Dr. [illegible]

COMMERCIAL IN CONFIDENCE

INFORMATION REQUIRED

FOR APPLICATION

FOR MINERAL EXPLORATION ASSISTANCE

ATLANTIC AND OCEANIC RESOURCES, LTD.

28th July, 1971

2 - MINERALS

The minerals sought at the Garudie Prospect are molybdenum and tungsten minerals with associated possibilities of other base metals such as lead and zinc.

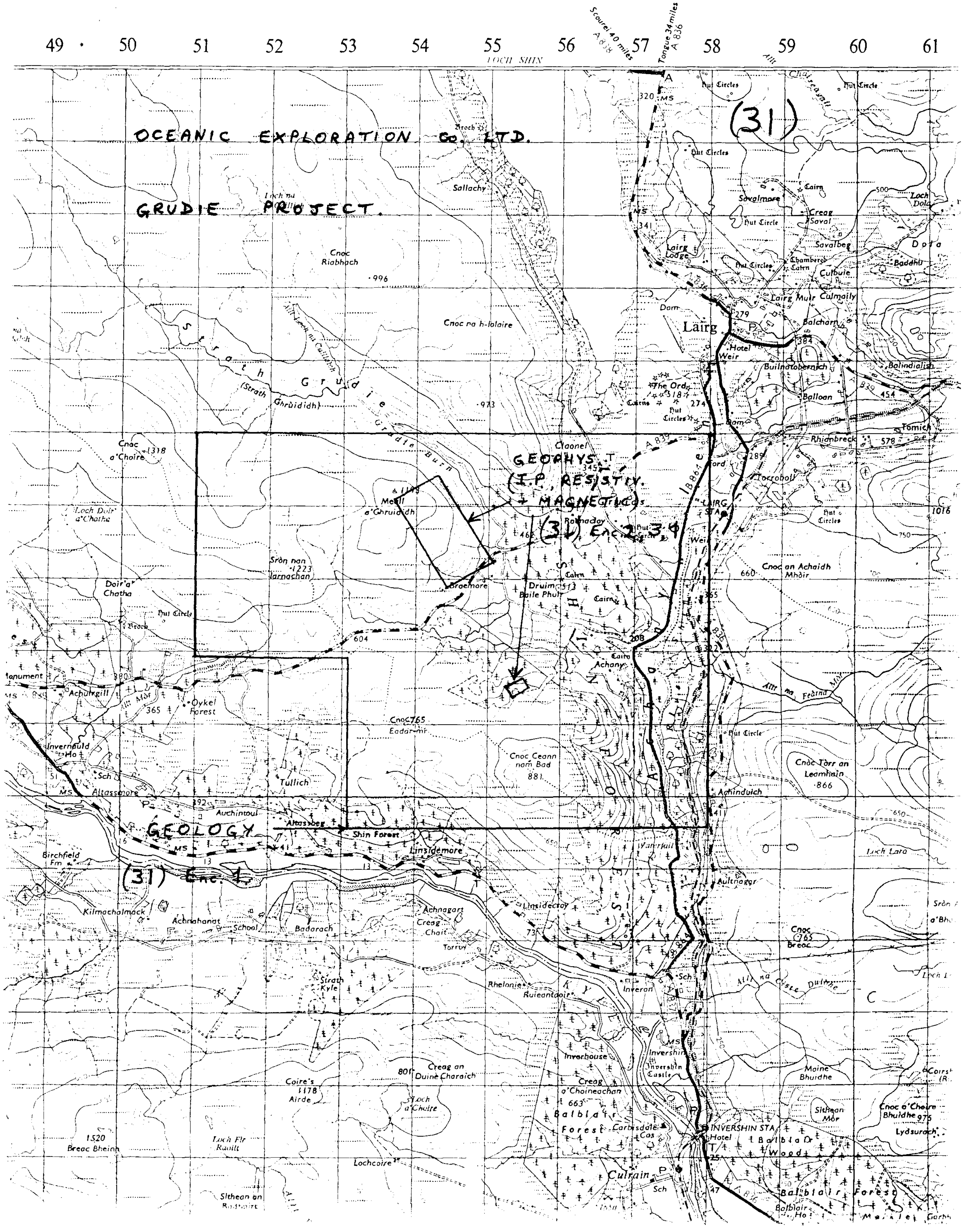
The project encompassing the exploration activities may be divided into two preliminary phases. Phase I includes surveying, geochemical sampling, and geophysical work (Induced Polarization and magnetometer) to cover the two areas in the prospect deemed most favourable by previous exploration. Phase II consists of trenching, to reveal and permit sampling of near surface bedrock, and diamond drilling, which will allow detailed sub-surface examination of those zones delineated by Phase I.

Since any additional plans or work depend on the results of Phases I and II, it is not possible or practical at this time to submit an outline of the project beyond that mentioned above, except to note that, for deposits of the type sought, extensive exploratory and development drilling and underground work and sampling are usually required.

4 - GEOLOGY

In the Ghrudie area, the Lower Paleozoic and Late Precambrian Moine Series (granulites and schists) are intruded by the well foliated Lower Paleozoic Lairg Granite and the Devonian relatively unfoliated Ghrudie Granite. A quartz porphyry phase of the Ghrudie Granite, occupying the southeast corner of the mass, and located approximately one-half mile southeast of Ghrudie Peak, is hydrothermally altered and weakly mineralized at the surface. Replacement and stockwork vein silica are sparsely evident over a large area which also contains disseminated pyrite and flourite. A large, 50-100', fault zone of undetermined throw located along the east contact of the porphyry mass contains numerous veins of calcite, flourite, quartz and hematite with some galena and sphalerite. The main area of economic interest however is that altered part of the porphyry which has a weak molybdenum geochemical anomaly over it. There exists a possibility for a porphyry or stockworks type molybdenum-tungsten deposit.

Elsewhere on the prospect, a large NW-SE trending fault has minor sphalerite, galena mineralization associated with massive replacement sili



OCEANIC EXPLORATION Co. LTD.
GRUDIE PROJECT.
(31)
GEOPHYS. (I.P, RESISTIV. + MAGNETICS)
(31) Enc. 2, 3, 4
GEOLOGY
(31) Enc. 1.
LOCH SHIN
Scourie 40 miles A 838
Tongue 34 miles A 836
Strath Grudie (Strath Ghruididh)
Lairg
Meall a'Chruidh
Braemore
Achany
Shin Forest
Linsidemore
Inveran
Invershin
INVERSHIN STA.
Culrain
Balblair Forest
Oykel Forest
Altassmore
Achnahanat
Kilmachalmack
Birchfield Fm
Cnoc Riabhach
Cnoc na h-Iolaire
Sròn nan Iarnachan
Cnoc Ceann nam Bad
Cnoc an Achaidh Mhòir
Cnoc Torr an Leamhain
Torroboll
Rhianbreck
Tomich
Sallachy
Lairg Lodge
49 50 51 52 53 54 55 56 57 58 59 60 61

FINANCIAL ASSISTANCE FOR MINERAL EXPLORATION (M.E.I.G.A.)

COMPANY: ATLANTIC AND OCEANIC RESOURCES LTD — REF: AE 6, MRD 84/4, MRD 144/4

PROJECT: GHRUDIE

The following Open File material is held by B.G.S. in London, Keyworth and Edinburgh. Available for public inspection from 19.9.86.

- Extracts from application 28.7.71, Minerals, Geology and location plan. Submitted with letter 28.7.71

- Final report. 19.4.73. J.C. Zahn, including IP and magnetic survey with the following plans:

  Plate 1 - Geological Map. 6" : 1 mile

  Plate 2 - Location map showing position of IP and magnetic traverses. October 1972. 1 : 10,560

  Plate 3 - Apparent chargeability, apparent resistivity and magnetic profiles. 1 : 5,000. October 1972

4C 6

OCEANIC EXPLORATION COMPANY

1900 PRUDENTIAL PLAZA TOWER • DENVER, COLORADO 80202 • PHONE 303 - 572-1561

TELEX 45-884
CABLE: OCEXCO
DENVER, COLORADO

EXPLORATION FOR ECONOMIC MINERALIZATION

GRUDIE PROSPECT, LAIRG, SCOTLAND

FINAL REPORT

OCEANIC EXPLORATION COMPANY

1900 PRUDENTIAL PLAZA TOWER • DENVER, COLORADO 80202 • PHONE 303 - 572-1561

TELEX: 45-884
CABLE: OCEXCO
DENVER, COLORADO

April 25, 1973

Enclosed are the results, conclusions and recommendations of our geological and geophysical exploration effort in the Shin Forest, Parish of Lairg, County of Sutherland, Scotland.

These data are submitted in compliance with the regulations of the Department of Trade and Industry, Great Britain.

The originals of these data are filed at the above office, in Denver, Colorado. Any questions concerning this report should be addressed to the undersigned.

Sincerely,

OCEANIC EXPLORATION COMPANY

Jack C. Zahn
Regional Explorationist

JCZ/yw
Enclosure

EXPLORATION FOR ECONOMIC MINERALIZATIO[N]

GRUDIE PROSPECT, LAIRG, SCOTLAND

FINAL REPORT

Introduction

This report concerns the results of exploration efforts conducted on a mineral lease granted by the Secretary of State for Scotland and described as an area of land known as Shin Forest in the Parish of Lairg, County of Sutherland, Scotland. The license area is bounded in the North by Loch Shin, on the East by the River Shin, on the South by Cnoc Ceann nam Bad and on the West by Meall a' Ghruididh (figures 1 and 2).

Geological and Geophysical Investigation

In 1969, Mr. R.G. Blair, a geologist with Atlantic and Oceanic Resources Limited, visited this area and produced the map enclosed as plate 1. At that time, it was established that there was one major zone of mineralization that was associated with a fault system from 100 to 200 feet in width. This zone contained some copper oxides and pyrite. It was thought that further investigation might turn up some zones of economic mineralization associated with the faulting.

In 1971, Mr. N. Christianson, a geologist for Atlantic and Oceanic Resources Limited, visited the area and examined the fault zones

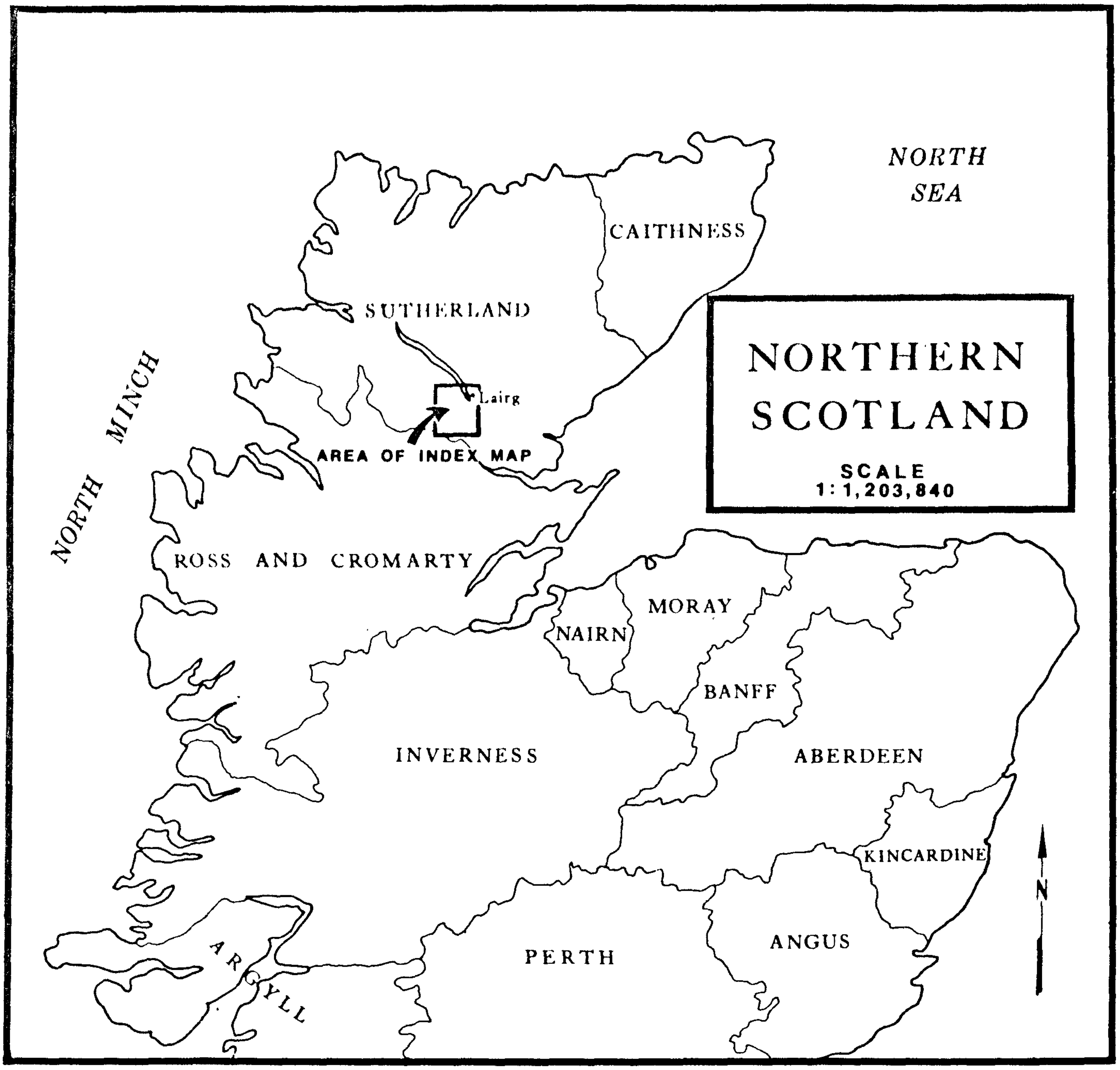

NORTH SEA
CAITHNESS
SUTHERLAND
Lairg
AREA OF INDEX MAP
NORTHERN SCOTLAND
SCALE
1: 1,203,840
NORTH MINCH
ROSS AND CROMARTY
MORAY
NAIRN
BANFF
INVERNESS
ABERDEEN
KINCARDINE
N
ANGUS
PERTH
ARGYLL

FIGURE I

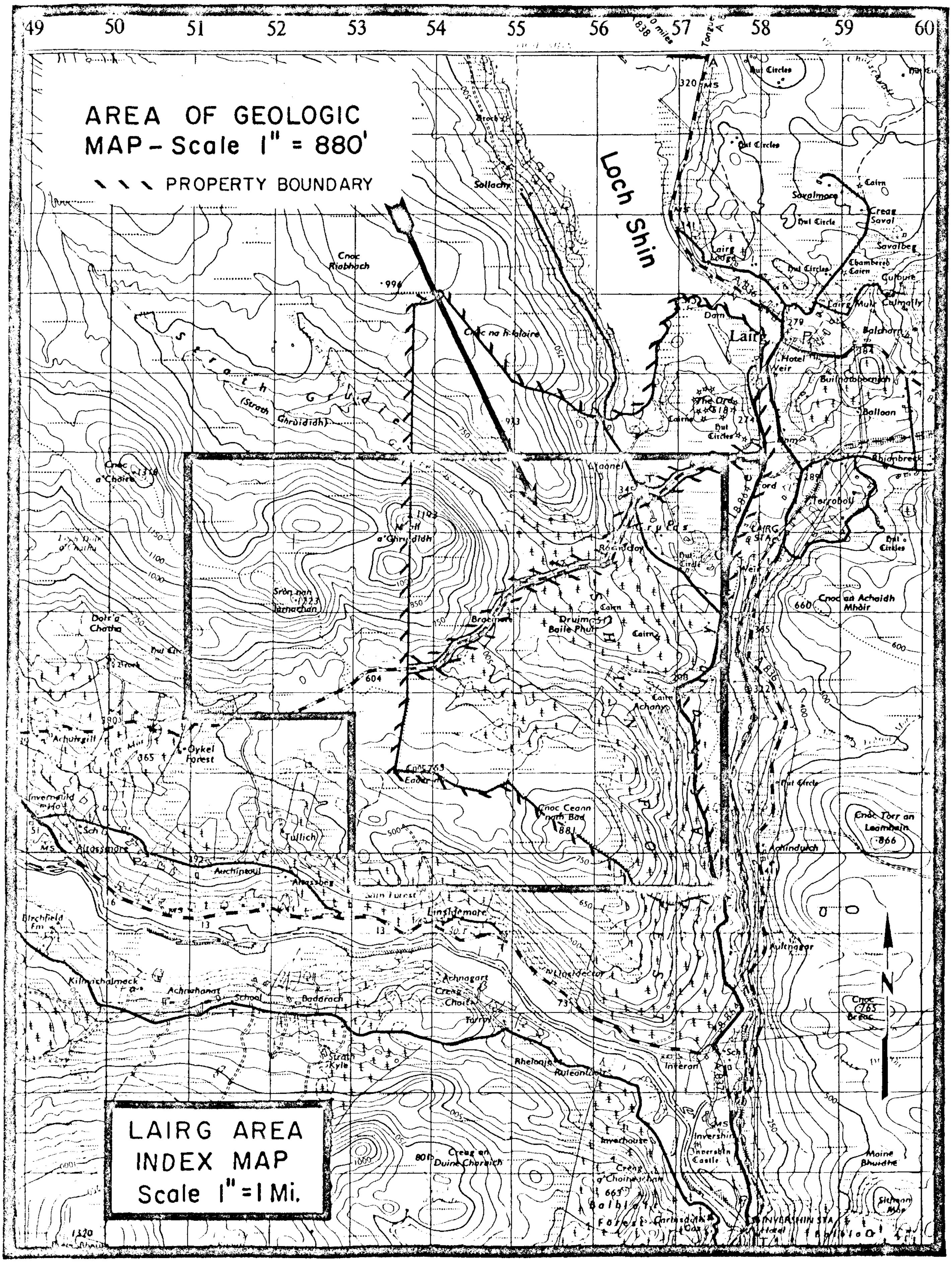

AREA OF GEOLOGIC
MAP - Scale 1" = 880'
PROPERTY BOUNDARY
LAIRG AREA
INDEX MAP
Scale 1" = 1 Mi.
Loch Shin
49
50
51
52
53
54
55
56
57
58
59
60

FIGURE 2

for mineralization. The results of his investigation concurred with those of Mr. Blair. Subsequently, Mr. Christianson suggested the area be evaluated for mineralization using geophysical techniques.

In 1972, Mr. Christianson and the undersigned laid out the location for an induced polarization and magnetic survey to determine the extent of mineralization in this prospect.

Geophysical Survey

The previously described induced polarization and geomagnetic survey was conducted by Hunting Geology and Geophysics Ltd. from the 25th through the 29th of October 1972. The results of the survey are described in a report by Hunting Geology and Geophysics Ltd. and are attached hereto. Plate 2 shows the layout of the IP and magnetic traverse lines along with the locations of the current electrode positions. The survey was conducted in two parts. The first portion was laid out along the east slope of Meall a' Ghruididh, and the second over the crest of Cona Chreag.

Plate 3 shows the results of the induced polarization and geomagnetic surveys in profile. The apparent chargeability observed in the Meall a' Gruididh shows a minor anomalous condition between stations 8 and 10 on line 1. There is however no apparent resistivity anomaly associated with this very small chargeability maximum. The same can be said for the apparent chargeability anomalies on line 3 between stations 10 and 12, line 5, between stations 8 and 10, line 7, between stations 16 and 18 and on line 11 between stations 12 and 14.

The large anomaly in both the apparent chargeability and apparent resistivity associated with line 17 between stations 6 and 9 and stations 11 and 14 can be explained by the fact that this line almost parallels road A839 and the wire fences associated with the right of way.

The magnetic profiles show no anomalous condition except along the east end of lines 5 and 6 and along the west ends of lines 12 and 13. Since there are no induced polarization anomalies in these regions, it is concluded that these anomalous magnetic values should not be pursued further.

Conclusions and Recommendations

Mineralization in this area would have to be of a large extent to justify a further exploration effort. From the results of the induced polarization and geomagnetic survey it is obvious that the mineralization of the region tested is of a very negligeable extent.

Therefore, I recommend that our company conduct no further exploration for minerals in this area and that we relinquish the license as soon as practicable.

19th of April 1973

Jack C. Zahn

ATLANTIC AND OCEANIC RESOURCES, LTD.

INDUCED POLARISATION AND MAGNETIC SURVEYS
IN THE
LAIRG DISTRICT OF SUTHERLAND,
SCOTLAND.

Hunting Geology and Geophysics Limited,
Elstree Way,
Boreham Wood,
Herts.

Job No. 2325840
October 1972.

ABSTRACT

Two induced polarisation and magnetic surveys have been carried out over the Grudie Prospect near Lairg in the county of Sutherland, Scotland. The object was to locate mineralised zones which may possibly justify economic exploitation.

Neither induced polarisation nor magnetic anomalies have been found which could indicate the presence of either known or unknown zones of mineralisation.

CONTENTS

APPENDIX A.

APPENDIX B.

ILLUSTRATIONS

DRAWINGS ACCOMPANYING THE REPORT

1. INTRODUCTION

This report describes two Induced Polarisation (I. P.) and Magnetic surveys undertaken by Hunting Geology and Geophysics Limited for the Atlantic and Oceanic Resources, Ltd. on the Grudie Prospect, near Lairg in the county of Sutherland, Scotland (text. fig.1).

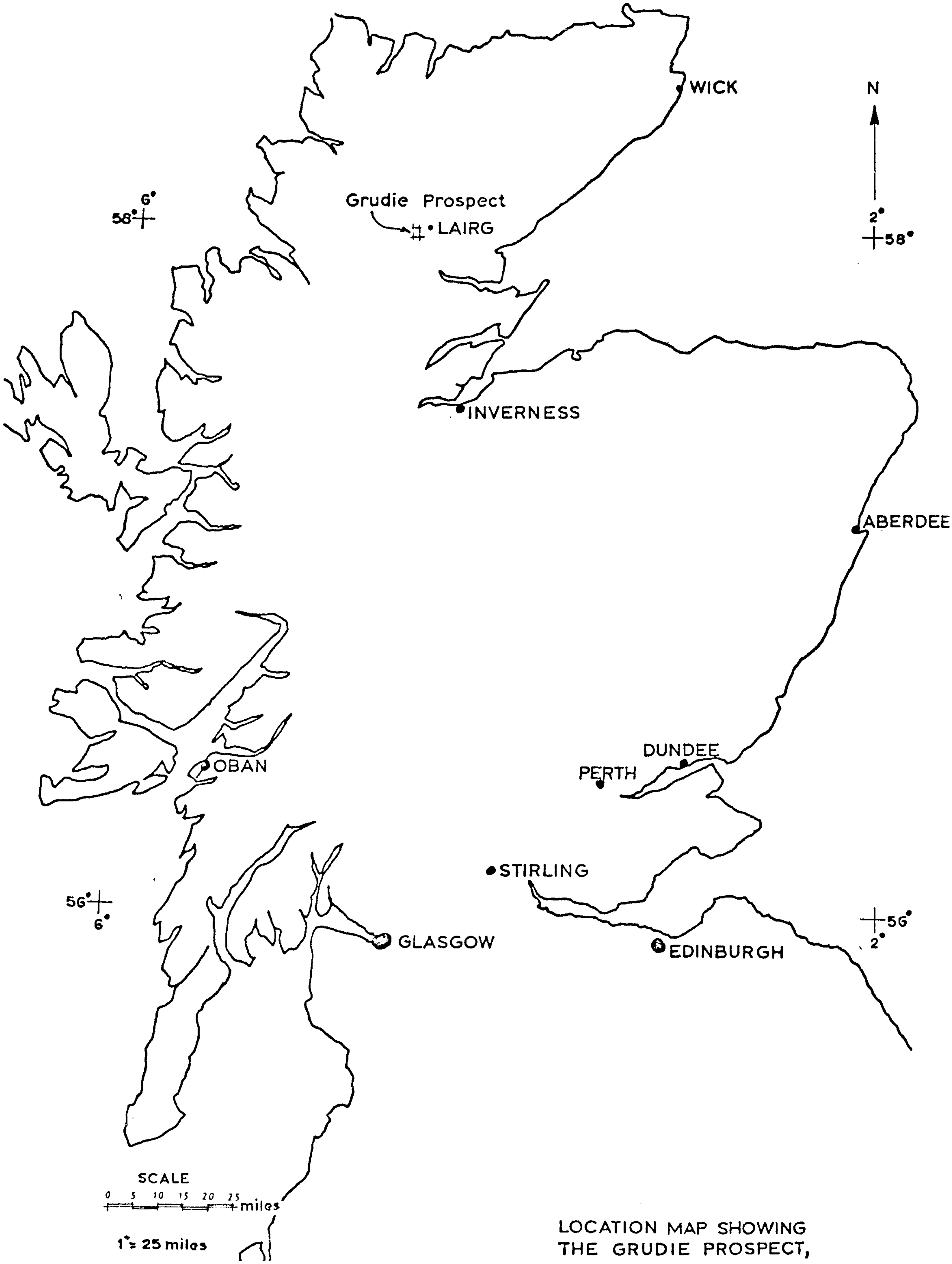
Field work was carried out from 25th to 29th October 1972 by a geophysicist and an electronics technician using a fluxgate magnetometer and I. P. equipment composed of a Huntec 2. 5 kw. transmitter and a Scintrex IPR7 receiver unit. A summary of operations will be found in Appendix A.

The first survey area lay on the eastern slopes of Meall a' Ghruididh, a hill some three miles south-west of the village of Lairg and covered an area of 2, 200 by 4, 800 sq. ft. The second area of two parallel traverses, each 1, 000 ft. long, straddled a rocky hillock called Cona Chreag at the eastern end of Braemore Wood. Braemore Wood lies 1. 3 miles due south of Meall a' Ghruididh.

The object of both surveys was to locate and identify mineralised zones that could be associated with either the eastern edges of the Grudie Granite or with a fault to the south by Cona Chreag.

2. GEOLOGY

The rocks of the Lairg district are predominantly siliceous granulites and schists of the Moine Series, intruded by granite bosses of Lower Palaeozoic age (the Lairg Granite) and of Devonian age (the Grudie Granite). The Grudie Granite which forms Meall a' Ghruididh, is considered to be an adamellite by Read et al (1926) and is more acidic along its eastern edges, where it contains conspicuous porphyritic quartz crystals.



LOCATION MAP SHOWING THE GRUDIE PROSPECT, LAIRG.

On the eastern side of Meall a' Ghruididh, both Read et al (1926) and Gallagher (1970) noted the presence of float blocks of chalcopyrite, pyrite and galena, indicating the possible presence of a mineralised zone that could be up to 200 feet wide. Mineralised vein outcrops of similar composition but a few inches thick have been located in Allt Bad na h-Achlaise, a stream descending the south-eastern sides of Meall a' Ghruididh.

The southern survey area at Cona Chreag crosses a fault zone in the Moine Series, though no known major mineralisation has been recorded here in the literature.

3. SUMMARY OF FIELD PROCEDURES.

Initially, the larger area, on Meall a' Ghruididh, was marked out on a grid system. 17 lines each 2,200 ft. long and spaced 300 ft. apart, were pegged at 100ft intervals by a surveyor measuring from a base line that roughly paralleled Grudie Burn. No corrections were carried out for the horizontal distortion caused by the severe topography.

Magnetic measurements were made along these lines at 100 ft. intervals using station 0 on line 17 (17/0) as a Base Station. I. P. readings were made along only the odd numbered traverses, i.e. Line Nos. 1, 3, 5, 7, 9, 11, 13, 15 and 17 using the gradient array. Two sets of current electrode positions were used in order to cover the entire area.

In the Cona Chreag area, two traverses, 500 ft. apart and 1,000 ft. long were surveyed and pegged at 100 ft. intervals. Magnetic and I. P. measurements were made on both lines.

A detailed account of the equipment used and the field techniques will be found in Appendix B; Drawing No.1 shows the traverse plans of both areas.

4. PRESENTATION AND DISCUSSION OF RESULTS.

(a) Presentation ;

The I. P. and magnetic field results are presented in profile form at a horizontal scale of 1:5, 000. The I. P. profiles indicate variations in Apparent Chargeability (Ma) at a vertical scale of 1 inch = 40 milliseconds, and also Apparent Resistivity, (Pa) at a vertical scale of 3.1 cm. = 1 decade. The profile datum levels chosen are 10 milliseconds and 3000 ohm metres respectively.

The magnetic profiles have been plotted using a vertical scale of 1 inch = 500 gammas; the profile datum level is the same as the magnetometer setting at station 17/0, namely 500 gammas.

(b) Discussion :

No significant chargeability, resistivity or magnetic anomalies have been located within either survey areas.

In the Meall a' Ghruididh area, no anomalies have been found that would seem to directly reflect the known mineralised outcrops in the bed of Allt Bad na h-Achlaise stream. However, this stream lies within an area covered by a broad but very weak rise in apparent chargeability of about 5 milliseconds above the datum level of 10 milliseconds. An apparent resistivity in this area of about 3000 ohm metres and the complete lack of any magnetic anomaly indicates that whatever mineralisation may be present probably has little or no measurable response to the geophysical methods employed here.

A broad though very slight rise in the apparent chargeability level may be observed at the north-eastern ends of the traverses in the Meall a' Ghruididh area as well as along the south-western ends of lines 11, 13, 15, and 17. The former could reflect the contact between granite and schist.

There is also a marked apparent resistivity low of about 1500 ohm metres along the north-eastern ends of lines 11, 13 and 15 that approximately coincides with a magnetometer low of about 50-100 gammas below datum. This would seem to have little significance with respect to any mineralisation that may be present.

The I. P. and magnetic anomalies seen on line 17 are most probably attributable to artificial conductors, such as telephone cables buried by the roadside. It will be seen that fences have also caused minor I. P. anomalies on other lines, such as lines 15 and 17.

In the Cona Chreag area, no apparent chargeability or magnetic anomalies have been recorded, though there is a marked resistivity low of about 800 ohm metres on both traverses. This may reflect a structural feature within the sub outcrop, such as a fault.

5. CONCLUSION

In both the Meall a' Ghruididh and Cona Chreag areas, there would seem to be no mineralisation present in sufficient quantity so as to give a recordable geophysical response using either Induced Polarisation or Magnetic methods.

6. REFERENCES

Read, H. H., Phemister, J. and Ross G., the Geology of Strath Oykell and Lower Loch Shin. Explanation of sheet 102, Mem. Geol. Survey of Scotland 1926, 220 pp.

Gallagher, M. J. Galena - flourite mineralisation near Lairg, Scotland. Trans. Inst. Min. Metall. Sect. B. App. Earth Sciences, 70, Aug. 1970, B.182-4.

APPENDIX A.

Summary of Operations.

Period of Survey - 8th to 29th October.

(a) Topographic survey

Productive time	12 days
Lost time	0 days
Total line mileage	7.07 miles
Length of lines	2200 feet
Line interval	300 feet
Peg interval	100 feet

(b) I. P. and magnetic surveys

Productive time	5 days
Lost time	0 days
Total line mileage (I. P.)	3.75 miles
Total line mileage (magnetic)	7.07 miles

(c) Equipment used

Huntec 2.5 kw. I. P. transmitter
Scintrex IPR7 receiver unit
Scintrex MF2 fluxgate magnetometer

(d) Electrode array.

Gradient. Current electrode separation; either 6000 or 3000 feet.
Potential electrode separation; 100 feet
Station interval : 100 feet.

APPENDIX B.

The Induced Polarisation and Magnetic Methods.

(a) Induced Polarisation Method.

The apparatus used for these surveys was a $2\frac{1}{2}$ kw Huntec pulse transmitter and a Scintrex IPR7 I. P. receiver.

The transmitter outputs a pulsed direct current which is cycled so that the current is on for 2 seconds, is off for 2 seconds, on for 2 seconds in the reverse direction to the former pulse, off for 2 seconds etc. This current is injected into the ground via stainless steel electrodes (C_1, C_2, in text fig. 2). The potential difference is then measured across two porous pot electrodes (P_1, P_2) with an I. P. receiver. This measures the primary voltage (Vp) during the current-on portions of the cycle, and a secondary voltage (Vs) a set period after the current has been switched off. The current (I) during the current-on portion of the cycle is recorded so that the apparent resistivity (Pa) can be recorded.

$Pa = 2 \frac{\pi}{K'} \times \frac{Vp}{I}$ where factor K' depends upon the geometry of the current electrodes and may be expressed as :-

$$K' = \frac{1}{C_1P_1} - \frac{1}{C_1P_2} - \frac{1}{C_2P_1} + \frac{1}{C_2P_2}$$

In the pulse technique, the I. P. effect parameter, chargeability (M) is defined by :-

$$\text{Chargeability} = \frac{\text{secondary voltage}}{\text{primary voltage}}$$

$$\text{or } M = \frac{Vs}{Vp} \quad \text{and is dimensionless}$$

The method of determining Vs (and M) is dependent upon the equipment. The magnitude of Vs depends upon :

(a) current-on and current-off times.

(b) delay time (t_d) - the interval between switching off the current and commencement of measuring Vs

(c) integration time (t_i) - the time over which Vs is measured.

Using the above parameters, the secondary voltage can now be defined as :

$$\bar{V}s = \frac{1}{t_i} \int_{t_d}^{t_d + t_i} Vs\,(t)\,dt$$

where Vs (t) is the instantaneous secondary voltage at any time t. Hence :

$$M = \frac{1}{t_i} \frac{1}{Vp} \int_{t_d}^{t_d + t_i} V_s\,(t)\,dt = \frac{\bar{V}s}{Vp}$$

Because there are many different manufacturers of commercial I. P. systems, and because these manufacturers are continually changing their equipment specifications, the equipment parameters which govern the measurement of the chargeability vary.
The field measured parameter used here is apparent chargeability and is usually expressed in milliseconds. Its value is given by the following formula :-

Apparent Chargeability

$$Ma = \frac{\bar{V}s}{Vp} \times t_i \text{ milliseconds}$$

The rate of decay of the voltage $\bar{V}s$, on termination of the current, is governed by a number of factors. Where electrolyte - electronic interfaces occur in the ground (e. g. where a metallic sulphide particle occurs in a rock pore) the decaying voltage is largely due to the return to equilibrium of the ionic charge which has built up at the interface during the current-on part of the cycle. Clay minerals have an ion exchange capacity which has the net result of affecting the mobility of electrolyte ions; it appears as though an extra resistance had been added to the ground. The clay content of rocks largely contributes the "background" polarisation which is observed in most rocks even though they do not contain any metallic minerals. For clays with high ion exchange capacity such as montmorillonite and illite, the maximum polarisation is observed for clay concentrations of about 0.1 to 0.4 per cent and 2 to 3 per cent of pore volume respectively. For kaoline, maximum polarisation occurs at a concentration of about 5 to 12 per cent of pore volume.

Any of the electrode arrays used in conventional resistivity surveys may be used for I. P. surveys. In the present survey, the Gradient (or rectangular Schlumberger) array was used (as illustrated in text figure 2). The current stakes C_1 and C_2 were fixed a large distance apart. The potential electrodes P_1 and P_2, closely spaced relative to the current electrode separation, were moved along lines 600 ft. apart and parallel to a line through the current electrodes. Measurements were restricted to a square area (the length of the sides of the area being about 60 per cent of the current electrode separation) centred on a point midway between the current electrodes; under homogeneous conditions the electrical field is essentially uniform within this area.

Field readings were taken at 100 ft. intervals with current electrode separations of about 6,000 ft. over the Meall a' Ghruididh area and 3,000 ft. over the Cona Chreag area. The potential electrode separation was 100 ft.

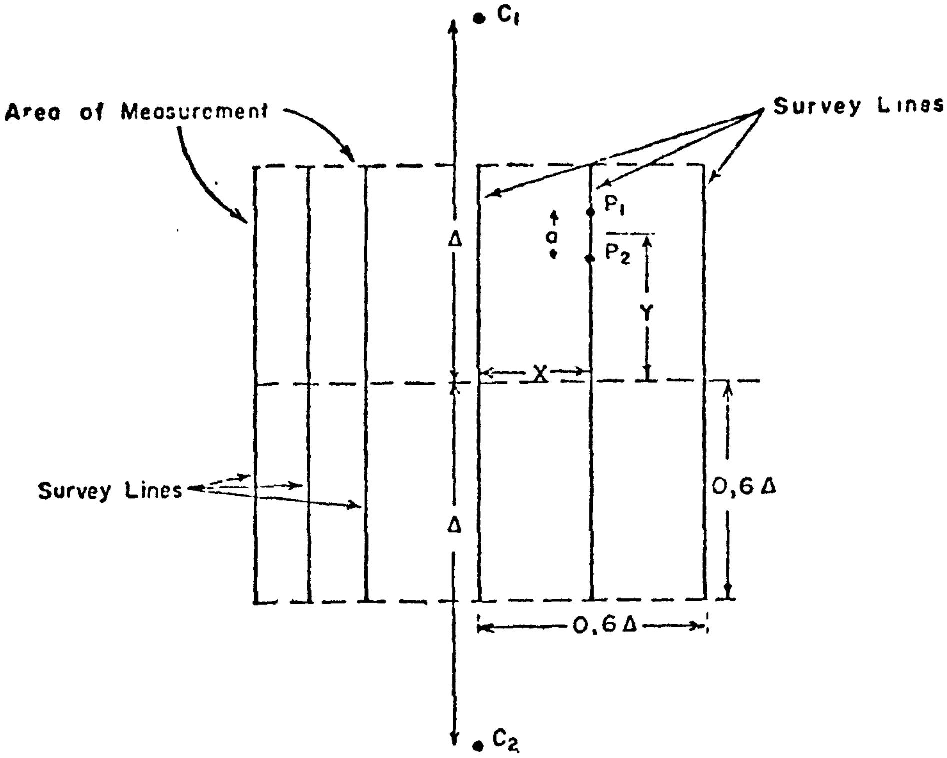
The gradient array is normally considered the most manageable to use in the field, especially in difficult terrain, because only two electrodes need to be moved along the traverse lines. This array gives good depth penetration of about one third to one sixth of the current electrode separation and yet provides moderate resolution for small bodies. It is the least susceptible to the masking effect of conductive overburden and also is least affected by topographic variations.

The main disadvantage of the gradient array is that in areas which are 'electrically noisy' i.e. with considerable electrical interference from power lines, telephone cables etc., the signals to be measured are often disrupted and it becomes difficult to operate the equipment satisfactorily.

(b) The Magnetic Method.

The vertical magnetic field was measured at 100ft. intervals along all the lines using a Scintrex MF2 fluxgate magnetometer. The traverses were covered in a series of closing loops that were subsequently tied into a Primary Base Station located at Station 0 on line 17 (17/0). As all the loops were closed within 90 minutes, the effects of drift and the diurnal variation became very small. The magnetometer was set at datum level of 500 gammas at station 17/0 and all field readings were subsequently corrected to this datum.

GRADIENT ELECTRODE ARRAY

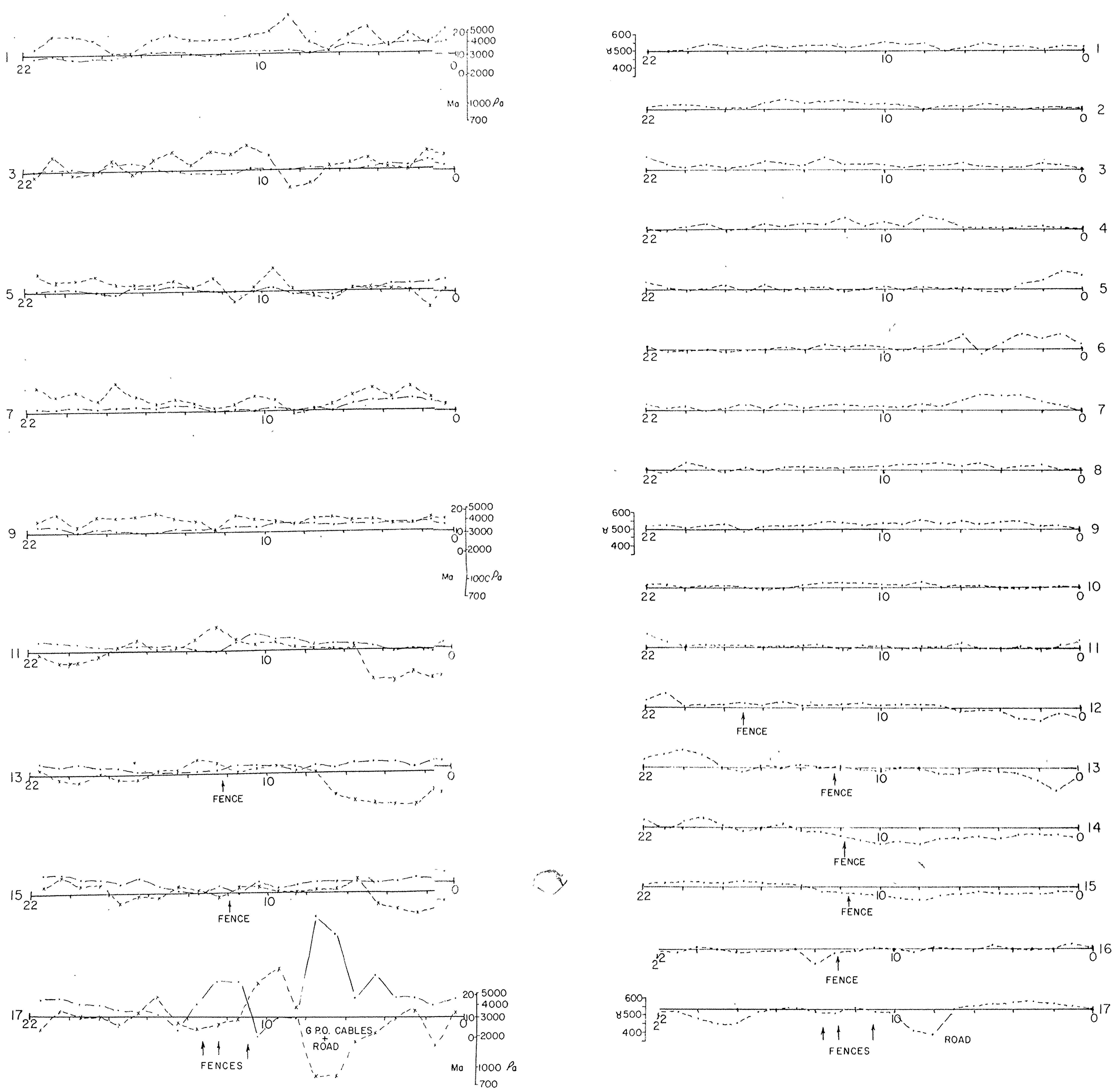


Apparent Resistivity $\rho a = \frac{V_p}{I} \pi \frac{\Delta^2}{a} \left[\frac{1 - \frac{Y}{\Delta}}{\left\{ \left(\frac{X}{\Delta}\right)^2 + \left(1 - \frac{Y}{\Delta}\right)^2 \right\}^{\frac{3}{2}}} + \frac{1 + \frac{Y}{\Delta}}{\left\{ \left(\frac{X}{\Delta}\right)^2 + \left(1 + \frac{Y}{\Delta}\right)^2 \right\}^{\frac{3}{2}}} \right]^{-1}$ ohm. metres

MEALL A' GHRUIDIDH AREA

I.P. PROFILES

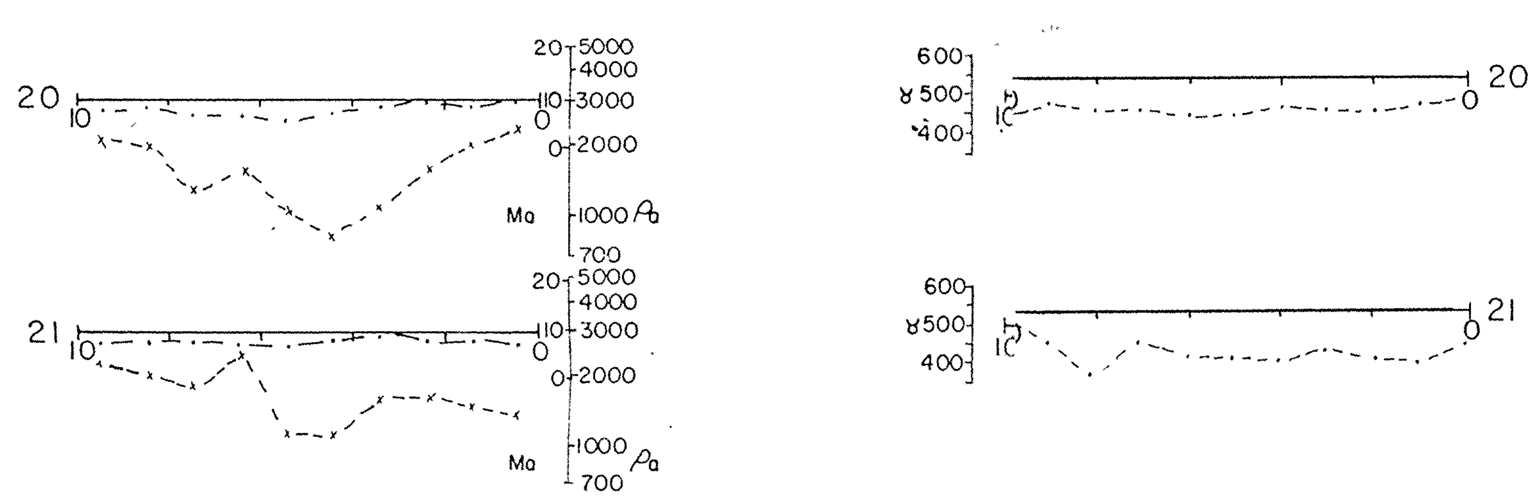
MAGNETIC PROFILES



CONA CHREAG AREA

I.P. PROFILES

MAGNETIC PROFILES



Scale 1:5,000

0 500 1000 ft

LEGEND

APPARENT CHARGEABILITY (Ma) —·—·—·—

Vertical scale 1" = 40 m.secs.

Datum level 10 m.secs.

APPARENT RESISTIVITY (ρa) - - x - - x - - x - -

Vertical scale logarithmic

1 decade 3·1 cm

Datum level 3,000 Ωm

20 5000 / 4000 / 10 3000 / 0 2000 / Ma ρ_a / 1000 / 700

VERTICAL MAGNETIC FIELD - - - - - - - - 1" = 500 ɣ

Datum level 500 ɣ

Base station (17/0) set at 500 ɣ

600 / ɣ 500 / 400

ATLANTIC AND OCEANIC RESOURCES, LTD.

GRUDIE PROSPECT – LAIRG – SCOTLAND

GROUND GEOPHYSICAL SURVEY

APPARENT CHARGEABILITY, APPARENT RESISTIVITY AND MAGNETIC PROFILES

Scale –1: 5,000

HUNTING GEOLOGY & GEOPHYSICS LIMITED

BOREHAM WOOD, HERTS.

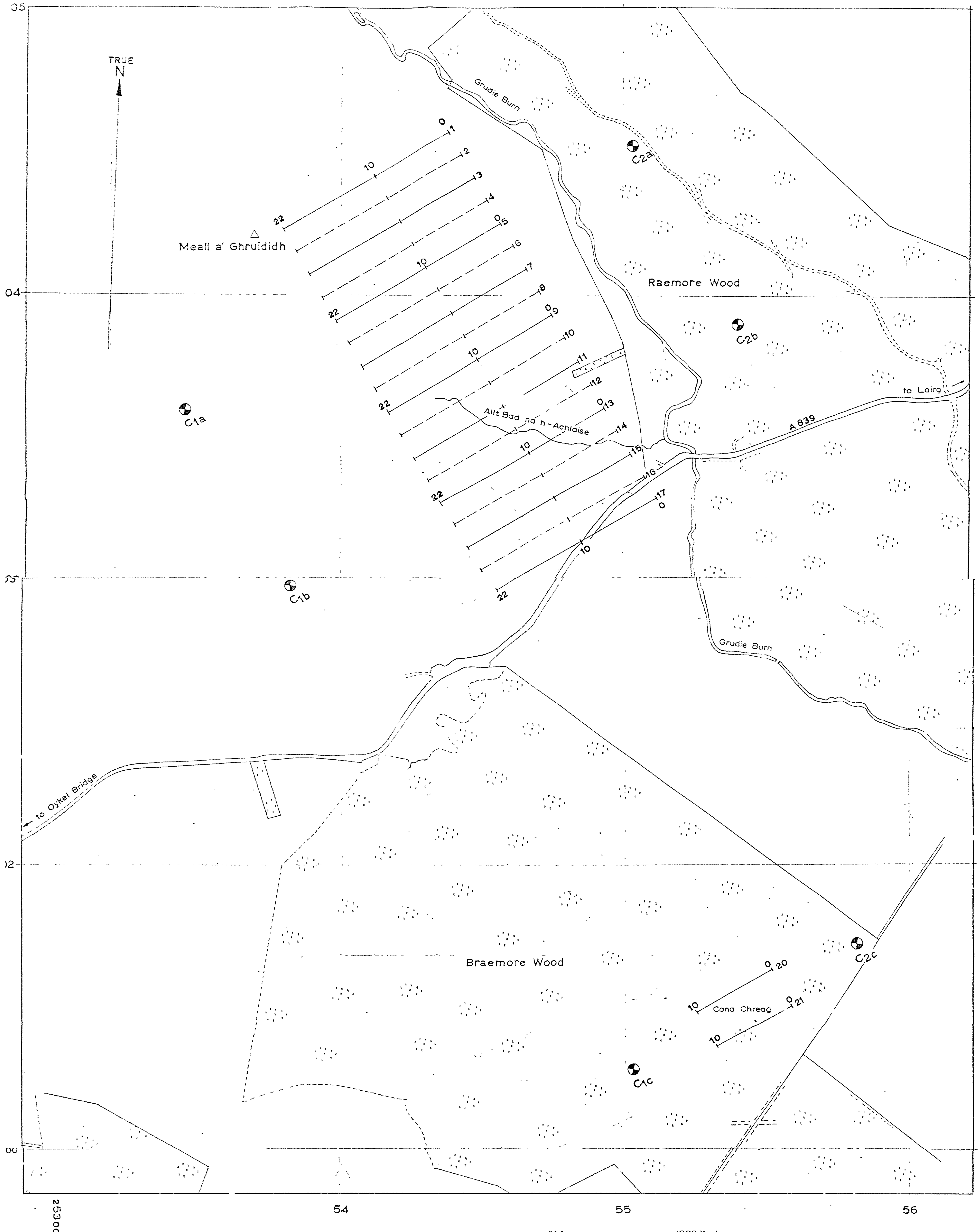
ENGLAND.

SURVEYED

October 1972

DRAWING Nº 2

Job Nº 2325840



LEGEND

I.P. and magnetic traverse with station and line N°.

Magnetic traverse only with station and line N°.

Current electrode positions C_1, C_2 (C_{1a}, C_{2a})

Afforested area

ATLANTIC AND OCEANIC RESOURCES, LTD.

GRUDIE PROSPECT - LAIRG - SCOTLAND

GROUND GEOPHYSICAL SURVEY LOCATION MAP SHOWING POSITION OF I.P. AND MAGNETIC TRAVERSES

Scale - 1:10,560

HUNTING GEOLOGY & GEOPHYSICS LIMITED
BOREHAM WOOD, HERTS,
ENGLAND.

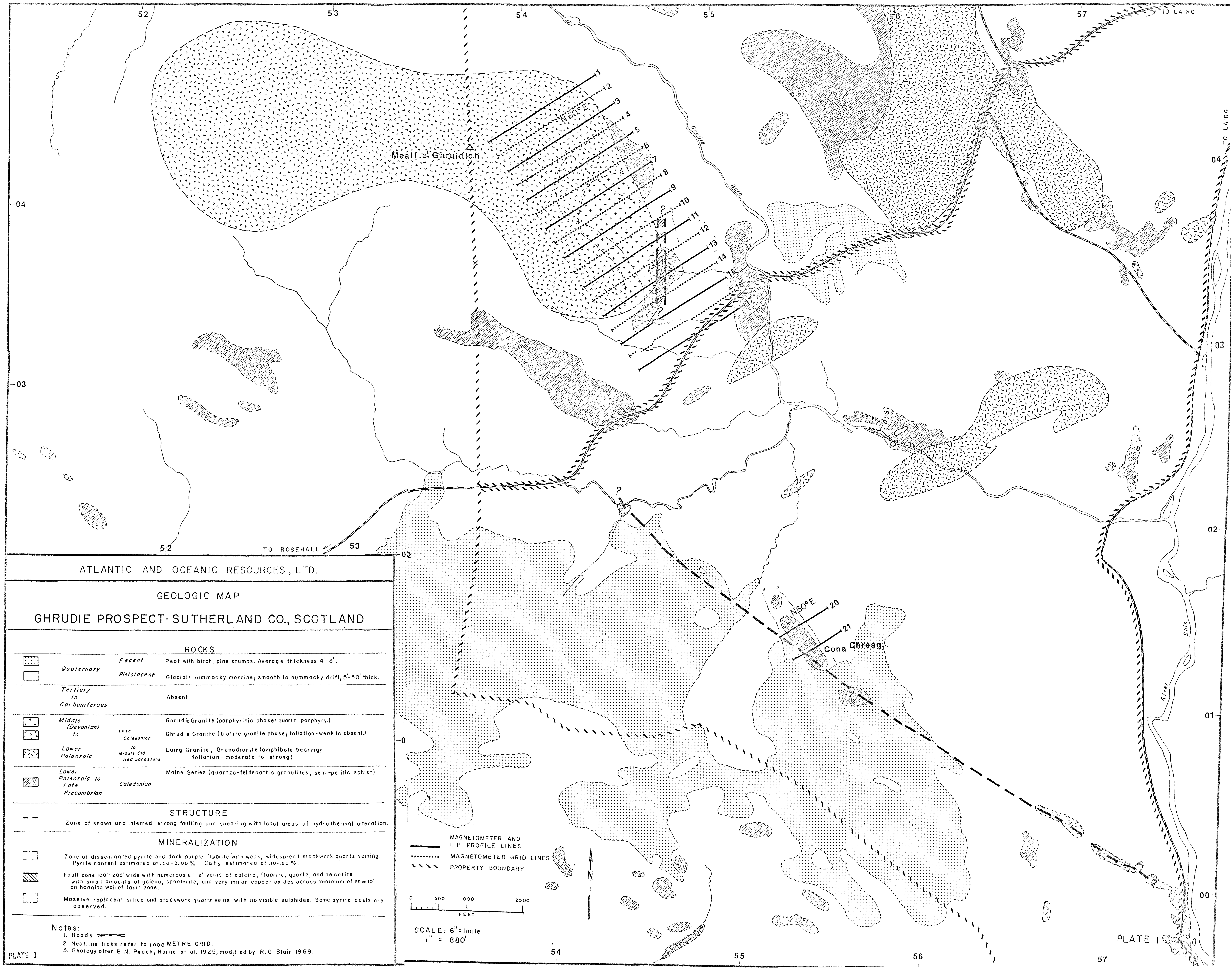
SURVEYED October 1972

DRAWING N° 1

Job N° 2325840

Topographical detail reproduced from O.S sheets NC 50 SW, SE.

PLA



ATLANTIC AND OCEANIC RESOURCES, LTD.
GEOLOGIC MAP
GHRUDIE PROSPECT-SUTHERLAND CO., SCOTLAND
ROCKS
Quaternary
Recent
Peat with birch, pine stumps. Average thickness 4'-8'.
Pleistocene
Glacial: hummocky moraine; smooth to hummocky drift, 5'-50' thick.
Tertiary to Carboniferous
Absent
Middle (Devonian) to Lower Paleozoic
Late Caledonian to Middle Old Red Sandstone
Ghrudie Granite (porphyritic phase: quartz porphyry.)
Ghrudie Granite (biotite granite phase; foliation-weak to absent.)
Lairg Granite, Granodiorite (amphibole bearing; foliation-moderate to strong)
Lower Paleozoic to Late Precambrian
Caledonian
Moine Series (quartzo-feldspathic granulites; semi-pelitic schist)
STRUCTURE
Zone of known and inferred strong faulting and shearing with local areas of hydrothermal alteration.
MINERALIZATION
Zone of disseminated pyrite and dark purple fluorite with weak, widespread stockwork quartz veining. Pyrite content estimated at .50-3.00%. CaF2 estimated at .10-.20%.
Fault zone 100'-200' wide with numerous 6"-2' veins of calcite, fluorite, quartz, and hematite with small amounts of galena, sphalerite, and very minor copper oxides across minimum of 25'± 10' on hanging wall of fault zone.
Massive replacent silica and stockwork quartz veins with no visible sulphides. Some pyrite casts are observed.
Notes:
1. Roads
2. Neatline ticks refer to 1000 METRE GRID.
3. Geology after B.N. Peach, Horne et al. 1925, modified by R.G. Blair 1969.
PLATE I
MAGNETOMETER AND I. P. PROFILE LINES
MAGNETOMETER GRID LINES
PROPERTY BOUNDARY
N
0 500 1000 2000
FEET
SCALE: 6" = 1mile
1" = 880'
Meall a' Ghruidiidh
N60°E
Grudie Burn
Cona Chreag
River Shin
TO LAIRG
TO ROSEHALL
PLATE I