOLTAGE | 330 | 320 | 400 | 340 | 310 | 330 | 320 | 400 | 340 | 310 |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |

FREQUENCIES 3 , 3

SENDER NO. 6644-S

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 19 HALF W SP. 1 DATE 10-26-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | | |
| RECEIVE | ← | ← | ← | 52.5-60 W | ← | ← | | | | |
| RANGE | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | | | | |
| VOLTAGE | 330 | 320 | 400 | 310 | 330 | 320 | | | | |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES .3 .3

SENDER NO. 6645

OPERATOR Bob Shipp

RECEIVER NO. 2069-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 19 BEARING E-W E 1/2 SP1 10/26/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.600 | 0.00 | 3.00 | .30 | 0.0000 | 1.0246 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 181.85 | .70 | 3.8 | .70 | 3.8 | 0.00 | ** | .70 | 3.00 | 1 | 1 | 235.000 | 0.00 |
| 2 | 2 | 90.65 | 1.70 | 18.8 | 1.56 | 17.2 | .14 | ** | 1.70 | 3.00 | 2 | 2 | 29.000 | 0.00 |
| 3 | 1 | 217.44 | .70 | 3.2 | .70 | 3.2 | 0.00 | ** | .70 | 3.00 | 3 | 1 | 281.000 | 0.00 |
| 4 | 2 | 143.74 | 1.00 | 7.0 | .93 | 6.4 | .07 | ** | 1.00 | 3.00 | 4 | 2 | 46.300 | 0.00 |
| 5 | 3 | 93.27 | 2.00 | 21.4 | 1.68 | 18.0 | .32 | ** | 2.00 | 3.00 | 5 | 3 | 11.900 | 0.00 |
| 6 | 1 | 202.74 | .70 | 3.5 | .70 | 3.5 | 0.00 | ** | .70 | 3.00 | 6 | 1 | 262.000 | 0.00 |
| 7 | 2 | 146.39 | .90 | 6.1 | .90 | 6.1 | 0.00 | ** | .90 | 3.00 | 7 | 2 | 47.200 | 0.00 |
| 8 | 3 | 103.53 | 1.30 | 12.6 | 1.03 | 9.9 | .27 | ** | 1.30 | 3.00 | 8 | 3 | 13.300 | 0.00 |
| 9 | 4 | 68.15 | 1.70 | 24.9 | .79 | 11.6 | .91 | ** | 1.70 | 3.00 | 9 | 4 | 4.360 | 0.00 |
| 10 | 1 | 90.36 | .50 | 5.5 | .50 | 5.5 | 0.00 | ** | .50 | 3.00 | 10 | 1 | 117.000 | 0.00 |
| 11 | 2 | 115.03 | .60 | 5.2 | .50 | 4.3 | .10 | ** | .60 | 3.00 | 11 | 2 | 37.200 | 0.00 |
| 12 | 3 | 91.67 | 1.10 | 12.0 | .78 | 8.5 | .32 | ** | 1.10 | 3.00 | 12 | 3 | 11.800 | 0.00 |
| 13 | 4 | 69.31 | 1.80 | 26.0 | .91 | 13.2 | .89 | ** | 1.80 | 3.00 | 13 | 4 | 4.430 | 0.00 |
| 14 | 5 | 37.84 | 2.70 | 71.3 | -.47 | -12.3 | 3.17 | ** | 2.70 | 3.00 | 14 | 5 | 1.370 | 0.00 |
| 15 | 2 | 88.26 | .40 | 4.5 | .25 | 2.9 | .15 | ** | .40 | 3.00 | 15 | 2 | 28.600 | 0.00 |
| 16 | 3 | 107.56 | .70 | 6.5 | .44 | 4.1 | .26 | ** | .70 | 3.00 | 16 | 3 | 13.900 | 0.00 |
| 17 | 4 | 90.61 | 1.30 | 14.3 | .68 | 7.5 | .62 | ** | 1.30 | 3.00 | 17 | 4 | 5.820 | 0.00 |
| 18 | 5 | 72.97 | 2.00 | 27.4 | .64 | 8.8 | 1.36 | ** | 2.00 | 3.00 | 18 | 5 | 2.660 | 0.00 |
| 19 | 6 | 37.61 | 5.30 | 140.9 | .57 | 15.2 | 4.73 | ** | 5.30 | 3.00 | 19 | 6 | .830 | 0.00 |
| 20 | 3 | 79.39 | .30 | 3.8 | -.10 | -1.2 | .40 | ** | .30 | 3.00 | 20 | 3 | 10.300 | 0.00 |
| 21 | 4 | 90.07 | .70 | 7.8 | .08 | .8 | .62 | ** | .70 | 3.00 | 21 | 4 | 5.820 | 0.00 |
| 22 | 5 | 78.15 | 1.60 | 20.5 | .36 | 4.6 | 1.24 | ** | 1.60 | 3.00 | 22 | 5 | 2.860 | 0.00 |
| 23 | 6 | 62.95 | 2.30 | 36.5 | -.17 | -2.7 | 2.47 | ** | 2.30 | 3.00 | 23 | 6 | 1.430 | 0.00 |
| 24 | 4 | 153.84 | .40 | 2.6 | .10 | .6 | .30 | ** | .40 | 3.00 | 24 | 4 | 9.970 | 0.00 |
| 25 | 5 | 171.58 | 1.10 | 6.4 | .67 | 3.9 | .43 | ** | 1.10 | 3.00 | 25 | 5 | 6.310 | 0.00 |
| 26 | 6 | 151.14 | 2.40 | 15.9 | 1.62 | 10.7 | .78 | ** | 2.40 | 3.00 | 26 | 6 | 3.430 | 0.00 |

BUSINESS FORMS PRINTING COMPANY BLUE RIBBON ENGINEERED FOR HIGH SPEED PRINTERS

JOB 463 LINE 19 BEARING E-W W 1/2 SP1 10/26/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.600 | 0.00 | 3.00 | .30 | 0.0000 | 1.0246 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 193.26 | .60 | 3.1 | .60 | 3.1 | 0.00 | ** | .60 | 3.00 | 1 | 1 | 250.000 | 0.00 |
| 2 | 2 | 142.83 | .80 | 5.6 | .73 | 5.1 | .07 | ** | .80 | 3.00 | 2 | 2 | 46.100 | 0.00 |
| 3 | 1 | 100.52 | 2.20 | 21.9 | 2.20 | 21.9 | 0.00 | ** | 2.20 | 3.00 | 3 | 1 | 128.000 | 0.00 |
| 4 | 2 | 83.94 | 1.90 | 22.6 | 1.74 | 20.8 | .16 | ** | 1.90 | 3.00 | 4 | 2 | 26.800 | 0.00 |
| 5 | 3 | 82.76 | 1.60 | 19.3 | 1.23 | 14.8 | .37 | ** | 1.60 | 3.00 | 5 | 3 | 10.600 | 0.00 |
| 6 | 1 | 84.77 | 1.20 | 14.2 | 1.20 | 14.2 | 0.00 | ** | 1.20 | 3.00 | 6 | 1 | 109.000 | 0.00 |
| 7 | 2 | 120.43 | 2.30 | 19.1 | 2.21 | 18.3 | .09 | ** | 2.30 | 3.00 | 7 | 2 | 38.300 | 0.00 |
| 8 | 3 | 103.46 | 2.00 | 19.3 | 1.73 | 16.7 | .27 | ** | 2.00 | 3.00 | 8 | 3 | 13.200 | 0.00 |
| 9 | 4 | 93.81 | 1.90 | 20.3 | 1.31 | 14.0 | .59 | ** | 1.90 | 3.00 | 9 | 4 | 5.990 | 0.00 |
| 10 | 1 | 56.69 | .10 | 1.8 | .03 | .5 | .07 | ** | .10 | 3.00 | 10 | 1 | 73.700 | 0.00 |
| 11 | 2 | 75.28 | 1.20 | 15.9 | 1.02 | 13.5 | .18 | ** | 1.20 | 3.00 | 11 | 2 | 24.200 | 0.00 |
| 12 | 3 | 95.12 | 2.30 | 24.2 | 1.99 | 20.9 | .31 | ** | 2.30 | 3.00 | 12 | 3 | 12.100 | 0.00 |
| 13 | 4 | 83.87 | 2.00 | 23.8 | 1.31 | 15.6 | .69 | ** | 2.00 | 3.00 | 13 | 4 | 5.350 | 0.00 |
| 14 | 5 | 74.42 | 2.10 | 28.2 | .77 | 10.4 | 1.33 | ** | 2.10 | 3.00 | 14 | 5 | 2.710 | 0.00 |
| 15 | 2 | 35.35 | 0.00 | 0.0 | -.52 | -14.6 | .52 | ** | 0.00 | 3.00 | 15 | 2 | 11.500 | 0.00 |
| 16 | 3 | 50.88 | 1.40 | 27.5 | .68 | 13.3 | .72 | ** | 1.40 | 3.00 | 16 | 3 | 6.530 | 0.00 |
| 17 | 4 | 62.92 | 2.60 | 41.3 | 1.59 | 25.3 | 1.01 | ** | 2.60 | 3.00 | 17 | 4 | 3.990 | 0.00 |
| 18 | 5 | 56.35 | 2.70 | 47.9 | .80 | 14.1 | 1.90 | ** | 2.70 | 3.00 | 18 | 5 | 2.040 | 0.00 |
| 19 | 6 | 49.15 | 2.90 | 59.0 | -.48 | -9.8 | 3.38 | ** | 2.90 | 3.00 | 19 | 6 | 1.110 | 0.00 |
| 20 | 3 | 40.07 | -.30 | -7.5 | -1.29 | -32.3 | .99 | ** | -.30 | 3.00 | 20 | 3 | 5.230 | 0.00 |
| 21 | 4 | 56.54 | 1.90 | 33.6 | .74 | 13.0 | 1.16 | ** | 1.90 | 3.00 | 21 | 4 | 3.610 | 0.00 |
| 22 | 5 | 67.72 | 3.20 | 47.2 | 1.70 | 25.1 | 1.50 | ** | 3.20 | 3.00 | 22 | 5 | 2.440 | 0.00 |
| 23 | 6 | 59.22 | 2.70 | 45.6 | .03 | .5 | 2.67 | ** | 2.70 | 3.00 | 23 | 6 | 1.340 | 0.00 |
| 24 | 4 | 41.45 | -.10 | -2.4 | -1.85 | -44.5 | 1.75 | ** | -.10 | 3.00 | 24 | 4 | 2.700 | 0.00 |
| 25 | 5 | 57.78 | 2.30 | 39.8 | .46 | 7.9 | 1.84 | ** | 2.30 | 3.00 | 25 | 5 | 2.100 | 0.00 |
| 26 | 6 | 68.08 | 3.40 | 49.9 | 1.16 | 17.1 | 2.24 | ** | 3.40 | 3.00 | 26 | 6 | 1.530 | 0.00 |

BUSINESS FORMS PRINTING COMPANY ENGINEERED FOR HIGH SPEED PRINTERS

JOB 463. LINE 20

BEARING N65W.

E½. SPR I. 10-27-70

750.

BEARING: N65°W a=750' Job 463.750 EMPIRE #463

PAGE 1

HEINRICHS GEOEXPLORATION CO. PROJECT

I.P. RECEIVER NOTES LINE 20 HALF E SP. 1 DATE 10-27-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | Z-3 | 1-2 | 3-4 | Z-3 | 1-2 | 4-5 | 3-4 | Z-3 | 1-2 |
| RECEIVE | 3-4 | 0-7.5E | → | 7.5-15E | → | → | 15-22.5E | → | → | → |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 ① | 0.0 | 0.7 | 1.0 | 0.7 | 1.1 | 1.8 | 0.7 | 1.2 | 1.6 | 2.2 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 1.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 N | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.6 | 65.2 | 22.7 | 82.4 | 28.8 | 15.0 | 44.8 | 17.9 | 9.96 | 6.31 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +4.7 | | +13.5 | | | -5.2 | | | |
| AC NOISE | 3.0 | | | | | | | | | |
| POT RES. | 0.3 | 7K | | 5K | | | 6K | | | |

OVER!

PAGE 2

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 20 HALF E SP. 1 DATE 10-27-71

| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 E | → | → | → | → | 30-37.5 | → | → | → | → |
| RANGE | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 1.0 | 1.4 | 2.3 | 2.5 | 3.1 | 1.4 | 2.2 | 2.6 | 3.5 | 3.9 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR. | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 N. | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 40.4 | 13.7 | 8.08 | 5.56 | 3.95 | 11.3 | 5.21 | 3.68 | 2.78 | 2.1 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | −10.8 | | | | | +18.2 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3K | | | | | 2K | | | | |

1-2

22.5-30C

1Hz 4.04

0.1Hz 1.6%

0.0

1-2

30-37.5

0.1

1Hz 2.17

0.1Hz 1.8%

0.0

GROUNDED FENCE @ 36.5E ⊥

HEINRICHS GEOEXPLORATION CO. PROJECT EMPIRE #463

I.P. RECEIVER NOTES OVER! LINE 20 HALF E SP. / DATE 10-27-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 37.5- | 45E | → | → | 45-52.5E | | ← | | | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | | |
| DC 1 | 2.3 | 3.6 | 3.7 | 5.5 | 3.6 | 5.8 | 6.3 | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | |
| DC 6 N | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 5.91 | 2.98 | 2.32 | 1.84 | 2.82 | 1.46 | 1.20 | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +7.7 | | | | +3.9 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 2.5K | | | | 2.5K | | | | | |

| | 5–6 37.5–45° 0.1 | 4–5 | 3–4 | 2–3 | 5–6 45–52.5° | 4–5 | 3–4 |
|---|---|---|---|---|---|---|---|
| 1 Hz | 6.01 MU. | 3.05 | 2.40 | 1.92 | 2.90 | 1.52 | 1.25 |
| 0.1 Hz | 1.1 % | 1.52 | 1.8% | 1.6% | 1.6% | 1.9% | 2.3% |
| | 0.0 DEV | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |

THIS CONVINCES ME OF COUPLING!

ALSO Good ~~COUPLER~~ check OF COUPLING LOOP IN Computer PROGRAM.

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 20 HALF E SP. 1 DATE 10-27-70

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 3-4 | 0-7.5 | → | 7.5-15E | ——— | → | 15-22.5E | ——— | ——— | → |
| RANGE | 10X100 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 |
| VOLTAGE | 120 | 320 | 290 | 360 | 320 | 290 | 240 | 360 | 320 | 290 |
| CURRENT | 1.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 22.5-30E | ——— | ——— | ——— | → | 30-37.5 | ——— | ——— | ——— | → |
| RANGE | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 |
| VOLTAGE | 280 | 240 | 360 | 320 | 290 | 280 | 240 | 350 | 320 | 290 |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |

FREQUENCIES 3 .3

SENDER NO. 6644-S

OPERATOR Bob Shipp

RECEIVER NO. 2069 3-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 20 HALF E SP. / DATE 10-27-7



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 37.5-45 | E. ← | ← | → | 45-52.5 | E. ← | → | | | |
| RANGE | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | 10x300 | | | |
| VOLTAGE | 280 | 240 | 350 | 320 | 280 | 240 | 350 | | | |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3 13

SENDER NO. 6644-S

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463

LINE 20

BEARING N65W

W½.

SPR I

10-27-70

750.

STA. 22.5 Beside WASH ~25' West Job 463 750. #463

PAGE 4

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE
LINE 20 HALF W SP. 1 DATE 10-27-72

| SEND | S.P | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 0-7.5W | 7.5-15W | → | 15-22.5 | W | → | 22.5-30 | W | → | → |
| RANGE | CAL | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 ① | 0.0 | 0.7 | 1.2 | 0.7 | 1.1 | 1.7 | 0.7 | 1.1 | 1.7 | 2.9 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 1.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 M. | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | 97.6 | | | | | | | | | |
| AC 1 | 0.0 | 63.8 | 28.8 | 68.8 | 22.1 | 14.8 | 51.7 | 13.0 | 6.31 | 4.70 |
| AC 2 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | 0.3 | | | | | | | | | |
| S.P. | +7.9 | +14.7 | | +10.6 | | | -6.0 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 6K | 4K | | 2K | | | 2K | | | |

5-6

22.5 - 30

0.1

1 Hz 4.79

0.1 Hz 1.4%

0.0

WATER TANK @ 32,5N

PAGE 5

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #163
LINE 20 HALF W SP. 1 DATE 6-27-76

| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-37.5 W | → | → | → | → | 37.5 — | 45 W | → | → | → |
| RANGE | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 0.7 | 1.1 | 1.9 | 2.4 | 2.9 | 0.9 | 1.1 | 2.7 | 3.9 | 4.5 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CURR | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 M | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 69.3 | 21.0 | 7.94 | 4.71 | 3.96 | 14.5 | 6.61 | 3.12 | 2.04 | 1.92 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| AC AVG. | | | | | | | | | | |
| S.P. | +6.0 | | | | | | +9.2 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 1.5K | | | | | | 2K | | | |

| | 4-5 | 5-6 |
|---|---|---|
| | 30-37.5 → | |
| 1 Hz | 4.81 | 4.06 |
| 0.1 Hz | 1.3% | 1.7% |
| | 0.0 | 0.0 |

| | 3-4 | 4-5 | 5-6 |
|---|---|---|---|
| | 37.5-45 | | |
| | 0.1 | | |
| 1 Hz | 3.18 | 2.10 | 1.99 |
| 0.1 Hz | 1.0% | 1.5% | 2.3 |
| | 0.0 | 0.0 | 0.0 |

FREQUENCY
CHeck when coupling IS SUSpected!

STA 52.5 IN WASH

PAGE 6

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 20 HALF W SP. 1 DATE 10-27-72

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | |
| RECEIVE | 45-52 | 5W | → | → | 52.5- | 60W | → | | | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | | |
| DC 1 | 1.3 | 2.3 | 3.4 | 6.0 | 2.3 | 3.9 | 4.7 | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR: | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | |
| DC 6 N | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 8.51 | 4.61 | 2.46 | 1.70 | 5.24 | 3.18 | 1.84 | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +17.4 | | | | -1.9 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 2.5K | | | | 2K | | | | | |

| 2-3 | 3-4 | 4-5 | | 1-2 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|
| 45-52.5 → | | | | 52.5 60W → | | |
| 4.68 | 2.50 | 1.76 | 1 HZ | 5.33 | 3.25 | 1.90 |
| 1.3% | 1.7% | 1.9% | 0.1 HZ | 1.3% | 1.5% | 2.0% |
| 0.0 | 0.0 | 0.0 | | 0.0 | 0.0 | 0.0 |

Cooling is ~~playing~~ HAUNTING (?) this line!

IT'S BEEN a Long day!

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 20 HALF W SP. 1 DATE 10-27-20



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 |
| RECEIVE | 7.5-15 | W → | 15-22.5 | W → | | 22.5-30 | W → | | | 30-37.5 |
| RANGE | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 |
| VOLTAGE | 240 | 270 | 340 | 240 | 270 | 300 | 340 | 240 | 270 | 280 |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 |
| RECEIVE | 30-37.5 W → | | | | 37.5-45 W → | | | | | 45-52.5 |
| RANGE | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 |
| VOLTAGE | 300 | 340 | 240 | 260 | 280 | 300 | 340 | 240 | 260 | 280 |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 |

FREQUENCIES 3 .3

SENDER NO. 6644-S

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 20 HALF W SP. 1 DATE 10-27-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | | |
| RECEIVE | 45-52.5N | → | → | 52.5-60N | → | → | | | | |
| RANGE | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | 10X300 | | | | |
| VOLTAGE | 300 | 340 | 240 | 280 | 300 | 340 | | | | |
| CURRENT | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | 3.0 | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3 .3

SENDER NO. 6645

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 20 BEARING N 65 W E 1/2 SP1 10/27/70 — 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.600 | 0.00 | 3.00 | .30 | 0.0000 | 1.0246 |

| COMPUTED DATA | | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 50.45 | .70 | 13.9 | .61 | 12.2 | .09 | ** | .70 | 3.00 | 1 | 1 | 65.200 | 0.00 |
| 2 | 2 | 70.47 | 1.00 | 14.2 | .80 | 11.4 | .20 | ** | 1.00 | 3.00 | 2 | 2 | 22.700 | 0.00 |
| 3 | 1 | 63.76 | .70 | 11.0 | .64 | 10.0 | .06 | ** | .70 | 3.00 | 3 | 1 | 82.400 | 0.00 |
| 4 | 2 | 89.50 | 1.10 | 12.3 | .96 | 10.7 | .14 | ** | 1.10 | 3.00 | 4 | 2 | 28.800 | 0.00 |
| 5 | 3 | 117.34 | 1.80 | 15.3 | 1.57 | 13.4 | .23 | ** | 1.80 | 3.00 | 5 | 3 | 15.000 | 0.00 |
| 6 | 1 | 34.67 | .70 | 20.2 | .55 | 15.9 | .15 | ** | .70 | 3.00 | 6 | 1 | 44.800 | 0.00 |
| 7 | 2 | 55.68 | 1.20 | 21.6 | .92 | 16.6 | .28 | ** | 1.20 | 3.00 | 7 | 2 | 17.900 | 0.00 |
| 8 | 3 | 77.76 | 1.60 | 20.6 | 1.19 | 15.3 | .41 | ** | 1.60 | 3.00 | 8 | 3 | 9.960 | 0.00 |
| 9 | 4 | 99.11 | 2.20 | 22.2 | 1.65 | 16.7 | .55 | ** | 2.20 | 3.00 | 9 | 4 | 6.310 | 0.00 |
| 10 | 1 | 31.36 | 1.00 | 31.9 | .83 | 26.5 | .17 | ** | 1.00 | 3.00 | 10 | 1 | 40.400 | 0.00 |
| 11 | 2 | 42.70 | 1.40 | 32.8 | 1.00 | 23.4 | .40 | ** | 1.40 | 3.00 | 11 | 2 | 13.700 | 0.00 |
| 12 | 3 | 63.52 | 2.30 | 36.2 | 1.76 | 27.8 | .54 | ** | 2.30 | 3.00 | 12 | 3 | 8.080 | 0.00 |
| 13 | 4 | 87.59 | 2.50 | 28.5 | 1.85 | 21.1 | .65 | ** | 2.50 | 3.00 | 13 | 4 | 5.560 | 0.00 |
| 14 | 5 | 109.53 | 3.10 | 28.3 | 2.31 | 21.1 | .79 | ** | 3.10 | 3.00 | 14 | 5 | 3.950 | 0.00 |
| 15 | 2 | 35.22 | 1.40 | 39.8 | .88 | 25.0 | .52 | ** | 1.40 | 3.00 | 15 | 2 | 11.300 | 0.00 |
| 16 | 3 | 40.92 | 2.20 | 53.8 | 1.23 | 30.1 | .97 | ** | 2.20 | 3.00 | 16 | 3 | 5.210 | 0.00 |
| 17 | 4 | 58.03 | 2.60 | 44.8 | 1.48 | 25.4 | 1.12 | ** | 2.60 | 3.00 | 17 | 4 | 3.680 | 0.00 |
| 18 | 5 | 77.39 | 3.50 | 45.2 | 2.24 | 29.0 | 1.26 | ** | 3.50 | 3.00 | 18 | 5 | 2.780 | 0.00 |
| 19 | 6 | 94.34 | 3.90 | 41.3 | 2.44 | 25.8 | 1.46 | ** | 3.90 | 3.00 | 19 | 6 | 2.110 | 0.00 |
| 20 | 3 | 46.46 | 2.30 | 49.5 | 1.48 | 31.9 | .82 | ** | 2.30 | 3.00 | 20 | 3 | 5.910 | 0.00 |
| 21 | 4 | 47.45 | 3.60 | 75.9 | 2.14 | 45.0 | 1.46 | ** | 3.60 | 3.00 | 21 | 4 | 2.980 | 0.00 |
| 22 | 5 | 64.71 | 3.70 | 57.2 | 2.11 | 32.6 | 1.59 | ** | 3.70 | 3.00 | 22 | 5 | 2.320 | 0.00 |
| 23 | 6 | 83.54 | 5.50 | 65.8 | 3.78 | 45.3 | 1.72 | ** | 5.50 | 3.00 | 23 | 6 | 1.840 | 0.00 |
| 24 | 4 | 44.90 | 3.60 | 80.2 | 2.03 | 45.1 | 1.57 | ** | 3.60 | 3.00 | 24 | 4 | 2.820 | 0.00 |
| 25 | 5 | 41.54 | 5.80 | 139.6 | 2.99 | 71.9 | 2.81 | ** | 5.80 | 3.00 | 25 | 5 | 1.460 | 0.00 |
| 26 | 6 | 54.89 | 6.30 | 114.8 | 3.36 | 61.2 | 2.94 | ** | 6.30 | 3.00 | 26 | 6 | 1.200 | 0.00 |

ENGINEERED FOR HIGH SPEED PRINTERS
BUSINESS FORMS PRINTING COMPANY BLUE SPRUCE PAP ENGINEE

JOB 463 LINE 20 BEARING N 65 W W 1/2 SP1 10/27/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.600 | 0.00 | 3.00 | .30 | 0.0000 | 1.0246 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 49.37 | .70 | 14.2 | .61 | 12.4 | .09 | ** | .70 | 3.00 | 1 | 1 | 63.800 | 0.00 |
| 2 | 2 | 89.59 | 1.20 | 13.4 | 1.06 | 11.8 | .14 | ** | 1.20 | 3.00 | 2 | 2 | 28.800 | 0.00 |
| 3 | 1 | 53.24 | .70 | 13.1 | .62 | 11.6 | .08 | ** | .70 | 3.00 | 3 | 1 | 68.800 | 0.00 |
| 4 | 2 | 68.68 | 1.10 | 16.0 | .89 | 13.0 | .21 | ** | 1.10 | 3.00 | 4 | 2 | 22.100 | 0.00 |
| 5 | 3 | 115.66 | 1.70 | 14.7 | 1.46 | 12.7 | .24 | ** | 1.70 | 3.00 | 5 | 3 | 14.800 | 0.00 |
| 6 | 1 | 40.01 | .70 | 17.5 | .58 | 14.5 | .12 | ** | .70 | 3.00 | 6 | 1 | 51.700 | 0.00 |
| 7 | 2 | 40.40 | 1.10 | 27.2 | .67 | 16.6 | .43 | ** | 1.10 | 3.00 | 7 | 2 | 13.000 | 0.00 |
| 8 | 3 | 49.31 | 1.70 | 34.5 | .95 | 19.2 | .75 | ** | 1.70 | 3.00 | 8 | 3 | 6.310 | 0.00 |
| 9 | 4 | 74.33 | 2.90 | 39.0 | 2.09 | 28.1 | .81 | ** | 2.90 | 3.00 | 9 | 4 | 4.700 | 0.00 |
| 10 | 1 | 53.63 | .70 | 13.1 | .62 | 11.6 | .08 | ** | .70 | 3.00 | 10 | 1 | 69.300 | 0.00 |
| 11 | 2 | 65.26 | 1.10 | 16.9 | .88 | 13.4 | .22 | ** | 1.10 | 3.00 | 11 | 2 | 21.000 | 0.00 |
| 12 | 3 | 62.17 | 1.90 | 30.6 | 1.35 | 21.7 | .55 | ** | 1.90 | 3.00 | 12 | 3 | 7.940 | 0.00 |
| 13 | 4 | 74.12 | 2.40 | 32.4 | 1.59 | 21.4 | .81 | ** | 2.40 | 3.00 | 13 | 4 | 4.710 | 0.00 |
| 14 | 5 | 109.59 | 2.90 | 26.5 | 2.11 | 19.2 | .79 | ** | 2.90 | 3.00 | 14 | 5 | 3.960 | 0.00 |
| 15 | 2 | 44.97 | .90 | 20.0 | .53 | 11.7 | .37 | ** | .90 | 3.00 | 15 | 2 | 14.500 | 0.00 |
| 16 | 3 | 51.35 | 1.10 | 21.4 | .39 | 7.5 | .71 | ** | 1.10 | 3.00 | 16 | 3 | 6.610 | 0.00 |
| 17 | 4 | 49.25 | 2.70 | 54.8 | 1.31 | 26.5 | 1.39 | ** | 2.70 | 3.00 | 17 | 4 | 3.120 | 0.00 |
| 18 | 5 | 57.01 | 3.90 | 68.4 | 2.02 | 35.5 | 1.88 | ** | 3.90 | 3.00 | 18 | 5 | 2.040 | 0.00 |
| 19 | 6 | 86.34 | 4.50 | 52.1 | 2.86 | 33.1 | 1.64 | ** | 4.50 | 3.00 | 19 | 6 | 1.920 | 0.00 |
| 20 | 3 | 66.24 | 1.30 | 19.6 | .79 | 12.0 | .51 | ** | 1.30 | 3.00 | 20 | 3 | 8.510 | 0.00 |
| 21 | 4 | 72.48 | 2.30 | 31.7 | 1.46 | 20.2 | .84 | ** | 2.30 | 3.00 | 21 | 4 | 4.610 | 0.00 |
| 22 | 5 | 68.41 | 3.40 | 49.7 | 1.92 | 28.1 | 1.48 | ** | 3.40 | 3.00 | 22 | 5 | 2.460 | 0.00 |
| 23 | 6 | 77.55 | 6.00 | 77.4 | 4.11 | 53.0 | 1.89 | ** | 6.00 | 3.00 | 23 | 6 | 1.700 | 0.00 |
| 24 | 4 | 82.39 | 2.30 | 27.9 | 1.60 | 19.4 | .70 | ** | 2.30 | 3.00 | 24 | 4 | 5.240 | 0.00 |
| 25 | 5 | 88.86 | 3.90 | 43.9 | 2.85 | 32.1 | 1.05 | ** | 3.90 | 3.00 | 25 | 5 | 3.180 | 0.00 |
| 26 | 6 | 82.90 | 4.70 | 56.7 | 2.97 | 35.8 | 1.73 | ** | 4.70 | 3.00 | 26 | 6 | 1.840 | 0.00 |

BUSINESS FORMS PRINTING COMPANY BLUE SPACE BAR ENGINEERED FOR HIGH SPEED PRINTERS

Job. 463.

Bearing N-S.

Line 21.

Spr. I.

N½.

10-30-70

1000.

DOWN THE WASH

1 & 0.1 CPS Hz @ = 1000' JOB 463. 1000. A

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 21 HALF N SP. 1 DATE 10-29-7

PAGE 1

| SEND | CAL | 1-2 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 2-3 | 0-10N | 10-20N | → | 20-30N | → | → | 30-40N | → | → |
| RANGE (1) | 1.0 | 10 | 10 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.0 | 1.0 | 0.8 | 1.1 | 1.3 | 1.1 | 1.3 | 1.4 | 0.9 | 1.2 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR. | 1.0 | 3.0 | 2.0 | 3.0 | 1.0 | 2.0 | 3.0 | 1.0 | 1.0 | 2.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 M | | 1 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.2 | 194. | 115. | 41.8 | 54.8 | 31.0 | 19.1 | 76.4 | 13.5 | 12.8 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | -0.2 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -10.8 | +17.4 | | -13.5 | | | -9.0 | | |
| AC NOISE | 1.0 | | | | | | | | | |
| POT RES. | 0.1 | 14K | 12K | | 23K | | | 45K | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 21 HALF N SP. / DATE 10-29-76

| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-40N | 40-50N | — | — | — | → | 50-60N | — | — | → |
| RANGE | 0.1 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 |
| DC 1 | 1.0 | 1.5 | 1.7 | 1.5 | 1.3 | 1.6 (1.7) | 1.8 | 1.5 | 1.5 | 1.6 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | (1.6) | | | | |
| DC 4 CUR. | 3.0 | 1.0 | 1.0 | 1.0 | 2.0 | 3.0 | 1.0 | 1.0 | 1.0 | 2.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 R. | 4 | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 9.85 | 138. | 31.6 | 9.80 | 12.2 | 10.8 | 39.4 | 15.8 | 7.11 | 10.5 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | +7.7 | | | | | | | | |
| S.P. | | | | | | | −7.9 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 40 K | | | | | 60 K | | | |

1-2

40 50

3Hz 10.9

0.3Hz 1.7

0.0

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 163
LINE 21 HALF N SP. 1 DATE 10-29-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | |
| RECEIVE | 50-60N | 60-70N | → | → | → | 70-80N | → | → | | |
| RANGE | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | |
| DC 1 | 2.1 | 1.1 | 1.0 | 1.6 | 1.5 | 1.0 | 1.0 | 0.9 | | |
| DC 2 | 2.5 | | | | 2.1 | | | 1.2 | | |
| DC 3 | (2.0) | | | | (1.3) | | | (0.6) | | |
| DC 4 CUR | 3.0 | 1.0 | 1.0 | 1.0 | 2.0 | 1.0 | 1.0 | 1.0 | | |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | |
| DC 6 N | 6 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 10.5 | 7.34 | 3.82 | 2.07 | 3.32 | 2.92 | 1.88 | 1.24 | | |
| AC 2 | 0.0 | 0.0 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | +14.1 | | | | -4.1 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 26K | | | | 6K | | | | |

| | 1-2 | 2-3 | 3-4 |
|---|---|---|---|
| | 50-60 | 60-70 | 70-80 |
| 3H2 | 10.4 | 3.28 | 1.23 |
| 0.3H2 | 2.5 | 2.1 | 1.8 |
| | 0.0 | 0.0 | 0.0 |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 21 HALF N SP. 1 DATE 10-29-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 1-2 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 2-3 | 0-10N | 10-20 | → | 20-30N | → | → | 30-40N | → | → |
| RANGE | 10X100 | 10X300 | 10X200 | 10X300 | 10X100 | 10X200 | 10X300 | 10X100 | 10X100 | 10X200 |
| VOLTAGE | 340 | 460 | 660 | 450 | 390 | 640 | 440 | 680 | 580 | 640 |
| CURRENT | 1.0 | 3.0 | 2.0 | 3.0 | 1.0 | 2.0 | 3.0 | 1.0 | 1.0 | 2.0 |
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 20-40X | 40-50N | → | → | → | → | 50-60 | → | → | → |
| RANGE | 10X300 | 10X100 | 10X100 | 10X100 | 10X200 | 10X300 | 10X100 | 10X100 | 10X100 | 10X200 |
| VOLTAGE | 440 | 660 | 670 | 560 | 620 | 440 | 660 | 670 | 560 | 600 |
| CURRENT | 3.0 | 1.0 | 1.0 | 1.0 | 2.0 | 3.0 | 1.0 | 1.0 | 1.0 | 2.0 |

FREQUENCIES 1 .1

SENDER NO. 6644-5

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 21 HALF N SP. 1 DATE 10-21-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | |
| RECEIVE | 50-60 | 60-70N | ← | ← | → | 70-80N | ← | → | | |
| RANGE | 10x300 | 10x100 | 10x100 | 10x100 | 10x200 | 10x100 | 10x100 | 10x100 | | |
| VOLTAGE | 440 | 650 | 660 | 550 | 600 | 640 | 660 | 540 | | |
| CURRENT | 3.0 | 1.0 | 1.0 | 1.0 | 2.0 | 1.0 | 1.0 | 1.0 | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 1 .1

SENDER NO. 6644-S

OPERATOR Bob Shipp

RECEIVER NO. 2069-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463

BEARING N-S.

LINE 21

SPR I

5 1/2.

10-30-70

1000.

Job 463 1000.

DUE EAST

STA. 20S Across from (West) notch in topography

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE #463

LINE 21 HALF S SP. 1 DATE 10-30-70

PAGE 1

| SEND | CAL | S.P. | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 3-4 | 0-10S | 10-20S | → | → | 20-30S | → | → | → | 30-40S |
| RANGE | 1.0 | | 1.0 | 1.0 | 0.1 | 10 | 1.0 | 0.1 | 0.1 | 10 |
| DC 1 3Hz | 97.6 | | 1.2 | 1.3 | 1.1 | 1.1 | 1.1 | 0.7 | 1.2 | 1.2 |
| DC 2 1Hz | 0.0 ← 1 | | | | | | | | 1.2 | |
| DC 3 0.3Hz | 0.0 | | | | | | | | 1.2 | |
| CUR DC 4 0.1Hz | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 2.0 | 1.0 | 1.0 | 1.0 | 3.0 |
| # DC 5 | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| m DC 6 Dev. | 0.0 | | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 1Hz | 97.6 ← | | 64.6 | 13.9 | 6.57 | 121. | 12.1 | 5.48 | 3.39 | 233. |
| AC 2 0.1Hz | 0.0 ← | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC ~~AVG.~~ Dev. | 0.0 | | | | | | | | | |
| S.P. | | +20.7 | -0.0 | | | +15.0 | | | | -34.0 |
| AC NOISE | 1.0 | | | | | | | | | |
| POT RES. | 0.1 | 50K | 20K | | | 15K | | | | 20K |

5-6

20-30

3H/2 3.37

0.3H/2 1.2

0.0

STA. 505 IS ≈300' EAST OF WELL — NOISY!

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 21 HALF S SP. 1 DATE 10-30-2

| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-40S | → | → | → | 40-50S | → | → | → | → | 50-60S |
| RANGE | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 0.9 | 0.9 | 1.2 | 1.4 | 1.1 | 1.1 | 1.6 | 1.4 | 1.6 | 1.1 |
| DC 2 | | | | 1.4 | | | | | 1.8 | |
| DC 3 | | | | (1.4) | | | | | (1.5) | |
| DC 4 CUR | 2.0 | 1.0 | 1.0 | 1.0 | 3.0 | 2.0 | 1.0 | 1.0 | 1.0 | 3.0 |
| DC 5 # | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| DC 6 n | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 | 3 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 35.8 | 6.65 | 4.27 | 3.08 | 39.6 | 13.3 | 3.30 | 2.45 | 1.89 | 18.0 |
| AC 2 | 0.0 | 0.0 | −0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | +30.8 | | | | | −26.6 |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | 25k | | | | | 45 k |

5-6
30-40

3Hz 3.05
0.3Hz 1.4
0.0

5-6
40-50

3Hz 1.88
0.3Hz 1.8
0.6

NOISY !!

• STA. 50 IN WASH – 100' N OF FENCE – NOT GROUNDED! #463

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE

LINE 21 HALF 5 SP. 1 DATE 10-30-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | | |
| RECEIVE | 50-60s | → | → | 60-70s | → | → | | | | |
| RANGE | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | | | | |
| DC 1 | 0.9 | 1.8 | 1.0 | 1.3 | 1.3 | 1.6 | | | | |
| DC 2 | | | 1.5 | | | 1.8 | | | | |
| DC 3 | | | (0.8) | | | (1.5) | | | | |
| DC 4 CHR | 2.0 | 1.0 | 1.0 | 3.0 | 2.0 | 1.0 | | | | |
| DC 5 # | 19 | 20 | 21 | 22 | 23 | 24 | | | | |
| DC 6 N | 4 | 5 | 6 | 4 | 5 | 6 | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 8.05 | 2.20 | 1.77 | 20.6 | 10.04 | 2.92 | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | +23.9 | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | 35K | | | | | | |

4-5

50 60

3Hz 1.74

0.3Hz 1.5

0.0

3-4

60-70

3Hz 2.90

0.3Hz 1.8

0.0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #466

LINE 21 HALF S SP. 1 DATE [illegible]

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 |
| RECEIVE | 3-4 | 10-20S | → | → | 20-30S | → | → | → | 30-40S | → |
| RANGE | 10X100 | 10X100 | 10X100 | 10X100 | 10X200 | 10X100 | 10X100 | 10X100 | 10X300 | 10X200 |
| VOLTAGE | 540 | 540 | 660 | 660 | 600 | 540 | 660 | 660 | 460 | 580 |
| CURRENT | 1.0 | 1.0 | 1.0 | 1.0 | 2.0 | 1.0 | 1.0 | 1.0 | 3.0 | 2.0 |
| SEND | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 |
| RECEIVE | 30-40S | → | → | 40-50S | → | → | → | → | 50-60S | → |
| RANGE | 10X100 | 10X100 | 10X100 | 10X300 | 10X200 | 10X100 | 10X100 | 10X100 | 10X300 | 10X200 |
| VOLTAGE | 540 | 660 | 660 | 460 | 480 | 440 | 660 | 660 | 460 | 580 |
| CURRENT | 1.0 | 1.0 | 1.0 | 3.0 | 2.0 | 1.0 | 1.0 | 1.0 | 3.0 | 2.0 |

FREQUENCIES 1 .1

SENDER NO. 6644-S

OPERATOR Bob Shipp

RECEIVER NO. 20693-R1

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 21 HALF S SP. 1 DATE 8-06-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-1 | 4-5 | 1-2 | 2-3 | 3-4 | | | | | |
| RECEIVE | 50-60S | → | 60-70S | → | → | | | | | |
| RANGE | 10x100 | 10x100 | 10x300 | 10x200 | 10x100 | | | | | |
| VOLTAGE | 540 | 660 | 450 | 580 | 530 | | | | | |
| CURRENT | 1.0 | 1.0 | 3.0 | 2.0 | 1.0 | | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 1 .1

SENDER NO. 6644-S

OPERATOR Bob Shipp

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 BEARING N-S LINE 21 SP1 N 1/2 10/30/70 1000 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.200 | 0.00 | 1.00 | .10 | 0.0000 | 1.0288 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 201.58 | 1.00 | 5.0 | 1.00 | 5.0 | 0.00 | ** | 1.00 | 3.00 | 1 | 1 | 194.000 | 0.00 |
| 2 | 1 | 178.89 | .80 | 4.5 | .80 | 4.5 | 0.00 | ** | .80 | 2.00 | 2 | 1 | 115.000 | 0.00 |
| 3 | 2 | 173.91 | 1.10 | 6.3 | 1.10 | 6.3 | 0.00 | ** | 1.10 | 3.00 | 3 | 2 | 41.800 | 0.00 |
| 4 | 1 | 171.33 | 1.30 | 7.6 | 1.30 | 7.6 | 0.00 | ** | 1.30 | 1.00 | 4 | 1 | 54.800 | 0.00 |
| 5 | 2 | 193.46 | 1.10 | 5.7 | 1.10 | 5.7 | 0.00 | ** | 1.10 | 2.00 | 5 | 2 | 31.000 | 0.00 |
| 6 | 3 | 199.06 | 1.30 | 6.5 | 1.30 | 6.5 | 0.00 | ** | 1.30 | 3.00 | 6 | 3 | 19.100 | 0.00 |
| 7 | 1 | 239.10 | 1.40 | 5.9 | 1.40 | 5.9 | 0.00 | ** | 1.40 | 1.00 | 7 | 1 | 76.400 | 0.00 |
| 8 | 2 | 168.16 | 1.00 | 5.9 | 1.00 | 5.9 | 0.00 | ** | .90 | 1.00 | 8 | 2 | 13.500 | -.20 |
| 9 | 3 | 199.90 | 1.20 | 6.0 | 1.20 | 6.0 | 0.00 | ** | 1.20 | 2.00 | 9 | 3 | 12.800 | 0.00 |
| 10 | 4 | 204.70 | 1.00 | 4.9 | .90 | 4.4 | .10 | ** | 1.00 | 3.00 | 10 | 4 | 9.850 | 0.00 |
| 11 | 1 | 432.31 | 1.50 | 3.5 | 1.50 | 3.5 | 0.00 | ** | 1.50 | 1.00 | 11 | 1 | 138.000 | 0.00 |
| 12 | 2 | 396.76 | 1.70 | 4.3 | 1.70 | 4.3 | 0.00 | ** | 1.70 | 1.00 | 12 | 2 | 31.600 | 0.00 |
| 13 | 3 | 307.01 | 1.50 | 4.9 | 1.50 | 4.9 | 0.00 | ** | 1.50 | 1.00 | 13 | 3 | 9.800 | 0.00 |
| 14 | 4 | 381.44 | 1.30 | 3.4 | 1.30 | 3.4 | 0.00 | ** | 1.30 | 2.00 | 14 | 4 | 12.200 | 0.00 |
| 15 | 5 | 395.11 | 1.60 | 4.0 | 1.60 | 4.0 | 0.00 | ** | 1.60 | 3.00 | 15 | 5 | 10.800 | 0.00 |
| 16 | 2 | 495.18 | 1.80 | 3.6 | 1.80 | 3.6 | 0.00 | ** | 1.80 | 1.00 | 16 | 2 | 39.400 | 0.00 |
| 17 | 3 | 494.97 | 1.50 | 3.0 | 1.50 | 3.0 | 0.00 | ** | 1.50 | 1.00 | 17 | 3 | 15.800 | 0.00 |
| 18 | 4 | 445.47 | 1.50 | 3.4 | 1.50 | 3.4 | 0.00 | ** | 1.50 | 1.00 | 18 | 4 | 7.110 | 0.00 |
| 19 | 5 | 576.20 | 1.60 | 2.8 | 1.60 | 2.8 | 0.00 | ** | 1.60 | 2.00 | 19 | 5 | 10.500 | 0.00 |
| 20 | 6 | 617.64 | 2.10 | 3.4 | 2.10 | 3.4 | 0.00 | ** | 2.10 | 3.00 | 20 | 6 | 10.500 | 0.00 |
| 21 | 3 | 229.04 | 1.10 | 4.8 | 1.10 | 4.8 | 0.00 | ** | 1.10 | 1.00 | 21 | 3 | 7.340 | 0.00 |
| 22 | 4 | 238.16 | 1.10 | 4.6 | 1.02 | 4.3 | .08 | ** | 1.00 | 1.00 | 22 | 4 | 3.820 | -.20 |
| 23 | 5 | 227.19 | 1.60 | 7.0 | 1.46 | 6.4 | .14 | ** | 1.60 | 1.00 | 23 | 5 | 2.070 | 0.00 |
| 24 | 6 | 291.22 | 1.50 | 5.2 | 1.34 | 4.6 | .16 | ** | 1.50 | 2.00 | 24 | 6 | 3.320 | 0.00 |
| 25 | 4 | 182.05 | 1.00 | 5.5 | .89 | 4.9 | .11 | ** | 1.00 | 1.00 | 25 | 4 | 2.920 | 0.00 |
| 26 | 5 | 205.12 | 1.00 | 4.9 | .84 | 4.1 | .16 | ** | 1.00 | 1.00 | 26 | 5 | 1.880 | 0.00 |
| 27 | 6 | 217.99 | .90 | 4.1 | .67 | 3.1 | .23 | ** | .90 | 1.00 | 27 | 6 | 1.250 | 0.00 |

BUSINESS FORMS PRINTING COMPANY ENGINEERED FOR HIGH SPEED PRINTERS

JOB 463 BEARING N-S LINE 21 SP1 S 1/2 10/30/70 1000 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.600 | 0.00 | 1.00 | .10 | 0.0000 | 1.0246 |

| | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 200.95 | 1.20 | 6.0 | 1.20 | 6.0 | 0.00 | ** | 1.20 | 1.00 | 1 | 1 | 64.600 | 0.00 |
| 2 | 2 | 173.12 | 1.30 | 7.5 | 1.30 | 7.5 | 0.00 | ** | 1.30 | 1.00 | 2 | 2 | 13.900 | 0.00 |
| 3 | 3 | 204.17 | 1.10 | 5.4 | 1.10 | 5.4 | 0.00 | ** | 1.10 | 1.00 | 3 | 3 | 6.570 | 0.00 |
| 4 | 1 | 188.01 | 1.10 | 5.9 | 1.10 | 5.9 | 0.00 | ** | 1.10 | 2.00 | 4 | 1 | 121.000 | 0.00 |
| 5 | 2 | 150.41 | 1.10 | 7.3 | 1.10 | 7.3 | 0.00 | ** | 1.10 | 1.00 | 5 | 2 | 12.100 | 0.00 |
| 6 | 3 | 169.62 | .70 | 4.1 | .70 | 4.1 | 0.00 | ** | .70 | 1.00 | 6 | 3 | 5.480 | 0.00 |
| 7 | 4 | 210.90 | 1.20 | 5.7 | 1.11 | 5.2 | .09 | ** | 1.20 | 1.00 | 7 | 4 | 3.390 | 0.00 |
| 8 | 1 | 241.59 | 1.20 | 5.0 | 1.20 | 5.0 | 0.00 | ** | 1.20 | 3.00 | 8 | 1 | 233.000 | 0.00 |
| 9 | 2 | 222.06 | .90 | 4.1 | .90 | 4.1 | 0.00 | ** | .90 | 2.00 | 9 | 2 | 35.800 | 0.00 |
| 10 | 3 | 206.25 | .90 | 4.4 | .90 | 4.4 | 0.00 | ** | .90 | 1.00 | 10 | 3 | 6.650 | 0.00 |
| 11 | 4 | 265.65 | 1.30 | 4.9 | 1.30 | 4.9 | 0.00 | ** | 1.20 | 1.00 | 11 | 4 | 4.270 | -.20 |
| 12 | 5 | 335.99 | 1.40 | 4.2 | 1.32 | 3.9 | .08 | ** | 1.40 | 1.00 | 12 | 5 | 3.080 | 0.00 |
| 13 | 2 | 164.08 | 1.10 | 6.7 | 1.10 | 6.7 | 0.00 | ** | 1.10 | 3.00 | 13 | 2 | 39.600 | 0.00 |
| 14 | 3 | 206.65 | 1.10 | 5.3 | 1.10 | 5.3 | 0.00 | ** | 1.10 | 2.00 | 14 | 3 | 13.300 | 0.00 |
| 15 | 4 | 206.11 | 1.60 | 7.8 | 1.50 | 7.3 | .10 | ** | 1.60 | 1.00 | 15 | 4 | 3.300 | 0.00 |
| 16 | 5 | 267.27 | 1.40 | 5.2 | 1.29 | 4.8 | .11 | ** | 1.40 | 1.00 | 16 | 5 | 2.450 | 0.00 |
| 17 | 6 | 330.53 | 1.60 | 4.8 | 1.47 | 4.4 | .13 | ** | 1.60 | 1.00 | 17 | 6 | 1.890 | 0.00 |
| 18 | 3 | 186.45 | 1.10 | 5.9 | 1.10 | 5.9 | 0.00 | ** | 1.10 | 3.00 | 18 | 3 | 18.000 | 0.00 |
| 19 | 4 | 249.67 | .90 | 3.6 | .90 | 3.6 | 0.00 | ** | .90 | 2.00 | 19 | 4 | 8.050 | 0.00 |
| 20 | 5 | 240.94 | 1.80 | 7.5 | 1.67 | 6.9 | .13 | ** | 1.80 | 1.00 | 20 | 5 | 2.200 | 0.00 |
| 21 | 6 | 307.72 | 1.00 | 3.2 | .86 | 2.8 | .14 | ** | 1.00 | 1.00 | 21 | 6 | 1.770 | 0.00 |
| 22 | 4 | 427.62 | 1.30 | 3.0 | 1.30 | 3.0 | 0.00 | ** | 1.30 | 3.00 | 22 | 4 | 20.600 | 0.00 |
| 23 | 5 | 547.08 | 1.30 | 2.4 | 1.30 | 2.4 | 0.00 | ** | 1.30 | 2.00 | 23 | 5 | 10.040 | 0.00 |
| 24 | 6 | 510.66 | 1.60 | 3.1 | 1.60 | 3.1 | 0.00 | ** | 1.60 | 1.00 | 24 | 6 | 2.920 | 0.00 |

ENGINEERED FOR HIGH SPEED PRINTERS
BUSINESS FORMS PRINTING COMPANY BLUE SPACE BAR

JOB 463.

LINE 22

SPR I

W½.

BERRING E-W.

5-11-70.

750

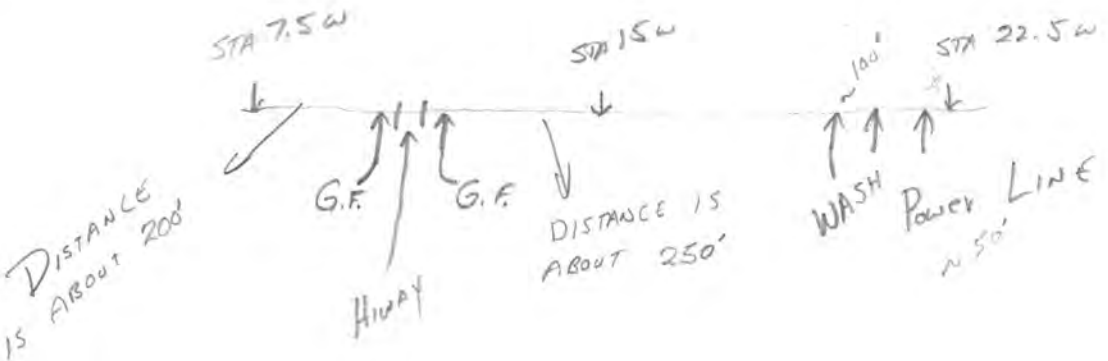
OVER! Job 463 750 EMPIRE #463

HEINRICHS GEOEXPLORATION CO. PROJECT

I.P. RECEIVER NOTES LINE 22 HALF W SP. 1 DATE 11-5-70

| SEND | CAL | 5-6 | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 4-5 | 0-7.5W | 7.5-15 | W → | 15-22.5 | W → | → | 22.5-30W | → | → |
| RANGE | 1.0 ① | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.0 | 0.4 | 0.7 | 0.7 | 0.9 | 0.7 | 0.7 | 1.3 | 1.3 | 1.8 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CAL | 1.0 | 4.0 | 4.0 | 4.0 | 5.0 | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 " | | 1 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.3 | 56.8 | 38.0 | 11.1 | 52.8 | 13.7 | 6.25 | 45.2 | 14.8 | 6.94 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +2.1 | +14.2 | | +3.9 | | | +2.6 | | |
| AC NOISE | 3.0 | | | | | | | | | |
| POT RES. | 0.3 | 2K | 12K | | 6K | | | 3K | | |

GROUNDED FENCES: (2) LOCATED ON EITHER SIDE OF HIWAY. ANGLE IS ABOUT 80°.



HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 22 HALF W SP. 1 DATE 11-5-76

| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 | 30-37.5 | W → | | | | 37.5-45 → | | | |
| RANGE | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 |
| DC 1 | 2.3 | 0.5 | 0.3 | 0.5 | 1.0 | 1.7 | 0.8 | 0.5 | 0.7 | 1.3 |
| DC 2 | 1.65 | | | | | 0.9 | | | | |
| DC 3 | (1.4) | | | | | (0.6) | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 CUR | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| DC 6 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 7 N | 4 | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 3.80 | 31.1 | 5.50 | 4.07 | 2.92 | 1.83 | 14.3 | 4.23 | 3.38 | 2.39 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +12.1 | | | | | +22.1 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 2K | | | | | 6K | | | |

5-6

22.5-30

3.85

1Hz

0.1Hz 1.6%

-0.1

5-6

30-37.5 w/Respect to 3Hz

1Hz 1.22

0.1Hz 2.1%

0.0

STA 45 IN WASH

PAGE 6

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE 463
LINE 22 HALF W SP. / DATE 11-5-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | |
| RECEIVE | 37.5-45 | 45-52 | 5 ——— | ——— | ——— | 52.5- | 60W | ——— | | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | |
| DC 1 | 1.9 | 0.7 | 0.6 | 0.9 | 1.9 | 0.7 | 0.7 | 1.1 | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 CUR | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| DC 6 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | |
| DC 7 μ | 6 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.57 | 5.62 | 2.16 | 1.97 | 1.52 | 3.15 | 1.50 | 1.41 | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | +8.0 | | | | +16.0 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 5K | | | | 3K | | | | |

STA. 52.5W IS ON ANACONDA CLAIMS

"WASP 447" ABOUT 200' W OF CLAIM POST

"2100' to S.E. Claim Corner in a NW direction from SE CORNER Section 21, T. 18S, R. 16E G & S. R. B & M."

STA. 525 IS ALSO ≅ 150' S OF GROUNDED Fence running parallel to the line

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 02 HALF W SP. 1 DATE 11/5/78



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 |
| RECEIVE | CAL | 0-7.5W | 7.5-15W | → | 15-22.5W | → | → | 22.5- | 30W → | |
| RANGE | 100X10 | 133.3X3 | 133.3X3 | 133.3 | 166.6X3 | 133.3X3 | 133.3X3 | 166.6X3 | 166.6X3 | 166.6X3 |
| VOLTAGE | 125 | 490 | 525 | 500 | 475 | 525 | 500 | 510 | 475 | 455 |
| CURRENT | 1.0 | 4.0 | 4.0 | 4.0 | 5.0 | 4.0 | 4.0 | 5.0 | 5.0 | 5.0 |
| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 22.5-30W | 30-37.5W | → | → | → | → | 37.5-45W | → | → | → |
| RANGE | 166.6X3 | 166.6X3 | 166.6X3 | 166.6X3 | 166.6X3 | 166.6X3 | 166.6X3 | 166.6X3 | 166.6X3 | 166.6X3 |
| VOLTAGE | 610 | 470 | 510 | 465 | 650 | 610 | 470 | 505 | 465 | 650 |
| CURRENT | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |

FREQUENCIES 3.0 0.3

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT #463

LINE 22 HALF W SP. 1 DATE 11/5/82

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | |
| RECEIVE | 37.5-45W | 45-52.5 | W | → | | 52.5-60W | → | | | |
| RANGE | 166.6x3 | 166.6x3 | 166.6x3 | 166.6x3 | 166.6x3 | 166.6x3 | 166.6x3 | 166.6x3 | | |
| VOLTAGE | 605 | 465 | 500 | 460 | 650 | 460 | 500 | 460 | | |
| CURRENT | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | | |
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES _____ _____

SENDER NO.

OPERATOR

RECEIVER NO.

OPERATOR

COMMENTS:

JOB 463

LINE 22

SPR I

E½.

BEARING E-W.

5-11-70.

750

5-6-3-4-5-3 3-4-5 2-3-4 1-2-5

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

Wood Post Fence ~30'E of sta. 15 Job 463 750 # 463

PROJECT EMPIRE

LINE 22 HALF E SP. 1 DATE 11-5-70

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 3-4 | 0-7.5E | → | 7.5-15E | → | → | 15-22.5 | E → | → | → |
| RANGE | 1.0 (2) | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 |
| DC 1 | 0.0 | 0.5 | 1.1 | 0.5 | 0.8 | 1.3 | 0.5 | 0.9 | 1.0 | 1.4 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CUR | 1.0 | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | 3.0 | 5.0 | 4.0 | 5.0 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 " | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.9 | 38.2 | 18.8 | 71.1 | 11.1 | 8.70 | 53.5 | 19.6 | 5.16 | 5.06 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -19.3 | | +13.3 | | | -6.1 | | | |
| AC NOISE | 3.0 | | | | | | | | | |
| POT RES. | 0.3 | 5K | | 5K | | | 20K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 22 HALF E SP. 1 DATE 11-5-6



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 22.5-30 | → | → | → | → | 30-37.5 | E → | → | → | → |
| RANGE | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 0.6 | 0.8 | 1.0 | 1.4 | 1.8 | 0.9 | 0.9 | 1.3 | 1.5 | 2.2 |
| DC 2 | | | | | | | | | | 2.1 |
| DC 3 | | | | | | | | | | (2.1) |
| DC 4 CUR | 3.0 | 3.0 | 5.0 | 4.0 | 5.0 | 3.0 | 3.0 | 5.0 | 4.0 | 5.0 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 " | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 55.5 | 17.0 | 9.78 | 3.08 | 3.24 | 16.9 | 7.85 | 5.68 | 1.90 | 2.18 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +17.2 | | | | | +5.5 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 15K | | | | | 5K | | | | |

1-2

30-32.5

1Hz 2.22

0.1Hz 2.12

0.0

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 22 HALF E SP. 1 DATE 11-5-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 37.5-45 | E → | | | 45-52.5 | → | | | | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | | |
| DC 1 | 0.8 | 1.2 | 1.9 | 2.4 | 1.3 | 1.4 | 1.8 | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 CUR. | 3.0 | 3.0 | 5.0 | 4.0 | 3.0 | 3.0 | 5.0 | | | |
| DC 6 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | |
| DC 7 n | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 7.27 | 4.03 | 3.19 | 1.13 | 3.07 | 1.93 | 1.66 | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +12.5 | | | | +14.6 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 12K | | | | 12K | | | | | |

52.5
45
37
DIRT
ROAD
30
22.5
15
7.5
0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 22 HALF E SP. 1 DATE 11-5-7



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 3-4 | 0-7.5E | — | 7.5-15 | E | — | 15-22.5 | E | — | — |
| RANGE | 10×100 | 30×133 | 30×166 | 30×166 | 30×133 | 30×166 | 30×100 | 30×166 | 30×133 | 30×166 |
| VOLTAGE | 100 | 420 | 480 | 480 | 420 | 480 | 400 | 480 | 420 | 480 |
| CURRENT | 1.0 | 4.0 | 5.0 | 5.0 | 4.0 | 5.0 | 3.0 | 5.0 | 4.0 | 5.0 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 22.5-30 | E | — | — | → | 30-37.5 | E | — | — | → |
| RANGE | 30×100 | 30×100 | 30×166 | 30×133 | 30×166 | 30×100 | 30×100 | 30×166 | 30×133 | 30×166 |
| VOLTAGE | 380 | 400 | 480 | 420 | 480 | 380 | 400 | 480 | 420 | 480 |
| CURRENT | 3.0 | 3.0 | 5.0 | 4.0 | 5.0 | 3.0 | 3.0 | 5.0 | 4.0 | 5.0 |

FREQUENCIES 3.0 0.3

SENDER NO. 66445

OPERATOR Al Gotmer

RECEIVER NO. 2069 3-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

## I. P. SENDER NOTES

PROJECT Empire #463

LINE 22 HALF E SP. 1 DATE 11-5-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 37.5- | 45E | → | → | 45- | 52.5E | " | | | |
| RANGE | 30x100 | 30x100 | 30x166 | 30x133 | 30x100 | 30x100 | 30x133 | | | |
| VOLTAGE | 380 | 400 | 480 | 420 | 380 | 400 | 480 | | | |
| CURRENT | 3.0 | 3.0 | 5.0 | 4.0 | 3.0 | 3.0 | 5.0 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 6644S

OPERATOR Al Gotmer

RECEIVER NO. 2069J-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 22 SP1 W 1/2 BEARING E-W 5/11/70 — 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.300 | 0.00 | 3.00 | .30 | 0.0000 | 1.0277 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 32.97 | .40 | 12.1 | .24 | 7.3 | .16 | ** | .40 | 4.00 | 1 | 1 | 56.800 | 0.00 |
| 2 | 1 | 22.12 | .70 | 31.6 | .42 | 19.2 | .28 | ** | .70 | 4.00 | 2 | 1 | 38.000 | 0.00 |
| 3 | 2 | 25.85 | .70 | 27.1 | -.09 | -3.4 | .79 | ** | .70 | 4.00 | 3 | 2 | 11.100 | 0.00 |
| 4 | 1 | 24.64 | .90 | 36.5 | .66 | 26.9 | .24 | ** | .90 | 5.00 | 4 | 1 | 52.800 | 0.00 |
| 5 | 2 | 31.90 | .70 | 21.9 | .11 | 3.3 | .59 | ** | .70 | 4.00 | 5 | 2 | 13.700 | 0.00 |
| 6 | 3 | 36.38 | .70 | 19.2 | -.43 | -11.8 | 1.13 | ** | .70 | 4.00 | 6 | 3 | 6.250 | 0.00 |
| 7 | 1 | 21.18 | 1.30 | 61.4 | 1.01 | 47.6 | .29 | ** | 1.30 | 5.00 | 7 | 1 | 45.200 | 0.00 |
| 8 | 2 | 27.74 | 1.30 | 46.9 | .58 | 21.0 | .72 | ** | 1.30 | 5.00 | 8 | 2 | 14.800 | 0.00 |
| 9 | 3 | 32.67 | 1.80 | 55.1 | .50 | 15.3 | 1.30 | ** | 1.80 | 5.00 | 9 | 3 | 6.940 | 0.00 |
| 10 | 4 | 35.96 | 2.30 | 64.0 | .20 | 5.6 | 2.10 | ** | 2.30 | 5.00 | 10 | 4 | 3.800 | 0.00 |
| 11 | 1 | 15.85 | .50 | 31.5 | .07 | 4.1 | .43 | ** | .50 | 5.00 | 11 | 1 | 34.100 | 0.00 |
| 12 | 2 | 10.21 | .30 | 29.4 | -2.35 | -230.0 | 2.65 | ** | .30 | 5.00 | 12 | 2 | 5.500 | 0.00 |
| 13 | 3 | 18.92 | .50 | 26.4 | -2.14 | -113.0 | 2.64 | ** | .50 | 5.00 | 13 | 3 | 4.070 | 0.00 |
| 14 | 4 | 27.28 | 1.00 | 36.7 | -1.99 | -72.8 | 2.99 | ** | 1.00 | 5.00 | 14 | 4 | 2.920 | 0.00 |
| 15 | 5 | 30.13 | 1.70 | 56.4 | -2.52 | -83.5 | 4.22 | ** | 1.70 | 5.00 | 15 | 5 | 1.830 | 0.00 |
| 16 | 2 | 26.67 | .80 | 30.0 | .04 | 1.7 | .76 | ** | .80 | 5.00 | 16 | 2 | 14.300 | 0.00 |
| 17 | 3 | 19.66 | .50 | 25.4 | -2.01 | -102.3 | 2.51 | ** | .50 | 5.00 | 17 | 3 | 4.230 | 0.00 |
| 18 | 4 | 31.48 | .70 | 22.2 | -1.79 | -56.8 | 2.49 | ** | .70 | 5.00 | 18 | 4 | 3.380 | 0.00 |
| 19 | 5 | 39.19 | 1.30 | 33.2 | -1.73 | -44.1 | 3.03 | ** | 1.30 | 5.00 | 19 | 5 | 2.390 | 0.00 |
| 20 | 6 | 41.43 | 1.90 | 45.9 | -2.29 | -55.3 | 4.19 | ** | 1.90 | 5.00 | 20 | 6 | 1.570 | 0.00 |
| 21 | 3 | 26.17 | .70 | 26.7 | -1.04 | -39.7 | 1.74 | ** | .70 | 5.00 | 21 | 3 | 5.620 | 0.00 |
| 22 | 4 | 20.10 | .60 | 29.9 | -3.78 | -188.0 | 4.38 | ** | .60 | 5.00 | 22 | 4 | 2.160 | 0.00 |
| 23 | 5 | 32.18 | .90 | 28.0 | -2.98 | -92.7 | 3.88 | ** | .90 | 5.00 | 23 | 5 | 1.970 | 0.00 |
| 24 | 6 | 40.11 | 1.90 | 47.4 | -2.46 | -61.4 | 4.36 | ** | 1.90 | 5.00 | 24 | 6 | 1.520 | 0.00 |
| 25 | 4 | 32.13 | .70 | 21.8 | -1.72 | -53.6 | 2.42 | ** | .70 | 5.00 | 25 | 4 | 3.450 | 0.00 |
| 26 | 5 | 24.45 | .70 | 28.6 | -4.76 | -194.7 | 5.46 | ** | .70 | 5.00 | 26 | 5 | 1.500 | 0.00 |
| 27 | 6 | 36.92 | 1.10 | 29.8 | -3.74 | -101.2 | 4.84 | ** | 1.10 | 5.00 | 27 | 6 | 1.410 | 0.00 |

ENGINEERED FOR HIGH SPEED PRINTERS
BUSINESS FORMS PRINTING COMPANY BUCKEYE

JOB 463 LINE 22 SP1 E 1/2 BEARING E-W 5/11/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.900 | 0.00 | 3.00 | .30 | 0.0000 | 1.0215 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 22.06 | .50 | 22.7 | .22 | 10.1 | .28 | ** | .50 | 4.00 | 1 | 1 | 38.200 | 0.00 |
| 2 | 2 | 34.95 | 1.10 | 31.5 | .58 | 16.5 | .52 | ** | 1.10 | 5.00 | 2 | 2 | 18.800 | 0.00 |
| 3 | 1 | 32.84 | .50 | 15.2 | .34 | 10.4 | .16 | ** | .50 | 5.00 | 3 | 1 | 71.100 | 0.00 |
| 4 | 2 | 25.71 | .80 | 31.1 | .01 | .3 | .79 | ** | .80 | 4.00 | 4 | 2 | 11.100 | 0.00 |
| 5 | 3 | 40.51 | 1.30 | 32.1 | .32 | 7.9 | .98 | ** | 1.30 | 5.00 | 5 | 3 | 8.700 | 0.00 |
| 6 | 1 | 41.19 | .50 | 12.1 | .38 | 9.3 | .12 | ** | .50 | 3.00 | 6 | 1 | 53.500 | 0.00 |
| 7 | 2 | 36.36 | .90 | 24.8 | .40 | 11.1 | .50 | ** | .90 | 5.00 | 7 | 2 | 19.600 | 0.00 |
| 8 | 3 | 29.94 | 1.00 | 33.4 | -.46 | -15.3 | 1.46 | ** | 1.00 | 4.00 | 8 | 3 | 5.160 | 0.00 |
| 9 | 4 | 47.17 | 1.40 | 29.7 | -.08 | -1.6 | 1.48 | ** | 1.40 | 5.00 | 9 | 4 | 5.060 | 0.00 |
| 10 | 1 | 42.77 | .60 | 14.0 | .49 | 11.5 | .11 | ** | .60 | 3.00 | 10 | 1 | 55.500 | 0.00 |
| 11 | 2 | 52.51 | .80 | 15.2 | .50 | 9.5 | .30 | ** | .80 | 3.00 | 11 | 2 | 17.000 | 0.00 |
| 12 | 3 | 45.40 | 1.00 | 22.0 | .16 | 3.5 | .84 | ** | 1.00 | 5.00 | 12 | 3 | 9.780 | 0.00 |
| 13 | 4 | 35.89 | 1.40 | 39.0 | -.70 | -19.6 | 2.10 | ** | 1.40 | 4.00 | 13 | 4 | 3.080 | 0.00 |
| 14 | 5 | 53.06 | 1.80 | 33.9 | -.26 | -4.8 | 2.06 | ** | 1.80 | 5.00 | 14 | 5 | 3.240 | 0.00 |
| 15 | 2 | 52.25 | .90 | 17.2 | .60 | 11.4 | .30 | ** | .90 | 3.00 | 15 | 2 | 16.900 | 0.00 |
| 16 | 3 | 60.68 | .90 | 14.8 | .33 | 5.4 | .57 | ** | .90 | 3.00 | 16 | 3 | 7.850 | 0.00 |
| 17 | 4 | 52.90 | 1.30 | 24.6 | .03 | .6 | 1.27 | ** | 1.30 | 5.00 | 17 | 4 | 5.680 | 0.00 |
| 18 | 5 | 38.78 | 1.50 | 38.7 | -1.57 | -40.5 | 3.07 | ** | 1.50 | 4.00 | 18 | 5 | 1.900 | 0.00 |
| 19 | 6 | 57.35 | 2.20 | 38.4 | -.58 | -10.2 | 2.78 | ** | 2.20 | 5.00 | 19 | 6 | 2.180 | 0.00 |
| 20 | 3 | 56.14 | .80 | 14.3 | .17 | 3.0 | .63 | ** | .80 | 3.00 | 20 | 3 | 7.270 | 0.00 |
| 21 | 4 | 62.49 | 1.20 | 19.2 | .18 | 2.9 | 1.02 | ** | 1.20 | 3.00 | 21 | 4 | 4.030 | 0.00 |
| 22 | 5 | 52.30 | 1.90 | 36.3 | -.20 | -3.8 | 2.10 | ** | 1.90 | 5.00 | 22 | 5 | 3.190 | 0.00 |
| 23 | 6 | 37.23 | 2.40 | 64.5 | -2.39 | -64.1 | 4.79 | ** | 2.40 | 4.00 | 23 | 6 | 1.130 | 0.00 |
| 24 | 4 | 47.65 | 1.30 | 27.3 | -.16 | -3.3 | 1.46 | ** | 1.30 | 3.00 | 24 | 4 | 3.070 | 0.00 |
| 25 | 5 | 52.47 | 1.40 | 26.7 | -.69 | -13.1 | 2.09 | ** | 1.40 | 3.00 | 25 | 5 | 1.930 | 0.00 |
| 26 | 6 | 43.50 | 1.80 | 41.4 | -2.14 | -49.3 | 3.94 | ** | 1.80 | 5.00 | 26 | 6 | 1.660 | 0.00 |

ENGINEERED FOR HIGH SPEED PRINTERS
BUSINESS FORMS PRINTING COMPANY BLUE RIBBON

Job 463 Empire, Line 23, E½ SE¼, 11/10/70 750.

Bearing E-W

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 23 HALF E SP. / DATE 11-10-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | S.P. | 1-2 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 0-7.5W | 0-7.5E | 7.5-15E → | | 15-22.5E → | | → | 22.5-30 | → | → |
| RANGE | | 10 | 10 | 1.0 | 10 | 1.0 | 1.0 | 10 | 10 | 1.0 |
| DC 1 | | 0.7 | 1.4 | 1.7 | 1.4 | −1.0 | -2.1 | 2.7 | 3.0 | 0.9 |
| DC 2 | Cal | | | | | | -2.9 | | 3.4 | |
| DC 3 | 1 | | | | | | -3.2 | | 3.6 | |
| DC 4 | −0.2 | | | | | | | | | |
| DC 5 CUR | 1.0 | 3. | 3. | 3. | 4. | 3. | 3. | 4. | 4. | 3. |
| DC 6 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 7 # | | 1 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| DC 8 | | | | | | | | | | |
| DC AVG. | 97.3 | | | | | | | | | |
| AC 1 | 0.0 | 211. | 382. | 69.0 | 519. | 56.1 | 19.0 | 423. | 120. | 20.7 |
| AC 2 | 3.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | 0.3 | | | | | | | | | |
| S.P. | −10.2 | -3.1 | +8.9 | | -3.4 | | | +10.6 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 25K | 14K | 6K | | 12K | | | 10K | | |

3-E
22.5-30

| | |
|---|---|
| 3Hz | 120 |
| 1Hz | 1.3 |
| 0.3 Hz | 3.0 |
| 0.1 Hz | 4.9 |
| Dev. | 0.0 |

1-2
15-22.5

| | |
|---|---|
| 3Hz | 19.0 |
| 1Hz | -0.9 |
| 0.3Hz | -2.1 |
| 0.1 Hz | -3.8 |
| Dev. | 0.0 |

5m 30E IN WASH ON EAST BANK

PAGE 5

HEINRICHS GEOEXPLORATION CO. PROJECT EMPIRE #463

I.P. RECEIVER NOTES LINE 23 HALF E SP. 1 DATE 11-10-70

| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 | 30-37.5 | → | → | → | → | 37.5-45 | → | → | → |
| RANGE | 0.1 | 10 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.3 | 0.6 | 2.2 | 2.3 | 1.1 | 1.0 | 0.8 | 2.3 | 2.4 | 0.9 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cum | 3. | 3. | 4. | 4. | 3. | 3. | 3. | 4. | 4. | 3. |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 n | 4 | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 8.57 | 355. | 96.5 | 38.1 | 7.76 | 3.64 | 92.7 | 44.9 | 20.7 | 4.83 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +10.7 | | | | | +0.8 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 20K | | | | | 20K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

GROUNDED @ 42E FENCE ⊥

PROJECT EMPIRE # 463
LINE 23 HALF E SP. 1 DATE 11-10-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | |
| RECEIVE | 37.5-45 | 45-52.5 | → | → | → | 52.5-60E | → | → | | |
| RANGE | 0.1 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 0.1 | 0.1 | | |
| DC 1 | 1.3 | 1.1 | 2.5 | 2.7 | 1.9 | 1.1 | 2.7 | 3.1 | | |
| DC 2 | | | | | | 1.2 | 3.1 | 3.3 | | |
| DC 3 | | | | | | (1.2) | (3.2) | (3.4) | | |
| DC 4 (MA) | 3. | 3. | 4. | 4. | 3. | 3. | 4. | 4. | | |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | |
| DC 6 # | 5 | 1 | 2 | 3 | 4 | 1 | 2 | 3 | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 2.51 | 42.1 | 25.6 | 12.8 | 3.27 | 13.9 | 10.01 | 5.22 | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | +4.0 | | | | +10.4 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 6K | | | | 6K | | | | |

| | 5-6 | 4-5 | 3-4 |
|---|---|---|---|
| | 52.5-60 | → | |
| 3Hz | 13.9 | 10.01 | 5.22 |
| 1Hz | 0.2 | 1.2 | 1.5 |
| 0.3Hz | 1.1 | 2.7 | 3.1 |
| 0.1Hz | 1.4 | 4.3 | 4.8 |
| ped. | 0.0 | 0.0 | 0.0 |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 23 HALF E SP. I DATE 11-10-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 0-7.5E | 7.5-15 → | | 15 - 22.5 E | | | 22.5 - 30 E | | | |
| RANGE | 30x100 | 30x100 | 30x100 | 30x133 | 30x100 | 30x100 | 30x133 | 30x133 | 30x100 | 30x100 |
| VOLTAGE | 500 | 420 | 500 | 440 | 420 | 500 | 460 | 420 | 420 | 480 |
| CURRENT | 3.0 | 3.0 | 3.0 | 4.0 | 3.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 30 - 37.5 E | | | | → | 37.5 - 45 E | | | | → |
| RANGE | 30x100 | 30x133 | 30x133 | 30x100 | 30x100 | 30x100 | 30x133 | 30x133 | 30x100 | 30x100 |
| VOLTAGE | 460 | 460 | 420 | 420 | 480 | 460 | 460 | 420 | 420 | 480 |
| CURRENT | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 |

FREQUENCIES 3 0.3

SENDER NO. 6644-S

OPERATOR Al Gotner

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 20 HALF E SP. 1 DATE 11-100

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 4-5 — | 52.5E | → | | 52.5 — | 60E | → | | | |
| RANGE | 30×100 | 30×133 | 30×133 | 30×100 | 30×100 | 30×133 | 30×133 | | | |
| VOLTAGE | 460 | 460 | 420 | 420 | 460 | 460 | 420 | | | |
| CURRENT | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 4.0 | 4.0 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 6644-S

OPERATOR Al Gotmer

RECEIVER NO. 2693-R

OPERATOR Bill Freeman

COMMENTS:

Job 463 Empire, Line 23, W½ SP 1 11/10/70

750

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 23 HALF W SP. 1 DATE 11-10-



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 |
| RECEIVE | 3-4 | 7.5-15W | → | → | 15-22.5 W | → | → | → | 22.5-30 W | → |
| RANGE | 1.0 | 10 | 1.0 | 1.0 | 10 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 |
| DC 1 | -0.2 | 0.7 | 1.5 | -1.7 | 0.6 | 1.1 | 1.6 | -1.7 | 0.4 | 0.8 |
| DC 2 | | | | -2.1 | | | | -1.9 | | |
| DC 3 CUR | 1.0 | 4. | 4. | 3. (-2.1) | 3. | 4. | 4. | 3. (-2.0) | 3. | 3. |
| DC 4 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 5 " | | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 | 2 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.3 | 279. | 91.3 | 19.4 | 136. | 64.7 | 30.3 | 9.06 | 75.1 | 27.5 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | -5.6 | | | -0.7 | | | | +4.9 | |
| AC NOISE | 0.3 | | | | | | | | | |
| POT RES. | | 20K | | | 10K | | | | 3K | |

5-6
7.5-15 Ω

| | |
|---|---|
| 3Hz | 19.4 |
| 1Hz | -0.7 |
| 0.3Hz | -1.7 |
| 0.1Hz | -2.7 |
| Dev. | 0.0 |

5-6
15-22.5

| | |
|---|---|
| 3Hz | 9.06 |
| 1Hz | -0.7 |
| 0.3Hz | -1.7 |
| 0.1Hz | -2.6 |
| Dev. | 0.0 |

STA 37.5 ~ WASH

GROUNDED FENCE ⊥ @ ~ 42 W

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PROJECT EMPIRE # 463

LINE 23 HALF W SP. 1 DATE 11-10-70



| SEND | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 | W → | | 30-37.5 | W → | | | | 37.5-45 | W → |
| RANGE | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 |
| DC 1 | 1.7 | 1.9 | -1.2 | 0.6 | 0.9 | 1.7 | 2.1 | -0.4 | 1.0 | 1.3 |
| DC 2 | | | -1.2 | | | | | -0.8 | | |
| DC 3 CUR | 4. | 4. | 3. -1.9 | 3. | 3. | 4. | 4. | 3. -0.9 | 3. | 3. |
| DC 4 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 5 # | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 | 2 | 3 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 26.2 | 16.2 | 6.25 | 21.5 | 12.7 | 15.2 | 11.0 | 4.44 | 9.91 | 6.50 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | -18.2 | | | | | +18.4 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | 2K | | | | | 12K | |

| 5-6 | |
|---|---|
| 22.5-30 | |
| 3 Hz | 6.25 |
| 1 Hz | -0.3 |
| 0.3 Hz | -1.2 |
| 0.1 Hz | -2.0 |
| Dev. | 0.0 |

| 5-6 | |
|---|---|
| 30-37.5 | |
| 3Hz | 4.44 |
| 1.0Hz | -0.1 |
| 0.3Hz | -0.4 |
| 0.1Hz | -0.9 |
| Dev. | 0.0 |

STA 45 ON OTHER SIDE OF WASH



HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 163
LINE 23 HALF W SP. 1 DATE 11-10-7

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | | | 3-4 |
| RECEIVE | 37.5-45 W | | 45-52.5 → | | | | | | | 45-52.5W |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | | 3Hz | | 5.07 |
| DC 1 | 2.1 | 2.2 | 1.4 | 1.6 | 2.6 | | | 1Hz | | 1.3 |
| DC 2 | | | | | 2.5 | | | 0.3Hz | | 2.6 |
| DC 3 | | | | | (2.5) | | | 0.1Hz | | 3.8 |
| DC 4 CM | 4. | 4. | 3. | 3. | 4. | | | DEV. | | 0.0 |
| DC 5 Ø | 20 | 21 | 22 | 23 | 24 | | | | | |
| DC 6 ϕ | 3 | 4 | 3 | 4 | 5 | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 8.43 | 6.44 | 5.08 | 3.65 | 5.07 | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +8.0 | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | 11K | | | | | | | |

5-6

45-52.5

0.1

3Hz 1.78

0.3Hz 0.7

Dev. 0.0

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463 PAGE 1

LINE 22 HALF W SP. 1 DATE 11-10-70

| SEND | Cal | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 34 | 7.5-15W → | | | 15- | 22.5 | W → | | 22.5 | — |
| RANGE | 10x400 | 30x133 | 30x133 | 30x100 | 30x100 | 30x133 | 30x133 | 30x100 | 30x100 | 30x100 |
| VOLTAGE | 100 | 440 | 480 | 480 | 420 | 440 | 480 | 480 | 500 | 420 |
| CURRENT | 1.0 | 4.0 | 4.0 | 3.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 |
| SEND | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 |
| RECEIVE | 30 W → | | | 30- | 37.5 W → | | | | 37.5 | — |
| RANGE | 30x133 | 30x133 | 30x100 | 30x100 | 30x100 | 30x133 | 30x133 | 30x100 | 30x100 | 30x100 |
| VOLTAGE | 440 | 480 | 480 | 500 | 420 | 440 | 480 | 480 | 500 | 420 |
| CURRENT | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 | 4.0 | 4.0 | 3.0 | 3.0 | 3.0 |

FREQUENCIES 30 @ 3

SENDER NO. 6644-S

OPERATOR Al Gotmer

RECEIVER NO. 2093-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PAGE 2

PROJECT Empire # 463

LINE 23 HALF W SP. 1 DATE 11-10-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | | | |
| RECEIVE | 45 W | → | 45 - | 52.5 W - | | | | | | |
| RANGE | 30x133 | 30x133 | 30x100 | 30x100 | 30x133 | | | | | |
| VOLTAGE | 440 | 480 | 500 | 420 | 440 | | | | | |
| CURRENT | 4.0 | 4.0 | 3.0 | 3.0 | 4.0 | | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.5

SENDER NO. 6644-S

OPERATOR Al Gotmer

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 EMPIRE LINE 23 E 1/2 SP1 BEARING E-W 11/10/70 — 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | -.20 | 97.300 | 0.00 | 3.00 | .30 | -.2000 | 1.0277 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 164.11 | .90 | 5.5 | .90 | 5.5 | 0.00 | ** | .70 | 3.00 | 1 | 1 | 211.000 | 0.00 |
| 2 | 1 | 299.16 | 1.60 | 5.3 | 1.60 | 5.3 | 0.00 | ** | 1.40 | 3.00 | 2 | 1 | 382.000 | 0.00 |
| 3 | 2 | 216.79 | 1.90 | 8.8 | 1.90 | 8.8 | 0.00 | ** | 1.70 | 3.00 | 3 | 2 | 69.000 | 0.00 |
| 4 | 1 | 304.84 | 1.60 | 5.2 | 1.60 | 5.2 | 0.00 | ** | 1.40 | 4.00 | 4 | 1 | 519.000 | 0.00 |
| 5 | 2 | 171.59 | -.80 | -4.7 | -.80 | -4.7 | 0.00 | ** | -1.00 | 3.00 | 5 | 2 | 56.100 | 0.00 |
| 6 | 3 | 143.67 | -1.90 | -13.2 | -2.07 | -14.4 | .17 | ** | -2.10 | 3.00 | 6 | 3 | 19.000 | 0.00 |
| 7 | 1 | 251.63 | 2.90 | 11.5 | 2.90 | 11.5 | 0.00 | ** | 2.70 | 4.00 | 7 | 1 | 423.000 | 0.00 |
| 8 | 2 | 286.37 | 3.20 | 11.2 | 3.20 | 11.2 | 0.00 | ** | 3.00 | 4.00 | 8 | 2 | 120.000 | 0.00 |
| 9 | 3 | 161.31 | 1.10 | 6.8 | .95 | 5.9 | .15 | ** | .90 | 3.00 | 9 | 3 | 20.700 | 0.00 |
| 10 | 4 | 132.78 | .50 | 3.8 | .13 | 1.0 | .37 | ** | .30 | 3.00 | 10 | 4 | 8.570 | 0.00 |
| 11 | 1 | 275.83 | .80 | 2.9 | .80 | 2.9 | 0.00 | ** | .60 | 3.00 | 11 | 1 | 355.000 | 0.00 |
| 12 | 2 | 228.51 | 2.40 | 10.5 | 2.40 | 10.5 | 0.00 | ** | 2.20 | 4.00 | 12 | 2 | 96.500 | 0.00 |
| 13 | 3 | 225.77 | 2.50 | 11.1 | 2.41 | 10.7 | .09 | ** | 2.30 | 4.00 | 13 | 3 | 38.100 | 0.00 |
| 14 | 4 | 121.19 | 1.30 | 10.7 | .88 | 7.3 | .42 | ** | 1.10 | 3.00 | 14 | 4 | 7.760 | 0.00 |
| 15 | 5 | 99.38 | 1.20 | 12.1 | .30 | 3.0 | .90 | ** | 1.00 | 3.00 | 15 | 5 | 3.640 | 0.00 |
| 16 | 1 289 | 72.17 ×4 | 1.00 | 13.9 | 1.00 | 13.9 | 0.00 | ** | .80 | 3.00 | 16 | 1 2 | 92.700 | 0.00 |
| 17 | 2 266 | 106.42 ×5/2 | 2.50 | 23.5 | 2.39 | 22.4 | .11 | ** | 2.30 | 4.00 | 17 | 2 3 | 44.900 | 0.00 |
| 18 | 3 246 | 122.78 ×2 | 2.60 | 21.2 | 2.38 | 19.4 | .22 | ** | 2.40 | 4.00 | 18 | 3 4 | 20.700 | 0.00 |
| 19 | 4 132 | 75.28 ×105/60 | 1.10 | 14.6 | .30 | 4.1 | .80 | ** | .90 | 3.00 | 19 | 4 5 | 4.830 | 0.00 |
| 20 | 5 110 | 68.73 ×168/105 | 1.50 | 21.8 | .03 | .4 | 1.47 | ** | 1.30 | 3.00 | 20 | 5 6 | 2.510 | 0.00 |
| 21 | 1 329 | 32.87 ×10 | 1.30 | 39.5 | 1.14 | 34.7 | .16 | ** | 1.10 | 3.00 | 21 | 1 3 | 42.100 | 0.00 |
| 22 | 2 304 | 60.80 ×5 | 2.70 | 44.4 | 2.45 | 40.4 | .25 | ** | 2.50 | 4.00 | 22 | 2 4 | 25.600 | 0.00 |
| 23 | 3 266 | 76.14 ×7/2 | 2.90 | 38.1 | 2.48 | 32.6 | .42 | ** | 2.70 | 4.00 | 23 | 3 5 | 12.800 | 0.00 |
| 24 | 4 144 | 51.47 ×168/60 | 2.10 | 40.8 | .78 | 15.2 | 1.32 | ** | 1.90 | 3.00 | 24 | 4 6 | 3.270 | 0.00 |
| 25 | 1 217 | 18.85 ×20 | 1.30 | 119.8 | .58 | 53.0 | .72 | ** | 1.10 | 3.00 | 25 | 1 4 | 13.900 | 0.00 |
| 26 | 2 208 | 23.82 ×105/12 | 2.90 | 121.8 | 2.02 | 84.9 | .88 | ** | 2.70 | 4.00 | 26 | 2 5 | 10.010 | 0.00 |
| 27 | 3 174 | 31.17 ×168/30 | 3.30 | 105.9 | 1.92 | 61.5 | 1.38 | ** | 3.10 | 4.00 | 27 | 3 6 | 5.220 | 0.00 |

3
12
30
60
105
168

BUSINESS FORMS PRINTING COMPANY ENGINEERED FOR HIGH SPEED PRINTERS

JOB 463 EMPIRE LINE 23 W 1/2 SP1 11/10/70 — 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | -.20 | 97.300 | 0.00 | 3.00 | .30 | -.2000 | 1.0277 |

| | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 162.74 | .90 | 5.5 | .90 | 5.5 | 0.00 ** | .70 | 4.00 | 1 | 1 | 279.000 | 0.00 |
| 2 | 2 | 214.71 | 1.70 | 7.9 | 1.70 | 7.9 | 0.00 ** | 1.50 | 4.00 | 2 | 2 | 91.300 | 0.00 |
| 3 | 3 | 147.29 | -1.50 | -10.2 | -1.67 | -11.3 | .17 ** | -1.70 | 3.00 | 3 | 3 | 19.400 | 0.00 |
| 4 | 1 | 105.67 | .80 | 7.6 | .80 | 7.6 | 0.00 ** | .60 | 3.00 | 4 | 1 | 136.000 | 0.00 |
| 5 | 2 | 151.56 | 1.30 | 8.6 | 1.30 | 8.6 | 0.00 ** | 1.10 | 4.00 | 5 | 2 | 64.700 | 0.00 |
| 6 | 3 | 178.32 | 1.80 | 10.1 | 1.67 | 9.4 | .13 ** | 1.60 | 4.00 | 6 | 3 | 30.300 | 0.00 |
| 7 | 4 | 137.58 | -1.50 | -10.9 | -1.85 | -13.5 | .35 ** | -1.70 | 3.00 | 7 | 4 | 9.060 | 0.00 |
| 8 | 1 | 58.24 | .60 | 10.3 | .53 | 9.1 | .07 ** | .40 | 3.00 | 8 | 1 | 75.100 | 0.00 |
| 9 | 2 | 85.64 | 1.00 | 11.7 | .85 | 9.9 | .15 ** | .80 | 3.00 | 9 | 2 | 27.500 | 0.00 |
| 10 | 3 | 154.34 | 1.90 | 12.3 | 1.74 | 11.3 | .16 ** | 1.70 | 4.00 | 10 | 3 | 26.200 | 0.00 |
| 11 | 4 | 191.24 | 2.10 | 11.0 | 1.88 | 9.8 | .22 ** | 1.90 | 4.00 | 11 | 4 | 16.200 | 0.00 |
| 12 | 5 | 166.93 | -1.00 | -6.0 | -1.45 | -8.7 | .45 ** | -1.20 | 3.00 | 12 | 5 | 6.250 | 0.00 |
| 13 | 1 | 66.9 16.71 ×4 | .80 | 47.9 | .40 | 23.7 | .40 ** | .60 | 3.00 | 13 | 1 2 | 21.500 | 0.00 |
| 14 | 2 | 99.0 39.59 ×5/2 | 1.10 | 27.8 | .66 | 16.6 | .44 ** | .90 | 3.00 | 14 | 2 3 | 12.700 | 0.00 |
| 15 | 3 | 179.1 89.54 ×2 | 1.90 | 21.2 | 1.57 | 17.5 | .33 ** | 1.70 | 4.00 | 15 | 3 4 | 15.200 | 0.00 |
| 16 | 4 | 228 130.11 ×105/60 | 2.30 | 17.7 | 1.92 | 14.8 | .38 ** | 2.10 | 4.00 | 16 | 4 5 | 11.000 | 0.00 |
| 17 | 5 | 191.6 119.54 ×168/105 | -.20 | -1.7 | -.91 | -7.6 | .71 ** | -.40 | 3.00 | 17 | 5 6 | 4.440 | 0.00 |
| 18 | 2 | 77.3 30.92 ×5/2 | 1.20 | 38.8 | .58 | 18.8 | .62 ** | 1.00 | 3.00 | 18 | 2 3 | 9.910 | 0.00 |
| 19 | 3 | 101.7 50.85 ×2 | 1.50 | 29.5 | .78 | 15.3 | .72 ** | 1.30 | 3.00 | 19 | 3 4 | 6.500 | 0.00 |
| 20 | 3 | 175 49.86 ×105/30 | 2.30 | 46.1 | 1.56 | 31.2 | .74 ** | 2.10 | 4.00 | 20 | 3 5 | 8.430 | 0.00 |
| 21 | 4 | 213.6 76.25 ×168/60 | 2.40 | 31.5 | 1.62 | 21.2 | .78 ** | 2.20 | 4.00 | 21 | 4 6 | 6.440 | 0.00 |
| 22 | 3 | 79.6 39.78 ×2 | 1.60 | 40.2 | .60 | 15.0 | 1.00 ** | 1.40 | 3.00 | 22 | 3 4 | 5.080 | 0.00 |
| 23 | 4 | 100.1 57.28 ×105/60 | 1.80 | 31.4 | .66 | 11.5 | 1.14 ** | 1.60 | 3.00 | 23 | 4 5 | 3.650 | 0.00 |
| 24 | 5 | 169 105.46 ×168/105 | 2.80 | 26.6 | 1.97 | 18.6 | .83 ** | 2.60 | 4.00 | 24 | 5 6 | 5.070 | 0.00 |

ENGINEERED FOR HIGH SPEED PRINTERS
BUSINESS FORMS PRINTING COMPANY

Job 463, Line 24, Sp1, E½, 11/11/70 750.

FOUND SECTION CORNER!

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

Ø. FENCE @ ~17.5E + 19.1

PROJECT EMPIRE #463

LINE 24 HALF E SP. 1 DATE 11-11-70

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 3-4 | 0-7.5E | → | 7.5-15E | ← | → | 15-22.5E | ← | ← | → |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 |
| DC 1 | -0.1 | 0.3 | 0.6 | 0.5 | 0.4 | 0.5 | 0.7 | 0.5 | 1.0 | 0.9 |
| DC 2 | | | | | | | | | | |
| DC 3 Gain | 1.0 | 5 | 4 | 4 | 5 | 4 | 4 | 4 | 5 | 3 |
| DC 4 ++ | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 5 n | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.6 | 54.8 | 15.1 | 49.7 | 13.7 | 5.58 | 49.1 | 9.23 | 4.37 | 1.68 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | +7.0 | | -5.6 | | | +11.2 | | | |
| AC NOISE | 0.3 | | | | | | | | | |
| POT RES. | | 2K | | 2K | | | 1K | | | |

POWER FAILURE ONAN? - BENDIX?

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 24 HALF E SP. 1 DATE 11-14-74

| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 E | ← | | | → | 30-37.5 E | ← | | | → |
| RANGE | 1.0 | 1.0 | 0.1 | 0.1 | 0.01 | 1.0 | 0.1 | 0.1 | 0.1 | 0.01 |
| DC 1 | 1.1 | 1.1 | 1.2 | 0.9 | 1.3 | 1.1 | 1.1 | 1.2 | 1.5 | 2.3 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Chan | 5 | 4 | 4 | 5 | 3 | 5 | 4 | 4 | 5 | 3 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 N | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 57.7 | 11.0 | 3.51 | 2.15 | 0.910 | 18.4 | 5.64 | 2.32 | 1.67 | 0.667 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +2.4 | | | | | +2.9 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 3K | | | | | 2K | | | | |

NOISY!

1-2

30-37.5

3Hz 0.667

1Hz ~1.8

0.3Hz ~2.3

0.1Hz ~3.2

Dev. 0.0

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT Emore #963

LINE 24 HALF ____ SP. ____ DATE ____



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 37.5-45E | → | → | → | 45-52.5E | → | → | | | |
| RANGE | | | | | | | | | | |
| DC 1 | | | | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | | | | | | | | |
| AC 2 | | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463 PAGE 4

LINE 24 HALF E SP. 1 DATE 1-11-7

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Cal | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 3-4 | 0-7.5 E | | 7.5-15 E → | | | 15-22.5 E → | | | |
| RANGE | 10x100 | 30x166 | 30x133 | 30x133 | 30x166 | 30x133 | 30x133 | 30x133 | 30x166 | 30x100 |
| VOLTAGE | 120 | 500 | 750 | 420 | 500 | 750 | 400 | 420 | 500 | 550 |
| CURRENT | 1.0 | 5.0 | 4.0 | 4.0 | 5.0 | 4.0 | 4.0 | 4.0 | 5.0 | 3.0 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 22.5-30 E → | | | | | 30-37.5 E → | | | | |
| RANGE | 30x166 | 30x133 | 30x133 | 30x166 | 30x100 | 30x166 | 30x133 | 30x133 | 30x166 | 30x100 |
| VOLTAGE | 440 | 400 | 420 | 500 | 550 | 440 | 400 | 420 | 500 | 550 |
| CURRENT | 5.0 | 4.0 | 4.0 | 5.0 | 3.0 | 5.0 | 4.0 | 4.0 | 5.0 | 3.0 |

FREQUENCIES 3.0 0.3

SENDER NO. 66445

OPERATOR Al Gotmer

RECEIVER NO. 20643 R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 24 HALF E SP. 1 DATE 11-11-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 37.5 | 45 | E | → | 45 | 52.5 | E | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 6644 S

OPERATOR Al Gotmer

RECEIVER NO. 2069-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 24 SP1 E 1/2 11/11/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | -.10 | 97.600 | 0.00 | 3.00 | .30 | -.1000 | 1.0246 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 25.37 | .40 | 15.8 | .17 | 6.8 | .23 | ** | .30 | 5.00 | 1 | 1 | 54.800 | 0.00 |
| 2 | 2 | 35.05 | .70 | 20.0 | .18 | 5.1 | .52 | ** | .60 | 4.00 | 2 | 2 | 15.100 | 0.00 |
| 3 | 1 | 28.82 | .60 | 20.8 | .41 | 14.2 | .19 | ** | .50 | 4.00 | 3 | 1 | 49.700 | 0.00 |
| 4 | 2 | 25.39 | .50 | 19.7 | -.31 | -12.1 | .81 | ** | .40 | 5.00 | 4 | 2 | 13.700 | 0.00 |
| 5 | 3 | 32.35 | .60 | 18.5 | -.72 | -22.2 | 1.32 | ** | .50 | 4.00 | 5 | 3 | 5.580 | 0.00 |
| 6 | 1 | 28.52 | .80 | 28.0 | .61 | 21.3 | .19 | ** | .70 | 4.00 | 6 | 1 | 49.100 | 0.00 |
| 7 | 2 | 21.41 | .60 | 28.0 | -.41 | -19.3 | 1.01 | ** | .50 | 4.00 | 7 | 2 | 9.230 | 0.00 |
| 8 | 3 | 20.37 | 1.10 | 54.0 | -1.30 | -63.8 | 2.40 | ** | 1.00 | 5.00 | 8 | 3 | 4.370 | 0.00 |
| 9 | 4 | 26.08 | 1.00 | 38.3 | -2.16 | -82.8 | 3.16 | ** | .90 | 3.00 | 9 | 4 | 1.680 | 0.00 |
| 10 | 1 | 26.92 | 1.20 | 44.6 | .99 | 36.8 | .21 | ** | 1.10 | 5.00 | 10 | 1 | 57.700 | 0.00 |
| 11 | 2 | 25.66 | 1.20 | 46.8 | .40 | 15.8 | .80 | ** | 1.10 | 4.00 | 11 | 2 | 11.000 | 0.00 |
| 12 | 3 | 20.49 | 1.30 | 63.4 | -1.08 | -52.8 | 2.38 | ** | 1.20 | 4.00 | 12 | 3 | 3.510 | 0.00 |
| 13 | 4 | 20.02 | 1.00 | 49.9 | -3.40 | -169.8 | 4.40 | ** | .90 | 5.00 | 13 | 4 | 2.150 | 0.00 |
| 14 | 5 | 24.82 | 1.40 | 56.4 | -3.96 | -159.6 | 5.36 | ** | 1.30 | 3.00 | 14 | 5 | .910 | 0.00 |
| 15 | 2 | 34.34 | 1.20 | 34.9 | .66 | 19.3 | .54 | ** | 1.10 | 5.00 | 15 | 2 | 18.400 | 0.00 |
| 16 | 3 | 32.90 | 1.20 | 36.5 | -.09 | -2.7 | 1.29 | ** | 1.10 | 4.00 | 16 | 3 | 5.640 | 0.00 |
| 17 | 4 | 27.09 | 1.30 | 48.0 | -1.71 | -63.2 | 3.01 | ** | 1.20 | 4.00 | 17 | 4 | 2.320 | 0.00 |
| 18 | 5 | 27.38 | 1.60 | 58.4 | -3.15 | -114.9 | 4.75 | ** | 1.50 | 5.00 | 18 | 5 | 1.670 | 0.00 |
| 19 | 6 | 29.39 | 2.40 | 81.7 | -4.00 | -136.2 | 6.40 | ** | 2.30 | 3.00 | 19 | 6 | .667 | 0.00 |

ENGINEERED FOR HIGH SPEED PRINTERS
BUSINESS FORMS PRINTING COMPANY

Job 463, Line 25, Sp 1, W+E½, 11/13/70 750.

LOST RADIO CONTACT

PAGE 1

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 25 HALF W SP. 1 DATE 11-13-7.

| SEND | CALC | S.P. | 5-6 | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 5-6 | 0-7.5E | 0-7.5W | 7.5-15W | → | 15-22.5W | → | → | 22.5-30W | → |
| RANGE | 1.0 | | 10 | 10 | 1.0 | 10 | 1.0 | 1.0 | 10 | 1.0 |
| DC 1 | 0.0 | | 0.9 | 0.8 | 0.9 | 0.9 | 1.6 | 1.6 | 0.6 | 1.3 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Pwr | 1.0 | | 1.3 | 1.6 | 1.3 | 1.1 | 1.6 | 1.3 | 1.2 | 1.1 |
| DC 5 # | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| DC 6 " | | | 1 | 1 | 2 | 1 | 2 | 3 | 1 | 2 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.6 | | 240. | 251. | 48.4 | 169. | 76.2 | 23.0 | 245. | 93.7 |
| AC 2 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | +2.6 | +7.0 | −56.0 | | −10.2 | | | +49.2 | |
| AC NOISE | 0.3 | | | | | | | | | |
| POT RES. | | 30K | 150K | 90K | | 40K | | | 40K | |

OVER! No Radio Contact!

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 25 HALF W SP. 1 DATE 11-8-70

| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30 → | | 30-37.5W | — | — | — | → | 37.5-45 | — | → |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 0.1 | 0.1 |
| DC 1 | 1.9 | 2.0 | 0.7 | 0.8 | 1.4 | 1.9 | 1.8 | 0.7 | 0.8 | 1.2 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Elev | 1.6 | 1.3 | 1.0 | 1.2 | 1.1 | 1.6 | 1.3 | 1.0 | 1.2 | 1.1 |
| DC 5 # | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| DC 6 " | 3 | 4 | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 59.0 | 22.1 | 111. | 29.5 | 14.0 | 10.7 | 4.39 | 14.7 | 6.09 | 4.33 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +0.0 | | | | | +16.7 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | 10 K | | | | | 3K | | |

STA 30 IN Limestone

STA 37.5 ON INTRUSIVE — CROSSES INTRUSIVE Hill

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 25 HALF N SP. 1 DATE 11-13-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | |
| RECEIVE | 37.5-45 → | | 45-52.5W → | | | | 52.5 — | 60W | → | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | |
| DC 1 | 2.1 | 2.2 | 0.8 | 0.9 | 1.6 | 2.3 | 1.1 | 1.3 | 2.4 | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cur | 1.6 | 1.3 | 1.0 | 1.2 | 1.1 | 1.6 | 1.0 | 1.2 | 1.1 | |
| DC 5 # | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | |
| DC 6 n | 5 | 6 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 3.61 | 1.83 | 7.08 | 3.66 | 2.74 | 2.63 | 4.45 | 2.79 | 2.08 | |
| AC 2 | -0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +23.7 | | | | +16.1 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | 20K | | | | 7K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES OVER!

PROJECT EMPIRE #963
LINE 25 HALF E SP. / DATE 11-13-70

| SEND | CAL | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 4-5 | 7.5-15E | → | → | 15-22.5 | E | → | → | 22.5-30 | E → |
| RANGE | 1.0 | 10 | 1.0 | 1.0 | 10 | 1.0 | 1.0 | 0.1 | 10 | 1.0 |
| DC 1 | 0.0 | 0.8 | 0.7 | 3.1 | 0.6 | 0.6 | 1.0 | 1.6 | 0.6 | 0.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Fm | | 1.1 | 1.2 | 1.0 | 1.6 | 1.1 | 1.2 | 1.0 | 1.3 | 1.6 |
| DC 5 # | | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 |
| DC 6 n | | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 | 2 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.5 | 202. | 43.7 | 16.8 | 274. | 46.1 | 14.6 | 7.11 | 106. | 74.6 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -26.1 | | | +29.6 | | | | +0.6 | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 6K | | | 7K | | | | 6K | |

1-2

7.515

3HZ 17.0

1HZ 1.6

0.3HZ 3.1

0.1HZ 4.1

Dev. 0.0

2.3 cm 4/2 scale

GROUNDED FENCE

@ ~ 10 E ~ 80°

0.5 amp

Gives ~ 3.1% PFE

AT 8.47 mV.

SAME STA.

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 25 HALF E SP. / DATE 11-13-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | | |
| RECEIVE | 22.5-30 E → | | | 30-37.5 E → | | | | | | |
| RANGE | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | | |
| DC 1 | 0.7 | 0.9 | 1.4 | 0.7 | 0.7 | 0.6 | 0.9 | 1.6 | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Pen | 1.1 | 1.2 | 1.0 | 1.3 | 1.6 | 1.1 | 1.2 | 1.0 | | |
| DC 5 # | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | | |
| DC 6 # | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 18.1 | 6.54 | 3.52 | 31.8 | 28.5 | 8.29 | 3.14 | 1.98 | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | +11.0 | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | 2K | | | | | | |

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT _____

LINE ____ HALF ____ SP. ____ DATE ____

PAGE

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| DC 1 | | | | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 | | | | | | | | | | |
| DC 5 | | | | | | | | | | |
| DC 6 | | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | | | | | | | | | | |
| AC 2 | | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 25 HALF E SP. 1 DATE 11-13-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Cal | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 |
| RECEIVE | 4-5 | 7.5-15E | → | 15- | 22.5 | E | → | | 22.5-30E | |
| RANGE | 10x100 | 10x110 | 10x120 | 10x100 | 10x160 | 10x110 | 10x120 | 10x100 | 10x130 | 10x160 |
| VOLTAGE | 540 | 950 | 900 | 700 | 880 | 950 | 900 | 700 | 820 | 880 |
| CURRENT | 1.0 | 1.1 | 1.2 | 1.0 | 1.6 | 1.1 | 1.2 | 1.0 | 1.3 | 1.6 |
| SEND | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 |
| RECEIVE | | | → | 30-37.5E | | | | → | 37.5 | |
| RANGE | 10x110 | 10x120 | 10x100 | 10x130 | 10x160 | 10x110 | 10x120 | 10x100 | | |
| VOLTAGE | 950 | 900 | 700 | 820 | 880 | 950 | 900 | 700 | | |
| CURRENT | 1.1 | 1.2 | 1.0 | 1.3 | 1.6 | 1.1 | 1.2 | 1.0 | | |

FREQUENCIES 3.0 0.3

SENDER NO. 644-S

OPERATOR Al Gatmer

RECEIVER NO. 2069-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 25 HALF E SP. 1 DATE 11-13-70

PAGE 2

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 6644-5

OPERATOR Al Gotmer

RECEIVER NO. 2069-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT EMPIRE #463

LINE 25 HALF W SP. 1 DATE 11-13-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | cal | 5-6 | 4-5 | 5 6 | 3-4 | 4 5 | 5 6 | 2-3 | 3-4 | 4 5 |
| RECEIVE | 5-6 | 0-7.5 W | 7.5-15 W → | | 15- | 22.5 | W → | 22.5 | - 30 | W → |
| RANGE | 10x100 | 10x130 | 10x160 | 10x130 | 10x110 | 10x160 | 10x130 | 10x120 | 10x110 | 10x160 |
| VOLTAGE | 700 | 920 | 950 | 920 | 1000 | 950 | 900 | 920 | 1000 | 950 |
| CURRENT | 1.0 | 1.3 | 1.6 | 1.3 | 1.1 | 1.6 | 1.3 | 1.2 | 1.1 | 1.6 |
| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | — | 30 - | 32.5 W | — | — | — | 37.5 | - 45 | W → | |
| RANGE | 10x130 | 10x100 | 10x120 | 10x110 | 10x160 | 10x130 | 10x100 | 10x120 | 10x110 | 10x160 |
| VOLTAGE | 920 | 680 | 940 | 1000 | 920 | 900 | 700 | 920 | 950 | 900 |
| CURRENT | 1.3 | 1.0 | 1.2 | 1.1 | 1.6 | 1.3 | 1.0 | 1.2 | 1.1 | 1.6 |

FREQUENCIES 30 0.3

SENDER NO. 6644-5

OPERATOR Al Gotmer

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS: Voltage Flux
took highest reading
both page 1 & 2

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PAGE 2

PROJECT Empire #463

LINE 25 HALF W SP. 1 DATE 1-13-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | 1-2 | 2-3 |
| RECEIVE | 45 W | 45-52.5 W | | | → | 52.5-60 | | W → | 60-67.5 W | |
| RANGE | 10x130 | 10x100 | 10x120 | 10x110 | 10x160 | 10x100 | 10x120 | 10x110 | 10x100 | 10x120 |
| VOLTAGE | 860 | 720 | 920 | 960 | 900 | 700 | 900 | 950 | 700 | 900 |
| CURRENT | 1.3 | 1.0 | 1.2 | 1.1 | 1.6 | 1.0 | 1.2 | 1.1 | 1.0 | 1.2 |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 6644-S

OPERATOR Al Gotmer

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 25 SP1 W + E 1/2 11/13/70
CAL GROUP NO. 1

750 FEET=DIPOLE LENGTH

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.600 | 0.00 | 3.00 | .30 | 0.0000 | 1.0246 |

| COMPUTED DATA | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 429.43 | .90 | 2.1 | .90 | 2.1 | 0.00 ** | .90 | 1.30 | 1 | 1 | 240.000 | 0.00 |
| 2 | 1 | 364.54 | .80 | 2.2 | .80 | 2.2 | 0.00 ** | .80 | 1.60 | 2 | 1 | 251.000 | 0.00 |
| 3 | 2 | 346.41 | .90 | 2.6 | .90 | 2.6 | 0.00 ** | .90 | 1.30 | 3 | 2 | 48.400 | 0.00 |
| 4 | 1 | 357.37 | .90 | 2.5 | .90 | 2.5 | 0.00 ** | .90 | 1.10 | 4 | 1 | 169.000 | 0.00 |
| 5 | 2 | 446.19 | 1.60 | 3.6 | 1.60 | 3.6 | 0.00 ** | 1.60 | 1.60 | 5 | 2 | 76.200 | 0.00 |
| 6 | 3 | 414.39 | 1.60 | 3.9 | 1.60 | 3.9 | 0.00 ** | 1.60 | 1.30 | 6 | 3 | 23.000 | 0.00 |
| 7 | 1 | 473.50 | .60 | 1.3 | .60 | 1.3 | 0.00 ** | .60 | 1.20 | 7 | 1 | 245.000 | 0.00 |
| 8 | 2 | 795.70 | 1.30 | 1.6 | 1.30 | 1.6 | 0.00 ** | 1.30 | 1.10 | 8 | 2 | 93.700 | 0.00 |
| 9 | 3 | 866.24 | 1.90 | 2.2 | 1.90 | 2.2 | 0.00 ** | 1.90 | 1.60 | 9 | 3 | 59.000 | 0.00 |
| 10 | 4 | 799.49 | 2.00 | 2.5 | 2.00 | 2.5 | 0.00 ** | 2.00 | 1.30 | 10 | 4 | 22.100 | 0.00 |
| 11 | 1 | 257.68 | .70 | 2.7 | .70 | 2.7 | 0.00 ** | .70 | 1.00 | 11 | 1 | 111.000 | 0.00 |
| 12 | 2 | 228.50 | .80 | 3.5 | .80 | 3.5 | 0.00 ** | .80 | 1.20 | 12 | 2 | 29.500 | 0.00 |
| 13 | 3 | 297.51 | 1.40 | 4.7 | 1.40 | 4.7 | 0.00 ** | 1.40 | 1.10 | 13 | 3 | 14.000 | 0.00 |
| 14 | 4 | 314.20 | 1.90 | 6.0 | 1.79 | 5.7 | .11 ** | 1.90 | 1.60 | 14 | 4 | 10.700 | 0.00 |
| 15 | 5 | 277.38 | 1.80 | 6.5 | 1.58 | 5.7 | .22 ** | 1.80 | 1.30 | 15 | 5 | 4.390 | 0.00 |
| 16 | 2 | 136.50 | .70 | 5.1 | .62 | 4.6 | .08 ** | .70 | 1.00 | 16 | 2 | 14.700 | 0.00 |
| 17 | 3 | 117.93 | .80 | 6.8 | .57 | 4.8 | .23 ** | .80 | 1.20 | 17 | 3 | 6.090 | 0.00 |
| 18 | 4 | 183.67 | 1.20 | 6.5 | .96 | 5.3 | .24 ** | 1.20 | 1.10 | 18 | 4 | 4.330 | 0.00 |
| 19 | 5 | 185.87 | 2.20 | 11.8 | 1.81 | 9.8 | .39 ** | 2.10 | 1.60 | 19 | 5 | 3.610 | -.20 |
| 20 | 6 | 185.73 | 2.20 | 11.8 | 1.61 | 8.6 | .59 ** | 2.20 | 1.30 | 20 | 6 | 1.830 | 0.00 |
| 21 | 3 | 164.52 | .80 | 4.9 | .66 | 4.0 | .14 ** | .80 | 1.00 | 21 | 3 | 7.080 | 0.00 |
| 22 | 4 | 141.89 | .90 | 6.3 | .56 | 4.0 | .34 ** | .90 | 1.20 | 22 | 4 | 3.660 | 0.00 |
| 23 | 5 | 204.20 | 1.60 | 7.8 | 1.26 | 6.2 | .34 ** | 1.60 | 1.10 | 23 | 5 | 2.740 | 0.00 |
| 24 | 6 | 217.09 | 2.30 | 10.6 | 1.82 | 8.4 | .48 ** | 2.30 | 1.60 | 24 | 6 | 2.630 | 0.00 |
| 25 | 4 | 207.43 | 1.10 | 5.3 | .90 | 4.3 | .20 ** | 1.10 | 1.00 | 25 | 4 | 4.450 | 0.00 |
| 26 | 5 | 190.03 | 1.30 | 6.8 | .92 | 4.9 | .38 ** | 1.30 | 1.20 | 26 | 5 | 2.790 | 0.00 |
| 27 | 6 | 249.97 | 2.40 | 9.6 | 2.00 | 8.0 | .40 ** | 2.40 | 1.10 | 27 | 6 | 2.080 | 0.00 |
| 28 | 1 | 426.73 | .80 | 1.9 | .80 | 1.9 | 0.00 ** | .80 | 1.10 | 28 | 1 | 202.000 | 0.00 |
| 29 | 2 | 338.16 | .70 | 2.1 | .70 | 2.1 | 0.00 ** | .70 | 1.20 | 29 | 2 | 43.700 | 0.00 |
| 30 | 3 | 399.30 | 3.10 | 7.8 | 3.10 | 7.8 | 0.00 ** | 3.10 | 1.00 | 30 | 3 | 16.800 | 0.00 |
| 31 | 1 | 397.16 | .60 | 1.5 | .60 | 1.5 | 0.00 ** | .60 | 1.60 | 31 | 1 | 274.000 | 0.00 |
| 32 | 2 | 388.78 | .60 | 1.5 | .60 | 1.5 | 0.00 ** | .60 | 1.10 | 32 | 2 | 46.100 | 0.00 |
| 33 | 3 | 283.29 | 1.00 | 3.5 | 1.00 | 3.5 | 0.00 ** | 1.00 | 1.20 | 33 | 3 | 14.600 | 0.00 |
| 34 | 4 | 333.06 | 1.60 | 4.8 | 1.50 | 4.5 | .10 ** | 1.60 | 1.00 | 34 | 4 | 7.110 | 0.00 |
| 35 | 1 | 189.10 | .60 | 3.2 | .60 | 3.2 | 0.00 ** | .60 | 1.30 | 35 | 1 | 106.000 | 0.00 |
| 36 | 2 | 432.95 | .70 | 1.6 | .70 | 1.6 | 0.00 ** | .70 | 1.60 | 36 | 2 | 74.600 | 0.00 |
| 37 | 3 | 381.99 | .70 | 1.8 | .70 | 1.8 | 0.00 ** | .70 | 1.10 | 37 | 3 | 18.100 | 0.00 |
| 38 | 4 | 253.54 | .90 | 3.5 | .75 | 3.0 | .15 ** | .90 | 1.20 | 38 | 4 | 6.540 | 0.00 |
| 39 | 5 | 287.99 | 1.40 | 4.9 | 1.19 | 4.1 | .21 ** | 1.40 | 1.00 | 39 | 5 | 3.520 | 0.00 |
| 40 | 2 | 227.15 | .70 | 3.1 | .70 | 3.1 | 0.00 ** | .70 | 1.30 | 40 | 2 | 31.800 | 0.00 |
| 41 | 3 | 413.51 | .70 | 1.7 | .70 | 1.7 | 0.00 ** | .70 | 1.60 | 41 | 3 | 28.500 | 0.00 |
| 42 | 4 | 349.56 | .60 | 1.7 | .50 | 1.4 | .10 ** | .60 | 1.10 | 42 | 4 | 8.290 | 0.00 |
| 43 | 5 | 213.03 | .90 | 4.2 | .58 | 2.7 | .32 ** | .90 | 1.20 | 43 | 5 | 3.140 | 0.00 |
| 44 | 6 | 259.70 | 1.60 | 6.2 | 1.22 | 4.7 | .38 ** | 1.60 | 1.00 | 44 | 6 | 1.980 | 0.00 |

BUSINESS FORMS PRINTING COMPANY ENGINEERED FOR HIGH SPEED PRINTERS

Job 463, LINE 26, Sp 1, W+E ½, 11/17/70 750.

CONTACT GRANITE – N 4.5W

PAGE 1

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

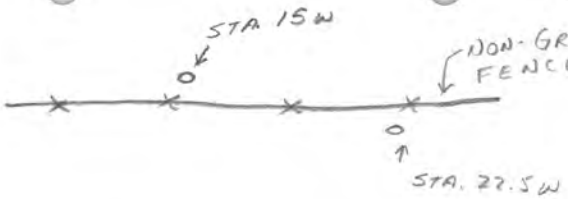
PROJECT EMPIRE #463

LINE 26 HALF W SP. 1 DATE 11-17-72

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | CAL | S.P. | 5-6 | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 |
| RECEIVE | 5-6 | 0-7.5E | 0-7.5W | 7.5-15W | → | 15-22.5 | W → | → | 22.5-30 | W → |
| RANGE | 1.0 | | 10 | 10 | 1.0 | 10 | 1.0 | 1.0 | 10 | 1.0 |
| DC 1 | 0.0 | | 0.7 | 0.3 | 0.8 | 0.9 | 0.7 | 1.1 | 0.6 | 0.9 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Pen | 1.0 | | 2 | 0.9 | 2 | 1 | 0.9 | 2 | 3 | 0.6 |
| DC 5 # | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| DC 6 M | | | 1 | 1 | 2 | 1 | 2 | 3 | 1 | 2 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | 149 | | 267 | | | 177 | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.6 | | 298. | 109. | 53.5 | 250. | 51.9 | 35.4 | 573. | 48.3 |
| AC 2 | 0.0 | | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | +17.0 | -18.2 | +23.3 | | +37.2 | | | +2.8 | |
| AC NOISE | 0.3 | | | | | | | | | |
| POT RES. | | 6K | 4K | 4K | | 4K | | | 10K | |

5-6

15-22.5 W




| | |
|---|---|
| 3Hz | 35.4 |
| 1 Hz | 0.6 |
| 0.3 Hz | 1.1 |
| 0.1 Hz | 1.8 |
| Dev. | 0.0 |

ALL IN GRANITE!

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 26 HALF W SP. 1 DATE 11-17-70

| SEND | 4-5 (0.6) | 5-6 (2.0) | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30μ | → | 30-37.5 W | ← | ← | ← | → | 37.5-45W | ← | → |
| RANGE | 1.0 | 1.0 | 10 | 10 | 1.0 | 1.0 | 1.0 | 10 | 1.0 | 1.0 |
| DC 1 | 0.7 | 1.1 | 0.6 | 0.9 | 1.1 | 1.1 | 1.2 | 1.4 | 1.1 | 1.1 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Pen | 0.6 | 2 | 1 | 3 | 0.6 | 0.6 | 2 | 1 | 3 | 0.6 |
| DC 5 # | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| DC 6 M | 3 | 4 | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 19.0 | 24.0 | 624. | 130. | 19.8 | 10.5 | 14.9 | 175. | 62.1 | 10.9 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +12.2 | | | | | -10.7 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | 3 K | | | | | 7K | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 26 HALF W SP. 1 DATE 11-17-2



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | |
| RECEIVE | 37.5-45 → | | 45-52.5 SW | ← | | → | 52.5-60 W | ← | | |
| RANGE | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 0.1 | |
| DC 1 | 1.2 | 1.2 | 1.3 | 1.1 | 1.1 | 0.8 | 1.4 | 1.2 | 0.9 | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 m | 0.6 | 2 | 1 | 3 | 0.6 | 0.6 | 1 | 3 | 0.6 | |
| DC 5 # | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | |
| DC 6 # | 5 | 6 | 3 | 4 | 5 | 6 | 4 | 5 | 6 | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 6.18 | 9.27 | 49.2 | 26.6 | 5.65 | 3.85 | 20.8 | 13.7 | 3.19 | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | +9.5 | | | | +31.3 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | 10K | | | | 40K | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 26 HALF E SP. 1 DATE 11-17-7.



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 |
| RECEIVE | 7.5-15 | E → | | 15-22.5 | E → | | | 22.5-30 | E → | |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 1.0 | 0.1 | 10 | 0.1 | 0.1 |
| DC 1 | 0.7 | 0.8 | 1.1 | 0.4 | 0.7 | 1.0 | 1.0 | 0.9 | 0.8 | 0.8 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Ten | 0.6 | 3 | 1 | 0.6 | 0.6 | 3 | 1 | 2 | 0.6 | 0.6 |
| DC 5 # | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 |
| DC 6 A | 1 | 2 | 3 | 1 | 2 | 3 | 4 | 1 | 2 | 3 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 89.8 | 62.6 | 20.9 | 23.4 | 9.81 | 11.4 | 4.36 | 156. | 9.45 | 5.82 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +2.3 | | | +10.4 | | | | -8.4 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 10 K | | | 6K | | | | 10 K | | |

STA. 30E IN QTZITE. NOISY.. "

PAGE 5

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 26 HALF E SP. 1 DATE 11-17-70

| SEND | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5-30E → | | 30-37.5 | → | → | → | → | 37.5- | 45 | → |
| RANGE | 0.1 | 0.1 | 1.0 | 0.1 | 0.1 | 0.1 | 0.01 | 0.1 | 0.1 | 0.1 |
| DC 1 | 1.0 | 1.1 | 1.0 | 0.6 | 0.9 | 1.3 | ≈ 1.8 | 0.9 | 0.9 | 1.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Pos | 3 | 1 | 2 | 0.6 | 0.6 | 3 | 1 | 2 | 0.6 | 0.6 |
| DC 5 # | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 |
| DC 6 M | 4 | 5 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 9.12 | 3.71 | 10.6 | 1.77 | 1.19 | 1.98 | 0.904 | 8.10 | 1.78 | 1.22 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | | -42.0 | | | | | +18.7 | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | 10 K | | | | | 30 K | | |

1-2

30-37.5

0.01

| | |
|---|---|
| 3Hz | 0.904 |
| 1Hz | 1.4% |
| 0.3 Hz | 1.8% |
| 0.1 Hz | 2.6% |
| Dev. | 0.0 |

HEINRICHS GEOEXPLORATION CO.

# I.P. RECEIVER NOTES

PAGE 6

PROJECT EMPIRE # 463

LINE 26 HALF E SP. 1 DATE 11-17-7.

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | | | 2-3 | | | | | | |
| RECEIVE | 37.5-45E | | | 37.5-45 | | | | | | |
| RANGE | 0.1 | | 3 Hz | 1.98 | | | | | | |
| DC 1 | 2.1 | (?) | 1 Hz | 1.2 | | | | | | |
| DC 2 | | Coupling | 0.3 Hz | 2.1 | 1.8 | | | | | |
| DC 3 | | | 0.1 Hz | 3.0 | 1.7 | | | | | |
| DC 4 Cur | 3 | | Dev. | 0.0 | | | | | | |
| DC 5 # | 48 | | | | | | | | | |
| DC 6 " | 6 | | | 1.7 cur 5/6 decade | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.98 | | | | | | | | | |
| AC 2 | 0.0 | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #63 PAGE 1

LINE 26 HALF N SP. 1 DATE 11-17-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Cal | 5-6 | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 |
| RECEIVE | 5-6 | 6-7.5 | 7.5-1 | SW | 15- | 22.5 | W→ | 22.5 | - 30 | W- |
| RANGE | 10×100 | 10×200 | 3×300 | 10×200 | 10×100 | 3×300 | 10×200 | 10×300 | 3×200 | 3×200 |
| VOLTAGE | 360 | 740 | 960 | 740 | 920 | 960 | 740 | 650 | 550 | 620 |
| CURRENT | 1.0 | 2.0 | 0.9 | 2.0 | 1.0 | 0.9 | 2.0 | 3.0 | 0.6 | 0.6 |
| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
| RECEIVE | — | 30 - 37.5 | W | — | — | — | 37.5 - 45 | W | — | — |
| RANGE | 10×200 | 10×100 | 10×300 | 3×200 | 3×200 | 10×200 | 10×100 | 10×300 | 3×200 | 3×200 |
| VOLTAGE | 720 | 700 | 660 | 550 | 660 | 720 | 700 | 650 | 540 | 620 |
| CURRENT | 2.0 | 1.0 | 3.0 | 0.6 | 0.6 | 2.0 | 1.0 | 3.0 | 0.6 | .06 |

FREQUENCIES 3.0 0.3

SENDER NO. 66475

OPERATOR Al Gotaas

RECEIVER NO. 20643-P

OPERATOR Bill Freund

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 26 HALF W SP. 1 DATE 11-17-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | |
| RECEIVE | — | 45-52.5 W | | — | | 52.5-60 W | | | | |
| RANGE | 10x200 | 10x100 | 10x300 | 3x200 | 3x200 | 10x100 | 10x300 | 3x200 | | |
| VOLTAGE | 720 | 700 | 650 | 540 | 620 | 700 | 650 | 540 | | |
| CURRENT | 2.0 | 1.0 | 3.0 | 0.6 | 0.6 | 1.0 | 3.0 | 0.6 | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 644-5

OPERATOR Al Gotmer

RECEIVER NO. 2064-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 26 HALF E SP. 1 DATE 11-17-7



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 5-6 |
| RECEIVE | 7.5E | 15E | → | 15 | 22.5E | → | | 22.5E | 30E | → |
| RANGE | 3x200 | 10x300 | 10x100 | 3x200 | 3x200 | 10x200 | 10x100 | 10x200 | 3x200 | 3x200 |
| VOLTAGE | 520 | 640 | 700 | 600 | 520 | 640 | 680 | 680 | 600 | 520 |
| CURRENT | 0.6 | 3.0 | 1.0 | 0.6 | 0.6 | 3.0 | 1.0 | 2.0 | 0.6 | 0.6 |
| SEND | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 |
| RECEIVE | | | 30E | 3 | 7.5E | | | 37.5 | 45E | → |
| RANGE | 10x300 | 10x100 | 10x200 | 3x200 | 3x200 | 10x300 | 10x100 | 10x200 | 3x200 | 3x200 |
| VOLTAGE | 640 | 680 | 680 | 600 | 520 | 620 | 680 | 680 | 680 | 520 |
| CURRENT | 3.0 | 1.0 | 2.0 | 0.6 | 0.6 | 3.0 | 1.0 | 2.0 | 0.6 | 0.6 |

FREQUENCIES 3.0 0.3

SENDER NO. 6644 s

OPERATOR Al Gothner

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 26 HALF E SP. 1 DATE 11-17-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 2-3 | | | | | | | | | |
| RECEIVE | — | | | | | | | | | |
| RANGE | 10x300 | | | | | | | | | |
| VOLTAGE | 620 | | | | | | | | | |
| CURRENT | 3.0 | | | | | | | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 1644-5

OPERATOR Al Gotmer

RECEIVER NO. 2619-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 26 SP1 W + E 1/2 11/17/70
CAL GROUP NO. 1

750 FEET=DIPOLE LENGTH

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.600 | 0.00 | 3.00 | .30 | 0.0000 | 1.0246 |

| COMPUTED DATA | | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 345.90 | .70 | 2.0 | .70 | 2.0 | 0.00 ** | .70 | 2.00 | 1 | 1 | 298.000 | 0.00 |
| 2 | 1 | 280.04 | .30 | 1.1 | .30 | 1.1 | 0.00 ** | .30 | .90 | 2 | 1 | 109.000 | 0.00 |
| 3 | 2 | 248.64 | .80 | 3.2 | .80 | 3.2 | 0.00 ** | .80 | 2.00 | 3 | 2 | 53.500 | 0.00 |
| 4 | 1 | 581.52 | .90 | 1.5 | .90 | 1.5 | 0.00 ** | .90 | 1.00 | 4 | 1 | 250.000 | 0.00 |
| 5 | 2 | 535.48 | .70 | 1.3 | .70 | 1.3 | 0.00 ** | .70 | .90 | 5 | 2 | 51.900 | 0.00 |
| 6 | 3 | 412.53 | 1.10 | 2.7 | 1.10 | 2.7 | 0.00 ** | 1.10 | 2.00 | 6 | 3 | 35.400 | 0.00 |
| 7 | 1 | 442.96 | .60 | 1.4 | .60 | 1.4 | 0.00 ** | .60 | 3.00 | 7 | 1 | 573.000 | 0.00 |
| 8 | 2 | 749.00 | .90 | 1.2 | .90 | 1.2 | 0.00 ** | .90 | .60 | 8 | 2 | 48.300 | 0.00 |
| 9 | 3 | 735.13 | .70 | 1.0 | .70 | 1.0 | 0.00 ** | .70 | .60 | 9 | 3 | 19.000 | 0.00 |
| 10 | 4 | 559.36 | 1.10 | 2.0 | 1.10 | 2.0 | 0.00 ** | 1.10 | 2.00 | 10 | 4 | 24.000 | 0.00 |
| 11 | 1 | 1447.16 | .60 | .4 | .60 | .4 | 0.00 ** | .60 | 1.00 | 11 | 1 | 624.000 | 0.00 |
| 12 | 2 | 403.19 | .90 | 2.2 | .90 | 2.2 | 0.00 ** | .90 | 3.00 | 12 | 2 | 130.000 | 0.00 |
| 13 | 3 | 769.13 | 1.10 | 1.4 | 1.10 | 1.4 | 0.00 ** | 1.10 | .60 | 13 | 3 | 19.800 | 0.00 |
| 14 | 4 | 815.74 | 1.10 | 1.3 | 1.10 | 1.3 | 0.00 ** | 1.10 | .60 | 14 | 4 | 10.500 | 0.00 |
| 15 | 5 | 608.33 | 1.20 | 2.0 | 1.20 | 2.0 | 0.00 ** | 1.20 | 2.00 | 15 | 5 | 14.900 | 0.00 |
| 16 | 2 | 1636.32 | 1.40 | .9 | 1.40 | .9 | 0.00 ** | 1.40 | 1.00 | 16 | 2 | 175.000 | 0.00 |
| 17 | 3 | 482.45 | 1.10 | 2.3 | 1.10 | 2.3 | 0.00 ** | 1.10 | 3.00 | 17 | 3 | 62.100 | 0.00 |
| 18 | 4 | 846.82 | 1.10 | 1.3 | 1.10 | 1.3 | 0.00 ** | 1.10 | .60 | 18 | 4 | 10.900 | 0.00 |
| 19 | 5 | 841.04 | 1.20 | 1.4 | 1.20 | 1.4 | 0.00 ** | 1.20 | .60 | 19 | 5 | 6.180 | 0.00 |
| 20 | 6 | 605.55 | 1.20 | 2.0 | 1.08 | 1.8 | .12 ** | 1.20 | 2.00 | 20 | 6 | 9.270 | 0.00 |
| 21 | 3 | 1148.97 | 1.30 | 1.1 | 1.30 | 1.1 | 0.00 ** | 1.30 | 1.00 | 21 | 3 | 49.200 | 0.00 |
| 22 | 4 | 413.31 | 1.10 | 2.7 | 1.10 | 2.7 | 0.00 ** | 1.10 | 3.00 | 22 | 4 | 26.600 | 0.00 |
| 23 | 5 | 768.16 | 1.10 | 1.4 | 1.10 | 1.4 | 0.00 ** | 1.10 | .60 | 23 | 5 | 5.650 | 0.00 |
| 24 | 6 | 835.01 | .80 | 1.0 | .80 | 1.0 | 0.00 ** | .80 | .60 | 24 | 6 | 3.850 | 0.00 |
| 25 | 4 | 972.44 | 1.40 | 1.4 | 1.40 | 1.4 | 0.00 ** | 1.40 | 1.00 | 25 | 4 | 20.800 | 0.00 |
| 26 | 5 | 372.89 | 1.20 | 3.2 | 1.05 | 2.8 | .15 ** | 1.20 | 3.00 | 26 | 5 | 13.700 | 0.00 |
| 27 | 6 | 692.55 | .90 | 1.3 | .80 | 1.2 | .10 ** | .90 | .60 | 27 | 6 | 3.190 | 0.00 |
| 28 | 1 | 347.45 | .70 | 2.0 | .70 | 2.0 | 0.00 ** | .70 | .60 | 28 | 1 | 89.800 | 0.00 |
| 29 | 2 | 193.96 | .80 | 4.1 | .80 | 4.1 | 0.00 ** | .80 | 3.00 | 29 | 2 | 62.600 | 0.00 |
| 30 | 3 | 487.11 | 1.10 | 2.3 | 1.10 | 2.3 | 0.00 ** | 1.10 | 1.00 | 30 | 3 | 20.900 | 0.00 |
| 31 | 1 | 90.27 | .40 | 4.4 | .40 | 4.4 | 0.00 ** | .40 | .60 | 31 | 1 | 23.400 | 0.00 |
| 32 | 2 | 151.82 | .70 | 4.6 | .70 | 4.6 | 0.00 ** | .70 | .60 | 32 | 2 | 9.810 | 0.00 |
| 33 | 3 | 88.48 | 1.00 | 11.3 | .66 | 7.5 | .34 ** | 1.00 | 3.00 | 33 | 3 | 11.400 | 0.00 |
| 34 | 4 | 203.03 | 1.00 | 4.9 | .80 | 3.9 | .20 ** | 1.00 | 1.00 | 34 | 4 | 4.360 | 0.00 |
| 35 | 1 | 181.43 | .90 | 5.0 | .90 | 5.0 | 0.00 ** | .90 | 2.00 | 35 | 1 | 156.000 | 0.00 |
| 36 | 2 | 146.40 | .80 | 5.5 | .80 | 5.5 | 0.00 ** | .80 | .60 | 36 | 2 | 9.450 | 0.00 |
| 37 | 3 | 225.41 | .80 | 3.5 | .71 | 3.1 | .09 ** | .80 | .60 | 37 | 3 | 5.820 | 0.00 |
| 38 | 4 | 141.57 | 1.00 | 7.1 | .66 | 4.7 | .34 ** | 1.00 | 3.00 | 38 | 4 | 9.120 | 0.00 |
| 39 | 5 | 302.64 | 1.10 | 3.6 | .90 | 3.0 | .20 ** | 1.10 | 1.00 | 39 | 5 | 3.710 | 0.00 |
| 40 | 2 | 49.36 | 1.00 | 20.3 | .67 | 13.6 | .33 ** | 1.00 | 2.00 | 40 | 2 | 10.600 | 0.00 |
| 41 | 3 | 68.42 | .60 | 8.8 | .12 | 1.7 | .48 ** | .60 | .60 | 41 | 3 | 1.770 | 0.00 |
| 42 | 4 | 92.27 | .90 | 9.8 | .30 | 3.2 | .60 ** | .90 | .60 | 42 | 4 | 1.190 | 0.00 |
| 43 | 5 | 53.95 | 1.30 | 24.1 | -.71 | -13.2 | 2.01 ** | 1.30 | 3.00 | 43 | 5 | 1.980 | 0.00 |
| 44 | 6 | 118.81 | 1.80 | 15.2 | .72 | 6.0 | 1.08 ** | 1.80 | 1.00 | 44 | 6 | .904 | 0.00 |
| 45 | 3 | 94.21 | .90 | 9.6 | .59 | 6.2 | .31 ** | .90 | 2.00 | 45 | 3 | 8.100 | 0.00 |
| 46 | 4 | 138.01 | .90 | 6.5 | .55 | 4.0 | .35 ** | .90 | .60 | 46 | 4 | 1.780 | 0.00 |
| 47 | 5 | 166.85 | 1.70 | 10.2 | 1.25 | 7.5 | .45 ** | 1.70 | .60 | 47 | 5 | 1.220 | 0.00 |
| 48 | 6 | 86.99 | 2.10 | 24.1 | .47 | 5.4 | 1.63 ** | 2.10 | 3.00 | 48 | 6 | 1.980 | 0.00 |

Job A63, Line 27, Sp 1, SE½, 11/20/70 750.

545'E 750' PAGE 1

HEINRICHS GEOEXPLORATION CO. PROJECT EMPIRE #463
I.P. RECEIVER NOTES 2.5 1.4 LINE 27 HALF SE SP. 1 DATE 11-20-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 3-4 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | CAL | 0-7.5s | → | 7.5-15s | → | → | 15-22.5s | → | → | → |
| RANGE | 1.0 | 10 | 1.0 | 10 | 1.0 | 0.1 | 10 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.0 | 0.9 | 1.1 | 1.0 | 1.2 | 1.6 | 0.6 | 1.5 | 0.9 | 1.8 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cur | 1.0 | 1.4 | 0.5 | 2.5 | 1.4 | 0.5 | 3 | 2.5 | 1.4 | 0.5 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 n | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.5 | 115. | 20.5 | 235. | 26.2 | 5.41 | 396. | 79.0 | 20.1 | 4.77 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | -41.1 | | -102.5 | | | +174. | | | |
| AC NOISE | 0.3 | | | | | | | | | |
| POT RES. | | 11K | | 8K | | | 120K | | | |

| | |
|---|---|
| 1-2 | 0.5 |
| 2-3 | 1.4 |
| 3-4 | 2.5 |
| 4-5 | 3. |
| 5-6 | 2. |
| 6-7 | 0.6 |

Current

| | 1-2 |
|---|---|
| | 7.5-15 |
| 3Hz | 5.41 |
| 1 Hz | 0.8 |
| 0.3 Hz | 1.6 |
| 0.1 Hz | 2.5 |
| Dev | 0.0 |

| | 1-2 |
|---|---|
| | 15-22.5 |
| 3Hz | 4.77 |
| 1Hz | 0.8 |
| 0.3Hz | 1.8 |
| 0.1 Hz | 2.5 |
| Dev. | 0.0 |

HIGH POT RESISTANCES

OVER!!

MARBLIZED LIMESTONE!



HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 27 HALF SE SP. 1 DATE 11-20-70

| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5- | 30 E | → | → | → | 30-37.5 | E | → | → | → |
| RANGE | 10 | 10 | 1.0 | 1.0 | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 0.5 | 0.8 | 1.7 | 1.0 | 1.2 | 0.5 | 0.3 | 0.9 | 1.4 | 0.9 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cum | 2 | 3 | 2.5 | 1.4 | 0.5 | 0.5 | 2. | 3. | 2.5 | 1.4 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 n | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 335. | 167. | 49.3 | 16.9 | 4.28 | 91.6 | 26.6 | 26.4 | 11.4 | 5.10 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -6.6 | | | | | +6.7 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 80K | | | | | 30K | | | | |

3- F

22.5 - 30

| | |
|---|---|
| 3Hz | 49.3 |
| 1Hz | 0.9 |
| 0.3 Hz | 1.7 |
| 0.1 Hz | 2.7 |

Dev.

NO RADIO CONTACT

STA 37.5 ~ IN WASH

GROUNDED FENCE @ 38.5 ⊥



HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE #463

LINE 27 HALF E SP. 1 DATE 11-20-76

| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-37.5 | 37.5-45E | → | → | → | → | 45-52.5 | → | → | → |
| RANGE | 0.1 | 1.0 | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 1.1 | 0.5 | 1.0 | 1.4 | 2.0 | 1.4 | 0.7 | 0.8 | 1.3 | 1.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Run | .5 | .5 | 2. | 3. | 2.5 | 1.4 | .4 | 2. | 3. | 2.5 |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| DC 6 n | 6 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 1.40 | 24.9 | 12.7 | 16.1 | 8.04 | 4.11 | 8.45 | 6.84 | 5.41 | 8.08 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | +1.6 | | | | | −9.7 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 18K | | | | | 16K | | | |

3-4

45-52.5

0.1

3Hz 4.54 mv

0.3Hz 2.02

Dev 0.0

NOTE: Delete the 1st 6-7 Reading - AC Dropped Current

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 763
LINE 27 HALF E SP. 1 DATE 11-20-72



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
| RECEIVE | 52.5- | 60E | → | | | | | | | |
| RANGE | 0.1 | 0.1 | 0.1 | | | | | | | |
| DC 1 | 0.9 | 1.3 | 1.4 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cur | .4 | 2.- | 3. | | | | | | | |
| DC 5 # | 30 | 31 | 32 | | | | | | | |
| DC 6 M | 4 | 5 | 6 | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 2.24 | 1.99 | 3.34 | | | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +35.0 | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 21K | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 27 HALF SE SP. 1 DATE 11-19-71

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Cal | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 3-4 | 0-7.5 SE | — | 7.5-15 SE | — | | 15-22.5 SE | — | | |
| RANGE | 10x100 | 10x140 | 10x50 | 10x250 | 10x140 | 10x50 | 10x300 | 10x250 | 10x140 | 10x50 |
| VOLTAGE | 320 | 940 | 920 | 850 | 920 | 900 | 860 | 840 | 900 | 900 |
| CURRENT | 1.0 | 1.4 | 0.5 | 2.5 | 1.4 | 0.5 | 3.0 | 2.5 | 1.4 | 0.5 |
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 22.5-30 E | | | | | 30-37.5 E | | | | |
| RANGE | 10x200 | 10x300 | 10x250 | 10x140 | 10x50 | 10x50 | 10x200 | 10x300 | 10x250 | 10x140 |
| VOLTAGE | 760 | 860 | 840 | 900 | 880 | 740 | 760 | 860 | 820 | 880 |
| CURRENT | 2.0 | 3.0 | 2.5 | 1.4 | .5 | 0.5 | 2.0 | 3.0 | 2.5 | 1.4 |

FREQUENCIES 3.0 0.3

SENDER NO. 6644-5

OPERATOR Al Gatmer

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 27 HALF E SP. 1 DATE 11-19-70

2 PAGE

| SEND | 1-2 | 6-7 | 5-6 | 4-5 | 3-4 | 2-3 | 6-7 | 5-6 | 4-5 | 3-4 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | — | 37.5 | — | 45 E | — | — | 45E | 52.5E | — | — |
| RANGE | 10×50 | 10×50 | 10×200 | 10×300 | 10×250 | 10×140 | 10×40 | 10×200 | 10×300 | 10×250 |
| VOLTAGE | 860 | 740 | 760 | 850 | 820 | 860 | 600 | 760 | 850 | 800 |
| CURRENT | 0.5 | 0.5 | 2.0 | 3.0 | 2.5 | 1.4 | 0.4 | 2.0 | 3.0 | 2.5 |

| SEND | 6-7 | 5-6 | 4-5 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 52.5E | 60E | — | | | | | | | |
| RANGE | 10×40 | 10×200 | 10×300 | | | | | | | |
| VOLTAGE | 600 | 760 | 840 | | | | | | | |
| CURRENT | 0.4 | 2.0 | 3.0 | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 6644-S

OPERATOR Al Catmer

RECEIVER NO. 20693-R

OPERATOR Bill Freeman

COMMENTS:

Job 463, LINE 27, Sp 1, NW¼, 11/21/30 750.

G.F. @ 3.5~4.0W

SPRING @ 4.0W

PAGE 5

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE 463

LINE 27 HALF W SP. 1 DATE 11-21-7-

| SEND | CAL @ | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 4-5 | 0-7.5W | → | 7.5-15W | → | → | 15-22.5 | W → | → | → |
| RANGE | 1.0 | 10 | 1.0 | 10 | 1.0 | 0.1 | 10 | 10 | 1.0 | 0.1 |
| DC 1 .3Hz | 97.8 | 1.1 | 1.7 | 1.3 | 1.3 | 1.4 | 1.4 | 1.6 | 1.5 | 2.1 |
| DC 2 1Hz | -0.1 | | | | | | | | | |
| DC 3 0.3Hz | (-0.1) | | | | | | | | | |
| DC 4 0.1Hz | 0.0 | | | | | | | | | |
| DC 5 Env | 1.0 | 2 | .4 | 3 | 2 | .4 | 2.5 | 3 | 2 | .4 |
| DC 6 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | F | 9 |
| DC 7 n | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.8 | 188. | 12.4 | 275. | 39.1 | 5.66 | 412. | 129. | 22.5 | 3.98 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | 3.0 | -19.7 | | 134.5 | | | +0.0 | | | |
| AC NOISE | 0.3 | | | | | | | | | |
| POT RES. | | 30 K | | 20 K | | | 25 K | | | |

| 6-7 0-7.5 | |
|---|---|
| 3Hz | 12.4 |
| 1 Hz | 1.0 |
| 0.3Hz | 1.7 |
| 0.1 Hz | 2.7 |
| Dev | 0.0 |

| 6-7 15-22.5 | |
|---|---|
| 3Hz | 3.98 |
| 1 Hz | 1.0 |
| 0.3Hz | 2.1 |
| 0.1 Hz | 2.6 |
| Dev | 0.0 |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 27 HALF W SP. 1 DATE 11-21-76



| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 22.5 — | 30 W | → | → | → | 30-37.5 W | → | → | → | → |
| RANGE | 10 | 1.0 | 1.0 | 0.1 | 0.1 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 |
| DC 1 | 1.1 | 1.4 | 1.7 | 1.3 | 1.1 | 0.6 | 1.5 | 1.8 | 2.1 | 2.1 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Gain | 1.4 | 2.5 | 3 | 2 | 1.4 | 1.4 | 1.4 | 2.5 | 3 | 2 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 # | 1 | 2 | 3 | 4 | 5 | 1 | 2 | 3 | 4 | 5 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 233. | 100.0 | 41.9 | 8.52 | 1.79 | 43.6 | 55.8 | 33.5 | 16.4 | 3.61 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | -33.8 | | | | | +35.1 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 30 K | | | | | 120K | | | | |

5-6

30-37.5

| | |
|---|---|
| 3 Hz | 3.61 |
| 1 Hz | 0.7 |
| 0.3 Hz | 2.1 |
| 0.1 Hz | 2.6 |
| Dev. | 0.0 |

OVER!!

PIRT Road @ 38N

PAGE 7

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #163
LINE 27 HALF W SP. 1 DATE 11-21-20

| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 30-37.5W | 37.5 — 45N | | | | → | 45-52.5W | | | → |
| RANGE | 0.01 | 0.1 | 0.1 | 0.1 | 0.1 | 0.01 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 0.4 | 1.4 | 1.5 | 1.6 | 2.1 | 2.4 | 1.7 | 1.9 | 2.2 | 2.3 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Gain | .4 | .4 | 1.4 | 2.5 | 3 | 2 | .4 | 1.4 | 2.5 | 2.5 |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| DC 6 " | 6 | 2 | 3 | 4 | 5 | 6 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.768 | 5.28 | 9.89 | 6.83 | 3.64 | 0.834 | 2.71 | 5.59 | 4.07 | 1.91 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | | -1.3 | | | | | +33.1 | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | 55K | | | | | 11K | | | |

| | 5-6<br>37.5-45 | 3-4<br>45-52.5 | 4-5<br>45-52.5 |
|---|---|---|---|
| 3Hz | 0.834 | 4.07 | 1.91 |
| 1Hz | 1.9 | 1.2 | 1.2 |
| 0.3Hz | 2.4 | 2.2 | 2.3 |
| 0.1 Hz | 3.8 | 3.3 | 3.4 |
| Dev. | 0.0 | 0.0 | 0.0 |

GROUNDED FENCE @ 52W ∀~45°

HEINRICHS GEOEXPLORATION CO.

I.P. RECEIVER NOTES

PROJECT EMPIRE #463

LINE 27 HALF W SP. 1 DATE 11-21-70

PAGE 8

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | | | | | | | |
| RECEIVE | 52.5 | 60 W | → | | | | | | | |
| RANGE | 0.1 | 0.1 | 0.1 | | | | | | | |
| DC 1 | 1.3 | 1.5 | 1.7 | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cm | .4 | 1.4 | 2.5 | | | | | | | |
| DC 5 II | 30 | 31 | 32 | | | | | | | |
| DC 6 " | 4 | 5 | 6 | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 2.70 | 6.21 | 4.80 | | | | | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 160K | | | | | | | | | |

STA. 52.5 IN ALLUVIUM

STA 60 IN LIMESTONE

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 27 HALF W SP. 1 DATE 11-21-78

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Cal | 5-6 | 6-7 | 4-5 | 5-6 | 6-7 | 3-4 | 4-5 | 5-6 | 6-7 |
| RECEIVE | 4-5 | 0-7.5 SW → | | 7.5-15 SW — | | | 15-22.5 SW → | | | |
| RANGE | 10×100 | 10×200 | 10×40 | 10×300 | 10×200 | 10×40 | 10×250 | 10×300 | 10×200 | 10×40 |
| VOLTAGE | 280 | 760 | 600 | 860 | 760 | 600 | 800 | 860 | 760 | 580 |
| CURRENT | 1.0 | 2.0 | 0.4 | 3.0 | 2.0 | 0.4 | 2.5 | 3.0 | 2.0 | 0.4 |
| SEND | 2-3 | 3-4 | 4-5 | 5-6 | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 22.5-30 W | | | | | 30-37.5 | W | | | |
| RANGE | 10×140 | 10×250 | 10×300 | 10×200 | 10×40 | 10×40 | 10×140 | 10×250 | 10×300 | 10×200 |
| VOLTAGE | 800 | 800 | 850 | 760 | 580 | 640 | 800 | 800 | 850 | 760 |
| CURRENT | 1.4 | 2.5 | 3.0 | 2.0 | 0.4 | 0.4 | 1.4 | 2.5 | 3.0 | 2.0 |

FREQUENCIES 3.0 0.3

SENDER NO. 6644-5

OPERATOR Al Gotmer

RECEIVER NO. 2069-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463 PAGE 2

LINE 27 HALF W SP. 1 DATE 11-21-70

| SEND | 6-7 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | — | 32.5-45 | w | ——— | ——→ | | 45-52.5 | w | — | |
| RANGE | 10×40 | 10×40 | 10×140 | 10×250 | 10×300 | 10×200 | 10×40 | 10×140 | 10×250 | 10×250 |
| VOLTAGE | 580 | 620 | 780 | 780 | 840 | 750 | 620 | 780 | 760 | 680 |
| CURRENT | 0.4 | 0.4 | 1.4 | 2.5 | 3.0 | 2.0 | 0.4 | 1.4 | 2.5 | 2.5 |

| SEND | F-2 | 2-3 | 3-4 | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 52.5-60w | | — | | | | | | | |
| RANGE | 10×40 | 10×140 | 10×250 | | | | | | | |
| VOLTAGE | 620 | 780 | 760 | | | | | | | |
| CURRENT | 0.4 | 1.4 | 2.5 | | | | | | | |

FREQUENCIES 3.0 0.3

SENDER NO. 6644-S

OPERATOR Al Gotner

RECEIVER NO. 20692-R

OPERATOR Bill Freeman

COMMENTS:

623 2505

JOB 463 LINE 27 SP1 SE 1/2 11/20/70 — 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.500 | 0.00 | 3.00 | .30 | 0.0000 | 1.0256 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 191.27 | .90 | 4.7 | .90 | 4.7 | 0.00 | ** | .90 | 1.40 | 1 | 1 | 115.000 | 0.00 |
| 2 | 2 | 382.62 | 1.10 | 2.9 | 1.10 | 2.9 | 0.00 | ** | 1.10 | .50 | 2 | 2 | 20.500 | 0.00 |
| 3 | 1 | 219.09 | 1.00 | 4.6 | 1.00 | 4.6 | 0.00 | ** | 1.00 | 2.50 | 3 | 1 | 235.000 | 0.00 |
| 4 | 2 | 174.82 | 1.20 | 6.9 | 1.20 | 6.9 | 0.00 | ** | 1.20 | 1.40 | 4 | 2 | 26.200 | 0.00 |
| 5 | 3 | 253.69 | 1.60 | 6.3 | 1.52 | 6.0 | .08 | ** | 1.60 | .50 | 5 | 3 | 5.410 | 0.00 |
| 6 | 1 | 306.44 | .60 | 2.0 | .60 | 2.0 | 0.00 | ** | .60 | 3.00 | 6 | 1 | 396.000 | 0.00 |
| 7 | 2 | 296.07 | 1.50 | 5.1 | 1.50 | 5.1 | 0.00 | ** | 1.50 | 2.50 | 7 | 2 | 79.000 | 0.00 |
| 8 | 3 | 334.30 | .90 | 2.7 | .90 | 2.7 | 0.00 | ** | .90 | 1.40 | 8 | 3 | 20.100 | 0.00 |
| 9 | 4 | 448.23 | 1.80 | 4.0 | 1.80 | 4.0 | 0.00 | ** | 1.80 | .50 | 9 | 4 | 4.770 | 0.00 |
| 10 | 1 | 388.47 | .50 | 1.3 | .50 | 1.3 | 0.00 | ** | .50 | 2.00 | 10 | 1 | 335.000 | 0.00 |
| 11 | 2 | 517.96 | .80 | 1.5 | .80 | 1.5 | 0.00 | ** | .80 | 3.00 | 11 | 2 | 167.000 | 0.00 |
| 12 | 3 | 462.81 | 1.70 | 3.7 | 1.70 | 3.7 | 0.00 | ** | 1.70 | 2.50 | 12 | 3 | 49.300 | 0.00 |
| 13 | 4 | 562.71 | 1.00 | 1.8 | 1.00 | 1.8 | 0.00 | ** | 1.00 | 1.40 | 13 | 4 | 16.900 | 0.00 |
| 14 | 5 | 699.68 | 1.20 | 1.7 | 1.20 | 1.7 | 0.00 | ** | 1.20 | .50 | 14 | 5 | 4.280 | 0.00 |
| 15 | 1 | 424.88 | .50 | 1.2 | .50 | 1.2 | 0.00 | ** | .50 | .50 | 15 | 1 | 91.600 | 0.00 |
| 16 | 2 | 123.14 | .30 | 2.4 | .21 | 1.7 | .09 | ** | .30 | 2.00 | 16 | 2 | 26.600 | 0.00 |
| 17 | 3 | 204.90 | .90 | 4.4 | .79 | 3.9 | .11 | ** | .90 | 3.00 | 17 | 3 | 26.400 | 0.00 |
| 18 | 4 | 213.41 | 1.40 | 6.6 | 1.21 | 5.7 | .19 | ** | 1.40 | 2.50 | 18 | 4 | 11.400 | 0.00 |
| 19 | 5 | 296.88 | .90 | 3.0 | .70 | 2.3 | .20 | ** | .90 | 1.40 | 19 | 5 | 5.100 | 0.00 |
| 20 | 6 | 365.83 | 1.10 | 3.0 | .87 | 2.4 | .23 | ** | 1.10 | .50 | 20 | 6 | 1.400 | 0.00 |
| 21 | 2 | 461.99 | .50 | 1.1 | .50 | 1.1 | 0.00 | ** | .50 | .50 | 21 | 2 | 24.900 | 0.00 |
| 22 | 3 | 148.00 | 1.00 | 6.8 | .83 | 5.6 | .17 | ** | 1.00 | 2.00 | 22 | 3 | 12.700 | 0.00 |
| 23 | 4 | 251.16 | 1.40 | 5.6 | 1.25 | 5.0 | .15 | ** | 1.40 | 3.00 | 23 | 4 | 16.100 | 0.00 |
| 24 | 5 | 264.95 | 2.00 | 7.5 | 1.76 | 6.7 | .24 | ** | 2.00 | 2.50 | 24 | 5 | 8.040 | 0.00 |
| 25 | 6 | 384.70 | 1.40 | 3.6 | 1.18 | 3.1 | .22 | ** | 1.40 | 1.40 | 25 | 6 | 4.110 | 0.00 |
| 26 | 3 | 490.91 | .70 | 1.4 | .70 | 1.4 | 0.00 | ** | .70 | .40 | 26 | 3 | 8.450 | 0.00 |
| 27 | 4 | 159.11 | .80 | 5.0 | .51 | 3.2 | .29 | ** | .80 | 2.00 | 27 | 4 | 6.840 | 0.00 |
| 28 | 5 | 147.55 | 1.30 | 8.8 | .77 | 5.2 | .53 | ** | 1.30 | 3.00 | 28 | 5 | 5.410 | 0.00 |
| 29 | 6 | 424.77 | 1.70 | 4.0 | 1.51 | 3.6 | .19 | ** | 1.70 | 2.50 | 29 | 6 | 8.080 | 0.00 |
| 30 | 4 | 260.79 | .90 | 3.5 | .76 | 2.9 | .14 | ** | .90 | .40 | 30 | 4 | 2.240 | 0.00 |
| 31 | 5 | 81.41 | 1.30 | 16.0 | .12 | 1.5 | 1.18 | ** | 1.30 | 2.00 | 31 | 5 | 1.990 | 0.00 |
| 32 | 6 | 145.89 | 1.40 | 9.6 | .58 | 4.0 | .82 | ** | 1.40 | 3.00 | 32 | 6 | 3.340 | 0.00 |

BUSINESS FORMS PRINTING COMPANY BLUE RIDGE SUMMIT ENGINEERED FOR HIGH SPEED PRINTERS

JOB 463 LINE 27 SP1 NW 1/2 11/21/70 750 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | -.10 | 97.800 | 0.00 | 3.00 | .30 | -.1000 | 1.0225 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 218.85 | 1.20 | 5.5 | 1.20 | 5.5 | 0.00 | ** | 1.10 | 2.00 | 1 | 1 | 188.000 | 0.00 |
| 2 | 2 | 290.41 | 1.80 | 6.2 | 1.80 | 6.2 | 0.00 | ** | 1.70 | .40 | 2 | 2 | 12.400 | 0.00 |
| 3 | 1 | 213.84 | 1.40 | 6.5 | 1.40 | 6.5 | 0.00 | ** | 1.30 | 3.00 | 3 | 1 | 275.000 | 0.00 |
| 4 | 2 | 182.43 | 1.40 | 7.7 | 1.40 | 7.7 | 0.00 | ** | 1.30 | 2.00 | 4 | 2 | 39.100 | 0.00 |
| 5 | 3 | 330.42 | 1.50 | 4.5 | 1.50 | 4.5 | 0.00 | ** | 1.40 | .40 | 5 | 3 | 5.660 | 0.00 |
| 6 | 1 | 384.83 | 1.50 | 3.9 | 1.50 | 3.9 | 0.00 | ** | 1.40 | 2.50 | 6 | 1 | 412.000 | 0.00 |
| 7 | 2 | 402.43 | 1.70 | 4.2 | 1.70 | 4.2 | 0.00 | ** | 1.60 | 3.00 | 7 | 2 | 129.000 | 0.00 |
| 8 | 3 | 262.96 | 1.60 | 6.1 | 1.60 | 6.1 | 0.00 | ** | 1.50 | 2.00 | 8 | 3 | 22.500 | 0.00 |
| 9 | 4 | 467.89 | 2.20 | 4.7 | 2.20 | 4.7 | 0.00 | ** | 2.10 | .40 | 9 | 4 | 3.980 | 0.00 |
| 10 | 1 | 387.48 | 1.20 | 3.1 | 1.20 | 3.1 | 0.00 | ** | 1.10 | 1.40 | 10 | 1 | 233.000 | 0.00 |
| 11 | 2 | 373.62 | 1.50 | 4.0 | 1.50 | 4.0 | 0.00 | ** | 1.40 | 2.50 | 11 | 2 | 100.000 | 0.00 |
| 12 | 3 | 327.10 | 1.80 | 5.5 | 1.80 | 5.5 | 0.00 | ** | 1.70 | 3.00 | 12 | 3 | 41.900 | 0.00 |
| 13 | 4 | 198.76 | 1.40 | 7.0 | 1.19 | 6.0 | .21 | ** | 1.30 | 2.00 | 13 | 4 | 8.520 | 0.00 |
| 14 | 5 | 364.66 | 1.20 | 3.3 | 1.05 | 2.9 | .15 | ** | 1.10 | .40 | 14 | 5 | 1.790 | 0.00 |
| 15 | 1 | 252.52 | .70 | 2.8 | .70 | 2.8 | 0.00 | ** | .60 | .40 | 15 | 1 | 43.600 | 0.00 |
| 16 | 2 | 372.65 | 1.60 | 4.3 | 1.60 | 4.3 | 0.00 | ** | 1.50 | 1.40 | 16 | 2 | 55.800 | 0.00 |
| 17 | 3 | 314.14 | 1.90 | 6.0 | 1.90 | 6.0 | 0.00 | ** | 1.80 | 2.50 | 17 | 3 | 33.500 | 0.00 |
| 18 | 4 | 257.07 | 2.20 | 8.6 | 2.05 | 8.0 | .15 | ** | 2.10 | 3.00 | 18 | 4 | 16.400 | 0.00 |
| 19 | 5 | 148.54 | 2.20 | 14.8 | 1.67 | 11.3 | .53 | ** | 2.10 | 2.00 | 19 | 5 | 3.610 | 0.00 |
| 20 | 6 | 248.60 | .50 | 2.0 | .10 | .4 | .40 | ** | .40 | .40 | 20 | 6 | .768 | 0.00 |
| 21 | 2 | 123.29 | 1.50 | 12.2 | 1.41 | 11.4 | .09 | ** | 1.40 | .40 | 21 | 2 | 5.280 | 0.00 |
| 22 | 3 | 165.12 | 1.60 | 9.7 | 1.46 | 8.8 | .14 | ** | 1.50 | 1.40 | 22 | 3 | 9.890 | 0.00 |
| 23 | 4 | 127.84 | 1.70 | 13.3 | 1.31 | 10.3 | .39 | ** | 1.60 | 2.50 | 23 | 4 | 6.830 | 0.00 |
| 24 | 5 | 99.85 | 2.20 | 22.0 | 1.30 | 13.0 | .90 | ** | 2.10 | 3.00 | 24 | 5 | 3.640 | 0.00 |
| 25 | 6 | 55.07 | 2.50 | 45.4 | -.43 | -7.8 | 2.93 | ** | 2.40 | 2.00 | 25 | 6 | .834 | 0.00 |
| 26 | 3 | 158.67 | 1.80 | 11.3 | 1.65 | 10.4 | .15 | ** | 1.70 | .40 | 26 | 3 | 2.710 | 0.00 |
| 27 | 4 | 187.39 | 2.00 | 10.7 | 1.77 | 9.5 | .23 | ** | 1.90 | 1.40 | 27 | 4 | 5.590 | 0.00 |
| 28 | 5 | 134.10 | 2.30 | 17.2 | 1.70 | 12.6 | .60 | ** | 2.20 | 2.50 | 28 | 5 | 4.070 | 0.00 |
| 29 | 6 | 100.79 | 2.40 | 23.8 | 1.06 | 10.5 | 1.34 | ** | 2.30 | 2.50 | 29 | 6 | 1.910 | 0.00 |
| 30 | 4 | 314.93 | 1.40 | 4.4 | 1.29 | 4.1 | .11 | ** | 1.30 | .40 | 30 | 4 | 2.700 | 0.00 |
| 31 | 5 | 362.88 | 1.60 | 4.4 | 1.45 | 4.0 | .15 | ** | 1.50 | 1.40 | 31 | 5 | 6.210 | 0.00 |
| 32 | 6 | 251.81 | 1.80 | 7.1 | 1.41 | 5.6 | .39 | ** | 1.70 | 2.50 | 32 | 6 | 4.800 | 0.00 |

ENGINEERED FOR HIGH SPEED PRINTERS
BUSINESS FORMS PRINTING COMPANY BLUE SPACE PAK

J66 463, LINE 28, Sp 1, N½, 11/24/30 1000.

1 ¢ 0.1 Hz  2 = 1000'

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 28 HALF N SP. 1 DATE 11-24-70

PAGE 1

| SEND | CAL | 1-2 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 2-3 (1) | 0-10N | 10-20N | → | 20-30N | → | → | 30-40N | → | → |
| RANGE 3Hz | 1.0 | 0.1 | 1.0 | 0.1 | 1.0 | 1.0 | 0.1 | 10 | 1.0 | 0.1 |
| DC 1 | 98.8 8.0 | 1.3 | 0.8 | 1.3 | 1.1 | 0.9 | 1.9 | 1.1 | 1.2 | 1.4 |
| DC 2 1Hz | -0.2 | | | | | | | | | |
| DC 3 0.3 Hz | -0.2 | | | | | | | | | |
| DC 4 0.1 Hz | 0.0 | 0.5 | 3.5 | 0.5 | 4 | 3.5 | .5 | 6 | 4 | 3.5 |
| DC 5 Dev. | 0.0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 4 |
| DC 6 | | 1 | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 |
| DC 7 | | | | | | | | | | |
| DC 8 1Hz | 98.0 | | | | | | | | | |
| DC AVG 0.1 Hz | 0.0 | | | | | | | | | |
| AC 1 | 98.0 | 6.02 | 43.1 | 1.82 | 71.8 | 14.7 | 1.04 | 112. | 28.7 | 8.72 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | 1.0 | -13.9 | +18.3 | | + 5.1 | | | +1.0 | | |
| AC NOISE | 0.1 | | | | | | | | | |
| POT RES. | | 3K | 3.5K | | 8K | | | 3K | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # A63
LINE 28 HALF N SP. 1 DATE 11-24-76



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | | | | | | | | | |
| RECEIVE | 30-40N | | | | | | | | | |
| RANGE | 0.01 | | | | | | | | | |
| DC 1 | 2.1 | | | | | | | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 CW | .5 | | | | | | | | | |
| DC 5 # | 10 | | | | | | | | | |
| DC 6 # | 4 | | | | | | | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 0.761 | | | | | | | | | |
| AC 2 | 0.0 | | | | | | | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | | | | | | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | | | | | | | | | | |

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 28 HALF N SP. 1 DATE 11-24-76

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 |
| RECEIVE | 40-50N | — | — | — | → | 50-60N | — | — | — | → |
| RANGE | 1.0 | 1.0 | 1.0 | 0.1 | 0.01 | 1.0 | 1.0 | 0.1 | 0.1 | 0.01 |
| DC 1 | 1.0 | 1.3 | 1.6 | 2.3 | 2.6 | 1.4 | 1.6 | 1.9 | 2.9 | 3.1 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cur | 4 | 6 | 4 | 3.5 | .5 | 4 | 6 | 4 | 3.5 | .5 |
| DC 5 # | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| DC 6 # | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 72.9 | 27.0 | 11.9 | 4.38 | 0.466 | 23.4 | 14.7 | 7.72 | 3.14 | 0.366 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | +4.6 | | | | | +9.0 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 5K | | | | | 18K | | | | |

OVER!!

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 28 HALF N SP. 1 DATE 11-24-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | | |
| RECEIVE | 60-70 N | → | → | → | 70-80 N | → | → | | | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | | | |
| DC 1 | 1.3 | 1.4 | 2.1 | 2.6 | 1.4 | 1.9 | 2.4 | | | |
| DC 2 | | | | | | | N | OVER | | |
| DC 3 | | | | | | | | | | |
| DC 4 Sm | 4 | 6 | 4 | 3.5 | 4 | 6 | 4 | | | |
| DC 5 # | 21 | 22 | 23 | 24 | 25 | 26 | 27 | | | |
| DC 6 M | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 9.05 | 6.86 | 3.91 | 1.67 | 3.22 | 2.75 | 1.65 | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | +8.0 | | | | +9.1 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 12K | | | | 30K | | | | | |

# FREQ CHECK

5-6
70-80

| | |
|---|---|
| 3Hz | 3.17 |
| 1 Hz | 1.8 |
| 03 Hz | 2.8 |
| 0.1 | 3.7 |
| | 0.0 |

3-4
70-80

| | |
|---|---|
| 1.60 = | 3 Hz |
| 3.8 | 1 Hz |
| 6.1 | 0.3 Hz |
| 8.7 | 0.1 Hz |

0.0

GOOD CASE OF COUPLING!

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463 PAGE 2

LINE 2-8 HALF N SP. 1 DATE 11-24-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 5-6 | 4-5 | 3-4 | | |
| RECEIVE | — | 60 — | 70 N | — | — | 70 — | 80 N | — | | |
| RANGE | 10×50 | 30×133 | 30×200 | 30×133 | 10×50 | 30×133 | 30×200 | 30×132 | | |
| VOLTAGE | 550 | 570 | 400 | 420 | 740 | 560 | 380 | 420 | | |
| CURRENT | 0.5 | 4.0 | 6.0 | 4.0 | 3.5 | 4.0 | 6.0 | 4.0 | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 1.0 0.1

SENDER NO. 6644-5

OPERATOR Al Gotmer

RECEIVER NO. 2693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 28 HALF N SP. 1 DATE 11-24-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Cal | 1-2 | 2-3 | 1-2 | 3-4 | 2-3 | 1-2 | 4-5 | 3-4 | 2-3 |
| RECEIVE | 2-3 | 0-10N | 10-20N | — | 20-30N | — | — | 30-40N | — | — |
| RANGE | 10x100 | 10x50 | 10x350 | 10x50 | 30x133 | 10x350 | 10x50 | 30x200 | 30x133 | 10x350 |
| VOLTAGE | 210 | 550 | 750 | 550 | 450 | 750 | 550 | 400 | 440 | 750 |
| CURRENT | 1.0 | 0.5 | 3.5 | 0.5 | 4.0 | 3.5 | 0.5 | 6.0 | 4.0 | 3.5 |
| SEND | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 | 1-2 | 5-6 | 4-5 | 3-4 | 2-3 |
| RECEIVE | — | 40-50N | — | — | — | — | 50-60N | — | — | — |
| RANGE | 10x50 | 10x133 | 30x200 | 30x133 | 10x350 | 10x50 | 30x133 | 30x200 | 30x133 | 10x350 |
| VOLTAGE | 550 | 600 | 400 | 440 | 750 | 550 | 600 | 400 | 420 | 740 |
| CURRENT | 0.5 | 4.0 | 6.0 | 4.0 | 3.5 | 0.5 | 4.0 | 6.0 | 4.0 | 3.5 |

FREQUENCIES 1.0 0.1

SENDER NO. 644-5

OPERATOR Al Gotmer

RECEIVER NO. 2069-P

OPERATOR

COMMENTS:

Job 463, Line 28, Sp 1, 5½, 11/25/70 1000.

STA 20S IN LIMESTONE
S.P. shift

PAGE 1

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE #463
LINE 28 HALF S SP. 1 DATE 11-25-70

| SEND | CAL 2 | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
|---|---|---|---|---|---|---|---|---|---|---|
| RECEIVE | 3-4 | 0-10S | → | 10-20S | → | → | 20-30S | → | → | → |
| RANGE | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 0.1 | 10 | 1.0 | 1.0 | 1.0 |
| DC 1 | 0.0 | 1.0 | 0.9 | 1.2 | 1.4 | 1.5 | 0.8 | 1.3 | 1.6 | 1.7 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cm | 1.0 | 6 | 4 | 4 | 6 | 4 | 3.5 | 4 | 6 | 4 |
| DC 5 # | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| DC 6 " | | 1 | 2 | 1 | 2 | 3 | 1 | 2 | 3 | 4 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 97.6 | 71.1 | 17.5 | 38.3 | 15.6 | 6.25 | 110. | 40.5 | 25.6 | 11.4 |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | 1.0 | +8.2 | | -102.2 | | | -15.9 | | | |
| AC NOISE | 0.1 | | | | | | | | | |
| POT RES. | | 30K | | 20K | | | 50K | | | |

STA. 30 S Beside Cienega (30')

OVER

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 28 HALF S SP. 1 DATE 11-25-70



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 30-40s | → | → | → | → | 40-50s | → | → | → | → |
| RANGE | 1.0 | 1.0 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 |
| DC 1 | 1.4 | 1.5 | 1.7 | 1.8 | 3.2 | 1.1 | 1.5 | 2.1 | 2.6 | 5.2 |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Con | .5 | 3.5 | 4 | 6 | 4 | .5 | 3.5 | 4 | 6 | 3 |
| DC 5 # | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| DC 6 " | 1 | 2 | 3 | 4 | 5 | 2 | 3 | 4 | 5 | 6 |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 23.3 | 14.0 | 8.73 | 6.69 | 3.18 | 5.42 | 5.04 | 3.87 | 3.31 | 1.26 |
| AC 2 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| AC AVG. | | | | | | | | | | |
| S.P. | −0.0 | | | | | +4.2 | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 30 K | | | | | 30 K | | | | |

5-6
30-40

3Hz 3.08

1Hz

0.3Hz 5.3

I = 4 amp ↑

FINALLY
Lost
A amp switch
- had to 5 amp
to

I = 3 amp

5-6
30-40

3Hz 2.34

1Hz 3.0

0.3Hz 5.3

0.1Hz 8.7

Dev. 0.0

5-6
40-50

3Hz 1.16

1Hz 4.7

0.3 8.6

0.1Hz 10.5

Dev.

MAXIMUM DAMPING TIME 120 sec.

PAGE 3

HEINRICHS GEOEXPLORATION CO.
I.P. RECEIVER NOTES

PROJECT EMPIRE # 463
LINE 28 HALF S SP. / DATE 11-25-70

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | |
| RECEIVE | 50-60 | S → | → | → | 60-70 | S → | → | | | |
| RANGE | 0.1 | 0.1 | 0.1 | 0.1 | 0.01 | 0.1 | 0.1 | | | |
| DC 1 | 1.7 | 1.9 | 4.1 | 4.6 | 1.9 | 5.8 | 7.4 | | | |
| DC 2 | | | | | | | | | | |
| DC 3 | | | | | | | | | | |
| DC 4 Cum | .5 | 3.5 | 4 | 6 | .5 | 3.5 | 4 | | | |
| DC 5 # | 20 | 21 | 22 | 23 | 24 | 25 | 26 | | | |
| DC 6 " | 3 | 4 | 5 | 6 | 4 | 5 | 6 | | | |
| DC 7 | | | | | | | | | | |
| DC 8 | | | | | | | | | | |
| DC AVG. | | | | | | | | | | |
| AC 1 | 2.73 | 2.87 | 2.42 | 2.18 | 0.978 | 1.22 | 1.17 | | | |
| AC 2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | | | |
| AC AVG. | | | | | | | | | | |
| S.P. | -2.6 | | | | ±25.7 | | | | | |
| AC NOISE | | | | | | | | | | |
| POT RES. | 20K | | | | 20K | | | | | |

3-4

| | 60-70 |
|---|---|
| 3 Hz | 1.10 |
| 1 Hz | 6.0 |
| 0.3 Hz | 8.5 |
| 0.1 Hz | 13.5 |
| | 0.0 |

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463

LINE 28 HALF S SP. / DATE 11-25-74

PAGE 1

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | Cal | 4-5 | 5-6 | 3-4 | 4-5 | 5-6 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 3-4 | 0-10s | — | 10-20s | — | — | 20-30s | — | — | — |
| RANGE | 10x100 | 30x200 | 30x133 | 30x133 | 30x200 | 30x133 | 10x350 | 30x133 | 30x200 | 30x133 |
| VOLTAGE | 180 | 380 | 600 | 420 | 380 | 580 | 750 | 400 | 380 | 580 |
| CURRENT | 1.0 | 6.0 | 4.0 | 4.0 | 6.0 | 4.0 | 3.5 | 4.0 | 6.0 | 4.0 |
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 | 1-2 | 2-3 | 3-4 | 4-5 | 5-6 |
| RECEIVE | 30-40s | — | — | — | > | 40-50s | — | — | — | > |
| RANGE | 10x50 | 10x350 | 30x133 | 30x200 | 30x100 | 10x50 | 10x350 | 30x133 | 30x200 | 30x100 |
| VOLTAGE | 550 | 720 | 400 | 390 | 450 | 550 | 680 | 420 | 400 | 440 |
| CURRENT | 0.5 | 3.5 | 4.0 | 6.0 | 4.0 | 0.5 | 3.5 | 4.0 | 6.0 | 3.0 |

FREQUENCIES 1.0 1.1

SENDER NO. 6645

OPERATOR Al Gotmer

RECEIVER NO. 2693-R

OPERATOR Bill Freeman

COMMENTS:

HEINRICHS GEOEXPLORATION CO.

# I. P. SENDER NOTES

PROJECT Empire #463 LINE 28 HALF S SP. 1 DATE 11-25-74



| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| SEND | 1-2 | 2-3 | 3-4 | 4-5 | 1-2 | 2-3 | 3-4 | | | |
| RECEIVE | 56-60S | | | | 60-70S | | | | | |
| RANGE | 10×50 | 10×350 | 30×133 | 30×200 | 10×50 | 10×350 | 30×133 | | | |
| VOLTAGE | 550 | 680 | 420 | 400 | 550 | 660 | 420 | | | |
| CURRENT | 0.5 | 3.5 | 4.0 | 6.0 | 0.5 | 3.5 | 4.0 | | | |
| SEND | | | | | | | | | | |
| RECEIVE | | | | | | | | | | |
| RANGE | | | | | | | | | | |
| VOLTAGE | | | | | | | | | | |
| CURRENT | | | | | | | | | | |

FREQUENCIES 40 0.1

SENDER NO. 6644S

OPERATOR Al Gotmer

RECEIVER NO. 2693-R

OPERATOR Bill Freeman

COMMENTS:

JOB 463 LINE 28 SP1 N 1/2 11/24/70 1000 FEET=DIPOLE LENGTH
CAL GROUP NO. 1

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 98.000 | 0.00 | 1.00 | .10 | 0.0000 | 1.0204 |

| | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 37.34 | 1.30 | 34.8 | 1.24 | 33.1 | .06 | ** | 1.30 | .50 | 1 | 1 | 6.020 | 0.00 |
| 2 | 1 | 38.00 | .80 | 21.1 | .74 | 19.4 | .06 | ** | .80 | 3.50 | 2 | 1 | 43.100 | 0.00 |
| 3 | 2 | 45.15 | 1.30 | 28.8 | 1.12 | 24.8 | .18 | ** | 1.30 | .50 | 3 | 2 | 1.820 | 0.00 |
| 4 | 1 | 55.55 | 1.10 | 19.8 | 1.10 | 19.8 | 0.00 | ** | 1.10 | 4.00 | 4 | 1 | 71.800 | 0.00 |
| 5 | 2 | 51.89 | .90 | 17.3 | .75 | 14.5 | .15 | ** | .90 | 3.50 | 5 | 2 | 14.700 | 0.00 |
| 6 | 3 | 64.88 | 1.90 | 29.3 | 1.65 | 25.4 | .25 | ** | 1.90 | .50 | 6 | 3 | 1.040 | 0.00 |
| 7 | 1 | 57.77 | 1.10 | 19.0 | 1.10 | 19.0 | 0.00 | ** | 1.10 | 6.00 | 7 | 1 | 112.000 | 0.00 |
| 8 | 2 | 88.91 | 1.20 | 13.5 | 1.20 | 13.5 | 0.00 | ** | 1.20 | 4.00 | 8 | 2 | 28.700 | 0.00 |
| 9 | 3 | 77.34 | 1.40 | 18.1 | 1.20 | 15.5 | .20 | ** | 1.40 | 3.50 | 9 | 3 | 8.720 | 0.00 |
| 10 | 4 | 95.14 | 2.10 | 22.1 | 1.82 | 19.1 | .28 | ** | 2.10 | .50 | 10 | 4 | .761 | 0.00 |
| 11 | 1 | 56.35 | 1.00 | 17.7 | 1.00 | 17.7 | 0.00 | ** | 1.00 | 4.00 | 11 | 1 | 72.900 | 0.00 |
| 12 | 2 | 55.82 | 1.30 | 23.3 | 1.17 | 20.9 | .13 | ** | 1.30 | 6.00 | 12 | 2 | 27.000 | 0.00 |
| 13 | 3 | 92.53 | 1.60 | 17.3 | 1.45 | 15.6 | .15 | ** | 1.60 | 4.00 | 13 | 3 | 11.900 | 0.00 |
| 14 | 4 | 78.38 | 2.30 | 29.3 | 1.93 | 24.6 | .37 | ** | 2.30 | 3.50 | 14 | 4 | 4.380 | 0.00 |
| 15 | 5 | 102.45 | 2.60 | 25.4 | 2.17 | 21.2 | .43 | ** | 2.60 | .50 | 15 | 5 | .466 | 0.00 |
| 16 | 2 | 72.64 | 1.40 | 19.3 | 1.31 | 18.0 | .09 | ** | 1.40 | 4.00 | 16 | 2 | 23.400 | 0.00 |
| 17 | 3 | 76.20 | 1.60 | 21.0 | 1.40 | 18.3 | .20 | ** | 1.60 | 6.00 | 17 | 3 | 14.700 | 0.00 |
| 18 | 4 | 120.41 | 1.90 | 15.8 | 1.70 | 14.1 | .20 | ** | 1.90 | 4.00 | 18 | 4 | 7.720 | 0.00 |
| 19 | 5 | 98.91 | 2.90 | 29.3 | 2.45 | 24.8 | .45 | ** | 2.90 | 3.50 | 19 | 5 | 3.140 | 0.00 |
| 20 | 6 | 129.38 | 3.10 | 24.0 | 2.62 | 20.3 | .48 | ** | 3.10 | .50 | 20 | 6 | .366 | 0.00 |
| 21 | 3 | 70.16 | 1.30 | 18.5 | 1.07 | 15.3 | .23 | ** | 1.30 | 4.00 | 21 | 3 | 9.050 | 0.00 |
| 22 | 4 | 70.98 | 1.40 | 19.7 | .98 | 13.8 | .42 | ** | 1.40 | 6.00 | 22 | 4 | 6.860 | 0.00 |
| 23 | 5 | 106.93 | 2.10 | 19.6 | 1.70 | 15.9 | .40 | ** | 2.10 | 4.00 | 23 | 5 | 3.910 | 0.00 |
| 24 | 6 | 83.92 | 2.60 | 31.0 | 1.74 | 20.8 | .86 | ** | 2.60 | 3.50 | 24 | 6 | 1.670 | 0.00 |
| 25 | 4 | 49.98 | 1.40 | 28.0 | .72 | 14.4 | .68 | ** | 1.40 | 4.00 | 25 | 4 | 3.220 | 0.00 |
| 26 | 5 | 50.04 | 1.90 | 38.0 | .78 | 15.6 | 1.12 | ** | 1.90 | 6.00 | 26 | 5 | 2.750 | 0.00 |
| 27 | 6 | 72.41 | 2.40 | 33.1 | 1.36 | 18.8 | 1.04 | ** | 2.40 | 4.00 | 27 | 6 | 1.650 | 0.00 |

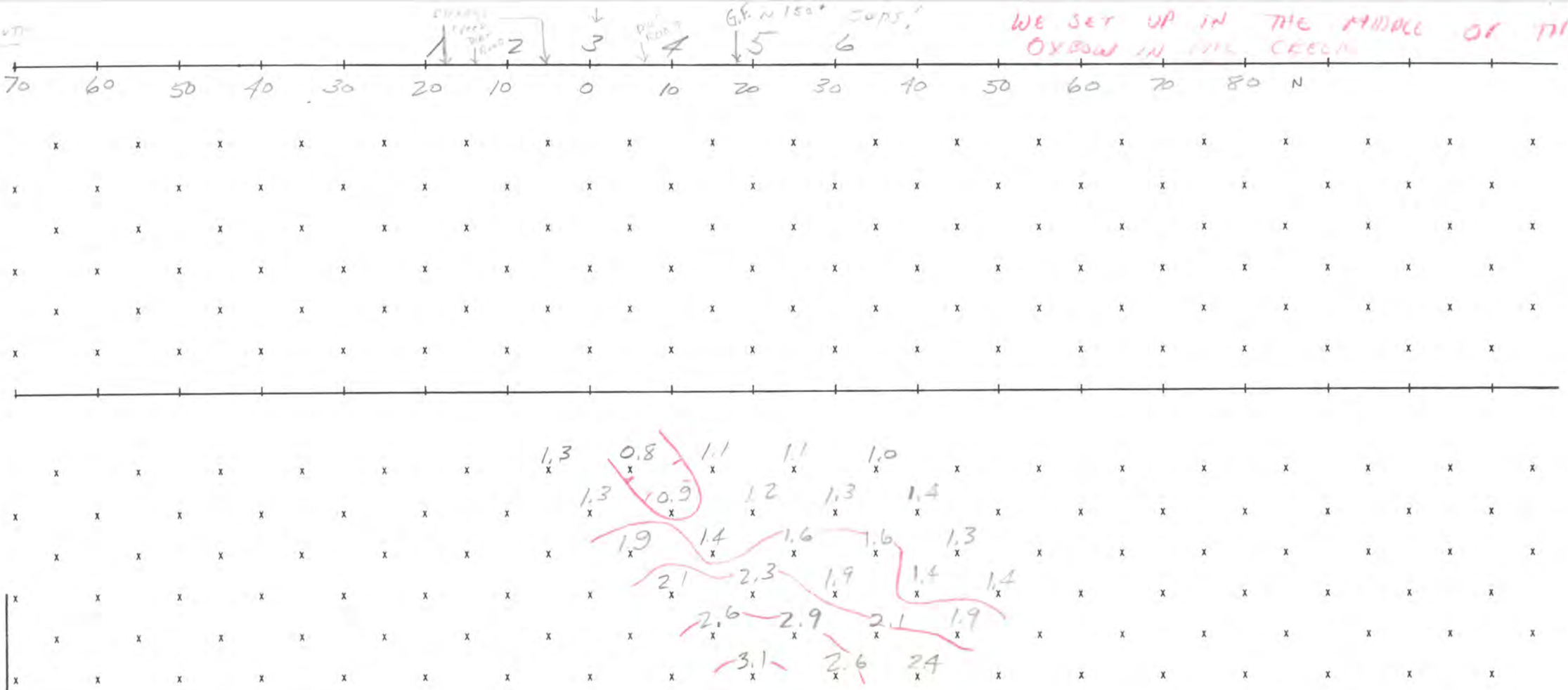
ENGINEERED FOR HIGH SPEED PRINTERS
BUSINESS FORMS PRINTING COMPANY BLUE SPACE BAR

JOB 463 LINE 28 SP 1 S 1/2 11/25/70 1000 FEET=DIPOLE LENGTH
CAL GROUP NO. 2

| CAL CUR | PFE | AC1 | AC2 | AC FREQ | DC FREQ | PFE CAL | RHO CAL |
|---|---|---|---|---|---|---|---|
| 1.000 | 0.00 | 97.600 | 0.00 | 1.00 | .10 | 0.0000 | 1.0246 |

| | | COMPUTED DATA | | | | | | | FIELD DATA | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| POINT NO. | N | RHO | PFE | MCF | CCPFE | CCMCF | CPFE | | PFE | CUR | PT. | N | AC1 | AC2 |
| 1 | 1 | 36.79 | 1.00 | 27.2 | .94 | 25.4 | .06 | ** | 1.00 | 6.00 | 1 | 1 | 71.100 | 0.00 |
| 2 | 2 | 54.28 | .90 | 16.6 | .76 | 14.0 | .14 | ** | .90 | 4.00 | 2 | 2 | 17.500 | 0.00 |
| 3 | 1 | 29.78 | 1.20 | 40.3 | 1.11 | 37.4 | .09 | ** | 1.20 | 4.00 | 3 | 1 | 38.300 | 0.00 |
| 4 | 2 | 32.41 | 1.40 | 43.2 | 1.12 | 34.4 | .28 | ** | 1.40 | 6.00 | 4 | 2 | 15.600 | 0.00 |
| 5 | 3 | 48.75 | 1.50 | 30.8 | 1.12 | 23.0 | .38 | ** | 1.50 | 4.00 | 5 | 3 | 6.250 | 0.00 |
| 6 | 1 | 97.38 | .80 | 8.2 | .80 | 8.2 | 0.00 | ** | .80 | 3.50 | 6 | 1 | 110.000 | 0.00 |
| 7 | 2 | 126.11 | 1.30 | 10.3 | 1.30 | 10.3 | 0.00 | ** | 1.30 | 4.00 | 7 | 2 | 40.500 | 0.00 |
| 8 | 3 | 133.25 | 1.60 | 12.0 | 1.51 | 11.3 | .09 | ** | 1.60 | 6.00 | 8 | 3 | 25.600 | 0.00 |
| 9 | 4 | 178.18 | 1.70 | 9.5 | 1.58 | 8.9 | .12 | ** | 1.70 | 4.00 | 9 | 4 | 11.400 | 0.00 |
| 10 | 1 | 145.24 | 1.40 | 9.6 | 1.40 | 9.6 | 0.00 | ** | 1.40 | .50 | 10 | 1 | 23.300 | 0.00 |
| 11 | 2 | 49.92 | 1.50 | 30.0 | 1.34 | 26.9 | .16 | ** | 1.50 | 3.50 | 11 | 2 | 14.000 | 0.00 |
| 12 | 3 | 68.23 | 1.70 | 24.9 | 1.46 | 21.4 | .24 | ** | 1.70 | 4.00 | 12 | 3 | 8.730 | 0.00 |
| 13 | 4 | 69.78 | 1.80 | 25.8 | 1.37 | 19.6 | .43 | ** | 1.80 | 6.00 | 13 | 4 | 6.690 | 0.00 |
| 14 | 5 | 88.26 | 3.20 | 36.3 | 2.68 | 30.3 | .52 | ** | 3.20 | 4.00 | 14 | 5 | 3.180 | 0.00 |
| 15 | 2 | 134.74 | 1.10 | 8.2 | 1.10 | 8.2 | 0.00 | ** | 1.10 | .50 | 15 | 2 | 5.420 | 0.00 |
| 16 | 3 | 44.93 | 1.50 | 33.4 | 1.08 | 24.0 | .42 | ** | 1.50 | 3.50 | 16 | 3 | 5.040 | 0.00 |
| 17 | 4 | 60.73 | 2.10 | 34.6 | 1.58 | 25.9 | .52 | ** | 2.10 | 4.00 | 17 | 4 | 3.870 | 0.00 |
| 18 | 5 | 60.89 | 2.60 | 42.7 | 1.74 | 28.5 | .86 | ** | 2.60 | 6.00 | 18 | 5 | 3.310 | 0.00 |
| 19 | 6 | 72.43 | 5.20 | 71.8 | 4.16 | 57.4 | 1.04 | ** | 5.20 | 3.00 | 19 | 6 | 1.200 | 0.00 |
| 20 | 3 | 170.68 | 1.70 | 10.0 | 1.70 | 10.0 | 0.00 | ** | 1.70 | .50 | 20 | 3 | 2.730 | 0.00 |
| 21 | 4 | 51.37 | 1.90 | 37.0 | 1.24 | 24.2 | .66 | ** | 1.90 | 3.50 | 21 | 4 | 2.870 | 0.00 |
| 22 | 5 | 67.76 | 4.10 | 60.5 | 3.35 | 49.5 | .75 | ** | 4.10 | 4.00 | 22 | 5 | 2.420 | 0.00 |
| 23 | 6 | 65.42 | 4.60 | 70.3 | 3.41 | 52.1 | 1.19 | ** | 4.60 | 6.00 | 23 | 6 | 2.180 | 0.00 |
| 24 | 4 | 122.53 | 1.90 | 15.5 | 1.70 | 13.9 | .20 | ** | 1.90 | .50 | 24 | 4 | .978 | 0.00 |
| 25 | 5 | 39.67 | 5.80 | 146.2 | 4.28 | 107.8 | 1.52 | ** | 5.80 | 3.50 | 25 | 5 | 1.220 | 0.00 |
| 26 | 6 | 54.07 | 7.40 | 136.8 | 5.87 | 108.6 | 1.53 | ** | 7.40 | 4.00 | 26 | 6 | 1.170 | 0.00 |

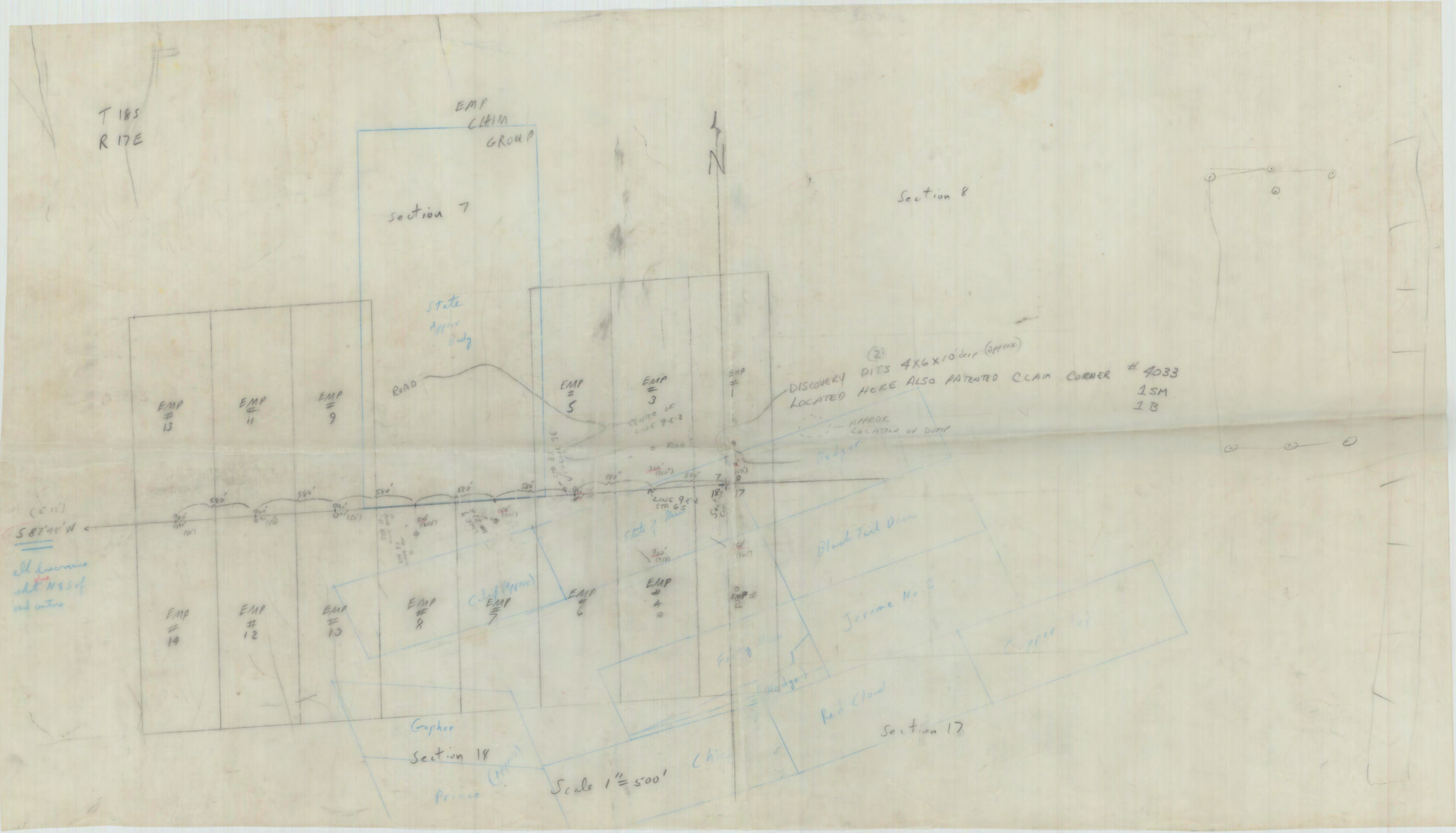
BUSINESS FORMS PRINTING COMPANY ENGINEERED FOR HIGH SPEED PRINTERS




JOB# 463 LINE# 28 SP 1 DATE Nov. 24 1976 FREQUENCIES 1 & 0.1 Hz

CLIENT MIAMI a = 1000' LOOKING WEST

AREA EMPIRE MTS.



T 18S
R 17E
EMP CLAIM GROUP
Section 7
Section 8
State Approx Bndy
ROAD
EMP # 13
EMP # 4
EMP # 9
EMP # 5
EMP # 3
EMP # 1
(2) DISCOVERY PITS 4X6X10' deep (approx.)
LOCATED HERE ALSO PATENTED CLAIM CORNER # 4033
1SM
1B
LOCATION OF DUMP
Badger
LINE 9-E-2
STA 6 S
580'
(2° 12')
S 87°48' W
all discoveries
EMP # 14
EMP # 12
EMP # 10
EMP # 8
EMP # 7
EMP # 6
EMP # 4
EMP # 2
Calif (Approx)
Black Tail Deer
Jerome No. 2
Red Cloud
Gopher
Section 18
Section 17
Prince
Scale 1" = 500'