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Geophysical test surveys and diamond drilling at Bidjovagge North.

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A transient electromagntic test survey with good results on the deep seated anticline structure is also included. A slingram test survey over the "B" ore body shows that Biddjovagge type mineralization only under special conditions can be distingushed from graphitic units by electromagnetic means. Magnetic surveys can be useful in the work to find sulphide mineralized sones. A gravimetric test survey shows that the "B" ore body has not got enough density sontrast against the greenstones to produce a clear gravity anomaly.

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RAPPORT VEDRØRENDE:

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CONTENTS

1. INTRODUCTION

This report contains the results of the 1983 exploration work in the continuation of the Bidjovagge anticline towards north. The work was done within the joint venture area of Norwegian Gulf Co A/S and A/S Sydvaranger. Included in the report are also geophysical test surveys at the "B" ore body of the Bidjovagge mining field.

The close association between graphite felsite and sulphide mineralization in Bidjovagge makes EM-surveying a useful tool for mapping the ore bearing horizon. In Fig. 1 the two limbs of the Bidjovagge anticline and the West anticline are clearly outlined by TURAM anomalies. The anomalies from the graphite felsite completely overshadows very weak effects from the sulphide mineralization.

Just north of the B ore body the Bidjovagge anticline plunges towards north. The continuation of the anticline is indicated by a deep EM anomaly (Fig. 1). This anomaly has been followed over a strike length of 2,9 km by several TURAM surveys by NGU from 1956 to 1965 (NGU reports no 525 and 607).

The ore bearing horizons of albite felsite and graphite felsite have been followed by diamond drilling northwards to profile N 1400. Two long holes in profile N 2200 (Ddh 220 A) and N 3400 (Ddh 340 A) from 1965 did not intersect the albite felsite and graphite felsite.

In 1982 geophysicists Ørnulf Logn of ASPRO and Per Singsås (retired) of NGU made a new interpretation of the old TURAM surveys. The new results are given in ASPRO report no 1504. The new interpretation involves important changes in the position of the deep conductor and gives an explanation why Ddh's 220 A and 340 A did not intersect the conductor.

Fig. 2 shows the new interpretation and two old interpretations of the position of the conductor in section N 1400. Diamond drill hole 140 D was drilled to test the new TURAM interpretation. Drilling results are described in the following chapter. The TURAM survey of profile N 1400 will be discussed in details in a later chapter. A test survey with a transient EM system, Geonics EM -37 will also be presented in this report.

The main target for the regional exploration of the Kautokeino greenstone belt is Bidjovagge-type mineralization. The main geophysical tools for follow-up work of the regional exploration are Slingram EM and magnetics.

It was therefore considered useful to survey test profiles with these instruments over the "B" ore body (profile N 920) and over the deep conductor of profile N 1400.

Gravity surveys have been used with success in North America to distinguish between sulphide and graphite conductors. Therefore also gravity measurements of line N 920 were made. The results of all these tests are presented in later chapters.

Geophysicist dr. Ørnulf Logn of ASPRO has written the chapter "TURAM indications, line N 1400". Geophysicist Finn Hansen of Sulfidmalm and geologist Ragnar Hagen of ASPRO have written chapters concerning EM-37 and Slingram surveys. Ragnar Hagen has compiled the report and written introduction chapter and chapters concerning diamond drilling and gravity measurements.

2. DIAMOND DRILLING 1983

The work by Logn and Singsås indicated that the graphite felsite is situated at a depth of less than 100 m in section N 1400 (Fig. 2). Ddh 140 C from 1965 showed a mineralization of 11 m with 0,69% copper at a depth of about 400 m. In the area between the B ore body and profile N 1400 the structures are not fully understood. Several diamond drill holes intersect the ore horizon in this area with very minor mineralization. All this in mind it was decided to test the new TURAM interpretation with ddh 140 D in 1983 (Fig. 2). The hole was situated to get an intersection close to the fold hinge at the top of the anticline.

The core log report and analyses of ddh 140 D are given in Encl. 1.
The vertical direction of the hole was kindly surveyed by Outokumpu Oy. The complete results are plotted in the geological section in Fig. 2.

Two zones of very weak mineralization (6,0 m of 0,16% Cu and 0.22 ppm Au and 4,0 m of 0,27% Cu). in albite felsite were found. Two closely spaced zones of graphite felsite were intersected at a depth of about 80 m. The albite felsite in ddh 140 D is brecciated with numerous carbonate veins with pyrite and pyrrhotite. These results prove that mineralization processes have taken place but the grade is too low. A high gold to copper ratio (0,22 ppm Au / 0,16% Cu) is nevertheless encouraging. The mineralization in ddh 140 D can probably be interconnected with the one in ddh 140 C by a stratabound model. The grade in both holes is too low to warrant further diamome drilling to explore the area between them.

Fig. 3. Diamond drill hole 140 D was drilled with ASPRO's Longyear 24 drill.

The geological interpretation of section N 1400 is uncertain. The geological section (Fig. 2) must be regarded as an attempt to demonstrate the fold style. The direction survey of the old ddh 140 C has not been found and in the section the hole has been given a "normal" deflection for the Bidjovagge area. The core log reports of the old holes are lacking details which adds an uncertainty to the interpretation. Apart from the drilling results the geological interpretation is based on a transient EM survey which will be discussed later in this report.

During the 1983 field season a magnetic profile was surveyed along line N 1400. A 5 point running average of the readings is plotted in Fig. 2. The central part of the anticline, between 400 E and 500 E is characterized by a magnetic low which corresponds to the low magnetite content of albite felsite, graphite felsite and meta diabase/meta basalt. The magnetite bearing meta diabase in the core of the anticline is too deep to influence the magnetic field at surface. Magnetite-rich bands in the thick meta tuff to the east of 535 E give a general magnetic high with several peaks. The same magnetic pattern is not found over the assumed same rock unit on the western limb. This may be explained by a lateral decrease in the magnetite content towards west together with decreasing thickness of the meta tuff unit.

3. TURAM-INDICATIONS, LINE N 1400

The turam-indications of Bidjovagge mining field, Northern part, have in 1965 been evaluated by the NGU geophysicist G.F. Sakshaug, now retired.

In 1982 a re-evaluation was carried out by the retired NGU geophysicist P. Singsaas and dr. ing. Ø. Logn, Prospektering A/S. The results of this evaluation are described in the Report no. 1504 (Prospektering A/S).

The indications given in the re-evaluation differ in some details from the interpretations of mr. Sakshaug.

The reason of the evaluation problems is that the em. field is quite complicated, indicating the following three current concentrations (Fig. 4):

1) An eastern concentration, and
2) A western concentration, lying in about 200 m distance from the eastern, positioned in depths roughly about 50-70 m, and
3) A very deep current concentration, not possible to position exactly.

The influence of this deep conductor dominates the Em field in the area.

The area in question was measured by 2 primary transmitting cables:

1) A western, long cable 1 placed at 0 (Fig. 4), and
2) An eastern corresponding cable 2 at 1200 E.

Both cables are earthed in the ends.

Measurements are made on the western side of cable 2, i.e. in the area between the two cables. Measurements are carried on both sides of the western cable 1. The three above-mentioned conductors are found between the two primary cables.

The vertical field components are measured. The em. field values are normalized as to the primary cable fields, and are given in percentage of the primary field. The normalized component variations are seen above the geological section in Fig. 4.

The coloured hole is drilled after the 1982 re-evaluation in report no. 1504. The em. curves are indicated in the figure with the symbols Re for the real (inphase) component, and Im for the imaginary (out of phase) component. The primary energizing cables (1-2) are stated in the indices of the components.

The re-evaluation of 1982 was based on the assumption that the deep conductor was so very deep that the em. field from it did not influence the depth evaluations of the two upper conductors particulary.

In the report no. 1504 the depth to the western conductor in profile N 1400 was evaluated to 75 m and the position was estimated to 450 E, with a surrounding 30 m diameter circle of uncertainty (Fig. 4). The conductor is suggested to be positioned in upper part of the Bidjovagge antiform.

The drillings carried out summer 1983 (drill hole coloured) showed (geological section, Fig. 4):

1) Conducting graphite felsite at 475 E in the depth 75 m
2) Weak copper-mineralizations in the hanging and in the foot-wall of this graphite felsite.

The difference between evaluated conductor position and the possible real position is supposed to be about 25 m. No difference in depth.

Afterwards the question is:

Could this result has been better?

To answer the question we have to take the geological situation in consideration

The structural section through the drill holes drawn by the geologist R. Hagen is found in the middle of the figure, in prinsiple not very different from the figur 6 in the Report no. 1504.

It appears that the rocks together with the graphite felsite are folded up in an antiform. The usual geological opinion is that the same graphitic horison some 800 m farther west has formed another antiform, the top of which is cut away by the surface. Em. measurements are carried out over this western antiform with cable 1 as primary transmitter. The em. vertical component curve in the western part show two strong indications on near-surface conductors, which are thought to belong to the graphitic felsite, found in the eastern antiform.

These two antiform have to be connected by an intermediate synform placed somewhere in the depth, as indicated in the figure.

The before mentioned deep conductor is thought to be positioned in the middle of the synform fold, there

1) possibly the graphite felsite is thickest, and

2) it is a good performance of the primary induction fields fields trough the conducting graphite bed (circles in the figure).

Therefore we will suggest a deep conductor positioned somewhere at coordinates at 400-500 E. In the figure the deep conductor is suggested to be placed about 500 m under surface.

This conductor is suggested to give a decrease in the real component of the vertical fields energized by the two cables, both the western cable 1 and the eastern cable 2, as indicated by the "deep" curves $Re_{Deep\ 1}$ and $Re_{Deep\ 2}$.

If normalizing the em. field values against these values of the "deep" curves $Re_{Deep\ 1}$ and $Re_{Deep\ 2}$, instead of the primary cable field values, we get a better approximation to the drilling results. Then the two conductor positions C1 and C2 of transmitting cable 1 and 2 in average differ not more than 5-10 m from the drilling results.

An interesting feature is that the imaginary components of the eastern and the western conductors (Fig. 4) have opposite sign in both cases either energized by the western (cable 1) or by the eastern cable 2. Therefore the currents induced in the two conductors have opposite phases independent on the primary transmitter cable position. This discussion reveals the problems in em. investigations when several conductors are present in the area.

I hope that this case shows the importance of knowing most exactly all geological informations, not only in the vicinity of an anomaly, but also in the surroundings, when evaluation of conductor depth and position is actual.

4. TRANCIENT EM TEST SURVEY

In late June 1983 a group from Geonics Ltd, Canada and Geophysical & Equipment Ltd, England was making a tour in Finland and Sweden, demonstrating the Geonics EM-37 transient EM system. This chance to get an inexpensive test survey in Bidjovagge with a transient EM system was utilized.

Shortly after the drilling of hole 140 D was started, the profiles N 1400 (drilling profile) and N 1700 were surveyed. The transmitter was a 300 m x 600 m loop with a 11 ampere current and a 200 sec turn off time. Both the horizontal (B_x) and the vertical (B_z) komponents of the secondary electromagnetic field were measured. The receiver records the secondary field at 20 channels, or gates. The center of the gates are located at the following times after the termination of the transmitter current:

Channel	Location (msek)	Channel	Location (msec)
1	0.089	11	0.876
2	0.110	12	1.087
3	0.140	13	1.40
4	0.177	14	1.77
5	0.220	15	2.21
6	0.280	16	2.82
7	0.355	17	3.57
8	0.443	18	4.46
9	0.563	19	5.66
10	0.712	20	7.16

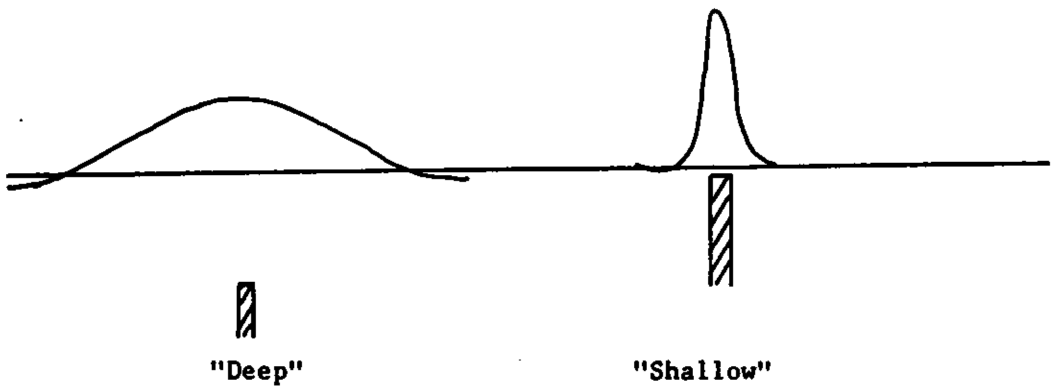
These 20 gates (channels) combined with a turn off time of 200 μs puts significant multispectral excitation from frequencies ranging from several kHz to Hz for obtaining information from all types of conductors.

For technical details concerning the EM-37 system see Geonics Technical Note TN-7.

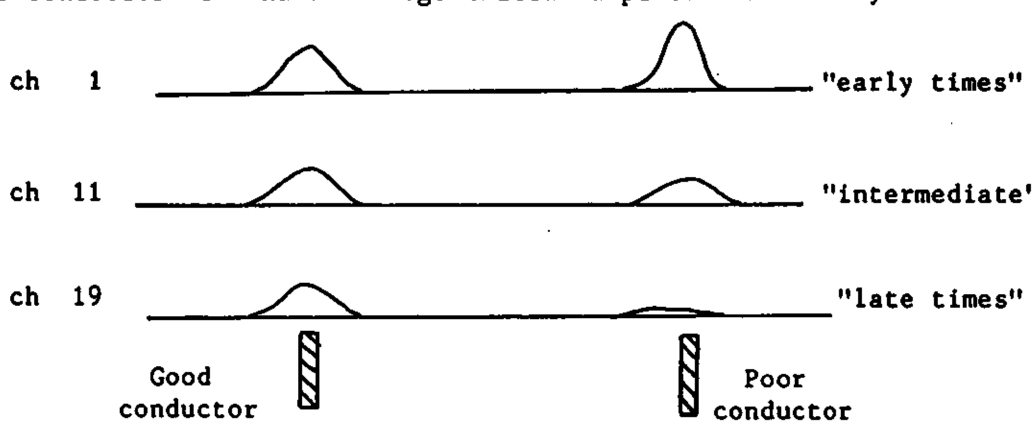
Fig. 5. EM-37 test survey in Bidjovagge.
Receiver with receiver coil in position to measure the horizontal field component.

The test survey data from line N 1400 are shown in fig. 6.1 (vertical field component B_z) and Fig. 6.2 (horizontal field component B_x). The 20 channels are grouped and scaled to demonstrate the dynamic range of the system. Under each component the geological section is shown.

The immediate interpretation is that two conductors are present - a poor and shallow conduction to the east and a good and a deep conductor to the west. The basis for this interpretation is: Anomaly shape, amplitude and time constant.



A good conductor will have a small initial amplitude and decay slowly while a poor conductor will have a large initial amplitude and decay fast:



Depth of conductor may be estimated by visual inspection using rules of thumb (peak- peak/half width rules etc.) or by modelling. By modelling an assumed conductor is given the properties which makes the best fit between the observed curve and the calculated curve from the assumed source. The Geonics simple PLATE program was used to find the model which gave the best fit to the observed channel 19 curve. On this "late" channel the only response is from the deep, good conductor. The best fit for line N 1400 was obtained for a plate at 475 E, at a depth of 85 m, with a 70° dip towards east and a height of 250 m (Fig. 6.3). This position also coincides well with the simpler ways of performing depth estimates. The PLATE program indicates a depth of 260 m in section N 1700. This means a plunge towards north of 31°.

Pyrite bands in the greenstone tuff are the cause of the easternmost anomaly on line N 1400. This zone is believed to have no economic potensial and will not be further discussed.

With the wide range of channels offered by the EM-37 system it is possible to select for interpretation a channel with minor disturbances from surrounding conductors. Interpretation is hereby made easy and good results are obtained both by conventional methods and by modelling.

5. SLINGRAM TEST SURVEY

The follow-up work of the regional airborne geophysical surveys is based on the use of the Apex Max Min II horizontal loop slingram system. It was therefore of great interest to test this system in the Bidjovagge area. Two test line were surveyed, N 920 and N 1400. Line N 920 is a profile across the central part of the B-ore body, and is therefore of direct relevance to the follow-up work. The purpose of surveying line N 1400 was of a more scientific nature, to test the response of the slingram system to a conductor at a depth of about 80 m.

The measurements were performed at two frequencies: 1777 H_z (high frequency - H) and 222 H_z (low frequency -L). Real (R) and imaginary (I) components of the secondary field are measured as percentage of the primary field for both frequencies. The results are presented as profiles above the geological section. Fig. 7. shows the slingram curve parameters that are used for the interpretation.

LINE N 1400

This line was surveyed with a coil separation of 200 m. The interval between readings was 25 m. The result are presented in Fig. 8.1. Both components of the high frequency and the imaginary component of the low frequency show negative minima. The low frequency real component has got only one negative minimum. The most likely interpretation of these curves is two steep conductors with a separation of less than 200 m. The ratio between the real component and the imaginary components of both frequencies indicate that the westernmost conductor "A" is a better conductor than the other, "B" (R/I 1 - "good", R/I 1 - "medium", R/I 1 - "poor"). This relation is most clearly seen on the low frequenzy, the easternmost conductor, "B" does not produce a real component anomaly, only an imaginary component anomaly.

The distance between the conductors is less than the coil separation. This causes an overlap of the anomaly curves. In spite of the overlap a further development of the interpretation is possible. The real component of the low frequency seems to "see" only the good conductor, "A". From this curve it is possible to extract the parameters needed for interpretation (Fig. 7.)

The slingram interpretation places the "A" conductor at 475 E, at a depth of about 70 m and with a 70° dip to the east. The thickness of the conductor is less than 25 m. The "B" conductor according the slingram interpretation should be placed at 650 E, at a depth of 20 to 40 meters with a dip of 35° to 60° to the east.

The slingram results of line N 1400 are in good agreement with both diamond drilling and results from the more "heavy" electromagnetic surveys. However it should be noted that a 200 m coil seperation is not practical and requires a relative flat topography and not too much vegetation.

LINE N 920

The slingram test profile of line N 920 was made to find the slingram response over a Bidjovagge-type ore body. Since magnetic measurements are made in the regional work, a magnetometer was also included in this survey.

The results are presented in Fig. 8.2. Slingram was surveyed at high and low frequencies with two coil separations, 25 m and 50 m. Three conductors, A, B and C can be seen in profile N 920 (Fig. 8.2.) Anomaly A represents the graphite felsite of the western limb of the anticline. The slingram interpretation of this anomaly is a good to medium conductor with a position at 400 E, at a depth of 10 to 15 m with a dip of 65° - 75° to the west and a thickness of about 10 m. This is in agreement with turam results and with diamond drilling.

Anomaly "B" is a very poor conductor which can be seen only on the high frequency with a ratio $R/I < 1$. The anomaly is somewhat disturbed by the strong "C" anomaly. There is noe doubt however, that the very weak "B" anomaly is caused by the vein-type mineralization of the B ore body. The "C" anomaly represents the graphite felsite of the eastern limb of the anticline. The low frequency real component is least disturbed from anomaly "B" and is therefore used for interpretation. The position of the conductor is 400 E, at a depth of less than 5 m with a dip of 65° - 75° to the east. The conductor thickness is about 10 m and the quality good.

The magnetic survey of line N 920 gives interesting results (Fig. 8.2). The wide magnetic high from about 350 E to 550 E is caused by the magnetite bearing meta diabase in the core of anticline. The high peak to the east is caused by a magnetite band in the meta tuff. Corresponding peaks can be seen in the magnetic profile N 1400 (Fig. 2). Small magnetic peaks superimposed on the broad magnetic high from the meta diabase at depth are probably due to magnetite associated with the sulphide mineralization. These small peaks corresponds well with the very irregular occurence of magnetite in the sulphide mineralization. There is a pyrite mineralization (with associated magnetite?) also on the western limb which may explain the magnetic peak at about 490 E.

6. GRAVITY TEST SURVEY N 920

In the summer of 1983 line N 920 over the B ore body at Bidjovagge was surveyed with a Warden 780 gravimetric instrument. The survey was conducted by geophysicist Jan F. Tønnesen of NGU. The purpose of the survey was to test if the B ore body could be detected by the use of gravity measurements.

The gravimetric profile is presented with the geological section in Fig. 9. The measurements have been reduced with reference to a local base level. Topographic corrections have not been maden.

The uncertainty of the data is about 0,1

The high anomaly to east is caused by the relative heavy greenstones. The near surface rocks of the central parts of the profile is dominated by lighter albite felsite. To the west the greenstones of the western limb of the anticline are suboutcropping with a corresponding weak gravity high.

The highest readings of the central part of the profile were made over the mineralization. This local anomaly is very weak (about 0,1 milligal) but is probably caused by the sulphide content of the mineralized albite felsite. It is impossible without detailed knowledge of the geology to distinguish the anomaly of the mineralization from the anomalies of greenstones of varying density.

From the gravity test survey it may be concluded that the density contrast of Bidjovagge-type mineralization compared to greenstones does not produce gravity anomalies that can be used in the exploration for these deposits.

7. CONCLUSIONS

This report shows the great importance of a close interaction between geology and geophysics. A good knowledge of the geology leads to a better understanding of the geophysics. A better understanding of the geophysics will again lead to a better geophysical interpretation in unknown areas. With the detailed work presented in this report the basis have been made for the exploration of the continuation of the Bidjovagge anticline towards north and for a better understanding of the data which are collected in the regional exploration programme.

The EM-37 system has demonstrated its ability to give exellent data from a deep seated conductor. The test results led to a new EM-37 survey of the Bidjovagge-North area in the fall of 1983.
This survey will be reported later.

Dr. Ørnulf Logns chapter in this report has shown that the old turam surveys with a careful and conscientious interpretation are able to produce a large amount of information. Compared to the EM-37 survey the turam survey seem to contain about equal amounts of information, but the turam results require a more experienced interpretator The EM-37 system has, however, an advantage with its many channels which corresponds to a wide range of frequencies.

The deep conductor of line N 1400 is clearly close to the limits of the Max Min II slingram system. It should be noted that the low frequency interpretation nevertheless is in good agreement with drilling results.

The slingram test line N 920 demonstrates that the Max Min II with the more convinient coil separations of 25 m and 50 m produce good data from more shallow conductors. These data can be used to outline the position, the geometry and quality of the conductors. The "B" ore body (516.000 tonnes of 1,04% Cu and 2,36 ppm Au) can be seen as a 7,5% imaginary anomaly on the high frequency (1777 Hz). The Bidjovagge-type mineralization normally occurs at the contact between albite felsite and graphite felsite. Under these conditions the anomaly from the mineralization could not have been distinguished from the anomaly from the graphite felsite. The small magnetic peaks associated with the sulphide mineralization is an important feature which should be used in the regional work. With a correlation to the large Viscaria ore body in Kiruna which can be classified as Bidjovagge-type, the importance of magnetic surveys together with the electromagnetic cannot be overemphasized.

The gravity survey did not produce encouraging results. No further work on detailed gravimetric surveys to distinguish between sulphide mineralized graphitic units and not mineralized graphitic units is recommended.

Stabekk, 19.06.1984

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DIAMANTBORING Bidjovagge 1983

Kjerneobservasjoner.

Borhull nr. 140 D Profil N 1400

Koordinator: Y 550 Ø X N 1400

Påsatt i høyde 604,3 m.

" i retning 300^g

" med helning " 50^g

Borhullets lengde 202,50

Boret meter	Bergart	Kjerne-mangel	Skifrighet	Bergart prøve
0 - 5,60	Jordboring			
5,60-18,50	Sedimentær grønnstein. Biotittholdig. Båndet med striper av py og mt. Oppknust og rusten til 7.50 15.80-16.05 og 16.45-16.60: Albittfels - omv. langs karb. årer i breksjert b.a.? 17.85-18.00 og 18.30-18.35: Py - karb. årer Ca. 70% py.		6.60:70 15.60:70	
18,50-22,60	Grønnstein, massiv, middels- til finkornig. umagn. Breksjert. Spredte årer og slirer med karb - qv. Inneholder spredte disseminerte py - korn. 21.10-21.20: Fragmenter av tett brun albittfels.			
22,60-36,00	Metadiabas. Middelskornig, massiv. Feltspat-lister i ofitisk textur 26.70-34.00. Svakt. magn. Inneholder spredte kart. årer. 34.00-36.00: Overgangssone med finkornig mørk grønnstein.			
36,00-73,60	Metadiabas. Grovkornig, massiv. Med spettet utseende av lyse feltspatkorn. Gradvis overgang ved 41.00 m til grov-middelskornig bergart uten lyse spetter. Inneholder spredte py-korn. 42.40-42-45 og 42.90-43.05: Albittfels-soner. 45.70-47.50: Grovkornige ofitiske texturer. Fra ~ 50 m : Biotittholdig. Litt py i tynne karb. årer.			
73,60-84.00	Sedimentær grønnstein. Fin- til middelskornig, båndet. Py som disseminerte korn og konkordante striper med karb. Lokalt finnes slirer med albittfels. Meget svakt magn.		75.20:80 80.75:60 83.70:75	
84,00-89,40	Albittfels. Uren albittfels med innhold av biotitt og amfibol. Fin- til middelskornig, båndet. Litt cp i årer med po og karb.		86.60:75	

Ark 2 Bh. nr. 140 D Profil N 1400

Boret meter	Bergart	Kjerne-mangel	Skifrighet	Bergart prøve
89,40-96,30	Grønnstein, mørk massiv og middelkornig. Inneholder disseminert po og py. Spor av cp i karb. årer med po.			
96,30-104,40	Sedimentær grønnstein som 73.60-84.00. Litt cp i karb. - py årer ved 88.20.		98.70:70° 103.70:70°	
104,40-107,80	Albittfels, uren med biotitt og amfibol. Karbonatholdig. Litt py i disseminasjon. Inneholder spredte karb. årer.		105.10:75°	
107,80-111,65	Grafittfels middels C-innhold. Hyppige årer og stikk med karb. og litt py.		108.70:70°	
111,65-113,20	Albittfels. Tett, grå med litt cp i impregnasjon.			
113,20-116,60	Grafittfels, som 107.80-141.65		114.65:65° 116.60:60°	
116,60-128,25	Albittfels, som 111.65-113.20. Litt cp og po i årer og slirer med karb. 117.30-117.45: po- (cp) åre. 118.95-119.20 og 123.55-125.40: Grovkornet karbonat med po og (cp). Foldestrukturer i albittfels ved 124.90 og 128.20.			
128,25-130,35	Grønnstein, middelskornig, massiv m/feltspat-lister. Magnetisk. Mørk, finkornig, foliert overgangssone: 128.25-129.90.			
130,35-133,75	Albittfels. Lys grå, finkornig. Lokalt med cm-store kloritt-rike spetter. Hyppige tynne karbonatårer med py, po og spor cp. 130.50-130,70: Karb-årer med qv, py og po.			
133,75-139,60	Grønnstein, massiv, mørk og middelskornig. Umagn. Spredte karb. årer. 137.40-137.60 og 138.40-139.00: Albittfels-soner.			
139.60-143.05	Albittfels, som 130.35-133.75, men noe bedre utviklet bånding.		140.60:40°	
143,05-159,00	Grønnstein, massiv, middelskorning, noe varierende utseende, lokalt med hvite spetter og lister. Svakt magn. Inneholder spredte karb. årer. Tynne årer med massiv py ved 143-144 m. 153-159: Overgangssone med veksling med albittfels.		155.95:60°	

Ark 3 Bh. nr. 140 D Profil N 1400

Boret meter	Bergart	Kjerne-mangel	Skifrighet	Bergart prøve
159,00-189,20	<u>Albittfels,</u> som 130.35-133.75. Inneholder enkelte karb- årer med py og mt. Lokale overgangssoner mot diabas. Åpne årer med karb. ved 182.90.		161.30:45° 188.60:60°	
189,20-202,50	<u>Grønnstein,</u> massiv middelkornig, meget svakt magn. Spredte karb. årer. 191.10-191.35: Åre med py på langs av kjernen. 192.40-192.60, 195.90-196.15 og 198.85-199.15: Albittfelssoner (mørk uren fels) i forbindelse med karbonat-årer med py, po og (cp). Bånding delvis utviklet?		196.10:45°	
	Hullet avsluttet ved 202,50 m. 14. juli 1983 Ragnar Hagen			

Borhull nr........140 D.........................

Prøve nr.	b.m.	% Cu	% Zn	% Pb	% Fe	ppm Au
	84-85	0,21				0,16
	85-86	0,11				0,83
	86-87	0,03				0,10
	87-88	0,11				0,02
	88-89	0,34				0,13
	89-90	0,22				0,13
	111-112	0,12				0,13
	116-117	0,11				< 0,02
	117-118	0,13				< 0,02
	118-119	0,02				< 0,02
	123-124	0,18				< 0,02
	124-125	0,36				< 0,02
	125-126	0,25				< 0,02
	126-127	0,32				0,05
	127-128	0,08				< 0,02

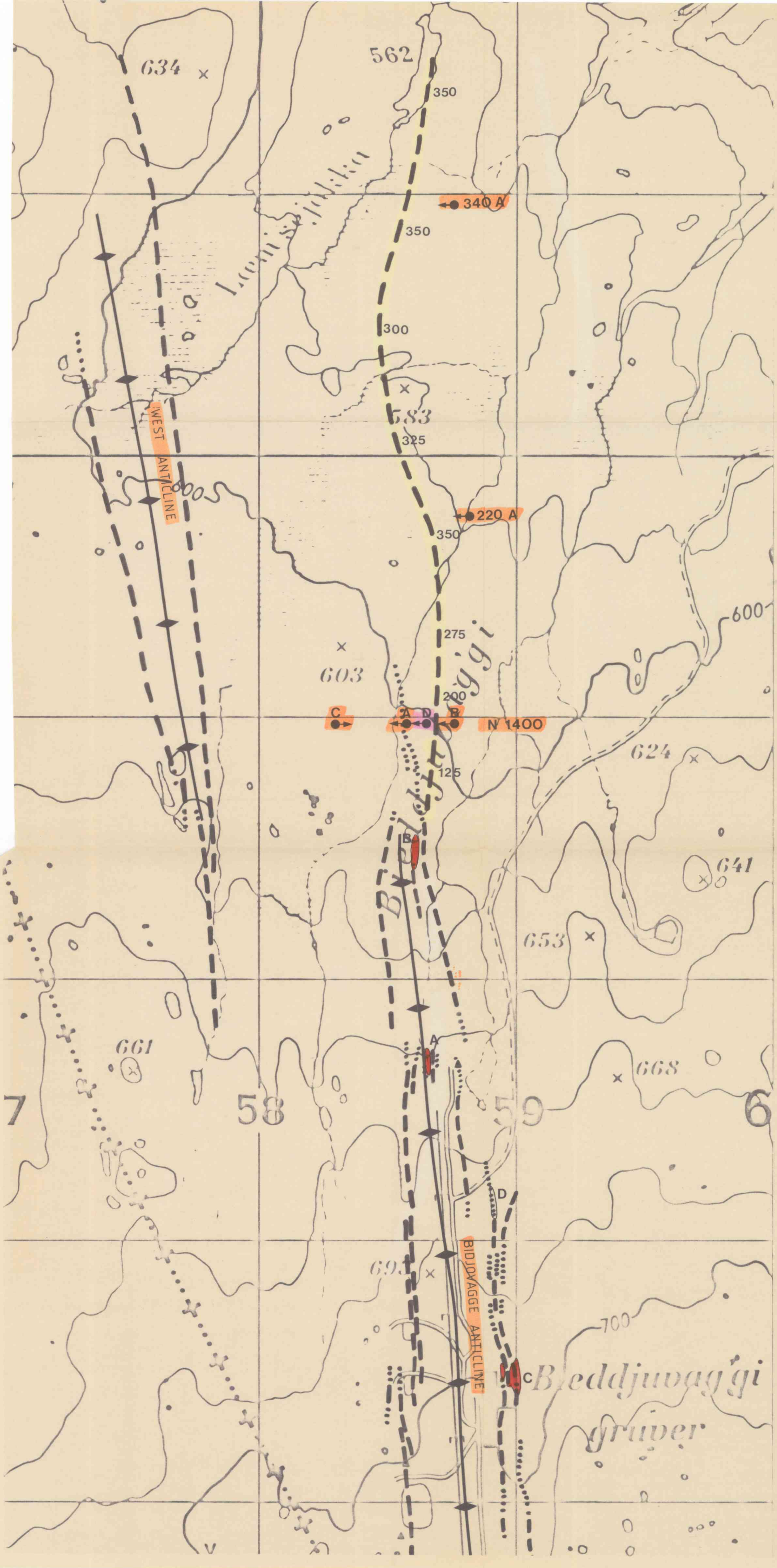
Avviksmåling   Borhull 140 D

N 1400   Ø 550   Bidjovagge 30.07.1983

Lengde (m)	Vertikal retning (°)
00	48,9
10	48,5
20	47,9
30	47,6
40	47,6
50	47,5
60	47,4
70	47,2
80	47,0
90	47,0
100	46,4
110	46,2
120	45,9
130	45,8
140	45,8
150	45,8
160	45,8
170	46,1
180	46,0
190	45,9
200	45,9

Målt av Suomen Malmi.

FIG. 1



LEGEND:

Turam surveys 1956-1963

— — Good conductor

• • • • • Poor conductor

— — Deep EM-anomaly

300 Depth estimate

A Ore body

Anticline

Diamond drill hole

N

Bidjovagge North EM-anomalies Diamond drill holes	M 1:10 000 Obs. NGU 1956 1963 Draw R.H. 1/84 Trace: H.B. 1/84
PROSPEKTERING A/S	Fig. 1.

FIG. 2

N 1400
nT
Magnetic vertical field 5 point running average.
4000
3500
3000
2500
2000
1500
1000
500
0
100 E
200 E
300 E
400 E
500 E
600 E
700 E
800 E
700
600
500
400
300
C
A
D
B
0,16 % Cu
0,22 ppm Au / 6,0 m
0,27 % Cu
< 0,02 ppm Au / 4,0 m
0,69 % Cu
< 0,1 ppm Au / 11,0 m
EM-interpretation
Position of deep conductor from TURAM surveys.
Logn / Singsås, 1982
Sakshaug, 1965
LEGEND
Till
Meta diabase / Meta basalt
Meta tuff
Graphite felsite
Albite felsite
Meta diabase
Diamond drill hole
% Cu
ppm Au
BIDJOVAGGE
Section N 1400
Geology
Magnetics
EM interpretation
PROSPEKTERING A/S
M
1:1000
Målt
Tegn R.H. 12/83
Trace
Fig 2

FIG. 4

Bidjovagge N 1400 Turam indcations	M 1:2000 Målt: Tegn: O.L. 3/84 Trace: H.B. 4/84 Fig. 4
PROSPEKTERING A/S	

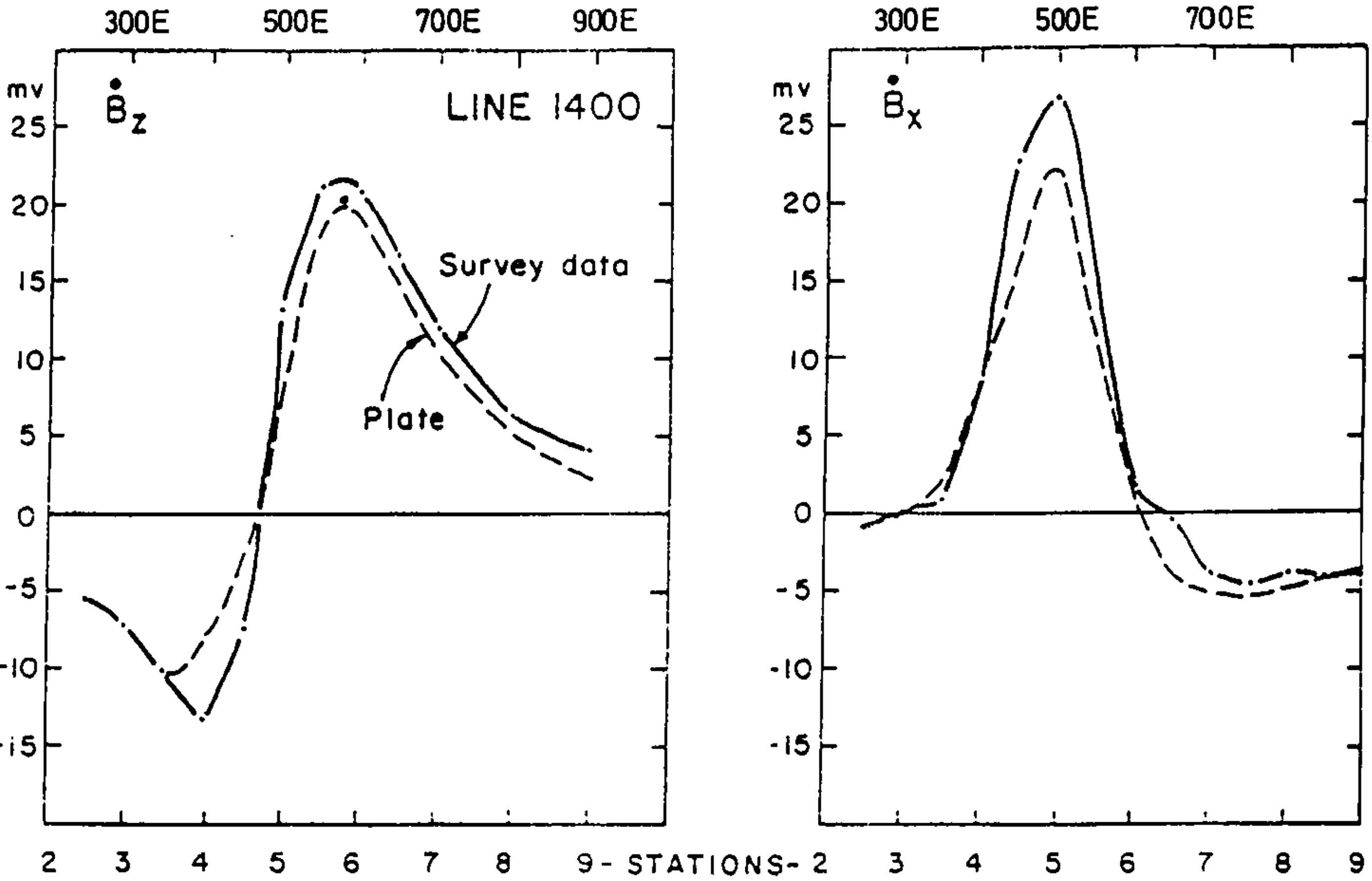
FIG. 6

N 1400
EM-37
Vertical field
component
BZ
mV
300 E
400 E
500 E
600 E
700 E
800 E
5000
1000
0
-1000
1000
500
100
0
-100
-200
100
10
0
-10
-20
30
20
10
0
-10
-20
CH 01
CH 02
CH 03
CH 04
CH 05
CH 06
CH 07
CH 08
CH 09
CH 10
CH 11
CH 12
CH 13
CH 14
CH 15
CH 16
CH 17
CH 18
CH 19
CH 20
LEGEND
Till
Meta diabase / Meta basalt
Meta tuff
Graphite felsite
Albite felsite
Meta diabase
Diamond drill hole
BIDJOVAGGE
Section N 1400
M
1:2000
Mål
Tegn RH 12/83
Trace
PROSPEKTERING A/S
Fig 6.1

6.1

BIDJOVAGGE Section N 1400	M 1:2000 Målt Tegn RH 12/83 Trace
PROSPEKTERING A/S	Fig 6.2

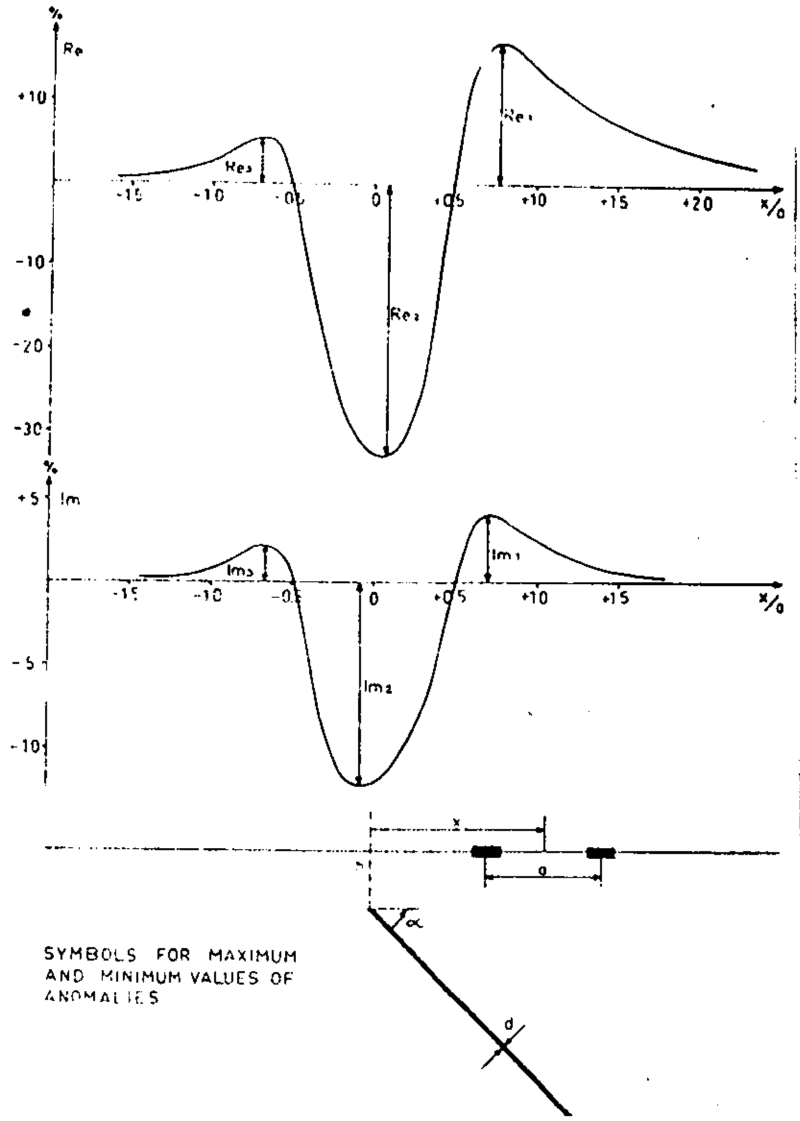
KAUTOKEINO Channel 19 5·7 m sec



Position at : 475E
Depth to plate : 85m
Dip of plate : 70°E

Bidjovagge N 1400 EM-37 Plate modelling	Scale 1:10000 Trace:
PROSPEKTERING A/S	Fig. 6.3

FIG. 7



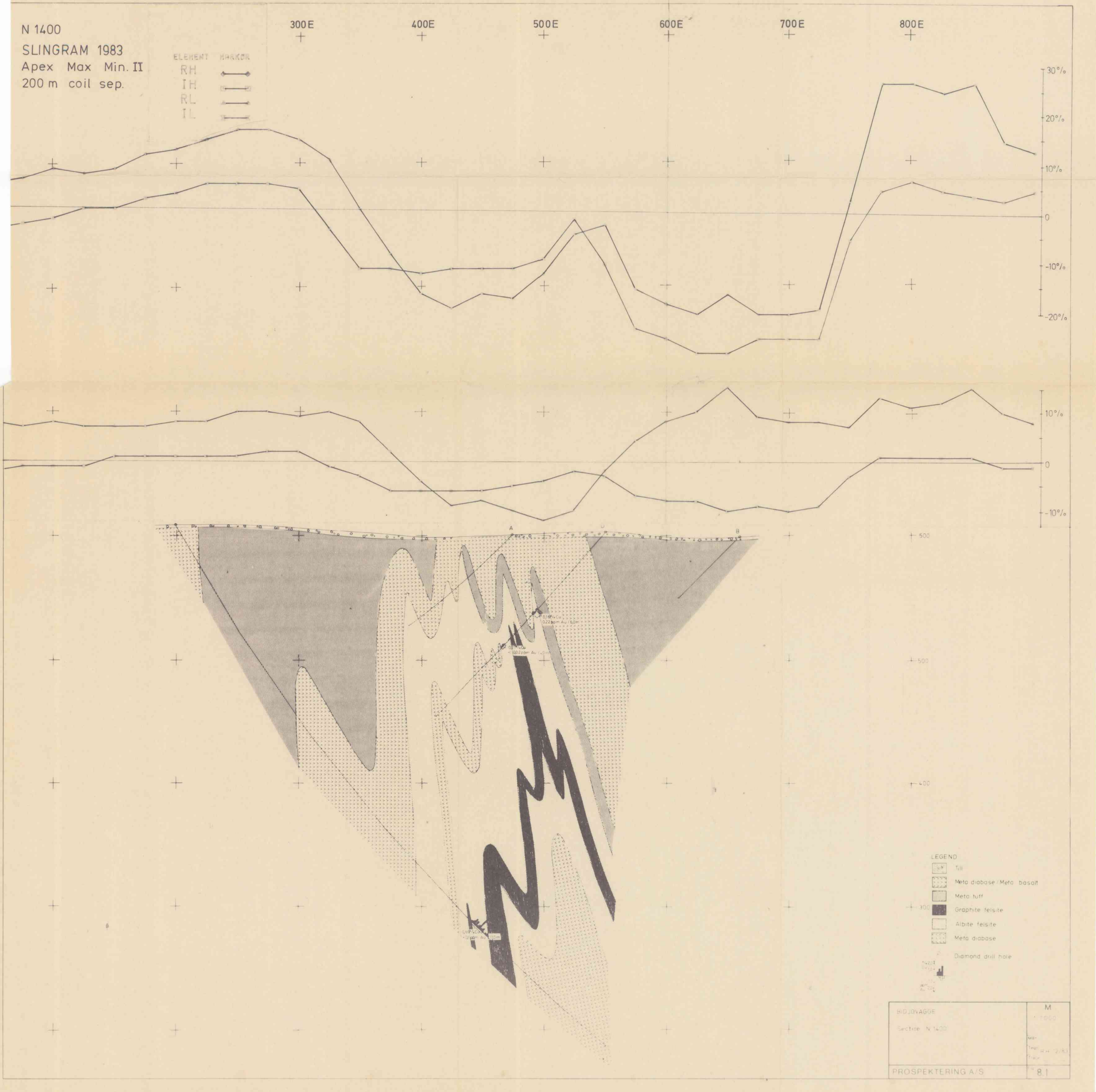
Horizontal loop slingram interpretation parameters

PROSPEKTERING A/S

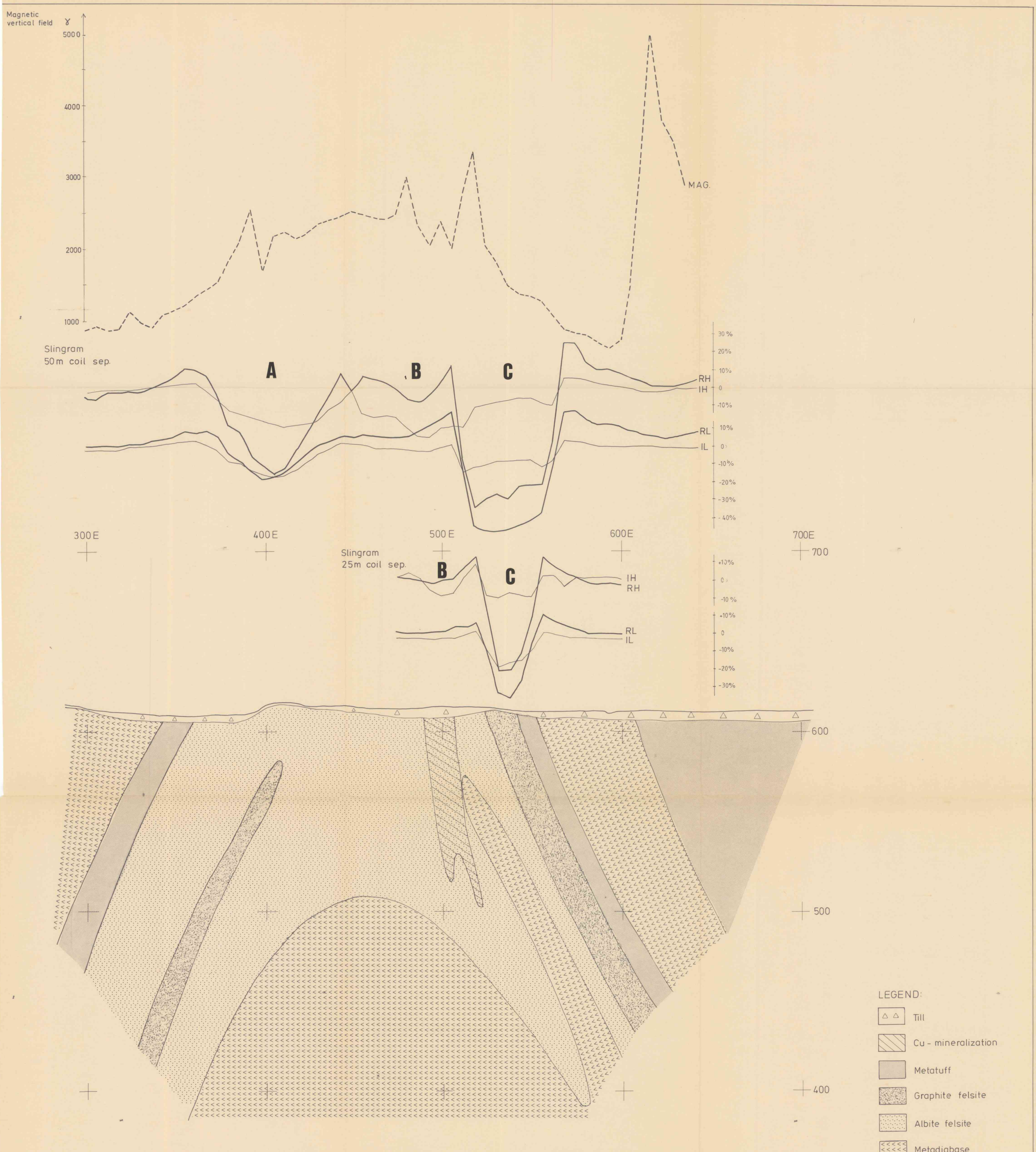
Trace:

Fig. 7

F
I
G.
8

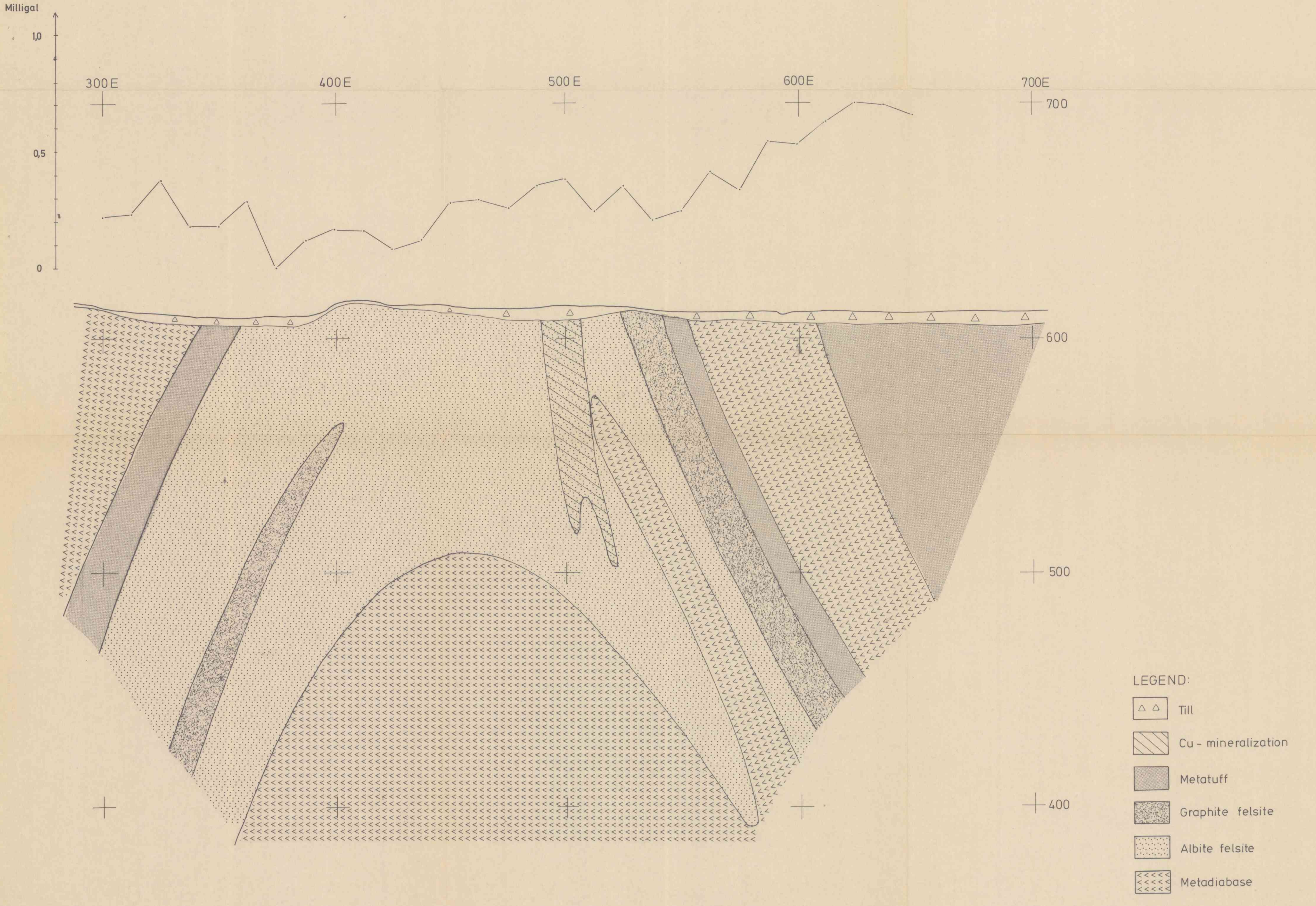


N 1400
SLINGRAM 1983
Apex Max Min. II
200 m coil sep.
ELEMENT MARKØR
RH
IH
RL
IL
300E
400E
500E
600E
700E
800E
30%
20%
10%
0
-10%
-20%
10%
0
-10%
A
B
500
400
300
LEGEND
Till
Meta diabase/Meta basalt
Meta tuff
Graphite felsite
Albite felsite
Meta diabase
Diamond drill hole
BIDJOVAGGE
Section N 1400
M
Tegn RH 2/83
PROSPEKTERING A/S
8.1



Bidjovagge	Scale
Section N 920 Slingram and magnetics	Draw: R.H. Trac: H.B. -83
PROSPEKTERING A/S	Fig 8.2

FIG. 9



Bidjovagge Gravity survey Section N920	Scale 1:1000
	Obs. JFT-83
	Draw RH 4/84
	Trac HB 4/84
PROSPEKTERING A/S	Fig. 9