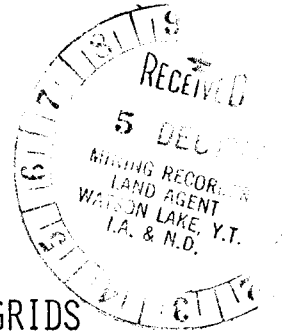


REPORT ON THE MAXMIN II EM SURVEY

ON THE

GARY CLAIM GROUP - NORTH, CENTRAL & SOUTH GRIDS



CLAIMS: Net 2-57, 60Fr, 62Fr, 63Fr, 64-70, 72, 73, 75, 76  
Gary 4, 28-38, 63-75

Watson Lake Mining District, Yukon Territory  
Macmillan Pass Area, N.T.S. 105-O-1  
Lat. 63°04'N Long. 130°15'W

WORK PERIOD: June 8 - July 6: North & Central Grid  
Aug. 7 - Sept.10: South Grid

FOR

OGILVIE JOINT VENTURE

CLAIMS HELD IN TRUST BY

BRITISH NEWFOUNDLAND EXPLORATION LIMITED  
704 - 602 West Hastings Street  
Vancouver, B. C.

By

John E. Betz - John Betz Limited  
Toronto, Ontario

Supervised by: O. S. Hairsine, P.Eng.

CORDILLERAN ENGINEERING LIMITED  
1418 - 355 Burrard Street  
Vancouver, B.C. V6C 2G8

NOVEMBER, 1977



061656

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- EM Profile Sheets  
with Interpreted Conductive Zones
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with Interpreted Conductive Zones  
1" = 500 feet
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with Interpreted Conductive Zones  
1" = 500 feet.

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~~Appendix "E" Affidavit of Expenditures~~

~~Appendix "F" Supervisor's Certificate~~

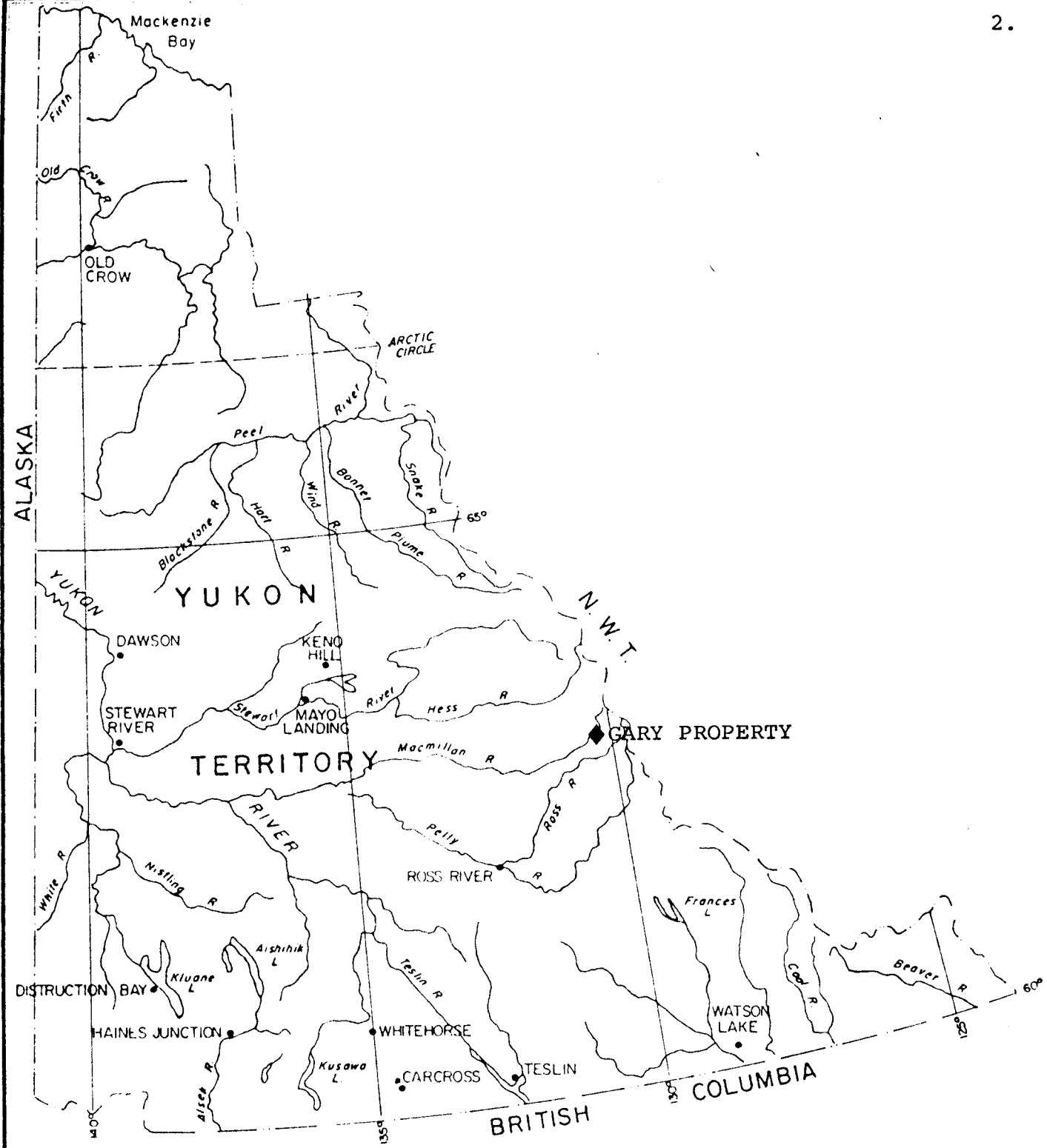
SUMMARY

An electromagnetic survey using the Maxmin II was conducted over the north, central and south grids on the Gary Property by Cordilleran Engineering Limited, under the direction of J. E. Betz, P.Eng., and the supervision of O. S. Hairsine, P.Eng. This work was carried out during the periods June 8 - July 6 and August 7 - September 10, 1977 for the Ogilvie Joint Venture whose claims are held in trust by British Newfoundland Exploration Limited

The following was performed:

	<u>Line Cutting and Secant Chaining</u>	<u>EM Survey</u>	<u>Secant Chaining</u>
North Grid	9.8 miles	8.1 miles	
Central Grid		6.0 miles	6.0 miles
South Grid	6.5 miles	5.5 miles	

The north and central grids are in both the Mayo and Watson Lake Mining Districts. Division of costs as to districts has been carried out on the basis of working time. The affidavit of expenditures included with this report details the costs incurred on each grid in the Watson Lake District.



# LOCATION MAP GARY PROPERTY

SCALE 0 20 40 60 80 100 MILES

BY

CORDILLERAN ENGINEERING LTD.  
1418 - 355 BURRARD STREET  
VANCOUVER 1, B.C.

FIGURE 1

REPORT ON THE MAXMIN II EM SURVEY, OGILVIE JOINT VENTURE,  
GARY NORTH, CENTRAL & SOUTH GRIDS,  
WATSON LAKE MINING DISTRICT, YUKON TERRITORY.  
LAT. 63°04'N      LONG. 130°15'W      N.T.S. 105 0/1

### INTRODUCTION

The MaxMin II EM system was used successfully in the autumn of 1976 for detecting and tracing out conductive graphite horizons associated with the nearby Jason orebody of Ogilvie Joint Venture and the Tom orebody of Hudson Bay Mining and Smelting.

The geological setting in the area of the Gary grids is very similar to that on the Jason and Tom grids; so, the use of the MaxMin II system on these grids was a logical step.

As with the previous work in the area, the MaxMin II was used in the coplanar mode with the turns of the transmitting and receiving coils held parallel to the mean slope of the terrain (along the traverse line) between the coils. Knowing the mean slope and coil spacing at all reading points was insured by secant chaining the grids prior to the MaxMin II coverage.

The secant method of chaining and the use of the subsequent data are amply described in the MaxMin II manual. They will not be described here. However, it is worthy of mention here that the end result of secant chaining the lines is to have "noise-free" EM results. Two bonus features of secant chaining are: a) equal station spacings on the horizontal plane, and b) accurate topographic profiles along the line. In fact, the topographic profiles shown on the profile sheets in this report are computed from the secant chaining notes.

Based on previous experience, a reconnaissance coil spacing of 400 ft (122 meters) and frequencies of 222 and 1777 Hz were used throughout the survey. The reasons for this choice are dealt with at some length in the report on the Jason and Tom surveys. In brief they are:

- a) that a coil spacing of 400 ft gives about the best combination of conductor resolution and search-depth capability for this area,
- b) two widely spaced frequencies lead to a fairly accurate

conductivity-thickness estimate for the conductive zones detected, as well as helping to interpret the shape and attitude of non-simplistic conductive zones,

c) the results at one frequency serve to monitor the inevitable reading and/or recording errors at the other frequency.

The writer played a role in both the secant chaining and the MaxMin II coverage of the central grid while training assistants Brian Goodacre and Paul Pitcher, who later did the work on the north and south grids.

#### PRESENTATION OF RESULTS

The MaxMin II profiles, topographic profiles, and the interpreted conductor picture for each line were plotted on special profile sheets. Reduced-scale copies of these sheets are bound with an index and legend sheet in Appendix "A" of this report. Contrary to the writer's convention, B. Goodacre faced south while plotting the MaxMin II profiles. However, the profiles have been arranged in such a way that by viewing the plan toward the south, it will be comparatively easy to relate the interpretation in section to that in plan.

Plan #1 (north and central grids) and plan #2 (south grid)--showing the grid lines, topographic contours, interpreted conductive zones, and geological sections--are included in the pocket at the end of the report.

#### INTERPRETATION OF RESULTS

The conductor picture is quite complex on the Gary grids. This complexity prohibits a unique interpretation. It is always helpful in cases like this to have some preliminary geological information. With this information, the conductor interpretation can be "fitted" to the known geological picture, then subsequently used to extend the latter.

Of course, the conductor interpretation cannot be made to "fit" all geological pictures. The location of the upper part of the more strongly conductive units will always remain constant. It is not subject to interpretational whims. However with these very complex conductive pictures, the interpretation for the dip, width, and internal changes of many of the component parts lends itself to considerable "bending".

Two geological sections in the area of the north and central Gary grids provided the basis for the conductor interpretation shown on the plan and profile sheets. Section A-A<sub>1</sub> (plan #1),

provided the key to the conductor interpretation on the central grid and in the southwest corner of the north grid. Section B-B<sub>1</sub>--not shown on the plan, but located about one half mile north of the north grid--provided the key to the conductor interpretation at the northern end of the north grid. However, there is appreciable room for change in the latter conductor interpretation due to the distance of section B-B<sub>1</sub> from the grid. Geological sections A-A<sub>1</sub> and B-B<sub>1</sub> are shown at the bottom and top of plan #1, respectively.

The mapped geology on the east side of the south grid provided the key to the conductor interpretation shown on the grid. To appreciate this point better, the reader is referred to geological section A-A<sub>1</sub> on plan #2. The northwesterly strike of the mapped geological units was applied to the interpreted conductive units on the grid. However, with the large line spacing (1000 ft) and the lack of an unequivocally consistent EM signature across the grid, it is quite easy to interpret an essentially north-south strike for the conductive units. In fact, this was done prior to receiving the geological information for the area.

Given a northwest strike to the conductors on the south grid (plan #2), and a southwest strike to the conductors on the central grid (plan #1), there would have to be a swinging of the former toward the north and the latter toward the south to make them compatible between the grids.

As in the case of the other grids, the dip of the conductive units on the south grid cannot be determined precisely, due to the complexity of the results. But, if it is assumed that the synclinal axis determined from geological mapping goes across the grid as shown on plan #2, then the units to the southwest of it will dip toward the northeast and those to the northeast of it will dip toward the southwest. A seeming weakness in this interpretation is the rapidly changing conductivities required, both down the dip and across the width of some of the units, to reconcile the pictures on each side of the synclinal axis. However, any interpretation in this area must accommodate some rapid changes in conductivity.

The interpreted conductive zones on all three grids can be related to the lithological units by superimposing the geological sections on the sectional view of the interpreted conductors, shown on the profile sheets. This exercise is left to the company geologists.

Specific conductivity-thickness figures were not worked out for these conductive zones, because they are time consuming to obtain and have no known relationship to the occurrence and grade of the ore-bearing zones in the area. However, a rough conductor classification has been used in the sections and plans for whatever future correlation it may have with ore occurrences in the area. The classification is arbitrary and it consists of three groups--"fair to good", "poor to fair", and "poor". The criterion for the dividing line between the "fair to good" and "poor to fair" conductive zones is the ratio of the in-phase to out-of-phase anomaly amplitudes at 222 Hz. A conductive zone is classified as "fair to good", when the "in-phase/out-of-phase" ratio is greater than unity, i.e. the conductivity-thickness value of the zone is greater than 25 mhos.

#### CONCLUDING REMARKS

When the lithological picture--interpreted from the MaxMin II results and known geology in the area--is combined with the previously obtained soil geochemical and gravity results, it will put the latter results into perspective, and guide any future drilling in the area.

This exercise is left to the company geologists.

#### WRITER'S DECLARATION

Neither I, nor John Betz Limited, have any financial interest in any of the properties of the Ogilvie Joint Venture Group.

I hold BA (1952) and MA (1953) degrees in geophysics from the University of Toronto. I have worked full time in mining exploration geophysics since 1953, and two summer seasons prior to 1953.

All statements made in this report are correct to the best of my knowledge.

November, 1977  
Toronto, Ontario



*John E. Betz*  
John E. Betz, M.A., P.Eng. Ont.  
John Betz Limited

APPENDIX "A"

- EM Profile Index and Legend

- EM Profile Sheets with  
Interpreted Conductive Zones

North Grid:        Line #545N & 535N  
                              525N & 515N  
                              505N & 495N  
                              485N & 475N  
                              465N

Central Grid:    Line    20N & 10N  
                              0    & 10S  
                              20S & 30S

South Grid:        Line    273N & 283N  
                              293N & 303N  
                              313N & 323N

- Plan #1 - Gary North and Central Grids  
          with Interpreted Conductive Zones  
          1" = 500 feet

- Plan #2 - Gary South Grid  
          with Interpreted Conductive Zones  
          1" = 500 feet

EM PROFILE INDEX

<u>Grid</u>	<u>Line #</u>
North .....	545N & 535N
	525N & 515N
	505N & 495N
	485N & 475N
	465N
Central .....	20N & 10N
	0 & 10S
	20S & 30S
South .....	273N & 283N
	293N & 303N
	313N & 323N

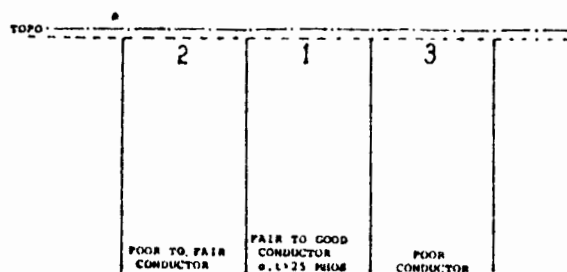
EM PROFILE LEGEND

The above-listed profiles are bound in the order shown.

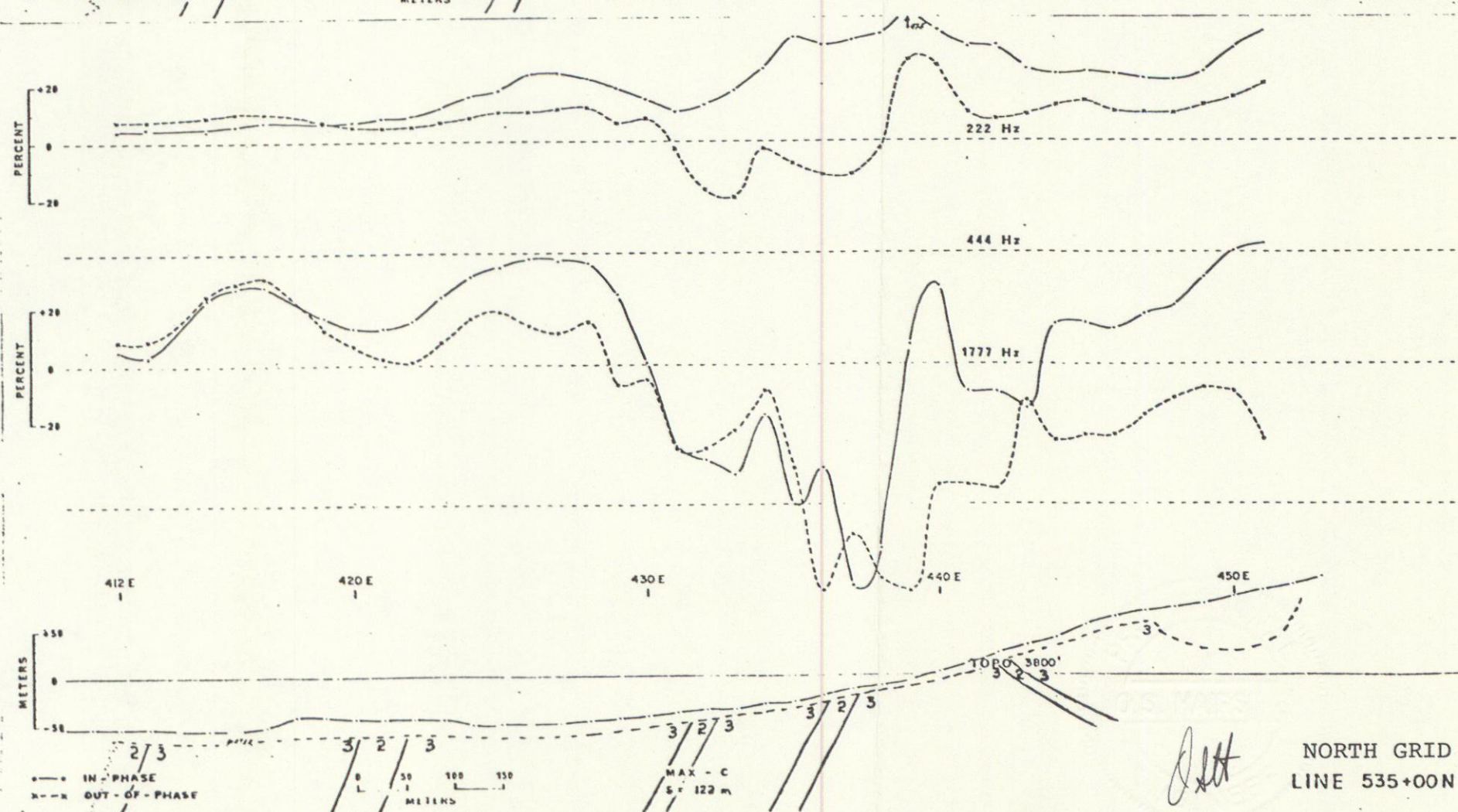
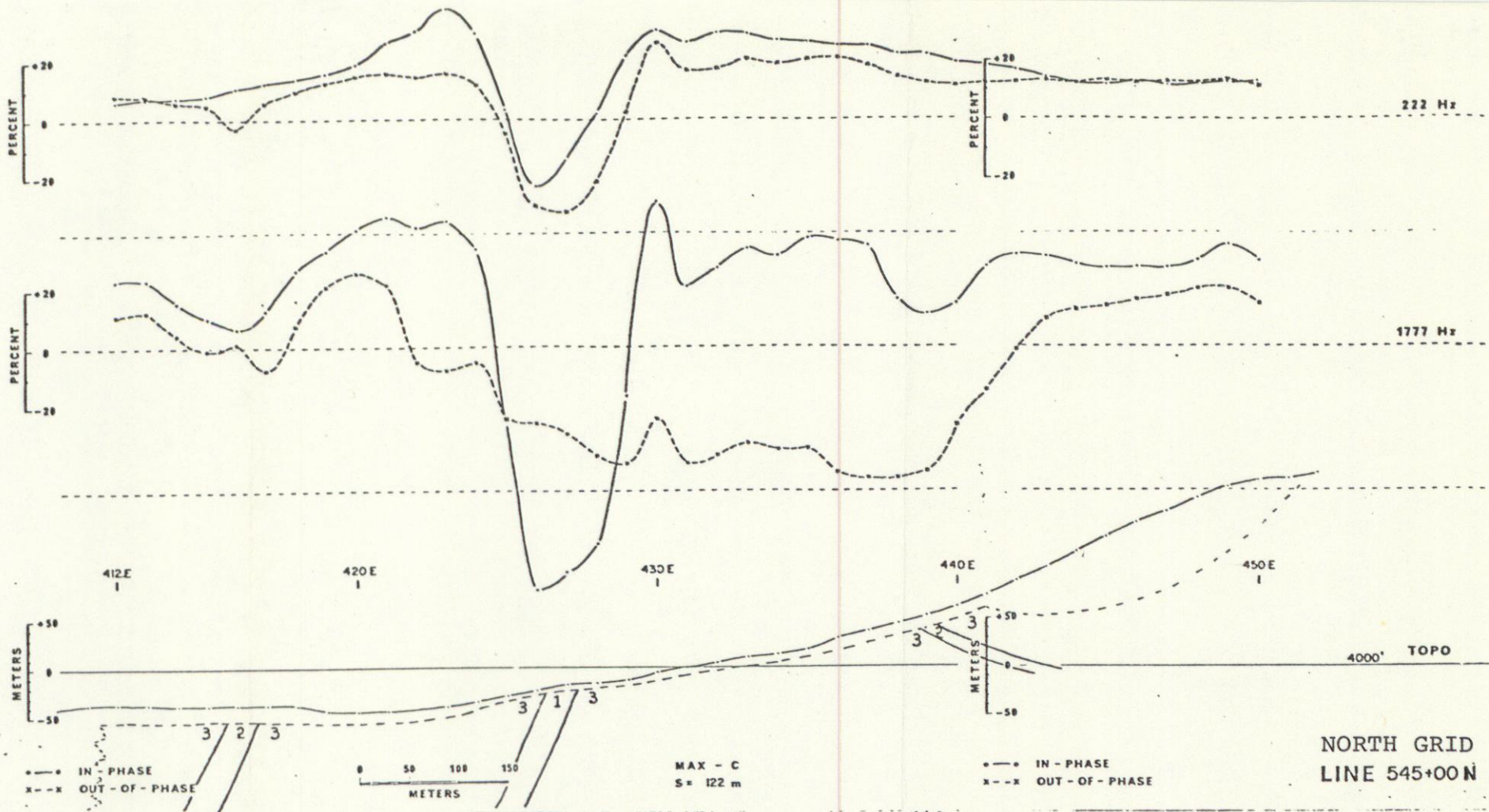
Additional Notes: The background in-phase and out-of-phase values are +1, +2 at 222 Hz and -2, +2 at 1777 Hz for the central and north grids. For the south grid they are +2, 0 at 222 Hz and +1, 0 at 1777 Hz.

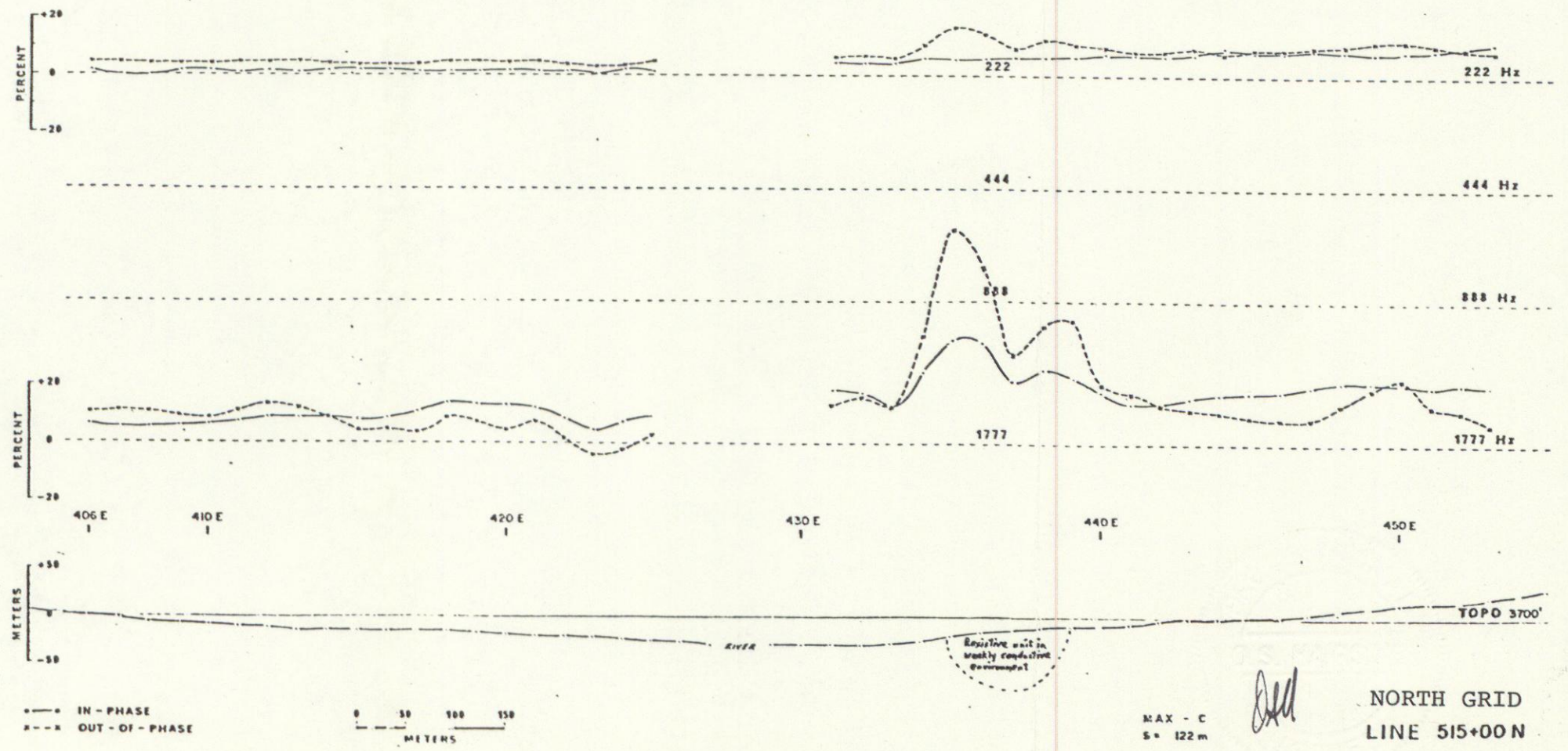
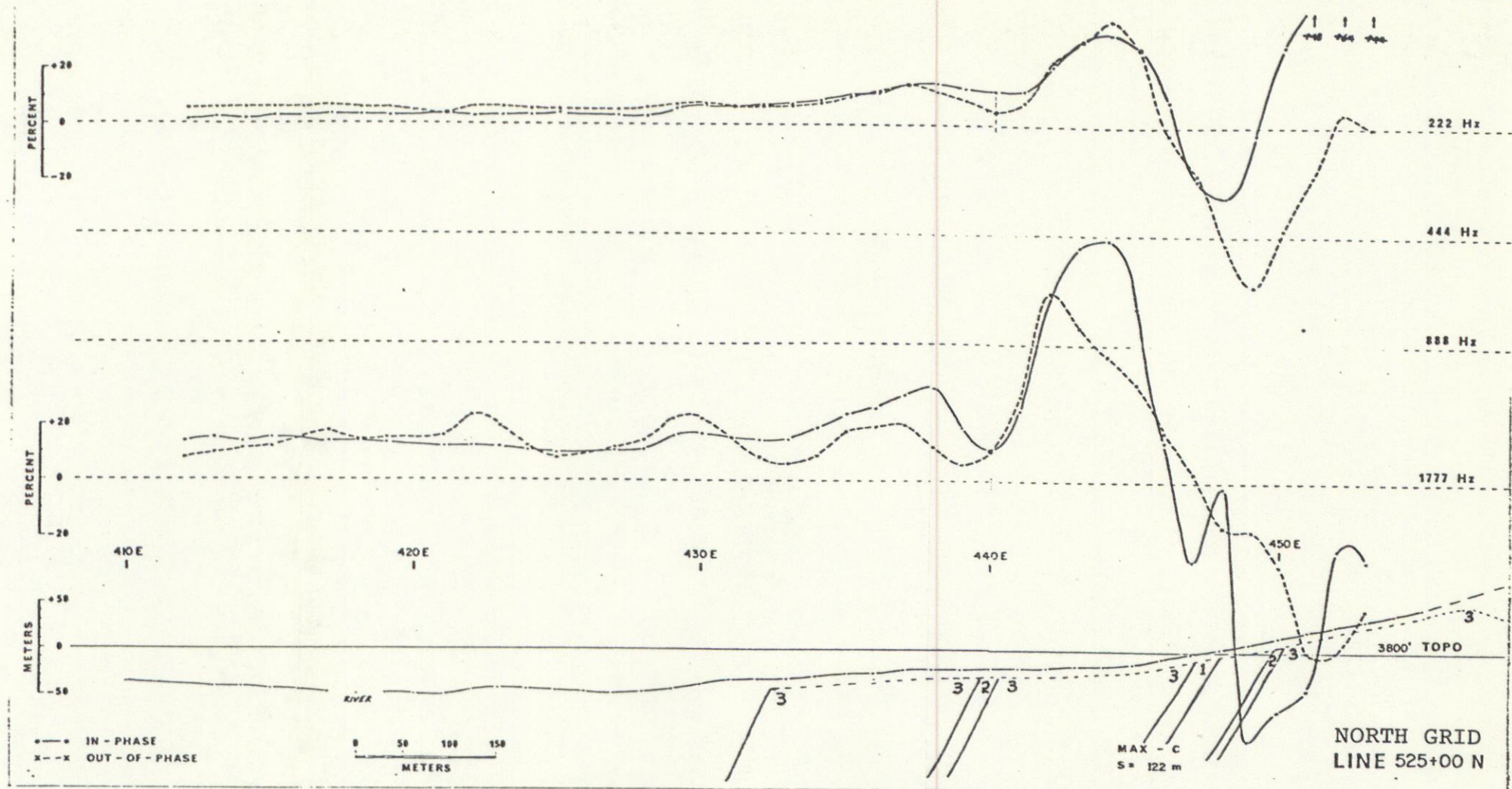
"S" on the profile sheet is the abbreviation for the coil spacing, which was 122 meters or 400 ft throughout the survey.

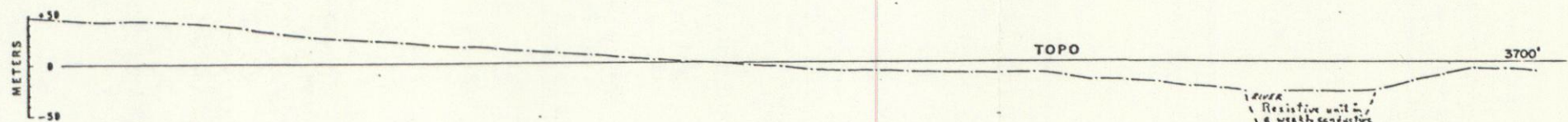
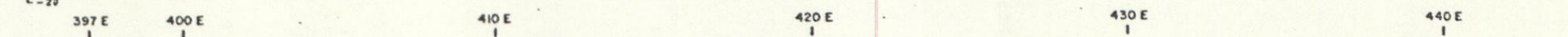
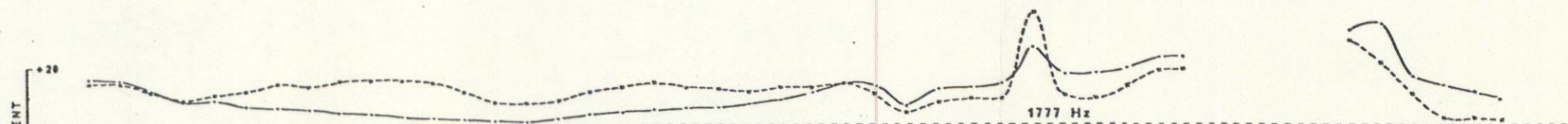
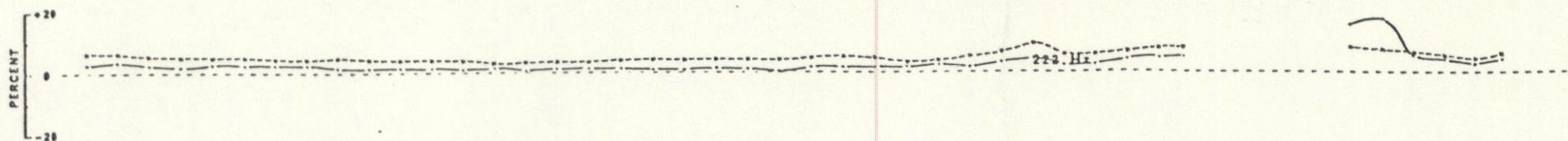
## Conductor Legend:



Note: There are no truly non-conductive areas on any of the grids. However, to avoid cluttering, some of the very poorly conductive areas have not been marked on the profile sheets (or on the plan).





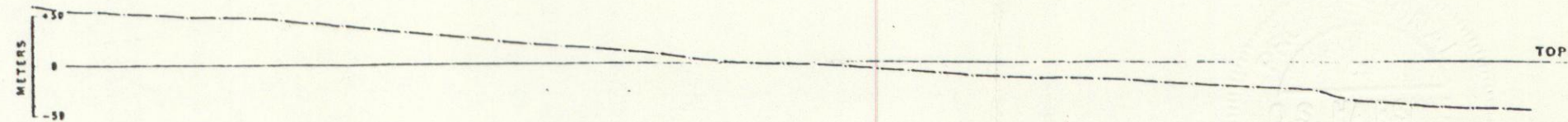
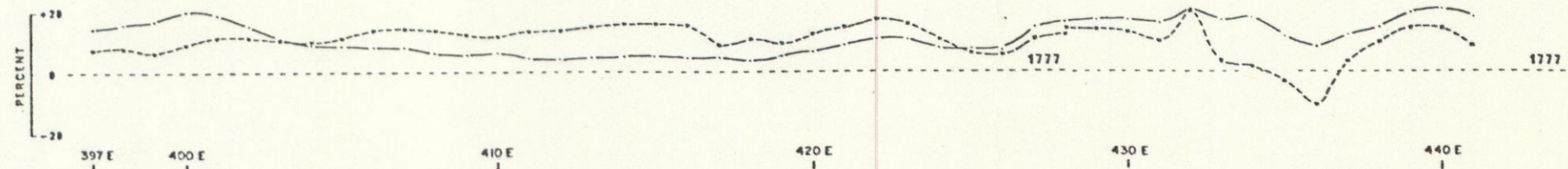


—•— IN - PHASE  
- - - OUT - OF - PHASE

0 50 100 150  
METERS

MAX - C  
S = 122 m

NORTH GRID  
LINE 505+00N

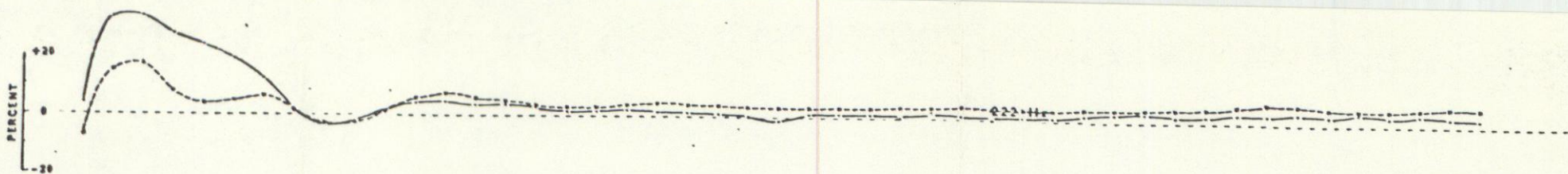


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- - - OUT - OF - PHASE

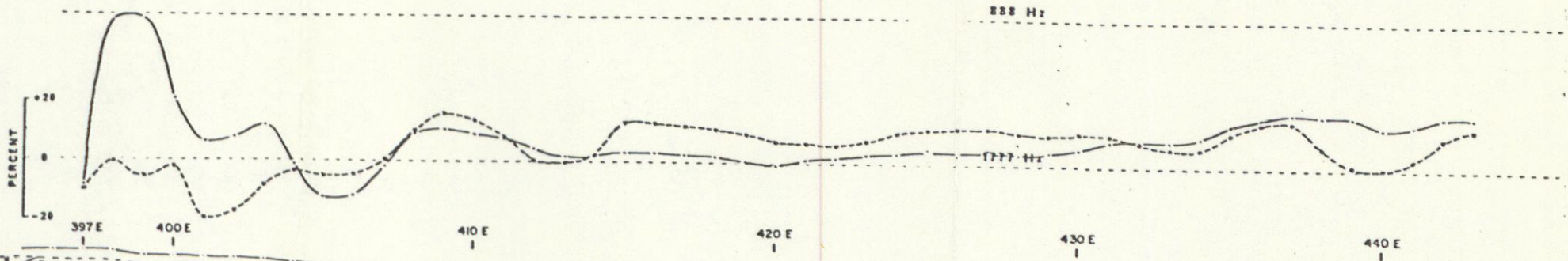
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METERS

MAX - C  
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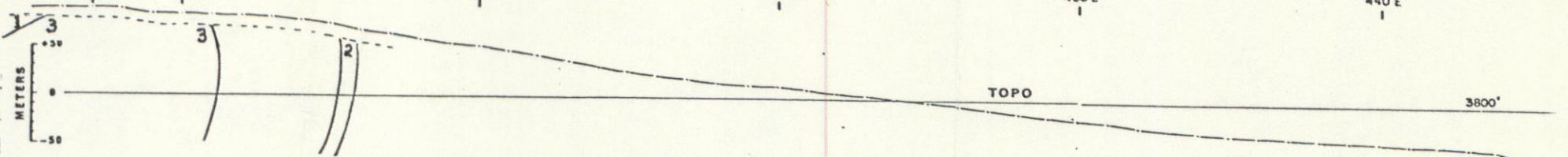
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LINE 495+00N



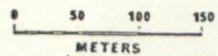
444 Hz



888 Hz

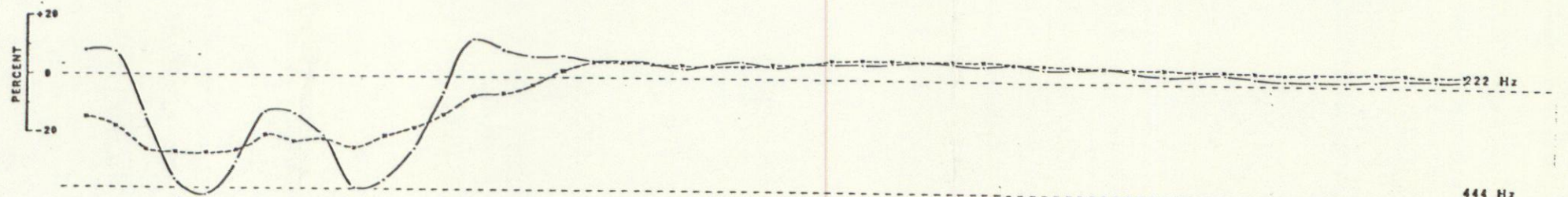


—•— IN - PHASE  
- - - - - OUT - OF - PHASE



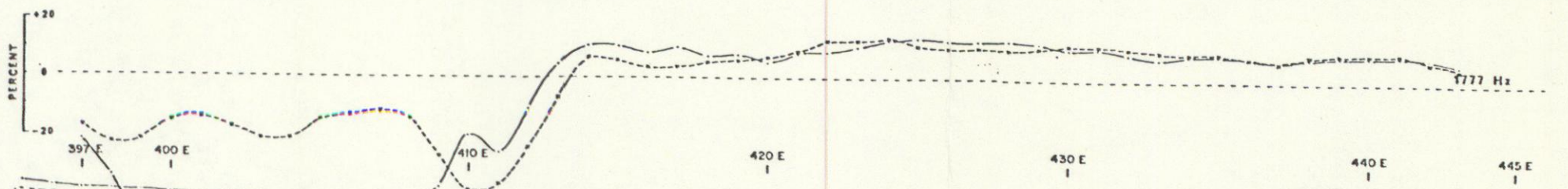
MAX - C  
S = 122 m

NORTH GRID  
LINE 485+00N

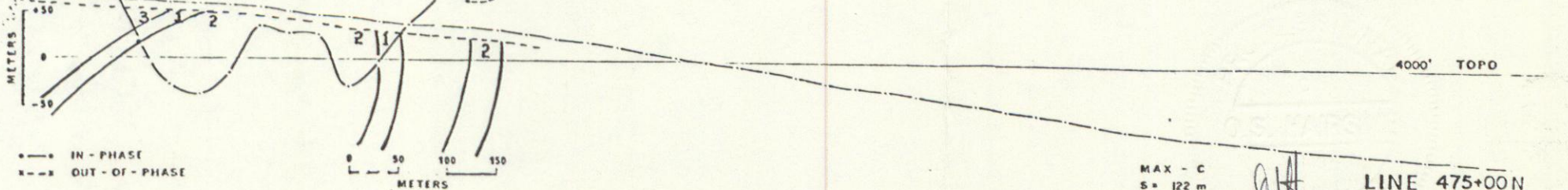


444 Hz

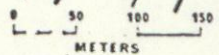
888 Hz



777 Hz

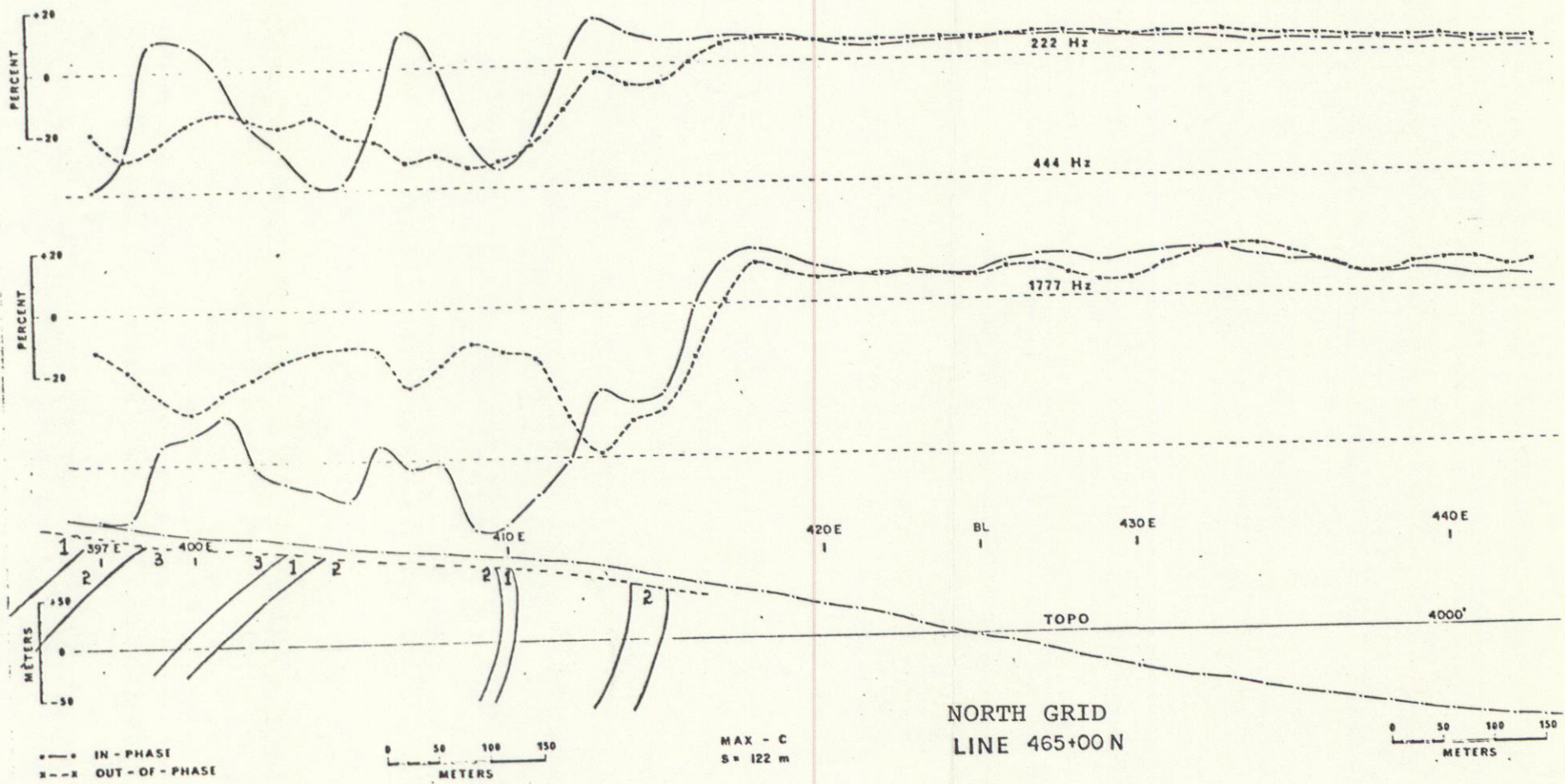


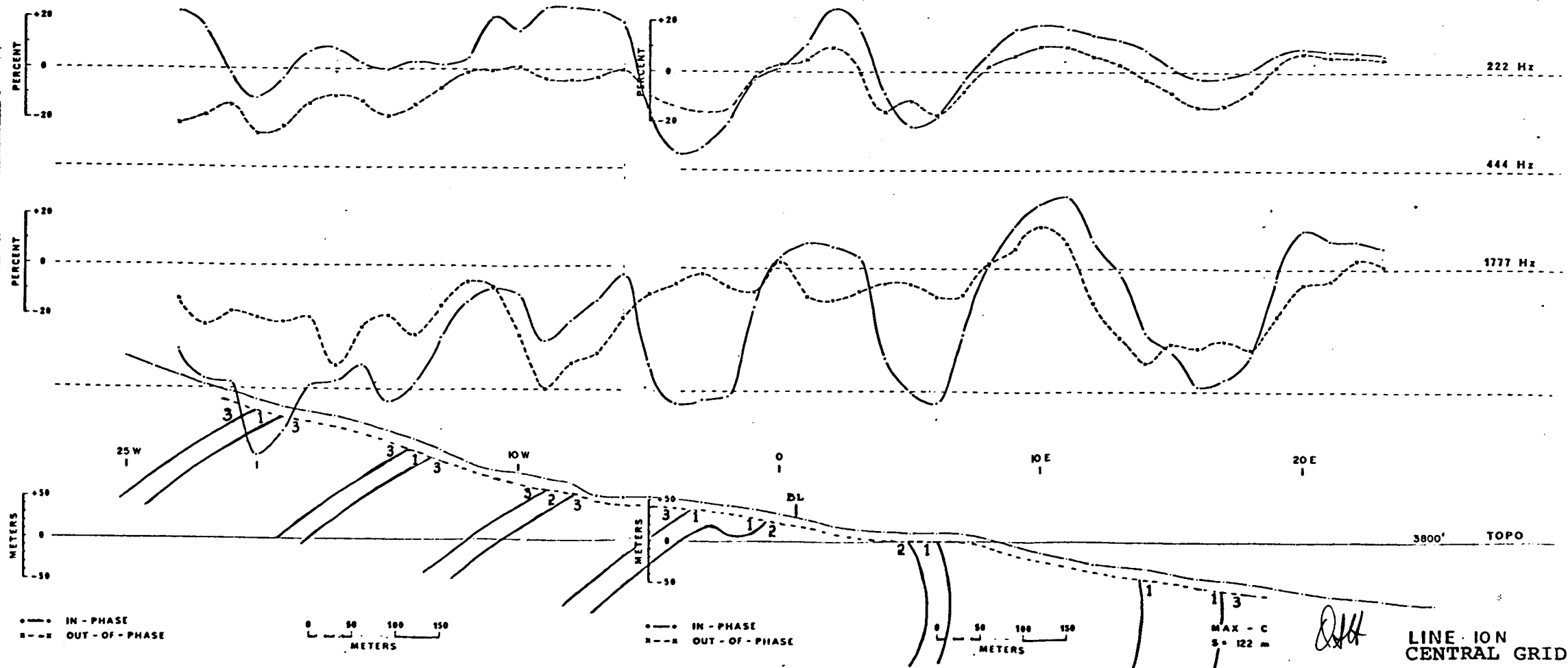
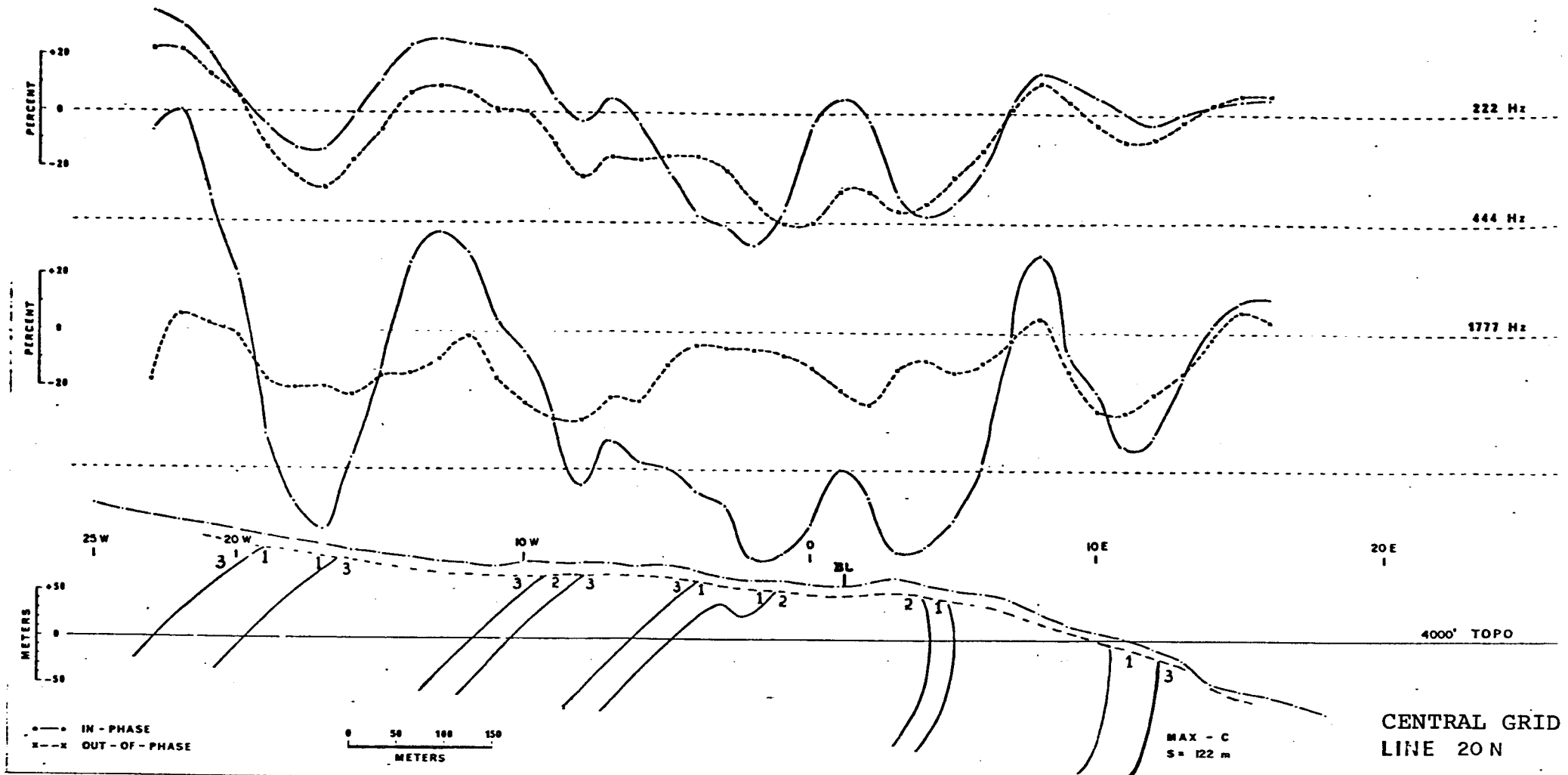
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- - - - - OUT - OF - PHASE

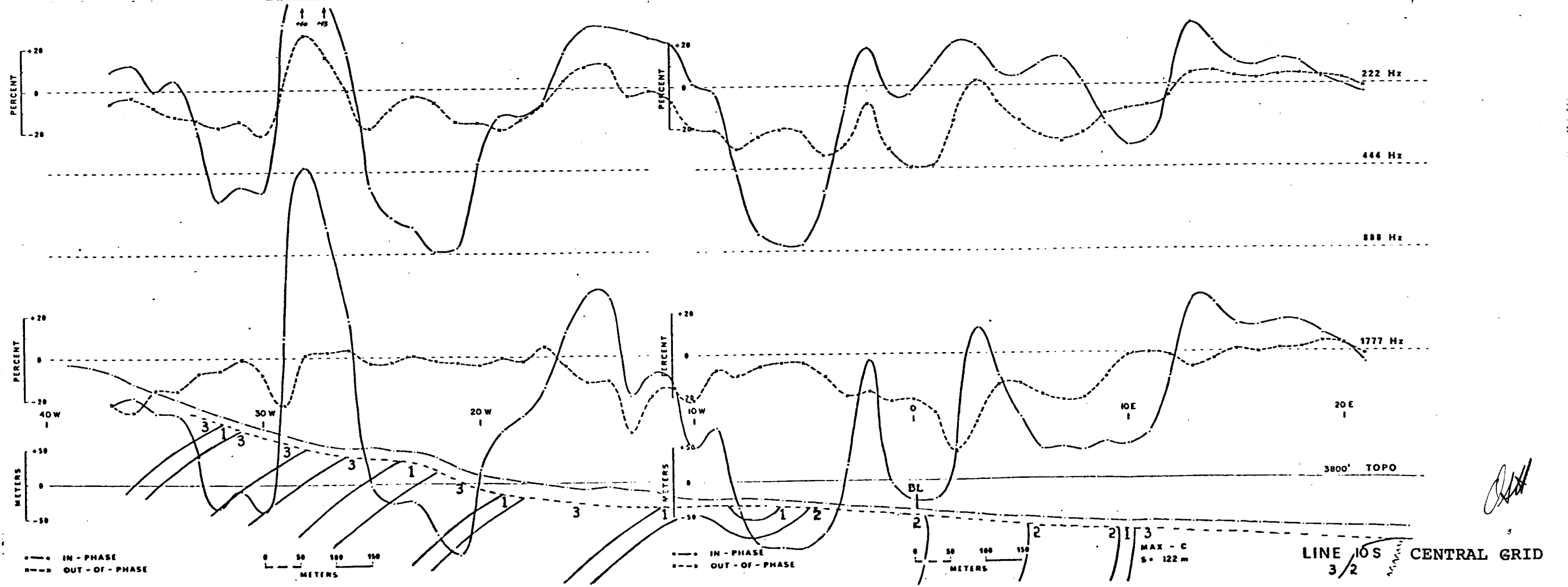
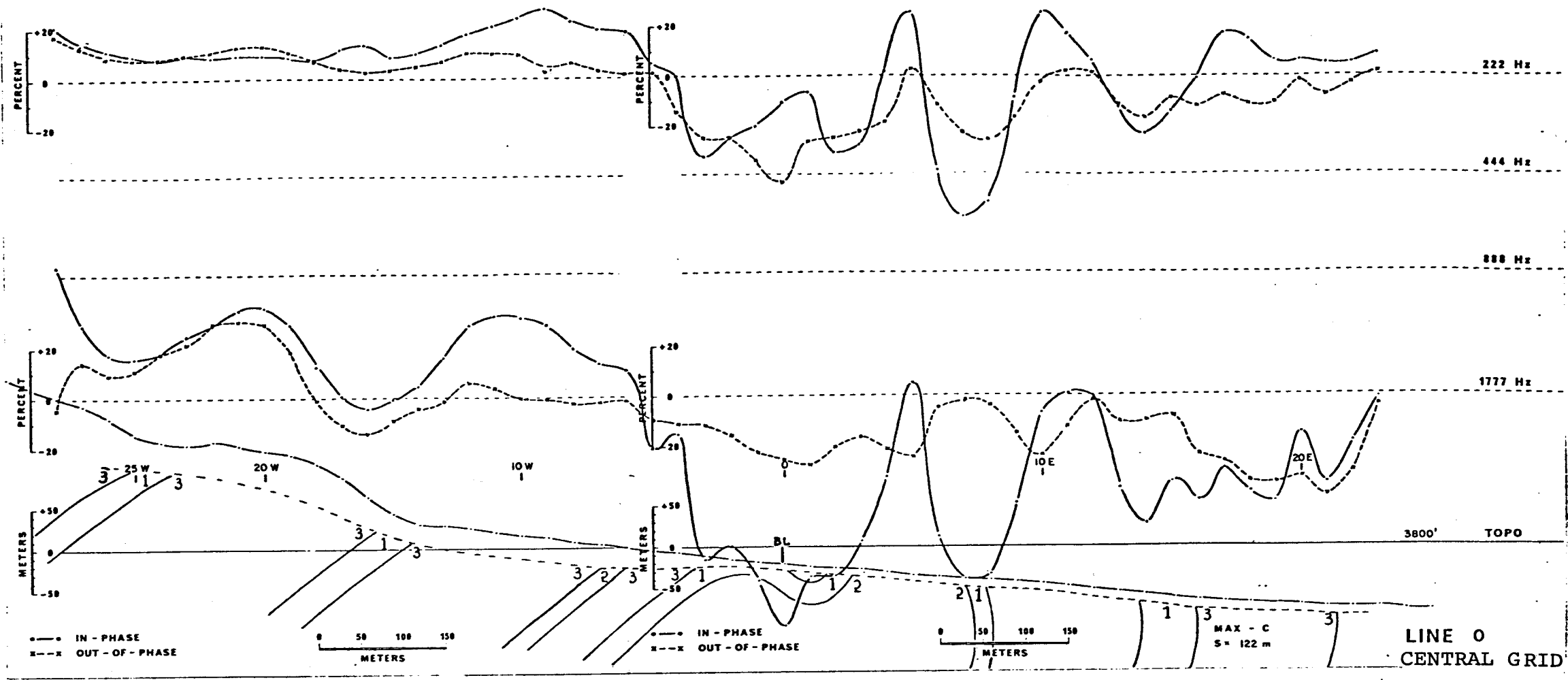


MAX - C  
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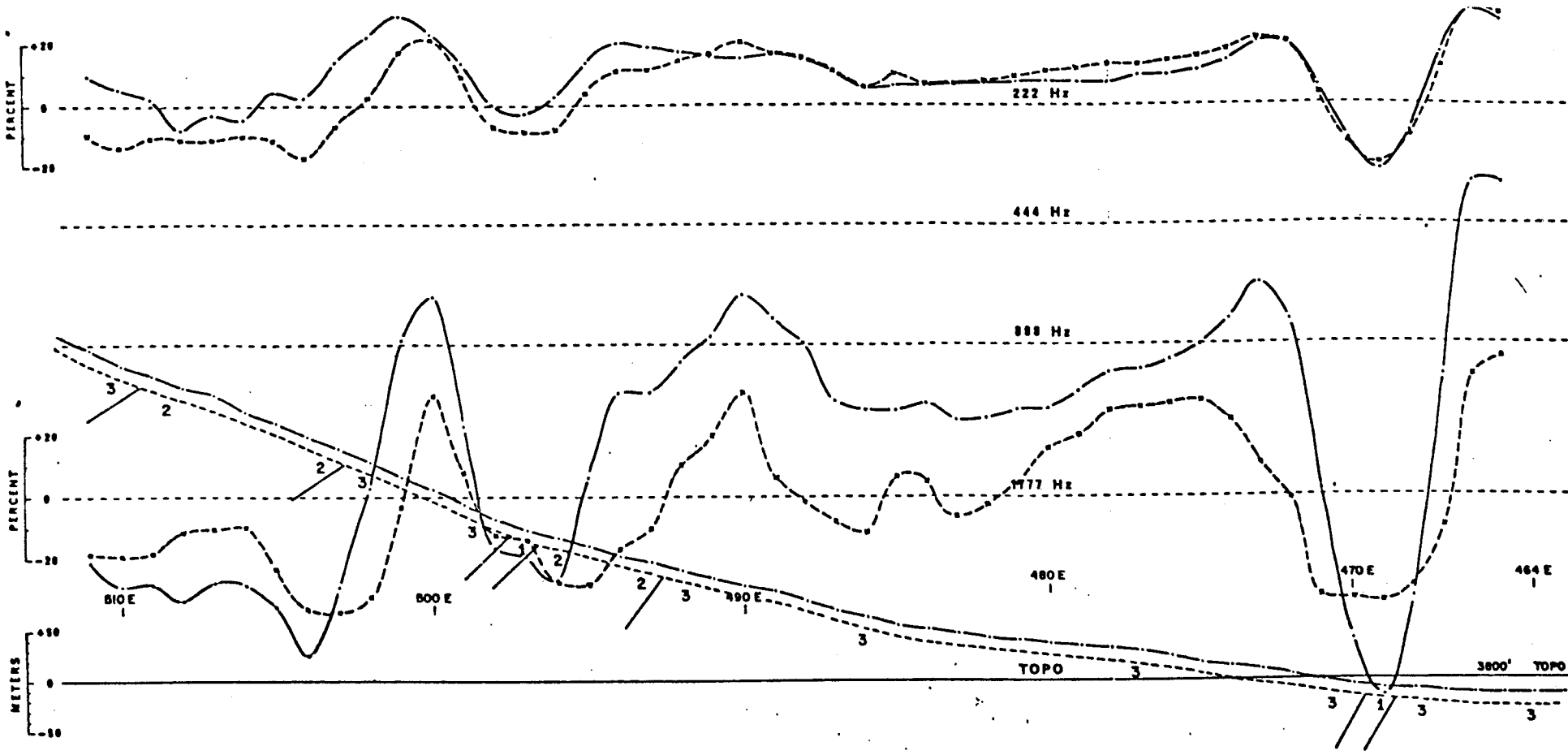
LINE 475+00N  
NORTH GRID



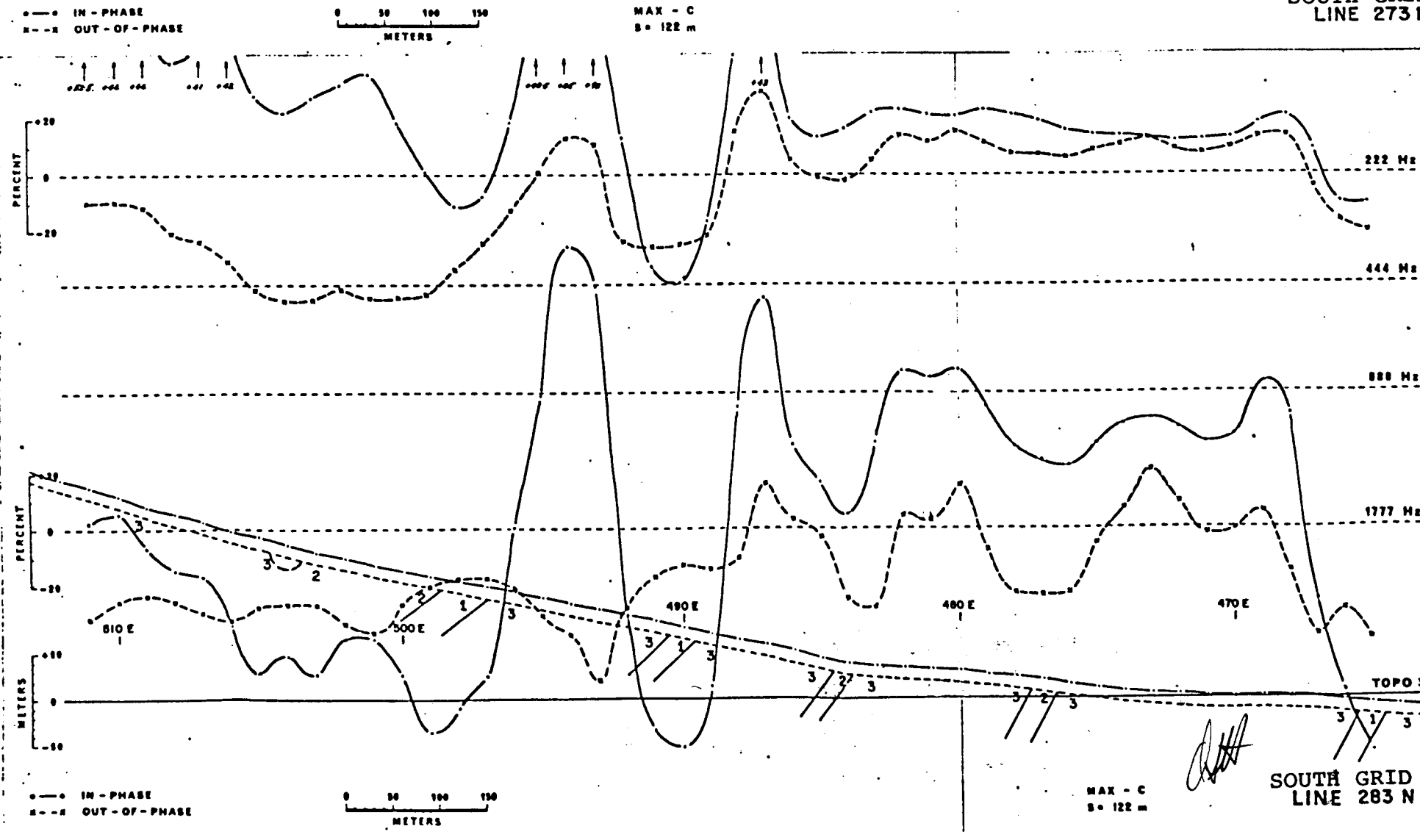




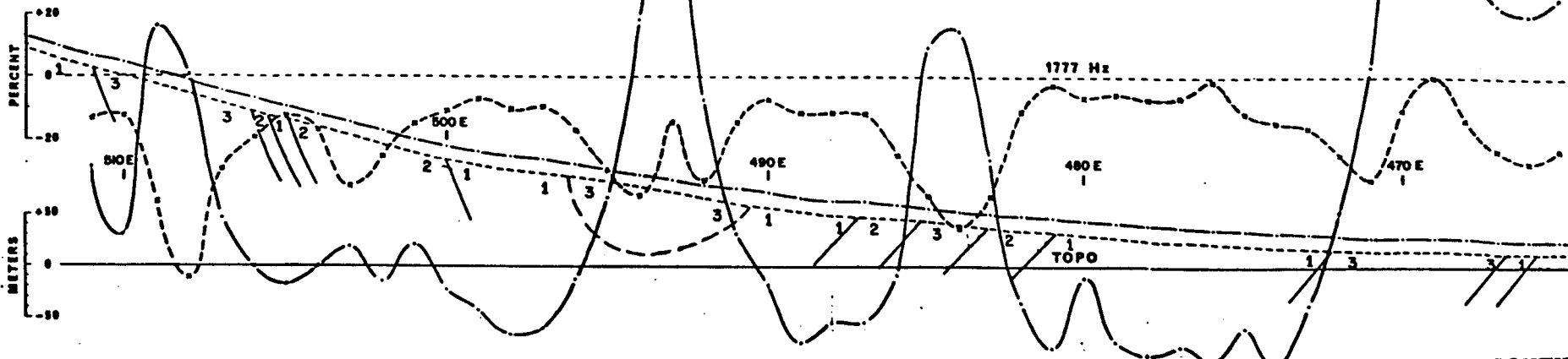
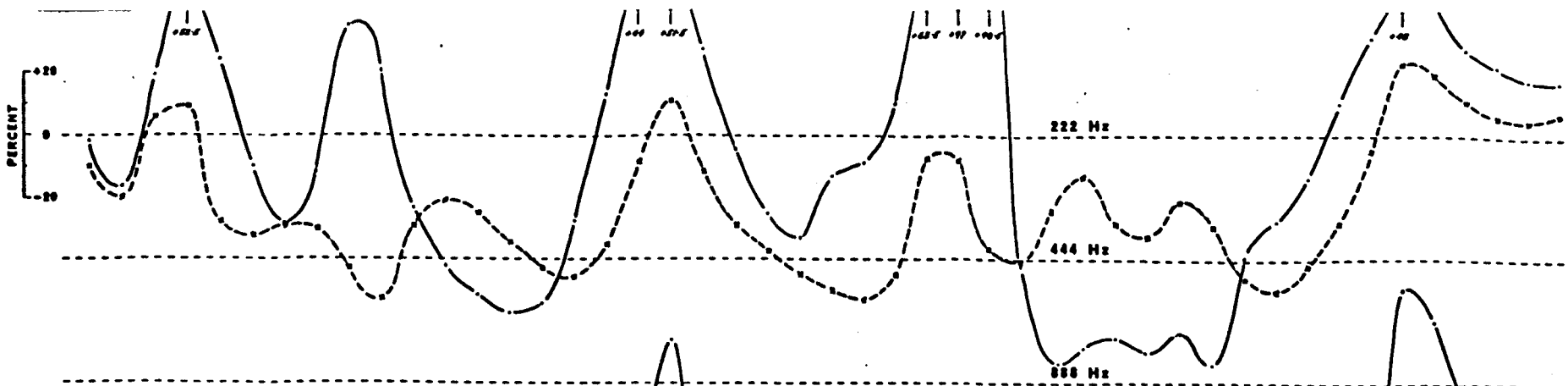




SOUTH GRID  
LINE 273 N



MAX - C  
S = 122 m

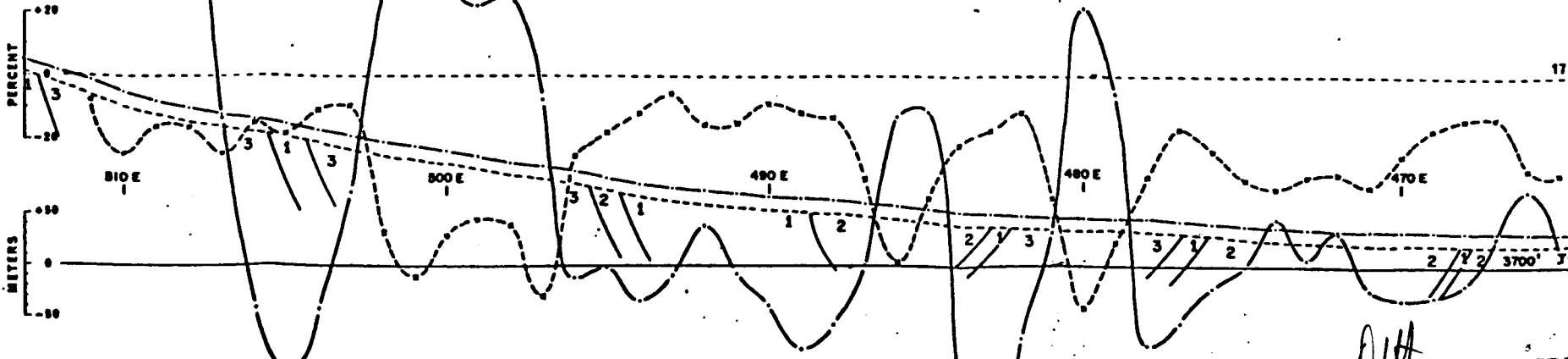
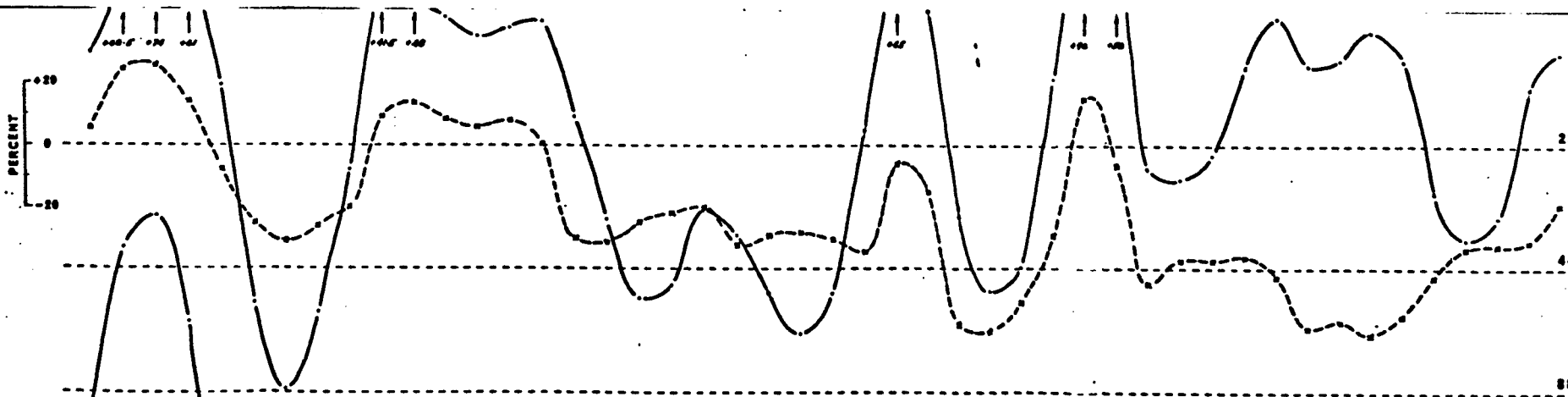


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- - - OUT-OF-PHASE

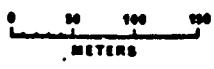


MAX - C  
S = 122 m

SOUTH LINE

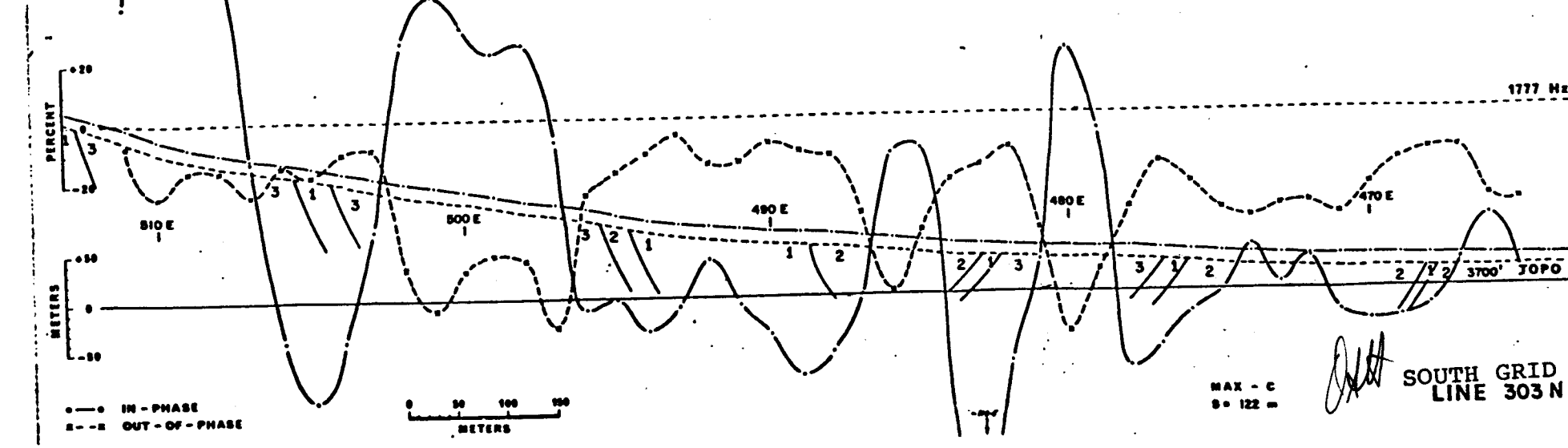
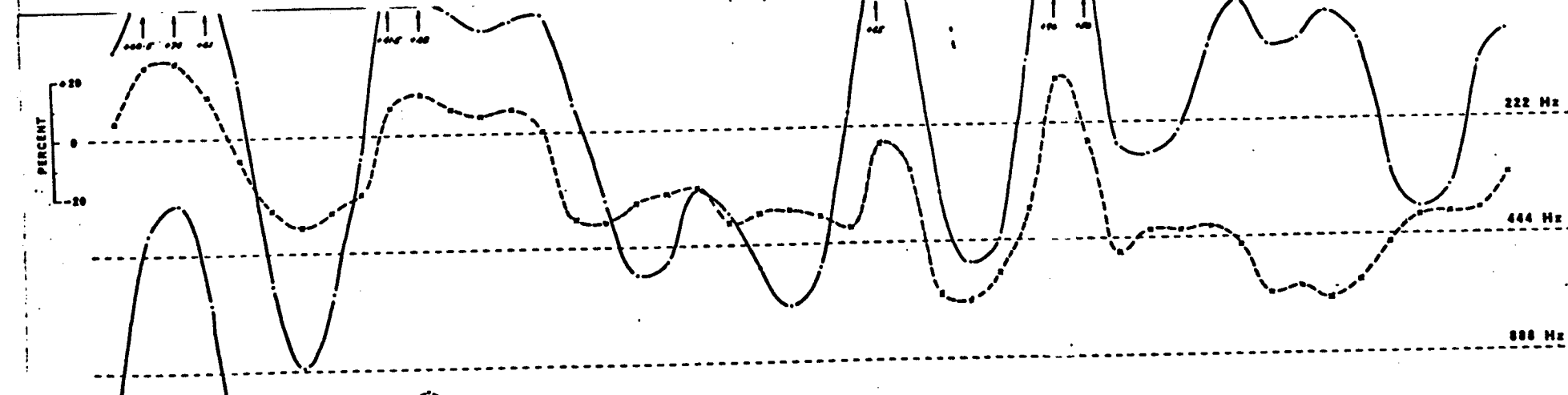
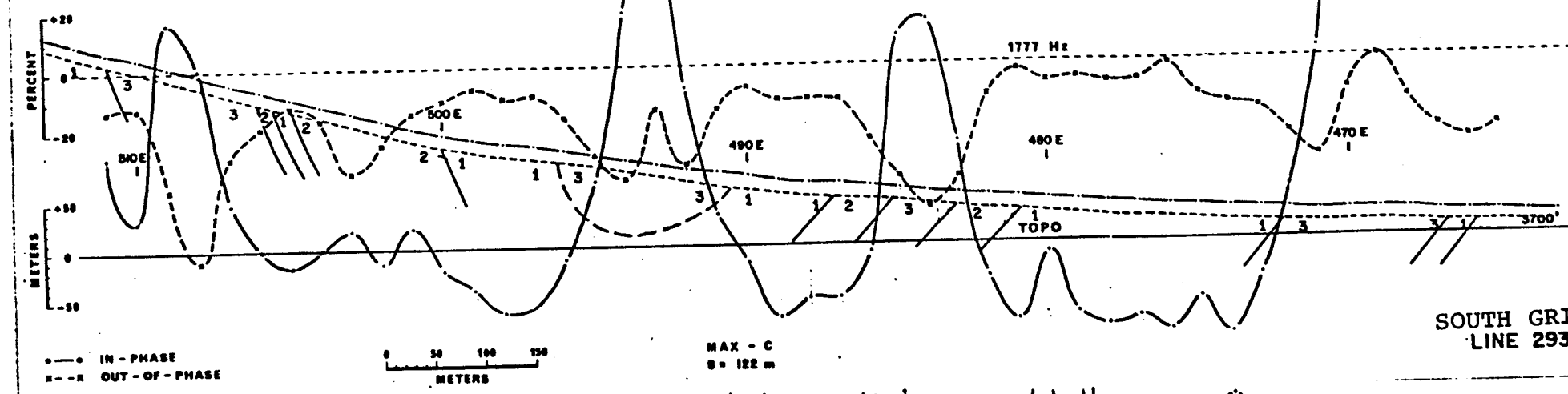
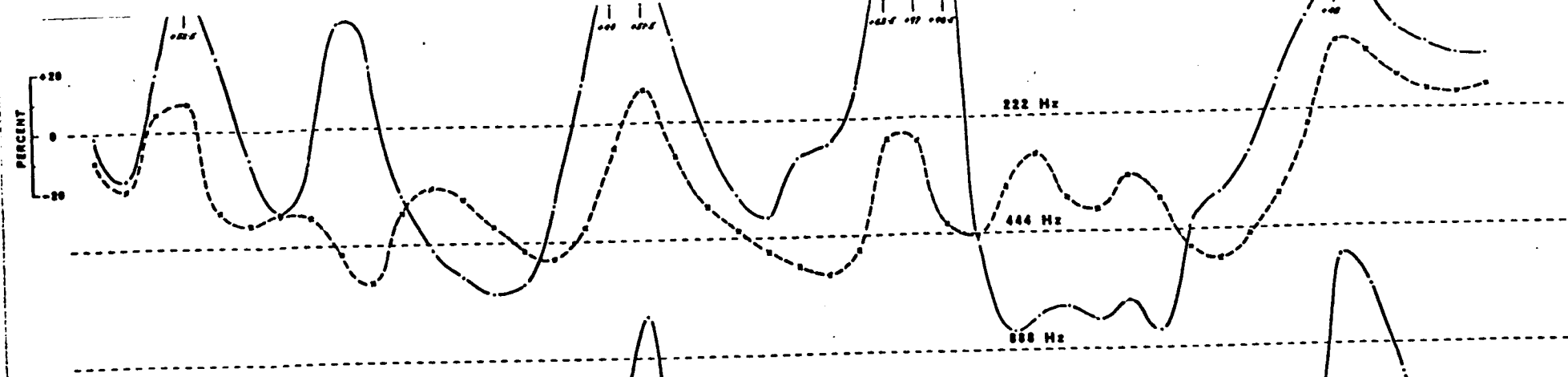


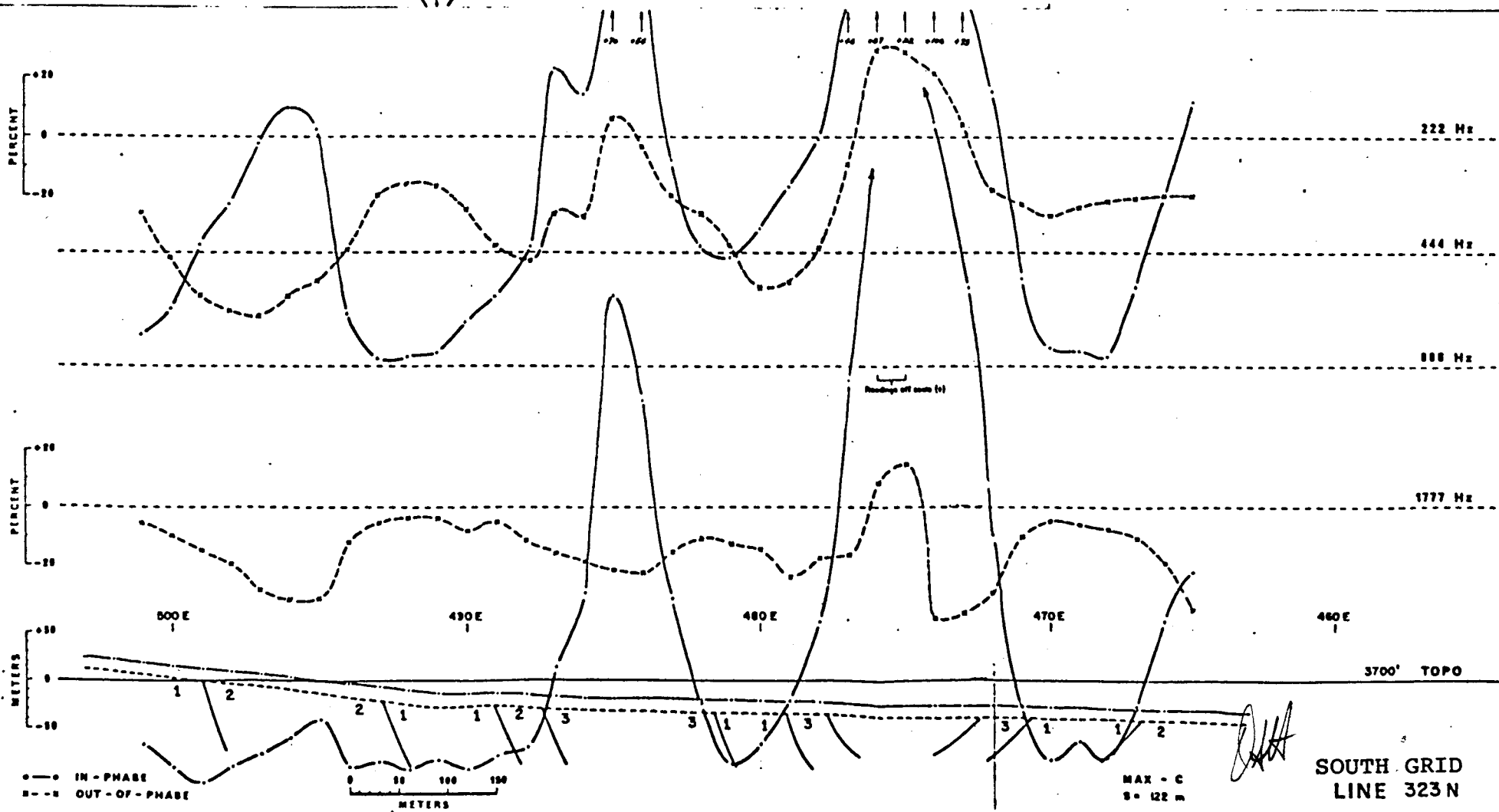
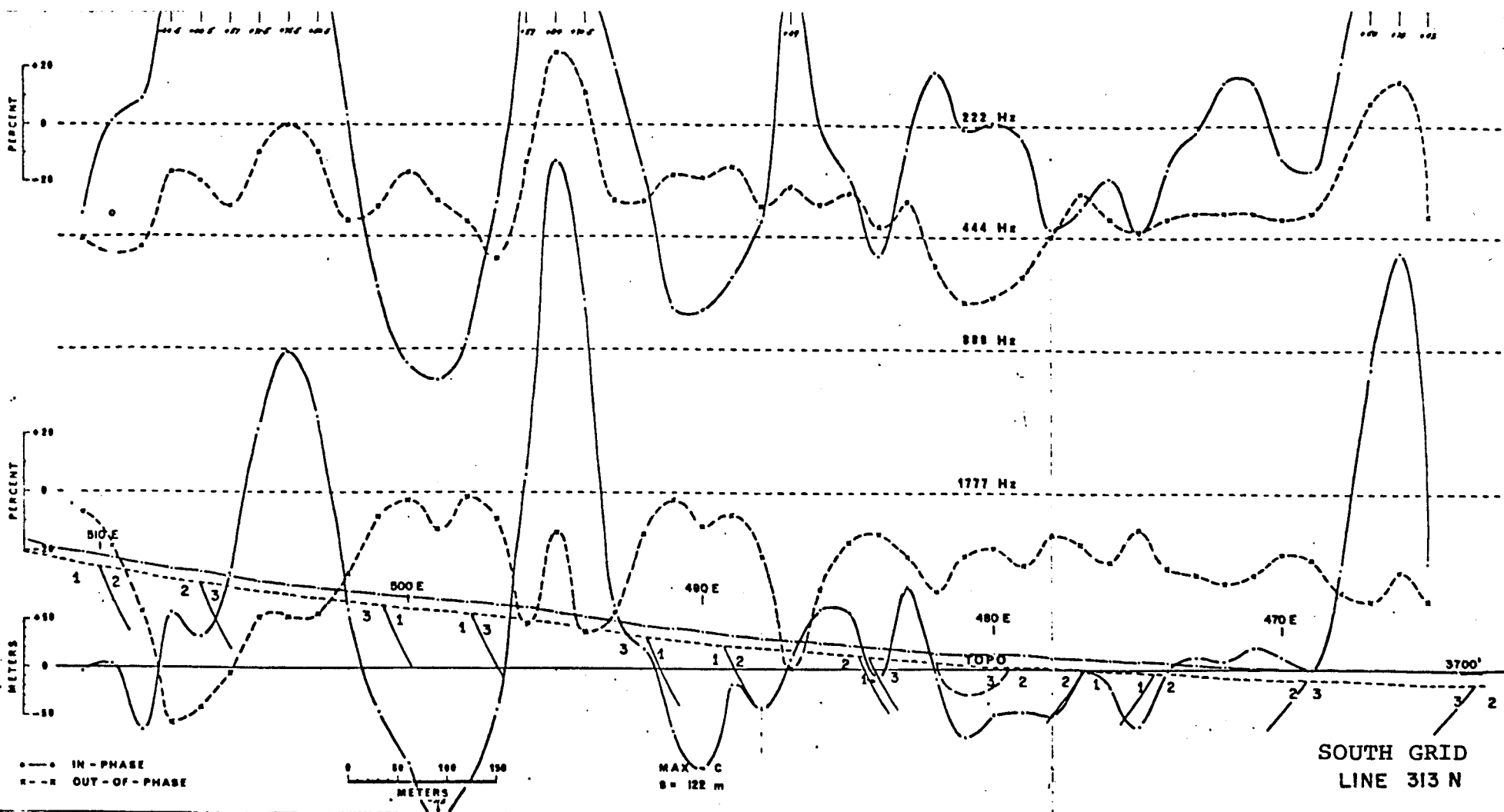
●—● IN-PHASE  
- - - OUT-OF-PHASE



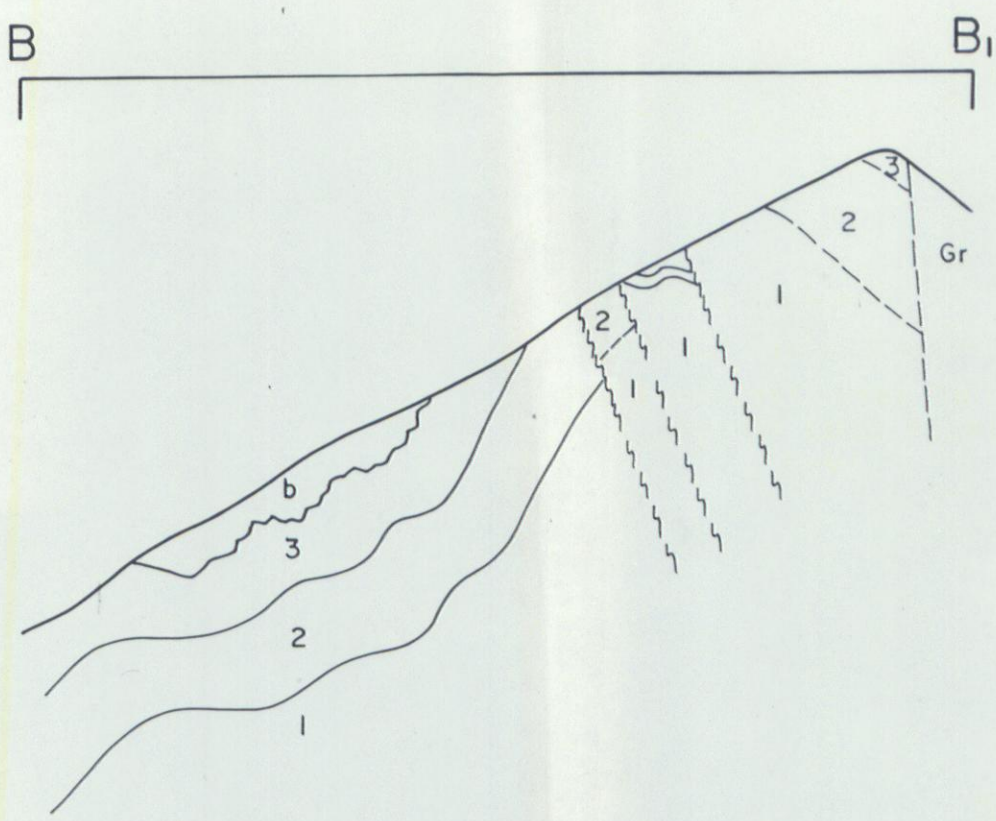
MAX - C  
S = 122 m

SOUTH GR. LINE 30

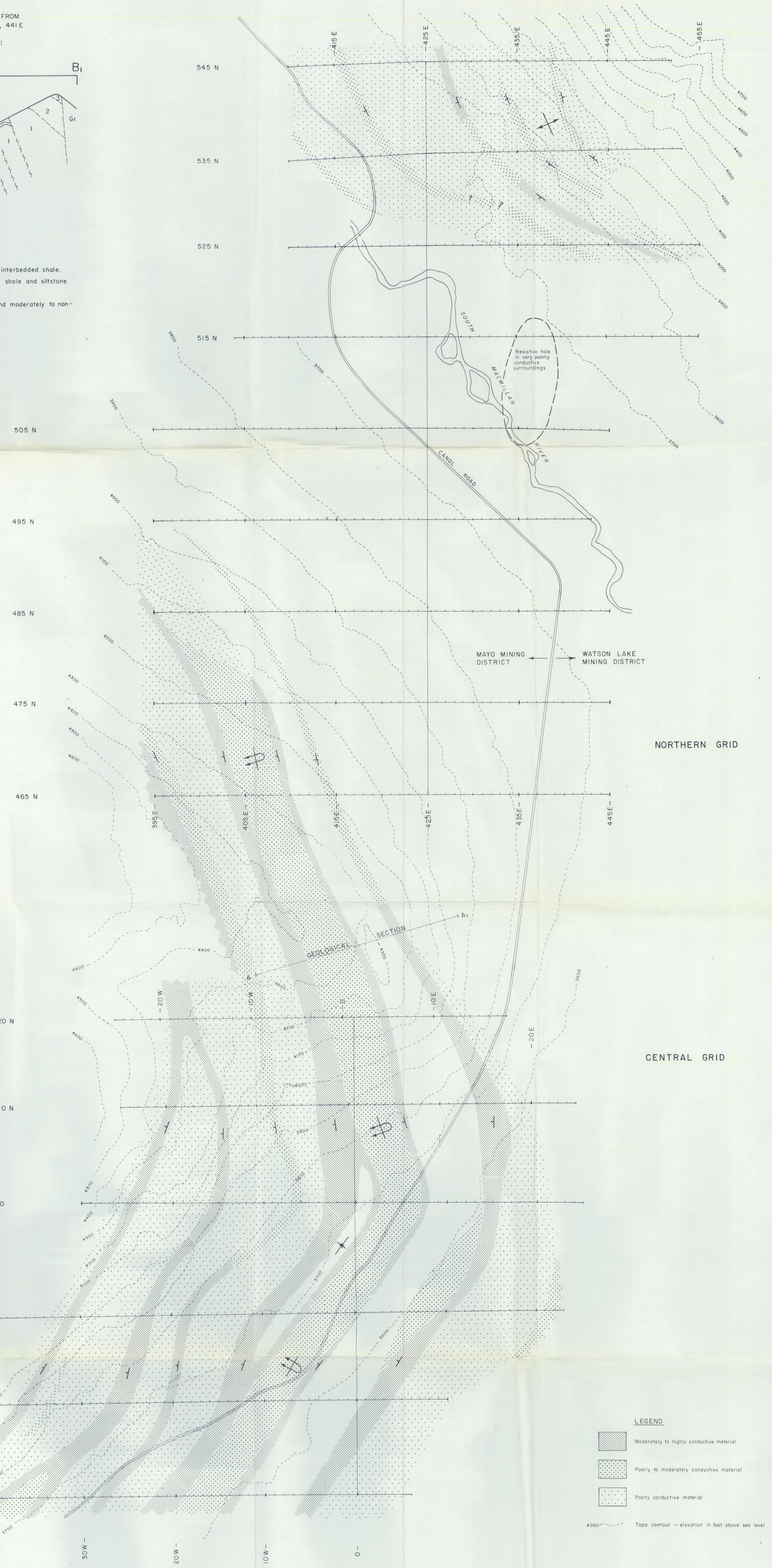
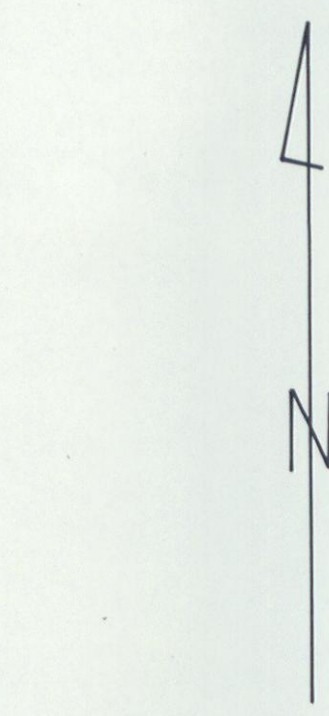




B - B<sub>1</sub>  
GEOLOGICAL SECTION FROM  
567 N, 429 E TO 573 N, 441 E  
(FROM 1977 MAPPING)



- b - Bedded barite with locally interbedded shale.
- 3 - Carbonaceous and siliceous shale and siltstone.
- 2 - Cherty breccia.
- 1 - Low to non-carbonaceous and moderately to non-siliceous siltstone and shale.
- Gr - Granite

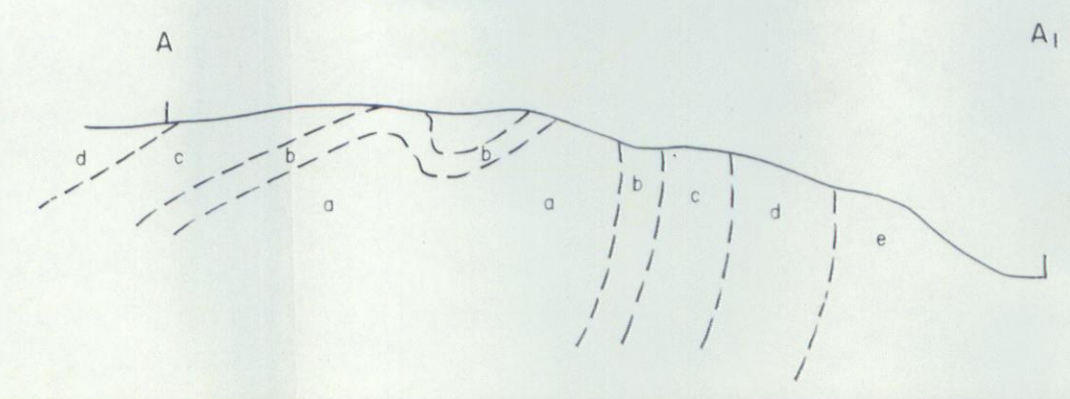


NORTHERN GRID

CENTRAL GRID

- LEGEND**
- Moderately to highly conductive material
  - Poorly to moderately conductive material
  - Poorly conductive material
  - Topo contour - elevation in feet above sea level

A-A<sub>1</sub>  
GEOLOGICAL SECTION FROM BETWEEN THE  
NORTH & CENTRAL GARY GRIDS  
SEE PLAN FOR EXACT LOCATION  
(FROM 1975 MAPPING)



- a - Road River Shale
- b - Bedded Barite
- c - Siliceous Argillite & Barite
- d - Wide Bedded Member
- e - Micaceous Siltstone



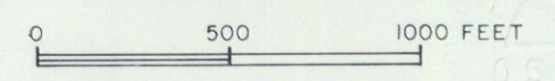
**CONDUCTIVITY MAP**  
**OGILVIE JOINT VENTURE**

MACMILLAN PASS AREA  
MAYO AND WATSON LAKE MINING DISTRICTS  
YUKON TERRITORY

63° 04' N, 130° 15' W  
N.T.S. 105-0-1

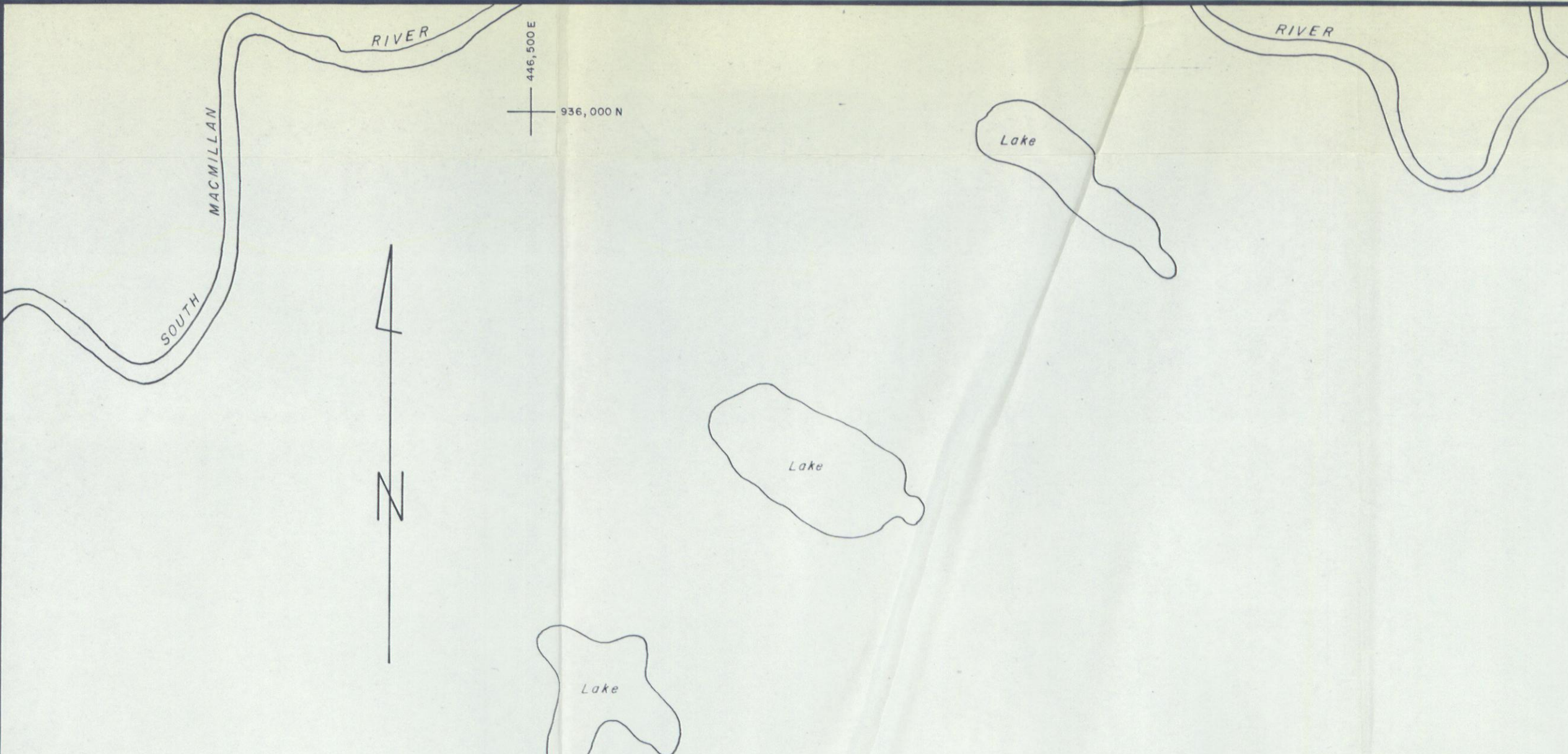
**GARY PROPERTY**  
(NORTH & CENTRAL)

HORIZONTAL and VERTICAL SCALE: 1 inch = 500 feet

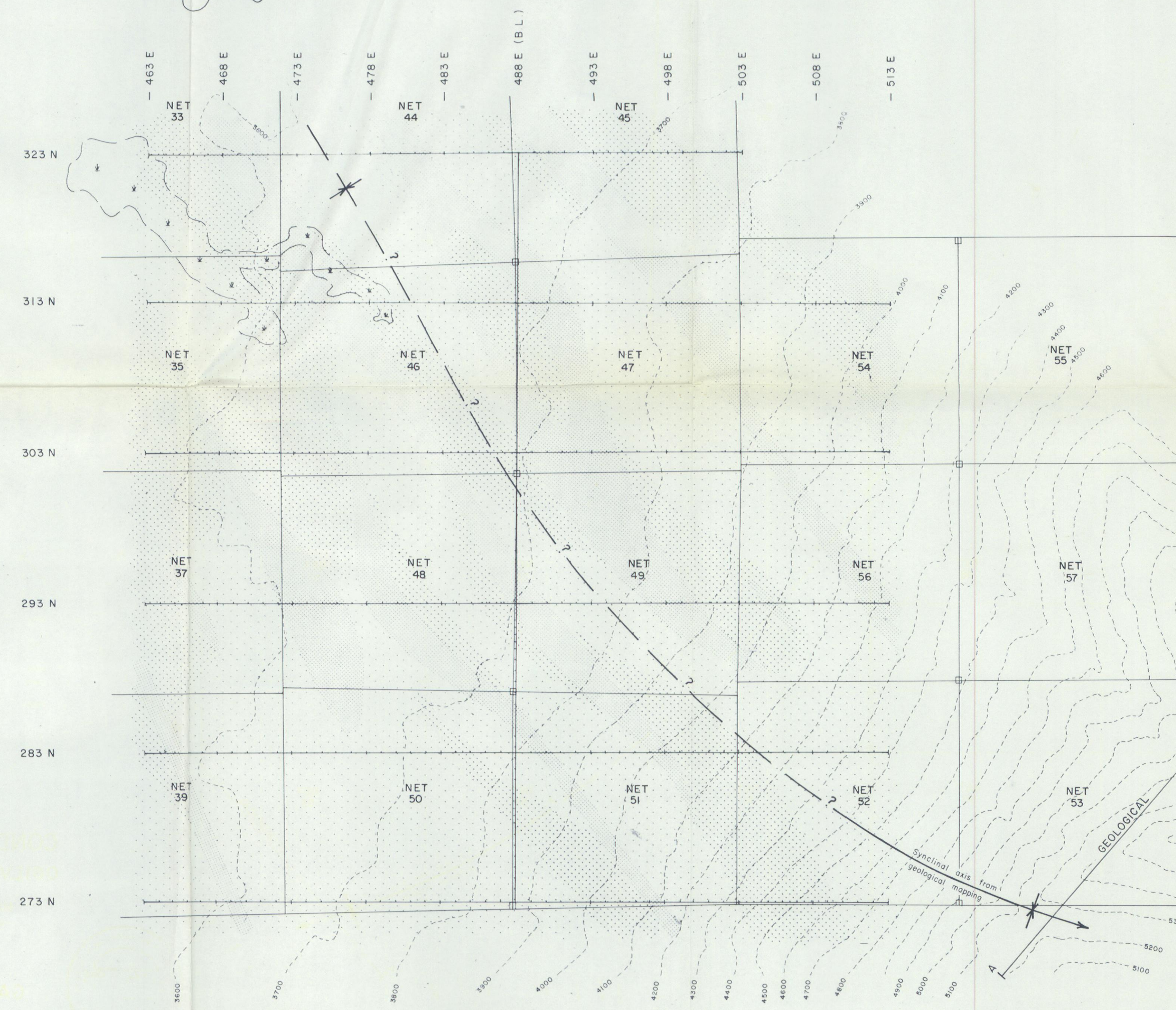
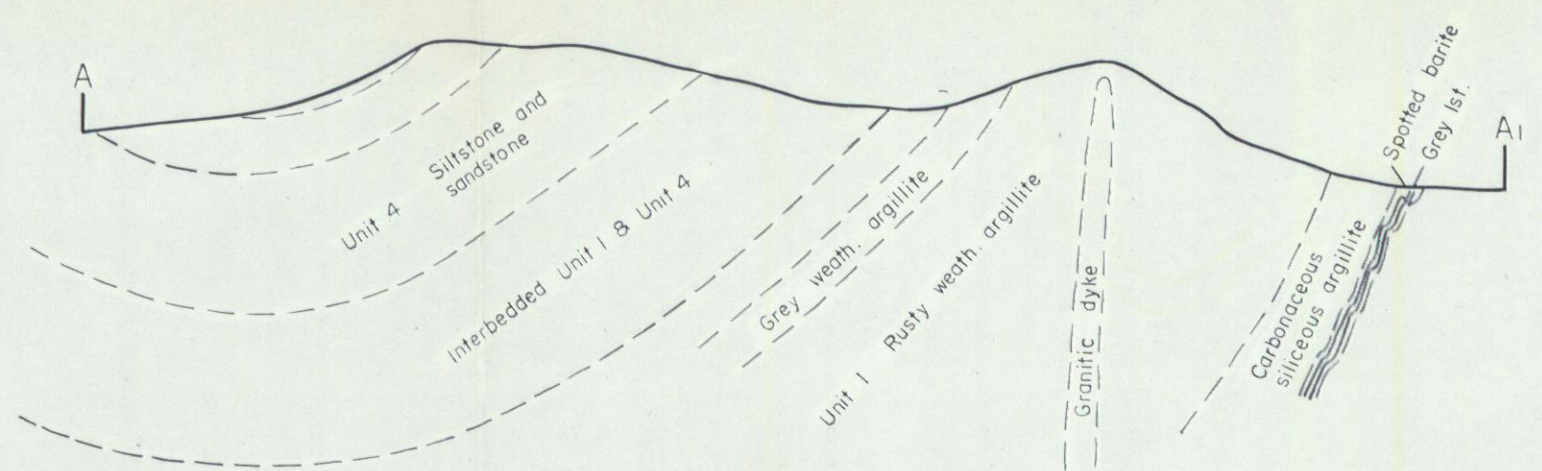


TO ACCOMPANY REPORT

JOHN BETZ LTD.  
NOV, 1977



GEOLOGICAL SECTION A - A<sub>1</sub>



LEGEND

- Moderately to highly conductive material
- Poorly to moderately conductive material
- Poorly conductive material
- 4000 Topo contour - elevation in feet above sea level

CONDUCTIVITY MAP  
OGILVIE JOINT VENTURE

MACMILLAN PASS AREA  
WATSON LAKE MINING DISTRICT  
YUKON TERRITORY  
63° 04' N, 130° 15' W  
N.T.S. 105-0-1

GARY PROPERTY  
(SOUTH)



HORIZONTAL and VERTICAL SCALE: 1 inch = 500 feet  
0 500 1000 FEET

TO ACCOMPANY REPORT

JOHN BETZ LTD.  
NOV, 1977

REFERENCES

BETZ, J.E., 1976: Maxmin II EM Survey  
on the Jason and Tom Properties,  
Assessment Report.

BETZ, J.E.: Maxmin II Manual.

APPENDIX "D"

CLAIM RECORD SUMMARY

CLAIM RECORD SUMMARY

<u>Claim Name</u>	<u>Grant Number</u>	<u>Renewal Date</u>
Net 2	YA 12246	December 20
Net 3	YA 12247	December 20
Net 4	YA 12248	December 20
Net 5	YA 12249	December 20
Net 6	YA 12250	December 20
Net 7	YA 12251	December 20
Net 8	YA 12252	December 20
Net 9	YA 12253	December 20
Net 10	YA 12254	December 20
Net 11	YA 12255	December 20
Net 12	YA 12256	December 20
Net 13	YA 12257	December 20
Net 14	YA 12258	December 20
Net 15	YA 12259	December 20
Net 16	YA 12260	December 20
Net 17	YA 12261	December 20
Net 18	YA 12262	December 20
Net 19	YA 12263	December 20
Net 20	YA 12264	December 20
Net 21	YA 12265	December 20
Net 22	YA 12266	December 20
Net 23	YA 12267	December 20
Net 24	YA 12268	December 20
Net 25	YA 12269	December 20
Net 26	YA 12270	December 20
Net 27	YA 12271	December 20
Net 28	YA 12272	December 20
Net 29	YA 12273	December 20
Net 30	YA 12274	December 20
Net 31	YA 12275	December 20
Net 32	YA 12276	December 20
Net 33	YA 12277	December 20
Net 34	YA 12278	December 20
Net 35	YA 12279	December 20
Net 36	YA 12280	December 20
Net 37	YA 12281	December 20
Net 38	YA 12282	December 20
Net 39	YA 12283	December 20
Net 40	YA 12284	December 20

CLAIM RECORD SUMMARY (cont'd)

<u>Claim Name</u>	<u>Grant Number</u>	<u>Renewal Date</u>
Net 41	YA 12285	December 20
Net 42	YA 12286	December 20
Net 43	YA 12287	December 20
Net 44	YA 12288	December 20
Net 45	YA 12289	December 20
Net 46	YA 12290	December 20
Net 47	YA 12291	December 20
Net 48	YA 12292	December 20
Net 49	YA 12293	December 20
Net 50	YA 12294	December 20
Net 51	YA 12295	December 20
Net 52	YA 12296	December 20
Net 53	YA 12297	December 20
Net 54	YA 12298	December 20
Net 55	YA 12299	December 20
Net 56	YA 12300	December 20
Net 57	YA 12301	December 20
Net 60 Fr	YA 12302	December 20
Net 62 Fr	YA 12303	December 20
Net 63 Fr	YA 12304	December 20
Net 64	YA 20147	December 22
Net 65	YA 20148	December 22
Net 66	YA 20149	December 22
Net 67	YA 20150	December 22
Net 68	YA 20151	December 22
Net 69	YA 20152	December 22
Net 70	YA 20153	December 22
Net 72	YA 20155	December 22
Net 73	YA 20156	December 22
Net 75	YA 20158	December 22
Net 76	YA 20159	December 22
Gary 4	Y 83280	December 22
Gary 28	Y 83282	December 22
Gary 29	Y 83283	December 22
Gary 30	Y 83284	December 22
Gary 31	Y 83285	December 22
Gary 32	Y 83286	December 22
Gary 33	Y 83287	December 22
Gary 34	Y 83288	December 22
Gary 35	Y 83289	December 22
Gary 36	Y 83290	December 22
Gary 37	Y 83291	December 22
Gary 38	Y 83292	December 22

CLAIM RECORD SUMMARY (cont'd)

<u>Claim Name</u>	<u>Grant Number</u>	<u>Renewal Date</u>
Gary 63	Y 84402	October 11
Gary 64	Y 84403	October 11
Gary 65	Y 84404	October 11
Gary 66	Y 84405	October 11
Gary 67	Y 84406	October 11
Gary 68	Y 84407	October 11
Gary 69	Y 84408	October 11
Gary 70	Y 84409	October 11
Gary 71	Y 84410	October 11
Gary 72	Y 84411	October 11
Gary 73	Y 84412	October 11
Gary 74	Y 84413	October 11
Gary 75	Y 84414	October 11