

NORANDA-KERR LIMITED

APPLICATION FOR FINANCIAL ASSISTANCE
FOR MINERAL EXPLORATION

PROJECT 1692 - ^{HAFOO-Y-LLAN}~~SNOWDON~~
N. WALES

October, 1971

NORANDA-KERR LIMITED

APPLICATION FOR FINANCIAL ASSISTANCE
FOR MINERAL EXPLORATION

SECTION I : DETAILS OF APPLICANT

1. a. Name: Noranda-Kerr Limited, 6 Curzon Place, London W1, (01-629-9919)
 - b. Registered Office: New Zealand House, Haymarket, London SW1.
 - c. Contact for further information: Dr. Barry Scott, or Mr. Hans R. Morris, 6 Curzon Place, London W1. (01-629-9919)
 - d. Bank: Bank of Nova Scotia, 10 Berkeley Square, London W1.
2. Work to be carried out by Noranda-Kerr Ltd. personnel, with contracts let out to geophysical and drilling contractors where appropriate.

SECTION II : FINANCIAL INFORMATION

3. a. Articles of Association of Noranda-Kerr Limited have been submitted under separate cover.
- b. Accounts: Noranda-Kerr Limited was registered as a U.K. company on 2nd January 1970; the First Annual Audit for the year 1970 is complete and will be adopted at the next board meeting; a copy of this Audit has been submitted under separate cover. Auditors are Arthur Young, McClelland Moores & Co., of Moor House, London Wall, EC2 (01-628-4070); the partner concerned is Mr. Brian Walters.
- c. Parent Company: Noranda Mines Limited, 44 King Street West, Canada; a copy of whose Annual Report for 1970 has been sent under separate cover.
- d. Company and Directors are not associated with any business outside the Noranda Group, except that a Director, Mr. P.J. Gaynor, is a partner in the legal firm of McKenna & Co., 10 Whitehall, London SW1.
- e. Shares of Noranda Mines Limited are quoted on the Toronto Stock Exchange.

APPLICATION FOR FINANCIAL ASSISTANCE
FOR MINERAL EXPLORATION

SECTION III - DETAILS OF THE EXPLORATION PROJECT

- 4a. Name: PROJECT No. 1692 - ~~SNOWDON~~ ^{HAFOD-Y-LLAN}.
- 4b. Location: Two miles north-east of the town of Beddgelert, mainly between the peak of Mt. Snowdon and the Nantgwynant valley, Caernarvonshire.
Nat. Grid Ref.: SH 620520
Field Office: Golan, Garn Dolbenmaen.
- 4c. Minerals sought: Copper, lead and zinc sulphides.
- 4d. Geology: See separate statement, Appendix 1.
- 5a. Mineral Rights: Various owners, (See map 1692/71/1)
- | | | | |
|---|---------------------------------|------------|--|
| ✓ | Property 116/26 - Hafod y Llan | 1600 acres | - P.H.O. Williams
Hafod y Llan,
Nantgwynant. |
| ✓ | Property 116/27 - Bwlch | 1000 acres | - P.H.O. Williams
Hafod y Llan,
Nantgwynant. |
| ✓ | Property 116/32 - Perthi | 328 acres | - D.M. Owen,
Beddgelert. |
| ✓ | Property 116/42 - Crafwlyn Hall | 260 acres | - D.L. Nemrow,
Beddgelert. |
- 5b. Exploration Access: A prospecting licence has been obtained from each mineral owner, in which terms of access are defined.
- 5c. Working of Minerals: Terms not yet arranged.
6. Planning Permission: Has not been sought, and is believed not required for the work now proposed.

SECTION IV - DETAILS OF THE WORK PROGRAMME

- 7a. Stages 1 and 2, consisting of regional stream sediment sampling and subsequent checking, have been carried out in the area, and geochemical anomalies shown to exist. Further surveys in Stages 3, 4 and 6 have consisted of soil sampling on a regular grid, local geological examination, and induced polarization surveys on the same lines as the soil grid. The work for which assistance is now being sought consists mainly of diamond drilling (Stage 7) with additional geological work.

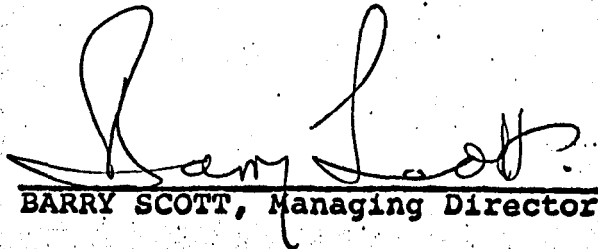
Stages /

Stages 4 and 7:

Diamond Drilling: Four holes are planned, each of 400 ft. proposed length, for a total of 1600 ft., as a first test of coincident geophysical and geochemical anomalies (See map

Geological Mapping: Further examination of the anomaly area, about 15 days work at this stage.

- 7b. Proposed starting date: November, 1971.
Likely duration: 30 days.
- 7c. Estimated cost: See Appendix 2.
- 7d. Amount of Assistance sought: 35% of cost estimate in Appendix 2, namely ~~£1,000~~ £4515.
8. Balance of cost: To be financed from Company funds.
9. Signed: On behalf of Noranda-Kerr Ltd.


BARRY SCOTT, Managing Director

DATE: October, 1971.

NORANDA-KERR LIMITED

MAFOD-Y-LLAN

PROJECT No. 1692 - SNOWDON, N. WALES

Application for Financial Assistance - October 1971

APPENDIX 2 - COST ESTIMATES

DIAMOND DRILLING

1.	Contract payment	10,725	
2.	Geological supervision, salary & living expenses.	720	} 124.0
3.	Field assistant, salary & living expenses.	520	
4.	Travelling.	320	
5.	Assaying.	810	
6.	Field office expenses.	120	
7.	London Office overhead.	640	
	Total Drilling:	£13,855	

GEOLOGICAL MAPPING

8.	Salary and living expenses, 15 days.	270
9.	Travelling, 15 days.	60
10.	London Office overhead.	150
	Total Geological Mapping:	480

Total Drilling & Geological £14,335

BASIS OF COMPILATION

1. D.P.I. Ltd. estimate, 1950 ft. at £5.50 per foot.
2. 40 days at £18, based on company records.
3. 80 days at £6.50, on company records.
4. 80 days at £4, leased car, on company records.
5. 180 samples for Cn, Pb, Zn, at £450 per sample, based on A. W. Knight Ltd. scale of charges.
6. 80 days at £1.50, on company records.
7. 80 days at £10.00.)
8. 15 days at £18.00) on company records.
9. 15 days at £4.00)
10. 15 days at £10.00)

NORANDA-KERR LIMITED

HAROD-Y-LLAN
PROJECT NO. 1692 SNOWDON, N. WALES.

Application for Financial Assistance : APPENDIX 1

Geology of the Area : The area covers the central part of the Snowdon volcanic region generally, in which a thick accumulation of acidic ignimbrite and tuffs was succeeded by a sequence of basic lavas and tuffs and these rocks later cut by rhyolitic intrusions. The structure is that of an oval synclinal basin, interpreted as a ring-faulted caldera, subjected to later folding on the north-easterly Caledonian trend.

The exploration target is a possible low-grade large-tonnage base-metal sulphide zone. Minerals of this type are known to occur in veins and disseminations.

There are several old prospects in the area, on the southern slopes of Mt. Snowdon.

Anomalies shown by surveys to date.

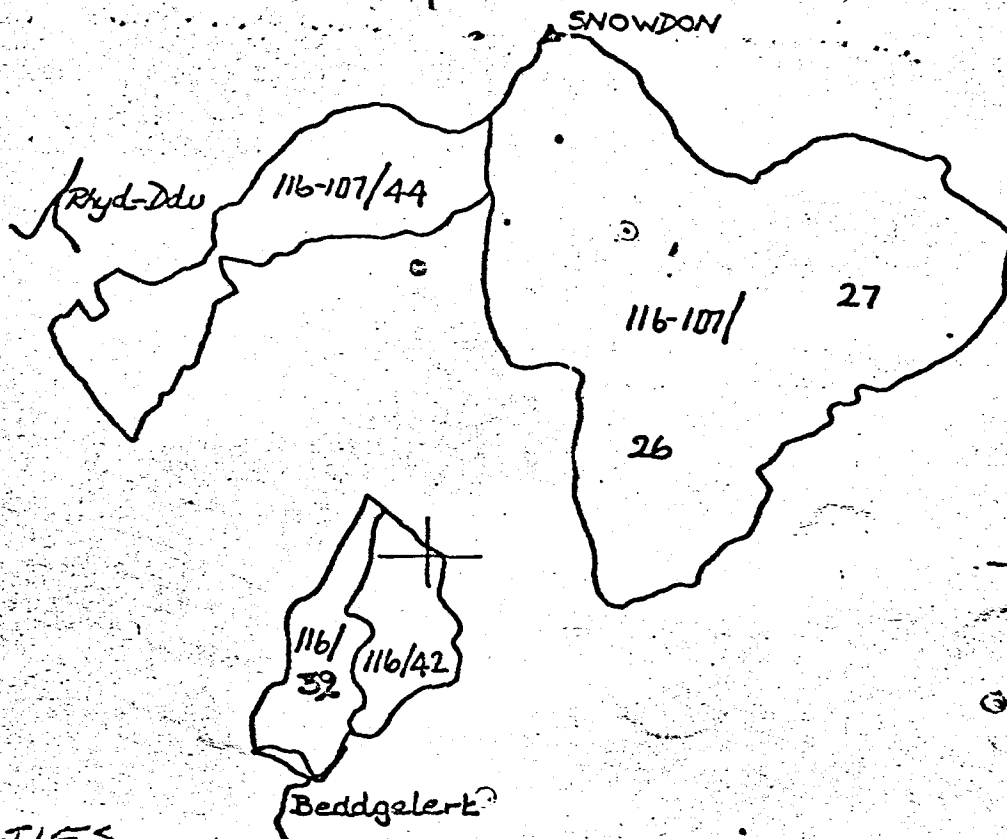
A well-defined area of anomalous lead and copper values in the soil was detected by a soil grid survey carried out in 1971, following the 1970 regional stream sediment survey. (See maps 1692/71/3 to 5) (NW3)

An induced polarization survey on property 116/27 (SH 630530) showed several zones of high chargeability which in general coincide with geochemical anomalies. These are indicated on maps 1692/71/6 and 7.

SH65E
+

SH60E
+

SH65E
SH55N
+



PROPERTIES

116-107/26	1000 ACRES
116-107/27	1600 ACRES
116-107/44	
116/32	329 ACRES
116/42	260 ACRES

MAP NO.
1692/71/1

NORANDA-KERR LTD

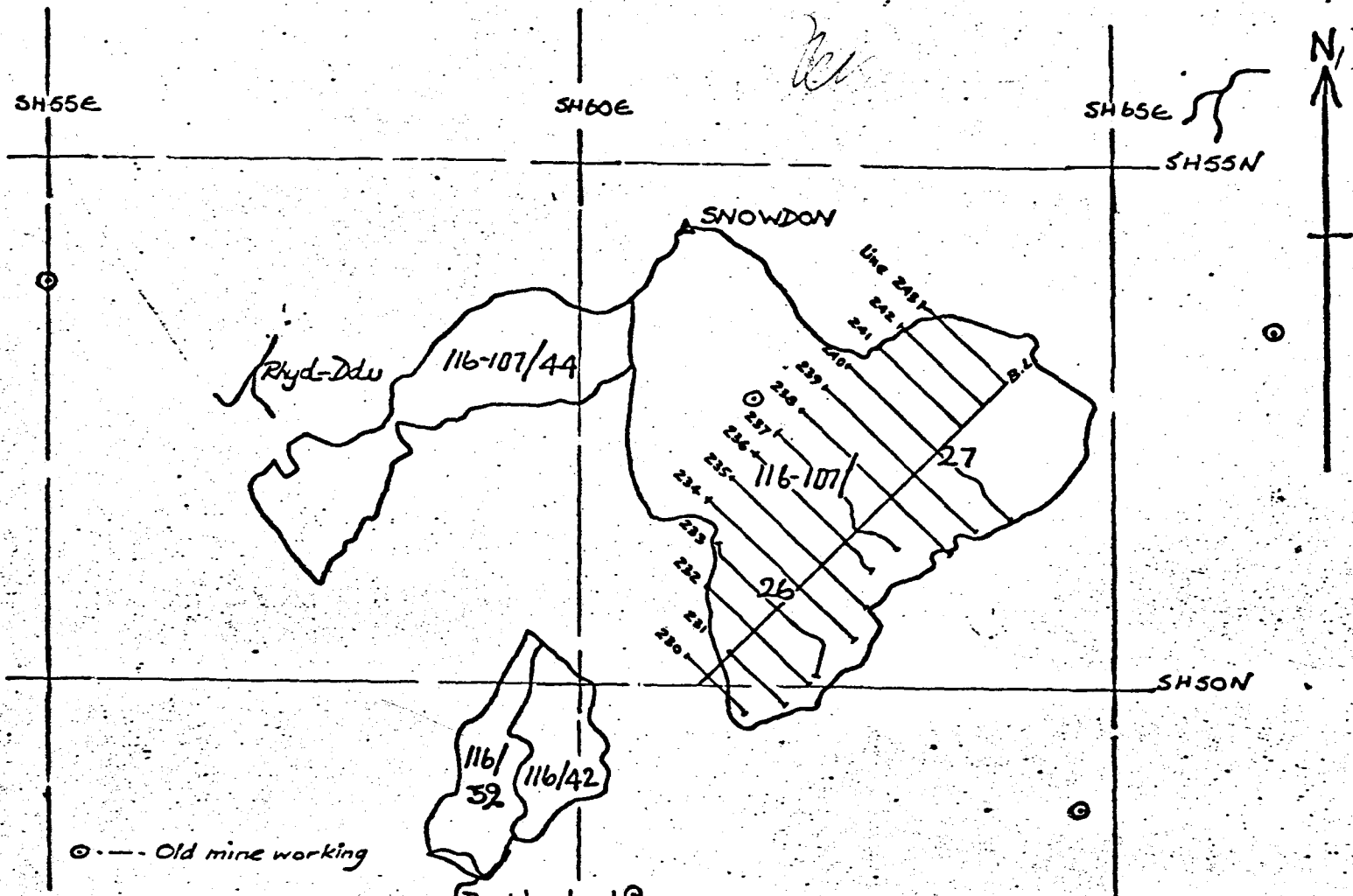
PROJECT 1692

SNOWDON

NORTH WALES

SCALE 1" = 1 MILE

10/71



PROPERTIES:

116-107/26	-	1000 Acres
116-107/27	-	1600
116-107/44	-	
116/32	-	328
116/42	-	260

MAP NO.
1692/71/1A

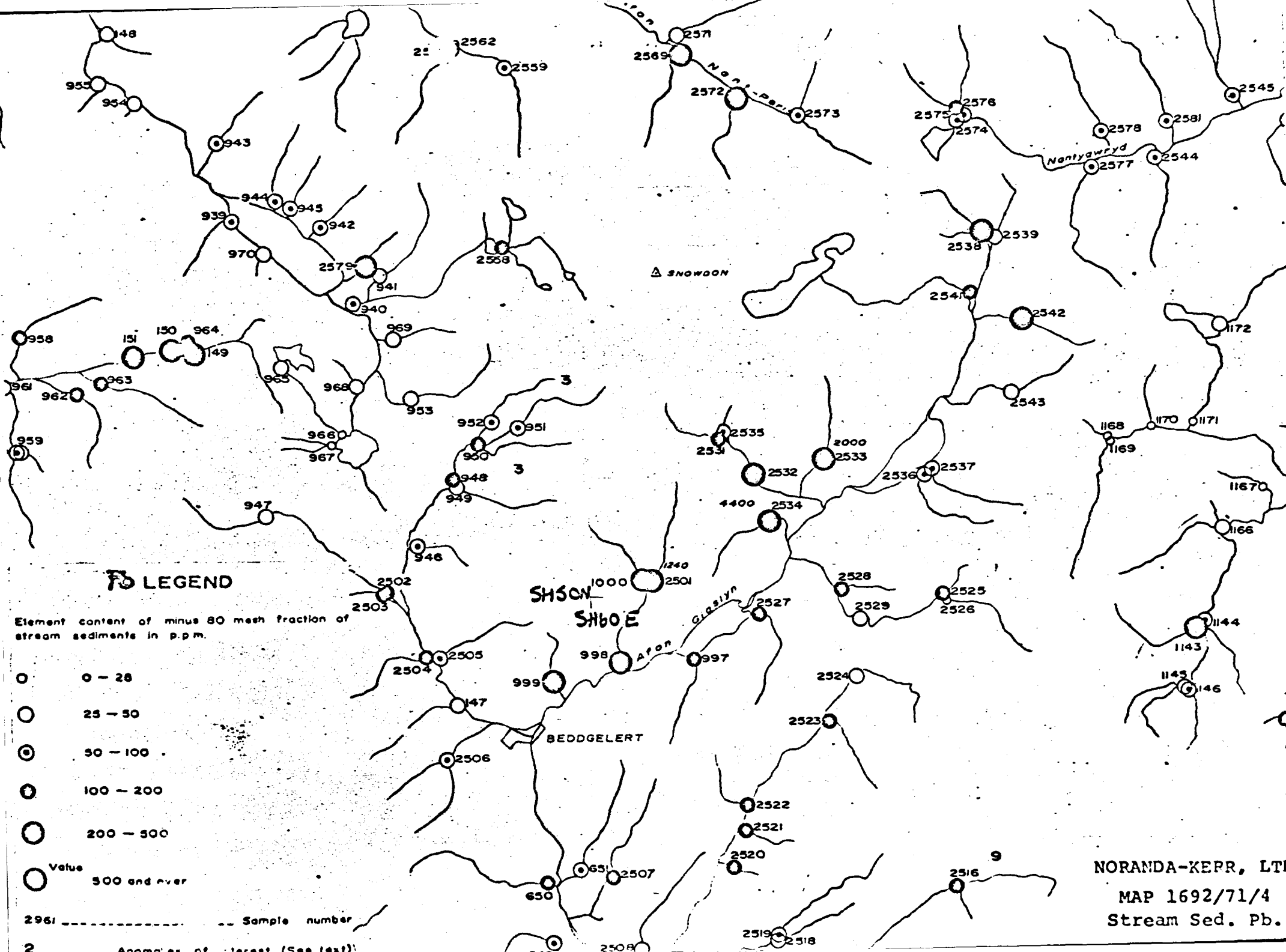
NORANDA-KERR LTD

PROJECT 1692

HAFOD-Y-LLAN
SNOWDON, N. WALES

SCALE: 1" ~ 1 MILE





LEGEND

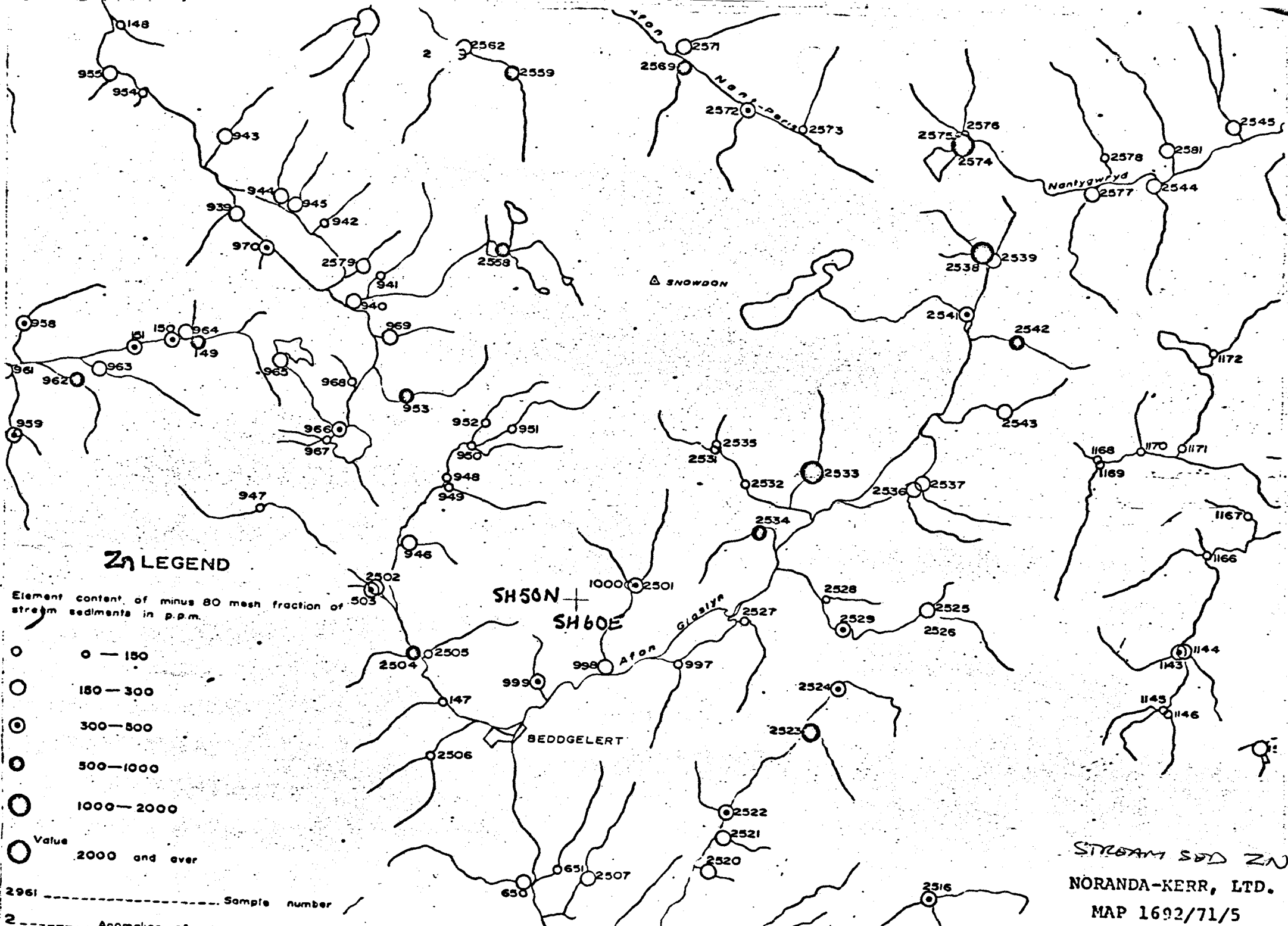
Element content of minus 80 mesh fraction of stream sediments in p.p.m.

- 0 - 25
- 25 - 50
- ⊙ 50 - 100
- ⊙ 100 - 200
- ⊙ 200 - 300
- ⊙ Value 300 and over

2961 --- Sample number

2 Anomalies of interest (See text)

NORANDA-KERR, LTD.
 MAP 1692/71/4
 Stream Sed. Pb.



Zn LEGEND

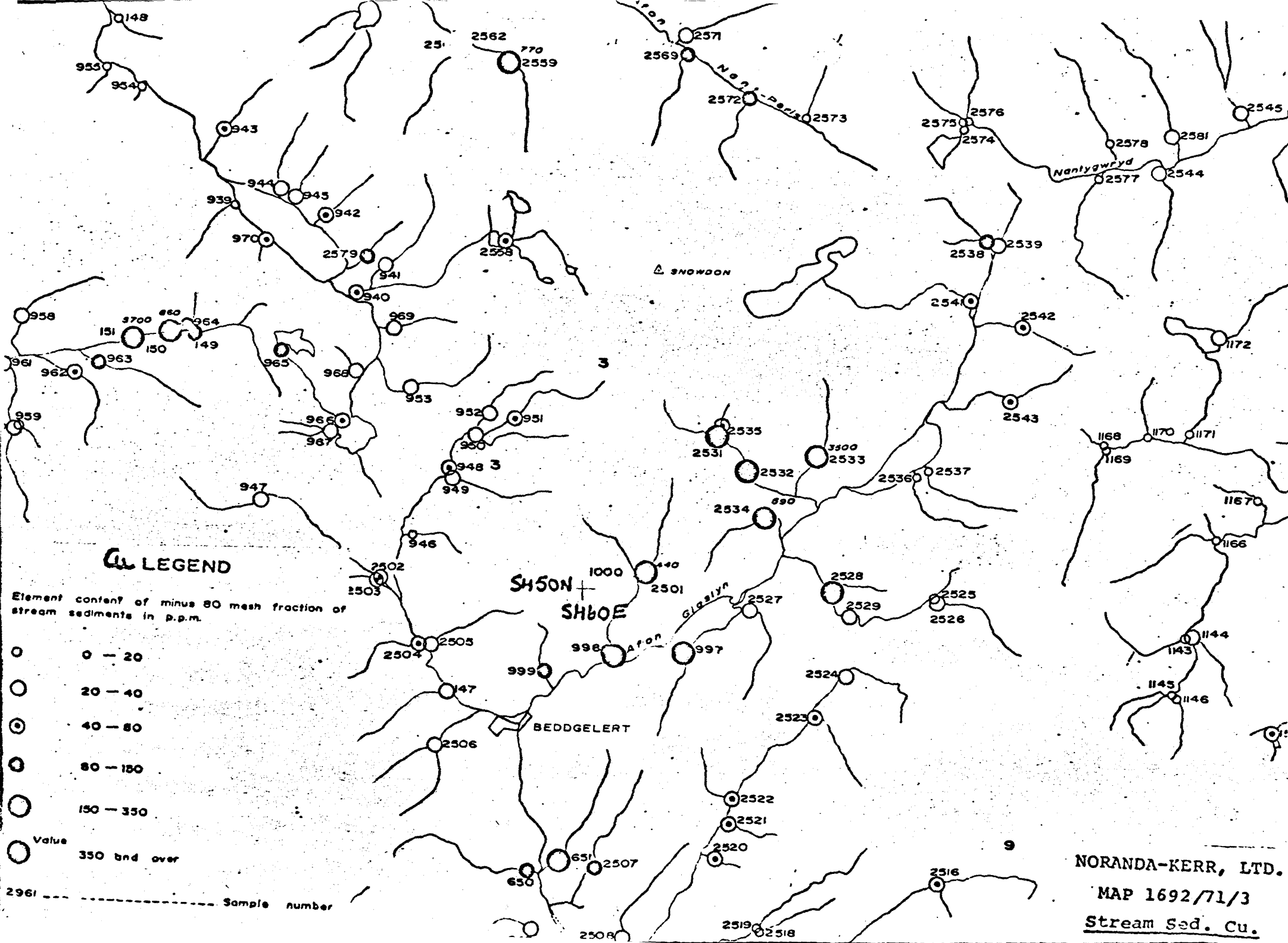
Element content of minus 80 mesh fraction of stream sediments in p.p.m.

- — 150
- — 150 — 300
- — 300 — 500
- — 500 — 1000
- — 1000 — 2000
- Value 2000 and over

2961 Sample number

2 Anomalies of interest

STREAM SED ZN
 NORANDA-KERR, LTD.
 MAP 1692/71/5



LEGEND

Element content of minus 80 mesh fraction of stream sediments in p.p.m.

- 0 - 20
- 20 - 40
- 40 - 80
- 80 - 150
- 150 - 350
- Value 350 and over

2961 - - - - - Sample number

NORANDA-KERR, LTD.
 MAP 1692/71/3
 Stream Sed. Cu.

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<u>Appendix 1</u>	Old Workings	
<u>Appendix 2</u>	Appraisal of Geophysical Data - J.B. Boniwell	
	Sludge & Split Core Analyses	DDH 1 Fig. 2. ✓
	Sludge & Split Core Analyses	DDH 2 3. ✓
	Sludge Sample Analysis	DDH 3 & 4 4. ✓
	Core Recovery and Sample Analyses	DDH 5 5. ✓
	Core Recovery and Sample Analyses	DDH 7 6. ✓
	Split Core Analyses	DDH 5 7. ✓
	Split Core Analyses	DDH 7 8. ✓
 Plans in Envelopes:-		
	Copper Geochemistry	Fig. 9. ✓
	Lead Geochemistry	10. ✓
	Geology	11. ✓
	Sections on Lines 234 and 239	12. ✓

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NORANDA EXPLORATION (U.K.) LIMITED
PROJECT 1692 - HAFOD-Y-LLAN, NORTH WALES
WORK DONE IN THE PERIOD FEBRUARY/JULY '72

INTRODUCTION

(See Figs. 1a & 1b)

This report is based on periodic and final reports by the company geologist in the area, Paul Dungate, describing work carried out by himself and his crew in the period. A note on old workings is appended.

Recent work covers three farm areas immediately north of Beddgelert. The farm areas are -

- | | | |
|-----|-------------------------------|-------------------|
| (a) | Hafod-y-Llan & Bwlch Mwlchlan | 107:26 and 107:27 |
| (b) | Perthi and Craflwyn Hall | 116:32 and 116:42 |
| (c) | Fridd Uchaf | 107:44 |

Perthi, Craflwyn Hall and Fridd Uchaf are discussed briefly since they were subject to reconnaissance soil sampling only. Hafod-y-Llan and Bwlch Mwlchlan are dealt with in more detail since detail soil sampling was followed by two separate I.P. surveys and subsequent diamond drilling. The latter two farms are referred to collectively in the rest of this report as Hafod-y-Llan.

The area is extremely rugged and lies within the Snowdonia National Park. The highest part takes in the summit of Snowdon (3,560 ft.), the highest mountain in Wales. The lowland area, about 100 ft. above sea level, is limited to the alluvial deposits in the Gwynant Valley, used for cattle raising. The greater part of the upland areas is solely given over to mountain sheep farming.

EARLIER WORK

The reconnaissance stream survey by Hunting Surveys in early 1970 indicated highly anomalous copper, lead and zinc to the south of Snowdon and moderately anomalous metal values to the southwest. Hafod-y-Llan was reconnaissance soil sampled and two short lines of soil samples were taken across Perthi and Craflwyn Hall.

Copper values in the soil across the central portion of the farms of Hafod-y-Llan and Bwlch Mwlchlan proved to be highly anomalous and a reconnaissance I.P. survey was commissioned. The I.P. outlined highly chargeable zones, and hence the area remained one of prime interest.

FOLLOW-UP WORK

(See Figs. 9, 10 & 12)

In April 1971 further I.P. measurements were made so that the area of the geochemical anomaly was covered by 500 ft. apart lines. Both I.P. surveys were performed by F.A. Buckley Ltd. using battery-powered low-wattage equipment with a Wenner electrode array.

During the late summer of 1971 further soil sampling was carried out over the Hafod-y-Llan farms so that the final geochemical information was on lines spaced at 500 ft. with samples approximately every 100 ft. The anomalous area was extended to its probable limit in the north, but it remains open to the north-east and south-west, where it goes onto land belonging to the Baron Hill Estates, whose owners were unwilling to enter a prospecting agreement.

From a study of the soil geochemistry, it appeared that the high metal content was closely associated with the transition zone between the Lower rhyolitic tuffs and the over lying basic (or bedded) pyroclastic series. This association is still not a proven fact since the geochemical pattern is confused by old workings in the area. Also the limited amount of drilling does not allow a correlation to be made, either laterally or in depth, between the separate lithologies within the Snowdon Volcanic Succession.

A study of the I.P. data was made in October 1971 by consulting geophysicist, J. Boniwell of Toronto, Canada, and a number of drilling sites recommended. At the same time the probable unreliability of some of the I.P. and resistivity readings was pointed out to the north-east of Line 236, due to low primary voltages applied to rocky or thinly peat-covered ground. A copy of the part of Boniwell's report relating to this area is appended.

PRESENT WORK

Drill-holes recommended were of depths of 450 to 500 feet, which would have required the use of standard drilling equipment. Site and access difficulties raised by potential drilling contractors and, secondly, consideration of possible objections by local amenity groups to the use of heavy equipment, lead to the choice of a small semi-portable "X-ray" unit to carry out the test drilling. Furthermore, to reduce to the furthest possible extent the bulk size of equipment placed on conspicuous sites and thereby

to avoid any accusation of spoiling the scenery on this popular tourist area, the 20 ft. tripod normally used with the "X-ray" was dispensed with, and the rods pulled by hand.

These considerations led to a limit of about 100 ft. depth being put on any drilled hole; and also to the siting of three or four such shallow holes to penetrate the same stratigraphic thickness of rock proposed to be tested by one hole of 450 ft. depth. Not all the recommended sites were in fact tested during the four month drilling operation. It is noteworthy that although half of the drill sites were visible from the Beddgelert-Capel Curig road no comment or objection was made to our crews who daily climbed up and down to work, and it is doubtful that the drilling activity or the sound of the drill engine were noticed by any one passing over the routes in the area. Moves between sites were accomplished by dismantling the drill into parts small enough to be man-handled over the rough terrain. Drilling was done by geologist Ian Greig and assistants, supervised by Paul Dungate.

In the period 18th February to 19th June, 1972, seven holes were drilled with an aggregate depth of 598 feet, including one hole abandoned at 18 ft. due to water difficulties. Drilling water was obtained from old stopes.

Holes numbered H1 to H4 were drilled at Boniwell's site 3, a high I.P zone appearing 100-200 ft. above the base of the Bedded Pyroclastic unit. (See map and section, Figures 11 and 12).

Sludge analyses from boreholes H1 and H2 (made at Noranda Exploration Ireland Ltd. laboratory, Mullingar) gave interesting percentages of zinc and occasionally lead, and some sections were split and sent for assay by A.H. Knight Ltd., Cheshire. Results are shown in figures 2 and 3. After the grinding of core similar laboratory methods were used in each case, and results are therefore roughly comparable. Holes H3 and 4 were drilled nearby on the same line.

HAFOD-Y-LLAN DIAMOND DRILL HOLE SUMMARY, FEBRUARY/JUNE, 1972.

D.D.H. No:	Final Depth (ft.)	Dip °	Az ° T	Grid Local*	Location National+	Elevn.a.s.l. (approx)	Dates
1	81	50	315	L234 37ON	6197/5103	980 ft.	18 - 25.2.72.
2	82	45	135	L234 48ON	6195/5105	1000 ft.	28.2 - 3.3.72.
3	84	45	135	L234 58ON	6194/5106	1010 ft.	6 - 10.3.72.
4	80	45	135	L234 68ON	6192/5108	1020 ft.	13 - 16.3.72.
5	120	45	142	L239 248ON	6264/5255	1600 ft.	27.3-20.4.72.
6	18 (abandoned)	50	135	L239 260ON	6266/5257	1680 ft.	22.4-25.4.72.
7	133	55	135	L239 273ON	6269/5259	1780 ft.	26.4-19.5.72.

* In relation to I.P. Stations, laid out on slope distances; horizontal distances from Base Line are 360 ft, 460 ft, 550 ft, 640 ft, 2380 ft, 2480 ft, and 2560 ft. respectively.

+ Grid locations all in 6" sheet SH 65 SW, to nearest 10 meters.

Lack of positive copper results from sludge sampling here, and the re-interpretation of high I.P. chargeabilities as being due to disseminated pyrite and pyrrhotite seen on the drill core, led to the drilling being transferred to sites 5000 ft. northeast of H1-H4, on Line 239. At this location, once again near the base of the Bedded Pyroclastics, an area of high copper in soil is associated with moderately high (but possibly unreliable) I.P. chargeabilities, in a zone which appears to trend NE with the geological structure. The location of the later drill holes H5-H7 on line 239 is shown on the map and section, figures 11 and 12.

Cores of H5 and H7 (H6 was abandoned at 18 ft.) showed sparsely disseminated base-metal sulphides throughout their length, with concentrations of chalcopyrite, and to a lesser extent galena, in the fault zones. Pyrrhotite is present in an amount sufficient to account for the I.P. anomaly shown hereabouts. Given the limited depth of the boreholes and the uniformity of the part of the Basic Pyroclastic sequence drilled, it was not found possible to correlate rocks intersected. The geology shown on the 1" - 200' section is generalised from surface data.

Correlation between sludge and core analyses appear fairly close; because of locally poor core recovery sludge samples are likely to give a more accurate overall view of metal content (see figures 2 to 8).

During and after the drilling operations some time was spent by company geologists examining rocks in the area to supplement or confirm rock data and relationships shown on the IGS "Snowdonia" 2½" compilation sheet. A few minor modifications on Hafod-y-Llan are incorporated in the 6 inch geological map, figure 11, otherwise an enlargement of the 2½" sheet.

Perthi/Craflwyn Hall - 116:32 and 116:42

The two short soil sample lines which were sampled in 1970 were considered inadequate to study this area on which rocks of the Snowdon Volcanic Series overlie the Glanrafon beds. A reconnaissance soil sampling programme was carried out on lines 1000 ft. apart. The results of this survey are shown in figures 9 and 10.

In order to show up the anomalous area it was necessary to choose a much lower contour interval than had been used on Hafod-y-Llan. Mineralisation appears restricted to the faults and appears to be

weak in the junction zone of the Bedded Pyroclastic and Lower Rhyolitic rocks.

Fridd Uchaf - 107:44

Although only weak stream anomalies were encountered on this farm, it was further investigated by reconnaissance soil sampling since it was underlain by Lower Rhyolitic tuffs. The results of the survey (figures 9 and 10) show that the area is almost totally devoid of anomalies. Towards the top of Snowdon, higher beds of Rhyolitic tuffs are exposed. Two anomalous copper values only occur on these higher slopes.

CONCLUSIONS

There is little doubt that Snowdonia is a base-metal province. The evidence in the parts investigated indicates that a concentration of base-metals occurs in the narrow sequence of rocks at the base of the Bedded Pyroclastic Series and the tops of the Lower Rhyolitic Tuffs, but that the amount of such concentration varies laterally in directions parallel to formational or bedding surfaces. Drilling and geochemical results also show that further concentration has occurred on faults and fractures, probably as a result of remobilization during the later folding, faulting and dynamic metamorphism to which the area has been subjected. The many mineralised veins and fractures accompanied by old mining trials would appear to be more numerous in areas in which there is an above-average amount of sulphides disseminated in the favourable rock sequence referred to above. Results given by sludge analysis of DDH H7 seem to indicate the likely quantity of copper present in these rocks. The average over the 133 ft. length of this hole is about 0.26%. Contained in this length are three sections totalling 45 ft. and running 0.69%, 0.63% and 0.34% copper (see figure 6).

This order of copper content, which one may generalise as a maximum of 50 ft. of 0.5% copper, is not sufficient to justify further work on this difficult and controversial area.

Hans R. Morris
Hans R. Morris Oct-1972

.....
Paul D. Dungeate

APPENDIX 1

OLD WORKINGS IN THE HAFOD-Y-LLAN AND THE SNOWDON AREA

This area has in the past been the scene of numerous small workings for non-ferrous metals. Most of these workings have been for copper but small quantities of lead, zinc, silver and manganese have been produced.

The majority of these workings are associated with the contact between the Lower Rhyolitic Series and the Basic Pyroclastic Series of the Snowdon Volcanics of Caradocian age.

At SH 619-548 and 611-547 the Brittania mine was worked on several chalcopyrite-bearing lodes close to the contact, over a discontinuous distance in excess of 3000 feet. At SH 637-550 and SH 647-552 trials have been made for copper. Near Llyn D'un Arddu (SH 604-556 and 607-558) a number of chalcopyrite bearing quartz veins have been worked. In Cwm-y-Bleiddiad (SH 611-508) two zones of chalcopyrite impregnation have been worked in the basic pyroclastics and rhyolitic breccia. At Bwlch Mwlchan (SH 638-517), above Llyn Gwynant (SH 644-522), near Bryn Dines (SH 626-503) and above Llyn Dines (SH 614-500 and 611-496) zones of mineralised rock and poorly defined 'lodes' have been trialed on.

At Braich-yr-Oen (SH 616-517) the actual fault plane separating the Basic Pyroclastic and Lower Rhyolitic Series is mineralised and has been worked for copper and lead. Between Braich-yr-Oen and Lliwedd Mine (SH 632-532) numerous trial stopes and levels, some quite extensive, have been made for copper (mainly), lead and zinc. At Lliwedd Mine copper, lead and zinc sulphides have been mined. The galena is reputed to carry considerable quantities of silver. All of these workings lie within the Snowdon Volcanic series, usually close to the Basic Pyroclastic/Lower Rhyolitic Series contact.

At SH 597-587, near Llanberis a lode has been worked that carries considerable quantities of pyrite and arsenopyrite as well as chalcopyrite in a quartz gangue.

Near Beddgelert at SH 590-481 some small trial workings have been carried out on a quartz vein that carries manganese minerals. It is associated with a N.N.E. trending fault that throws the Lower Rhyolitic Series against the Glanrafon Beds. The output from these workings and from numerous even smaller ones has been small.

Only Lliwedd, Brittania and Llanberis had copper outputs in the the thousands of tons of concentrates range, with probably a few

APPENDIX.

- 2 -

hundred tons produced at Braich-yr-Oen, Cwm-y-Bleiddiad, Llyn D'ur Arddu, and from the stopes between Braich-yr-Oen and Lliwedd. Small quantities of lead ore were produced at Lliwedd, Brittonia and Braich-y-Oen, and zinc ore also occurred although it is not known if it was exploited. A small amount of silver was reputedly extracted from the lead ore, and small quantities of gold is said to accompany the copper ore at Brittonia Mine.

.....
Ian Wallace.

September 1972

APPENDIX 2

EXTRACT FROM J.B. BONIWELL'S REPORT - 8th NOVEMBER, 1971 - ON APPRAISAL OF GEOPHYSICAL DATA

Pages 7 and 8

WALES

(a) Snowdon Farms (Hafod-y-Llan)

Exploration here is directed to a suite of volcanic rocks in a general caldera setting forming the host to copper mineralisation spread over a wide region. It is clear through the amount of folding and faulting present and from their distribution that the original sulphides laid down during vulcanism have seen considerable remobilization since. Occurrences of vein copper have in several instances been the object of old workings.

Considerable geochemical anomaly has been obtained in the grid area, ranging from 100 ppm. to peaks in excess of 2000 ppm. Some contamination from the old mine operations is likely in places but probably this is not of serious extent. The I.P. coverage over the area has provided a great deal of chargeability anomaly, much of it 20 msec, or better. The attendant resistivities tend to be rather erratic and not very diagnostic of rock-type. One of the complicating features is a known pyrite content to the rhyolite tuffs, one of the main rock units present. Another problem appears to be that measured resistivities under certain conditions are quite superficial in their significance. Nevertheless despite these distortions, a correlation between chargeability and intravolcanic contact does not appear to emerge at sufficient places to presume it a valid relationship. In particular two such contacts offer promise, one between a rhyolite tuff and basic pyroclastic along one side (SE) of a synclinal fold, the other between a local flinty rhyolite and the same pyroclastic series. In both cases there is a very reasonable geochemical support.

Since a contact-controlled mineralisation in a differentiated volcanic setting containing rhyolitic members is always a highly favourable circumstance, test drilling of the indicated occurrences is almost mandatory. However some discrimination has to be applied considering the amount and extent of I.P. anomaly present, and the geochemical results logically have

been drawn upon to supply it for the following recommended DDHs:

Site 1 Collar at 1N/238 drilled to N at -45° for 450'
Site 2 Collar at 10+50N/235 drilled to S at -45° for 500'
Site 3 Collar at 6+50N/234 drilled to S at -50° for 500'
Site 4 Collar at 13N/236 drilled to N at -45° for 500'

The last of these four holes is sited not so much on a contact as it is on top of an anticlinal fold in the middle of the rhyolite tuffs. The contact of course may lie buried, but the immediate target is a local chargeability peaking in correlation with strong geochemical indications (200-300 ppm). Vein copper with quartz also occurs in the general vicinity. It should be noted in passing that considerations of local terrain could force the re-siting of any of these holes; if so, the new collar can be placed anywhere that is convenient (including to the opposite side of the target) so long as an equivalent intersection is made vertically below the I.P. peak.

Page 11

It is suspected that the single greatest cause for measuring errors resides at the current electrodes where contact resistances would have a deleterious effect on reading quality if not monitored and kept within acceptable limits. Nowhere would this be more particularly true than on rocky ground with very low currents available at the current electrodes. In such conditions a thin covering of peat on a highly resistive bedrock for example could channel practically all the current through a surficial skin to preclude an effective penetration of the bedrock. Just such a circumstance is liable to account for the very atypical section of extremely low resistivities that has been recorded to the north-east side of line 236, Snowdon Farms grid. Since the primary voltages here would be very small, the secondary voltages in consequence would be exceedingly small and very prone to error. Thus the measured chargeabilities for this section would be suspect, as indeed they are.

Hafod-y Llan
Diamond Drill Hole No.5

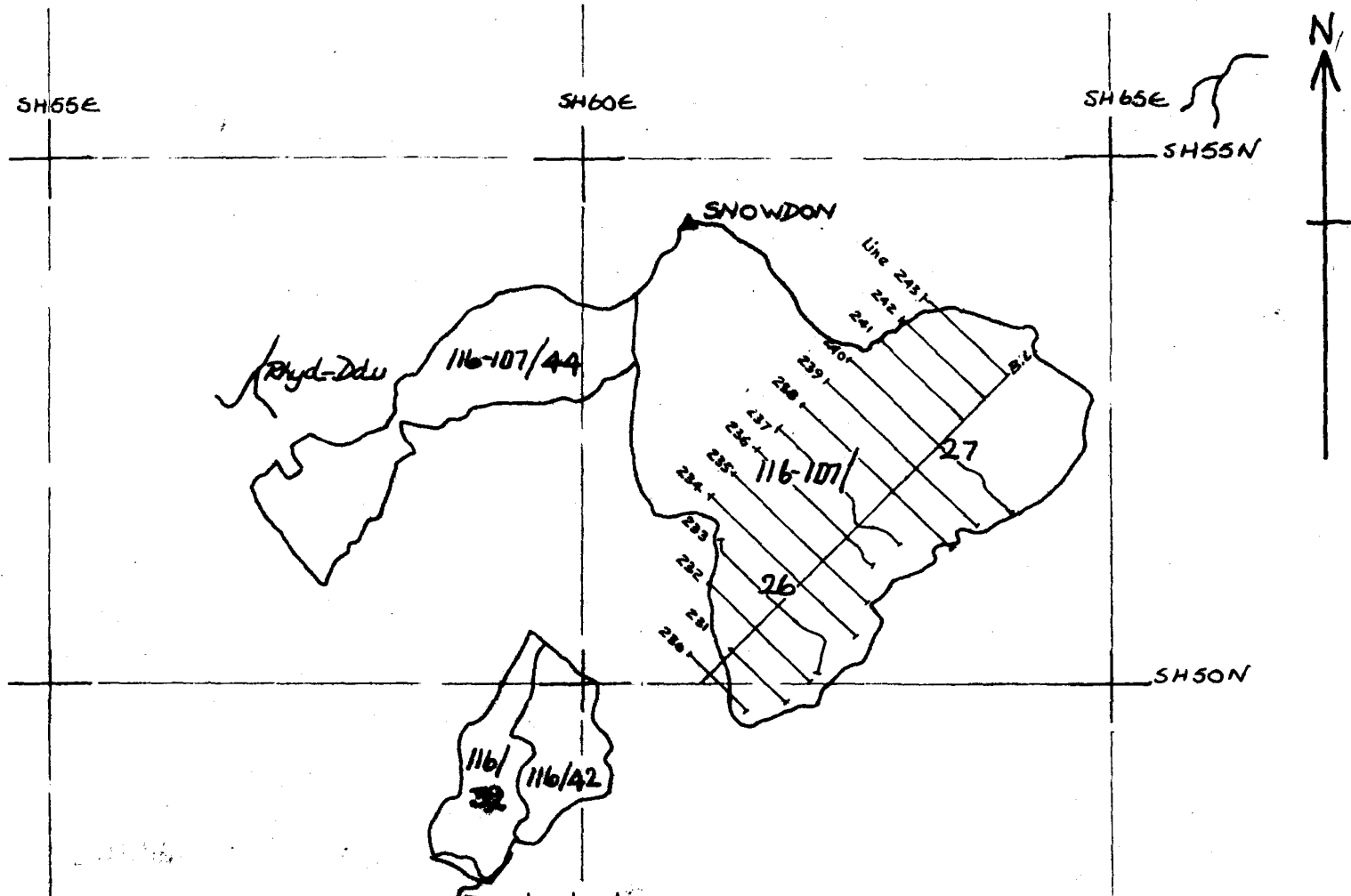
Split Core Analysis Results.

Depth. (ft)	Cu.%	Pb%	Zn.%
20.0 - 24.1	0.01	0.35	0.63
24.1 - 27.9	0.01	0.16	0.45
27.9 - 29.5	0.01	0.01	0.13
29.5 - 30.8	0.01	0.08	0.25
30.8 - 34.2	0.01	0.03	0.23
34.2 - 36.3	0.01	0.14	0.38
36.3 - 38.9	0.01	0.47	1.15
38.9 - 40.9	0.01	0.10	0.50
40.9 - 43.3	0.01	0.19	0.15
43.3 - 47.5	0.01	0.19	0.39
47.5 - 49.9	0.01	0.13	0.79
49.9 - 50.5	0.02	0.07	0.40
50.5 - 52.1	0.01	0.14	0.50
76.3 - 78.9	0.06	0.01	0.04
78.9 - 80.9	0.37	0.01	0.10
80.9 - 82.9	0.95	0.50	0.08
82.9 - 84.9	0.24	5.00	0.03
84.9 - 87.9	1.85	0.01	0.07
87.9 - 88.5	26.4	1.19	2.25
88.5 - 89.3	0.03	0.01	0.02
89.3 - 91.3	0.05	0.03	0.24
115.4 -118.3	0.27	0.01	0.02
118.3 -119.6	0.54	0.01	0.04

Hafod-y Llan
Diamond Drill Hole No.7

Split Core Analysis Results

Depth. (ft)	Cu.%	Pb.%	Zn.%
0 - 9.7	0.39	0.01	0.05
9 - 12.7	0.32	0.01	0.04
12.7 - 14.7	0.21	0.04	0.16
14.7 - 18.7	0.33	0.01	0.06
18.7 - 22.7	0.07	0.01	0.04
22.7 - 27.7	0.09	0.01	0.04
27.7 - 32.2	0.02	0.01	0.04
32.2 - 36.7	0.23	0.01	0.04
36.7 - 42.7	0.16	0.01	0.04
42.7 - 47.4	0.17	0.01	0.05
47.4 - 50.7	0.13	0.01	0.05
50.7 - 53.7	0.16	0.01	0.07
53.7 - 58.7	0.38	0.01	0.05
58.7 - 62.7	0.04	0.02	0.03
115.2 - 119.2	0.06	0.01	0.02
119.2 - 123.7	0.92	0.09	0.09
123.7 - 128.2	0.03	0.01	0.03
128.2 - 123.7	1.14	0.01	0.02



PROPERTIES:

116-107/26	-	1000	ACRES
116-107/27	-	1600	-
116-107/44	-		
116/32	-	328	-
116/42	-	260	-

MAP NO.
1692/16

NORANDA-EXPLN LTD
PROJECT 1692
HAFOD-Y-LLAN, N. WALES

SCALE: 1" ~ 1 MILE

Fig: 16.

SH56E



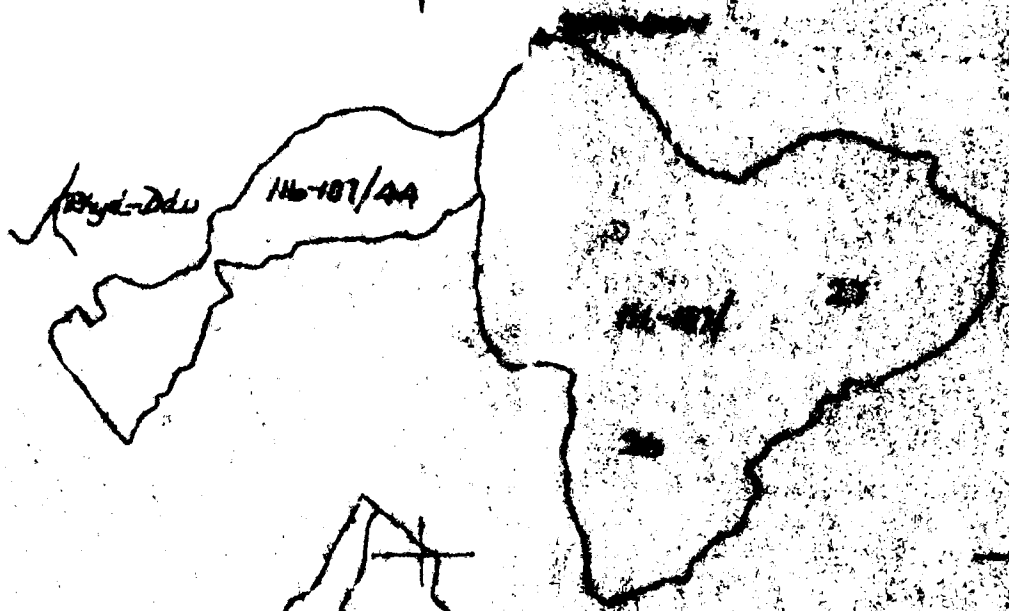
SH60E



SH64E



N

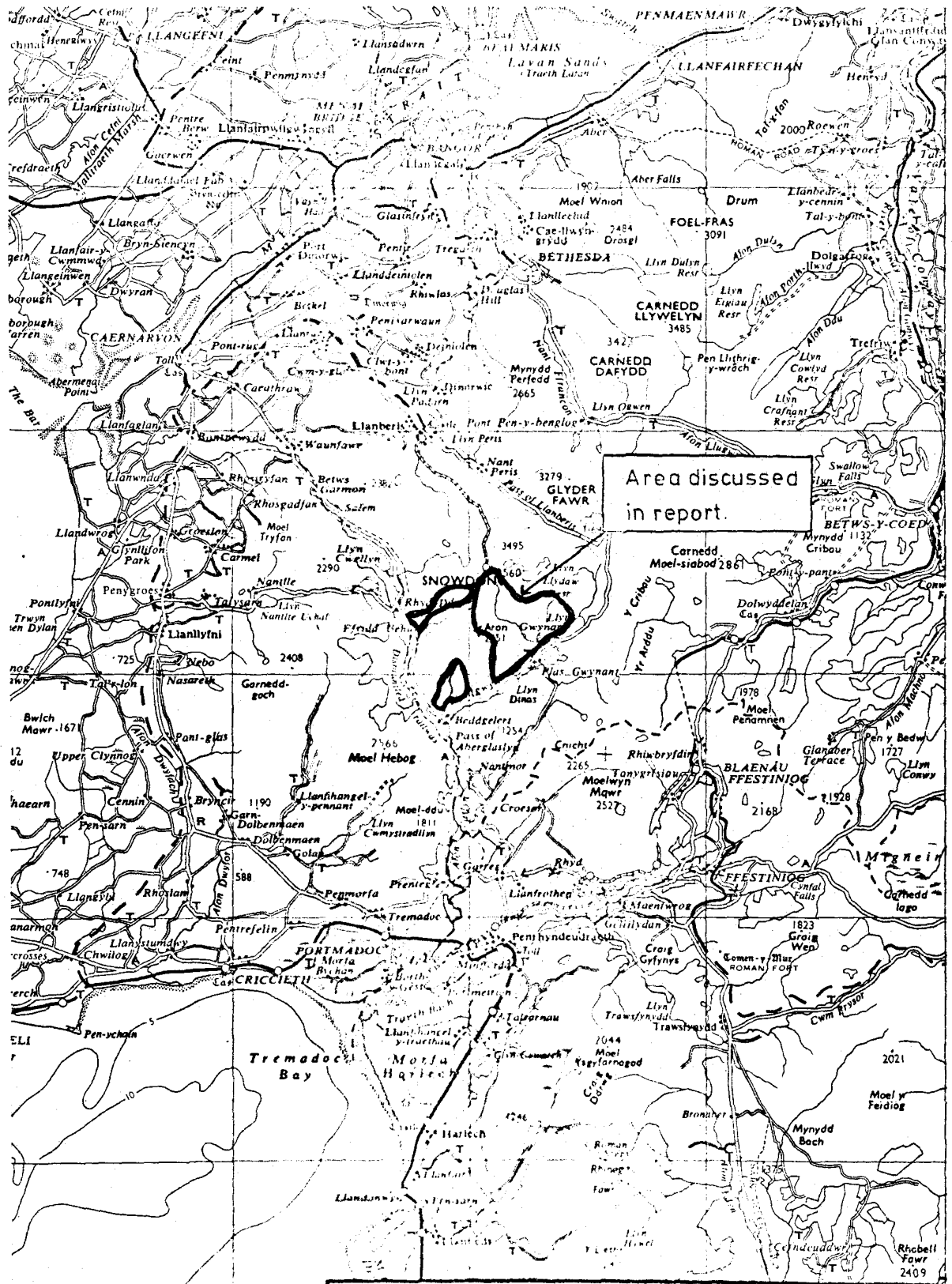


PROPERTIES

- 116-107/20 1000 ACRES
- 116-107/37 1600 ACRES
- 116-107/44
- 116/82 828 ACRES
- 116/42 260 ACRES

MAP NO.
1692/71/1

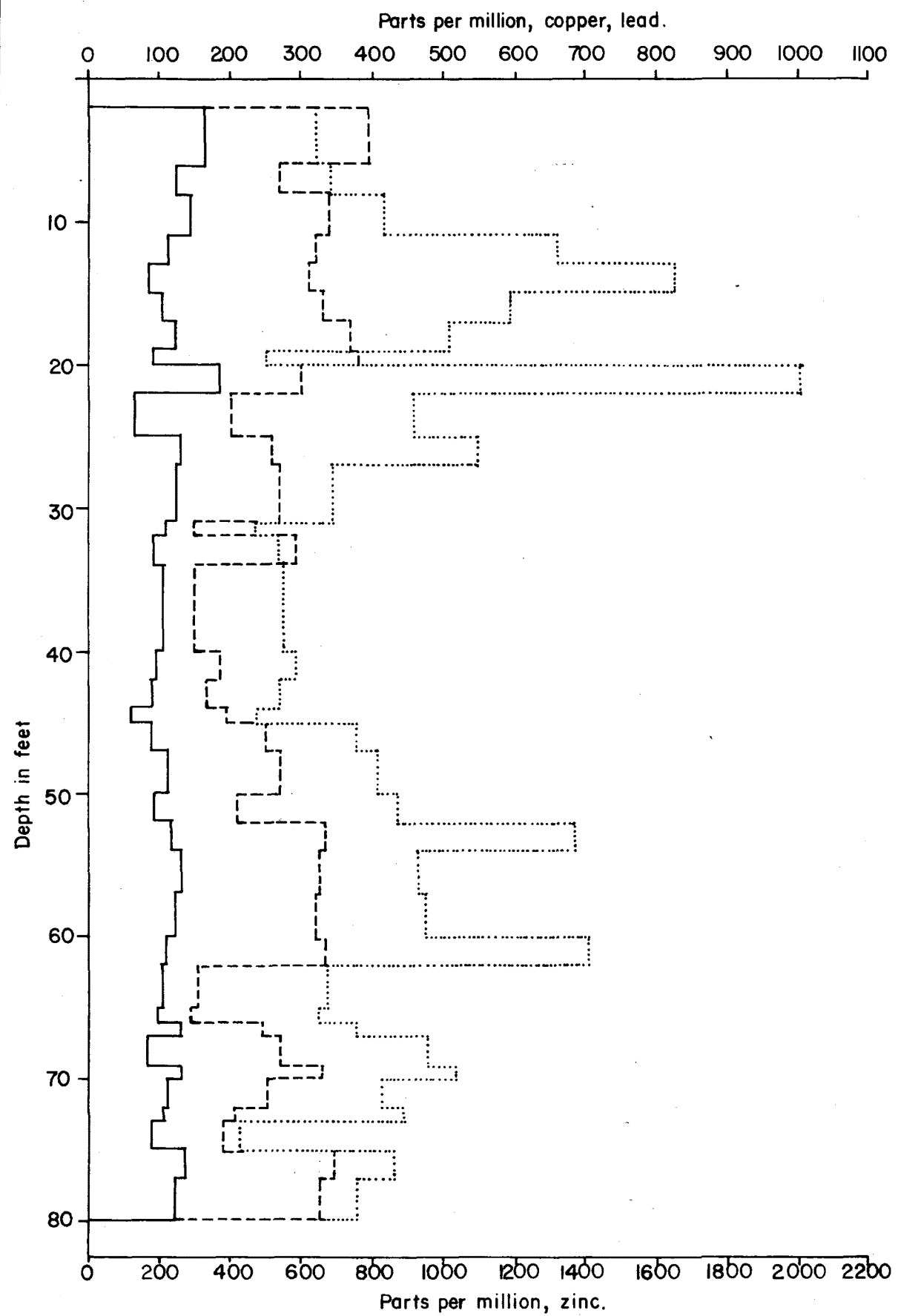
North Wales
Project 192
SNOWDON
 North Wales
 SCALE 1" = 1Miles 10/71



Area discussed
in report.

NORANDA EXPLORATION (U.K.) LTD	
HAFOD - Y _ LLAN	
Project 1692	
Location Plan	
Scale: 1 inch=4 miles.	Sept. 1972 Fig: 1A.

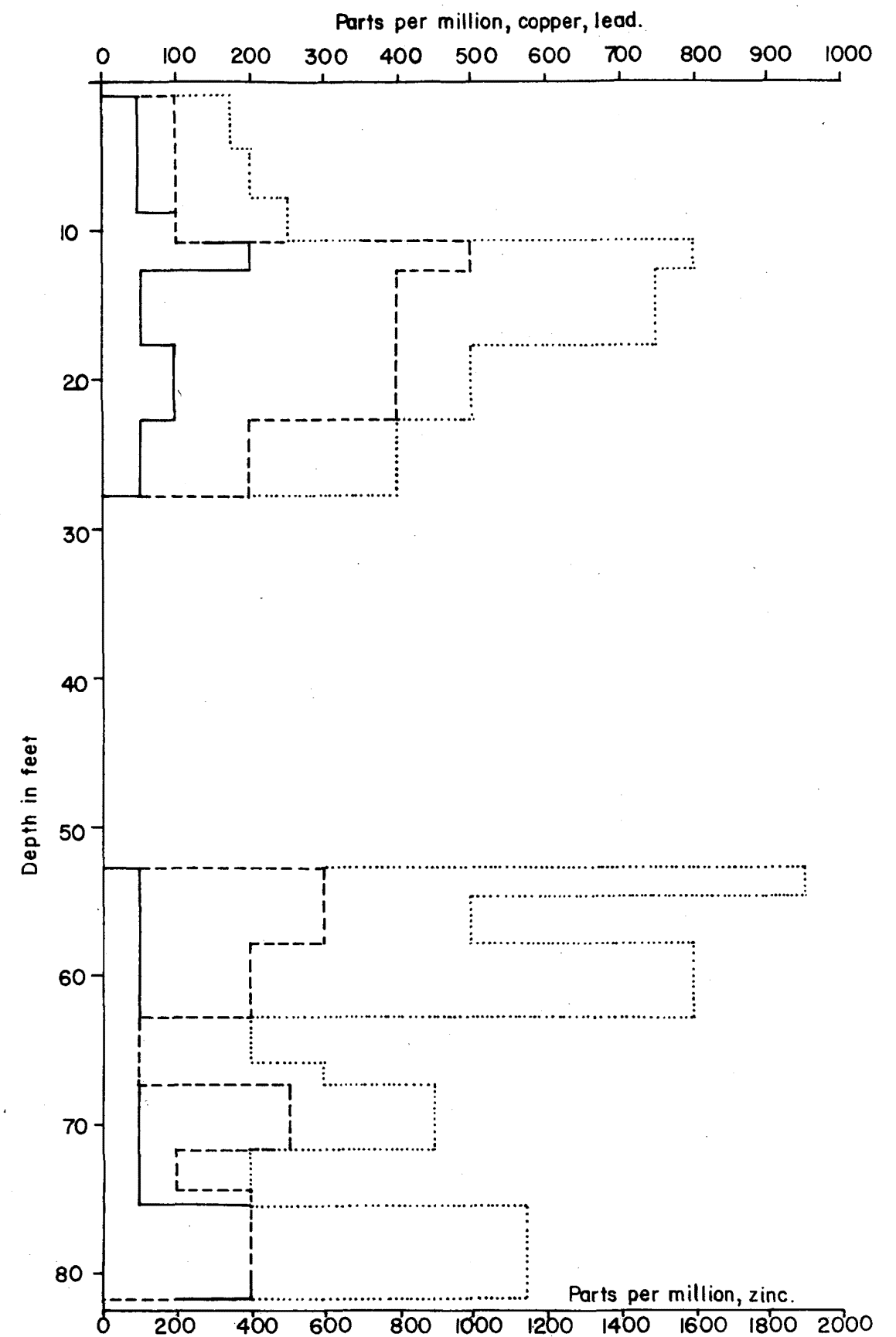
D.D.H. 1 SLUDGE



KEY

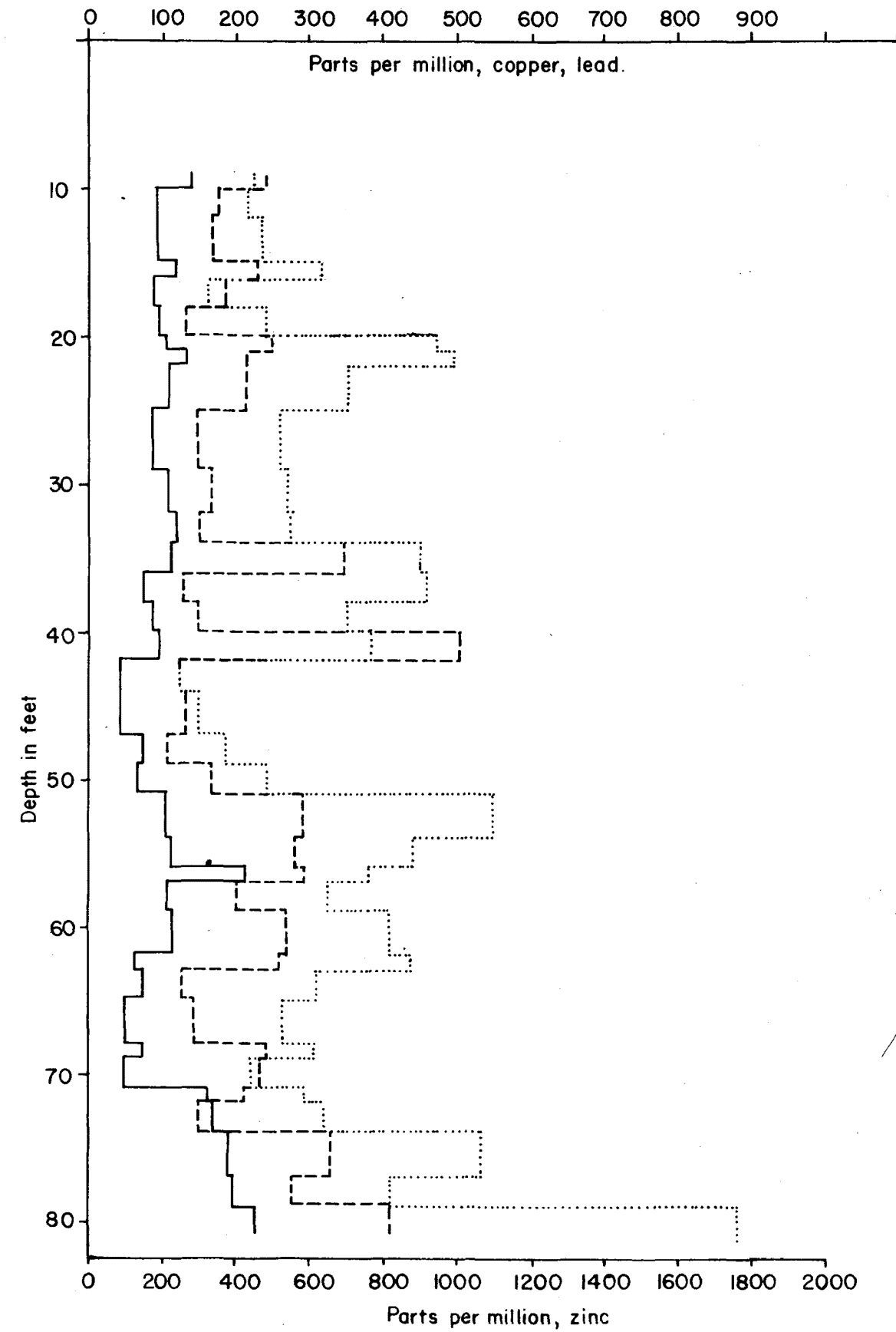
- Copper
- - - Lead
- Zinc

D.D.H. 1 SPLIT CORE



NORANDA EXPLORATION (UK) LIMITED		
PROJECT 1692		Fig: 2.
Hafod-y-Llan, North Wales.		
Sludge Sample & Split Core Analysis. D.D.H. 1		
Author: I. Wallace.	Date of work: March 1972	Drawn: H.F. Date: 11-9-72

D.D.H. 2 SLUDGE

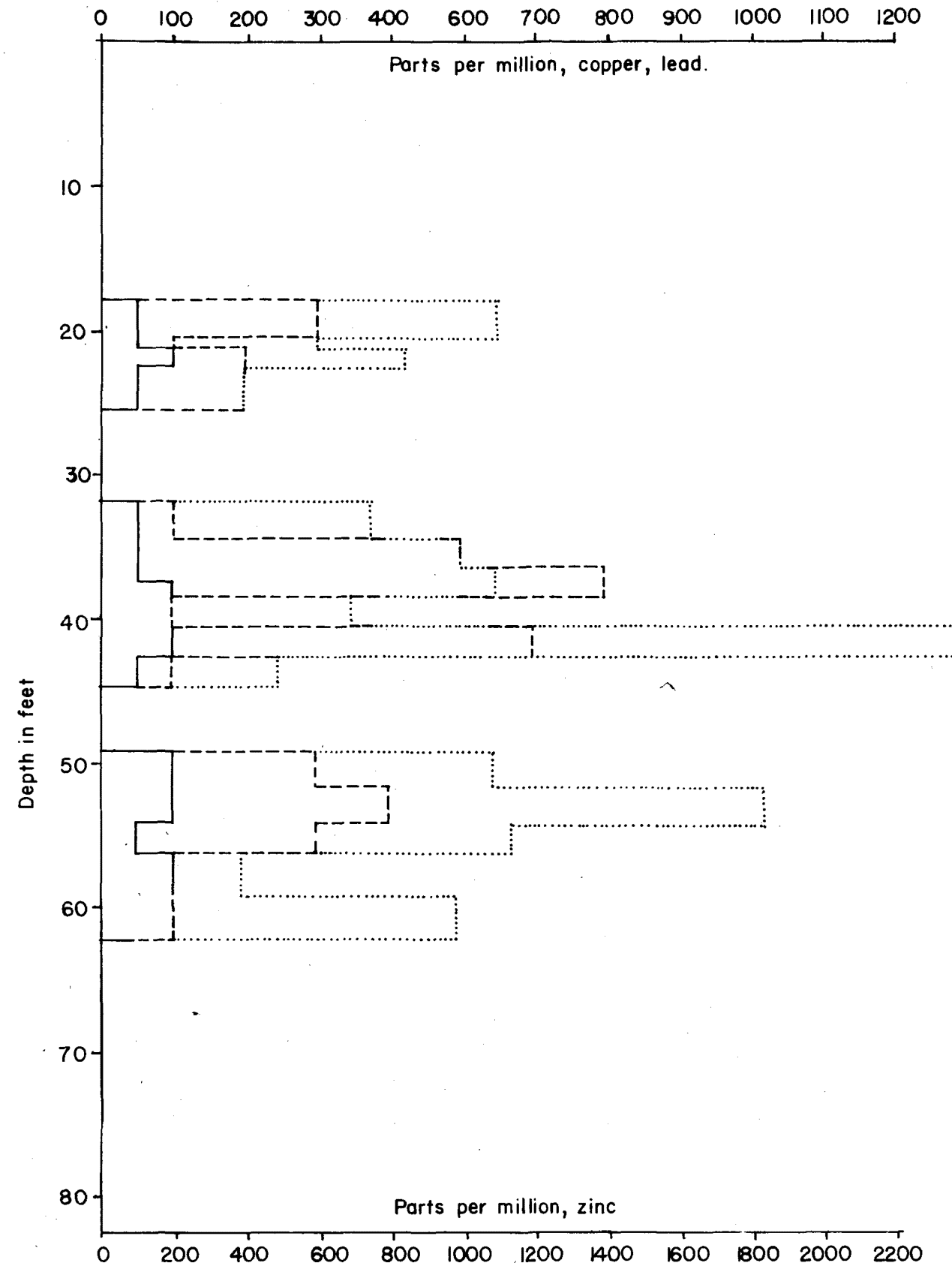


KEY

- Copper
- - - Lead
- Zinc

D.D.H. 2 SPLIT CORE

Fig:3



NORANDA EXPLORATION (UK) LIMITED

PROJECT 1692
Hafod-y-Llan, North Wales.

Fig:3.

Sludge Sample & Split Core Analysis. D.D.H. 2

Author: I. Wallace

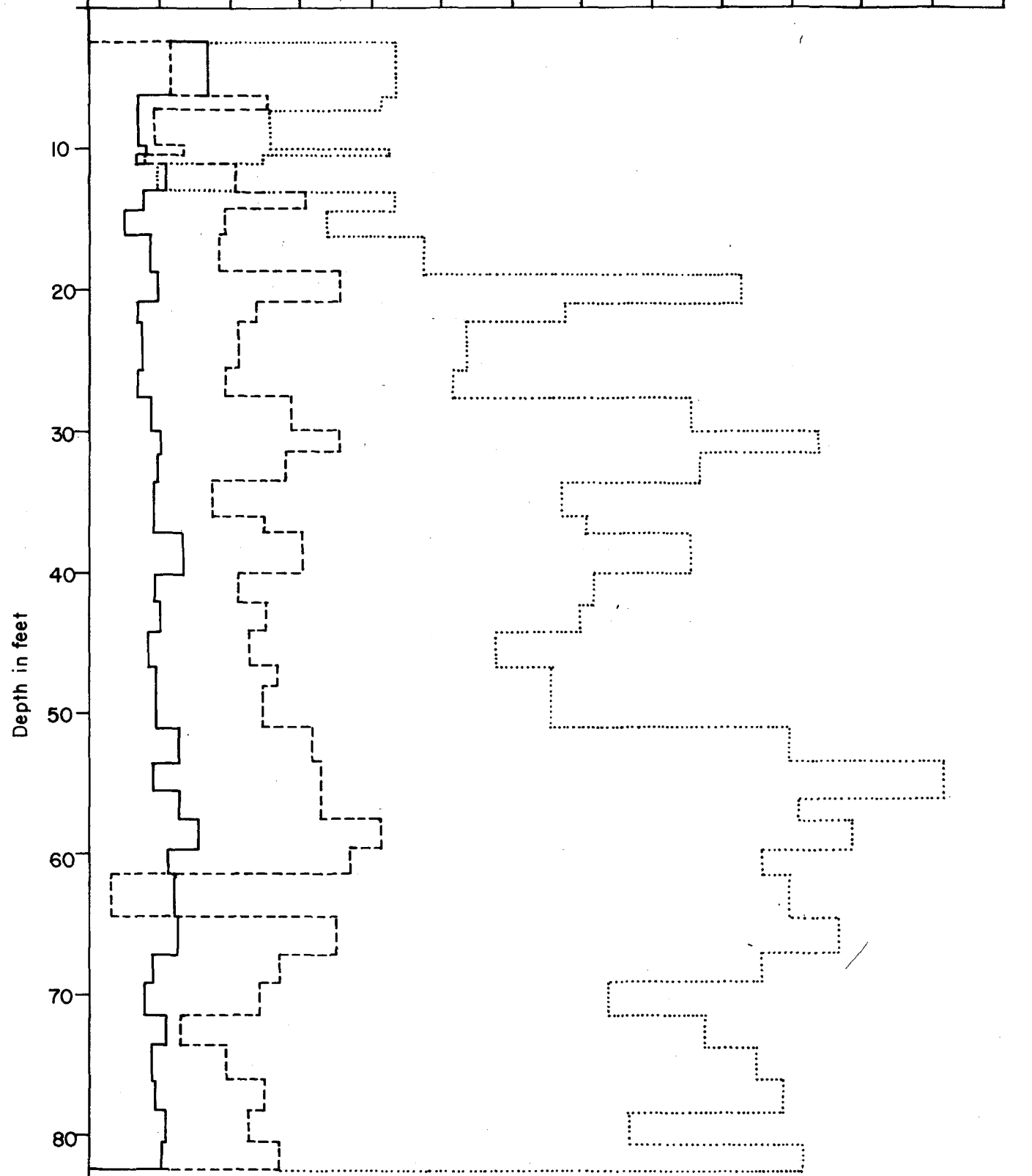
Date of work: March 1972

Drawn: H.F. Date: 11-9-72

D.D.H. 3

Parts per million

0 100 200 300 400 500 600 700 800 900 1000 1100 1200 1300



KEY

- Copper
- - - Lead
- Zinc

D.D.H. 4

Parts per million

0 100 200 300 400 500 600 700 800 900 1000

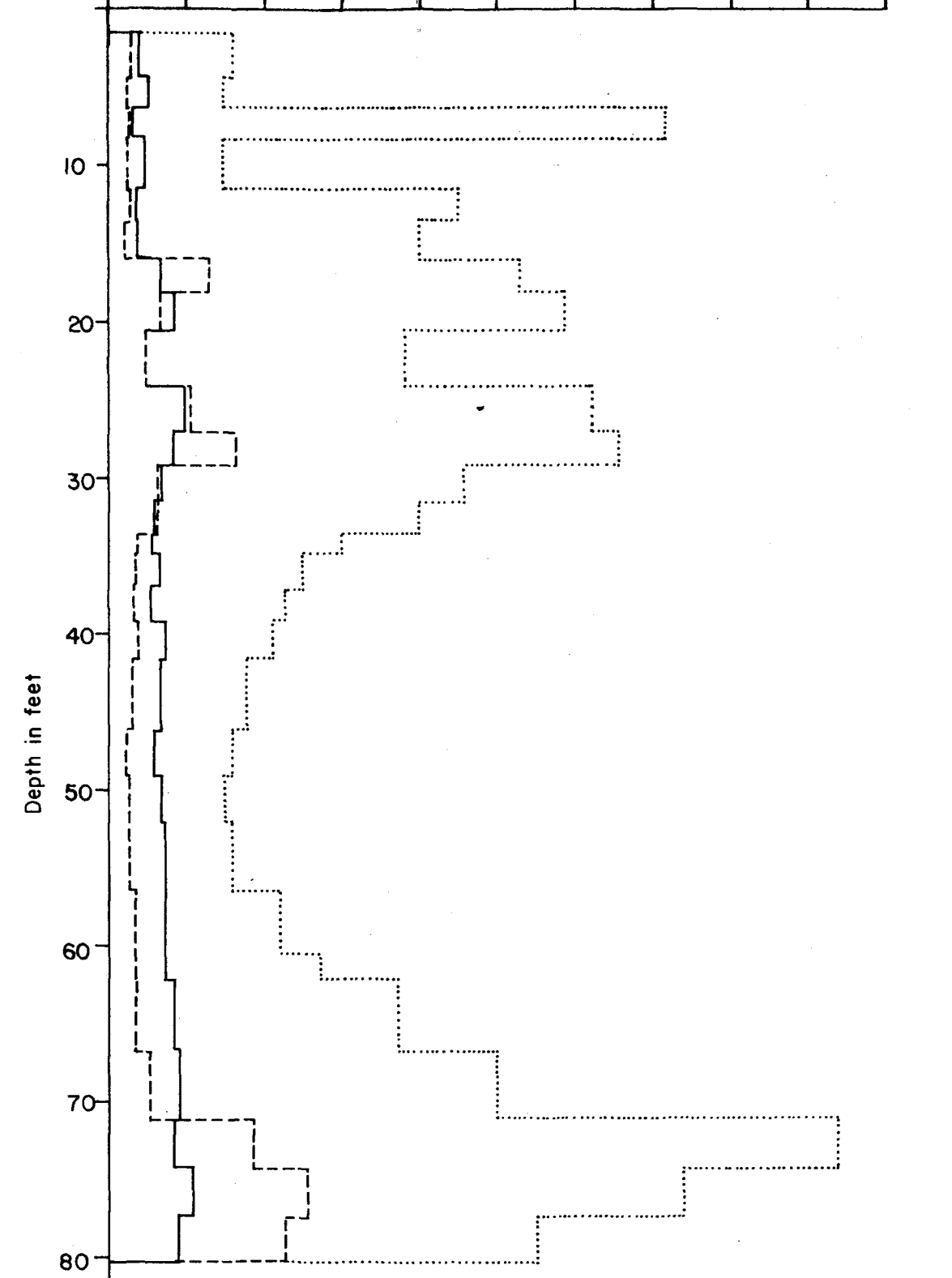


Fig: 4

NORANDA EXPLORATION (UK) LIMITED

PROJECT 1692
Hafod-y-Llan, North Wales.

Fig: 4

SLUDGE SAMPLE ANALYSIS, DDH.3 & DDH.4

Author: I. Wallace.

Date of work: March '72

Drawn: H.F. Date: 7-9-72

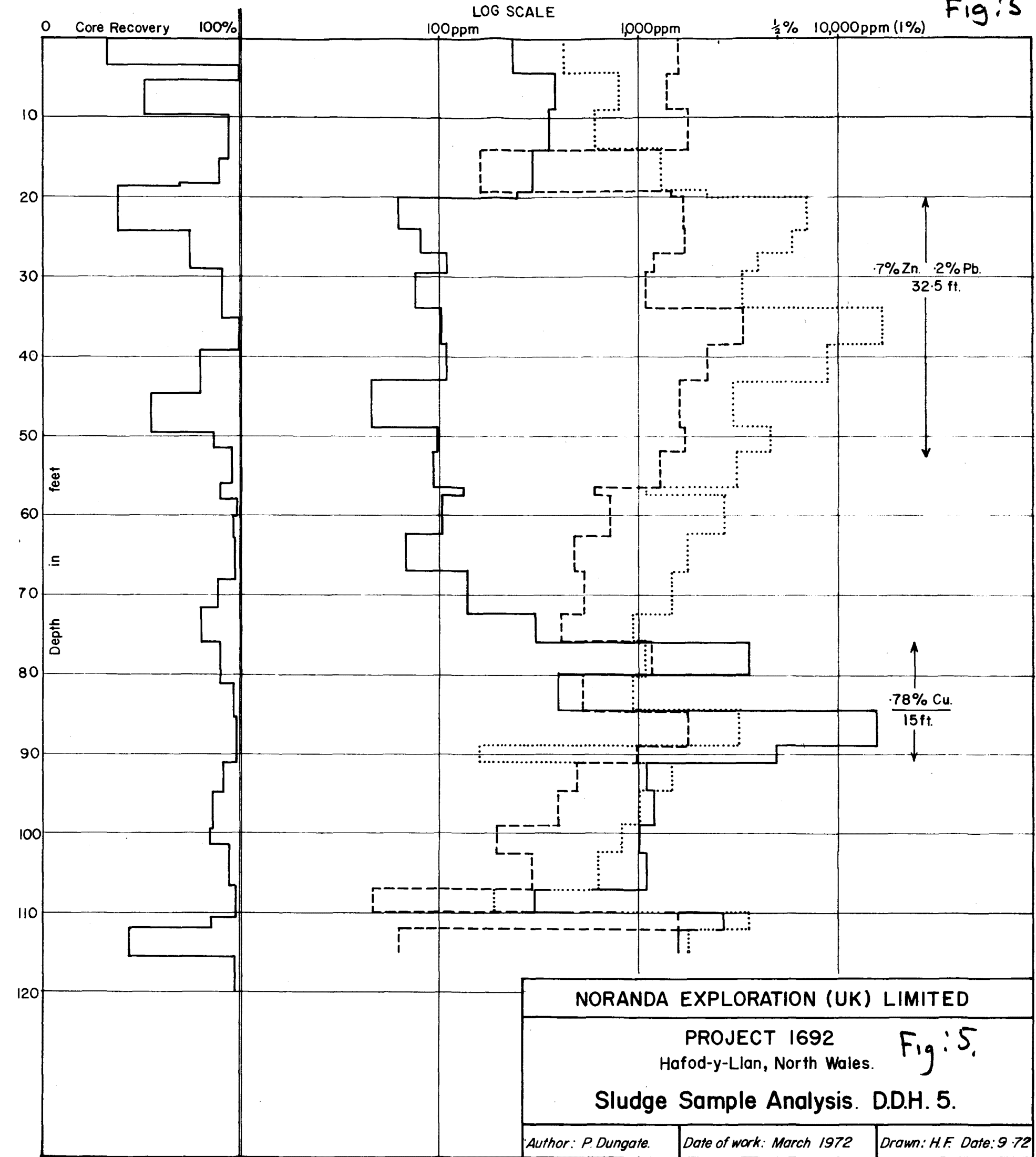
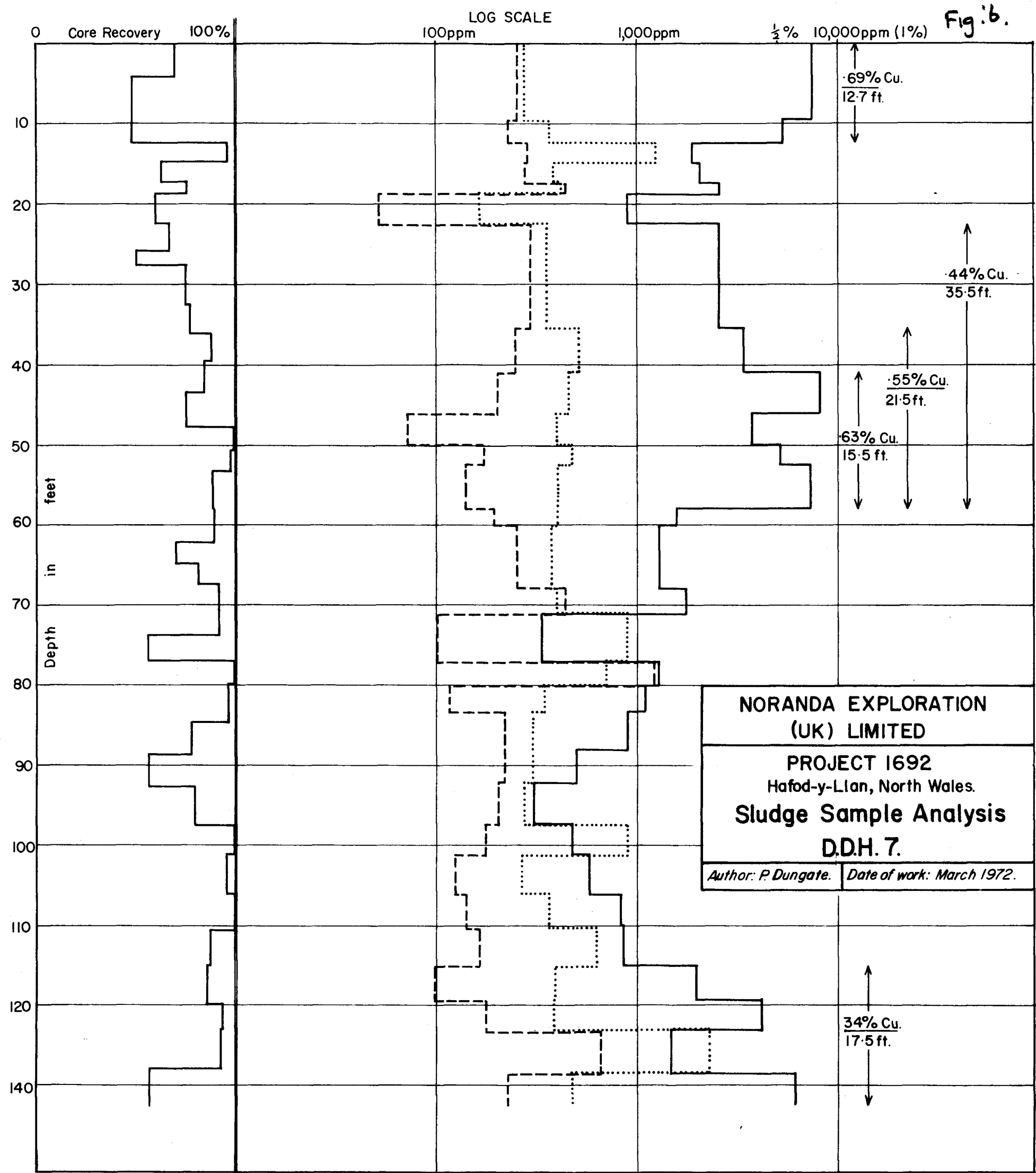


Fig. 6.



**NORANDA EXPLORATION
(UK) LIMITED**

PROJECT 1692
Hafod-y-Llan, North Wales.

**Sludge Sample Analysis
D.D.H. 7.**

Author: P. Dungate. Date of work: March 1972.



Department of Trade and Industry
Mineral Development Branch
Thames House South Millbank London SW1
Telegrams Advantage London SW1

Telephone 01-222 7000 ext 1389 or 2074

The Institute of Geological Sciences
Exhibition Road
London SW7

Your reference

MRD 84/17/7.

Our reference

MME 1 / FAME 76

Date

25 November 1971

FINANCIAL ASSISTANCE FOR MINERAL EXPLORATION

I attach a copy of an application with associated maps and papers from
Novanda-Terr Ltd for assistance towards
the *Hafod-y-Llan* project. I would be
grateful if you would consider the application and advise:

- (i) Whether the applicants have appropriate expertise and/or experience to undertake the programme or have access to it.
- (ii) Whether there is any reason why the project should not be supported.
- (iii) Whether the proposed work programme is sensible in the light of available information.
- (iv) If, in your view, there appear to be any abnormal features in the application which we should take into account in reaching a decision.

If the information provided is not adequate you should approach the applicant direct but we would be grateful if you keep us informed if anything significant arises from your discussions.

W. J. G. Jones

Noranda Exploration U.C. Ltd.

Diamond Drill Core Log Sheet

SH 65 SW/1

D.D.H. No. 1

Date Commenced 18.2.72

Prospect 1692 N.Y.L.

Date Completed 25.2.72

Location N. Wales

Grid refs. SH 65 SW 6198/5104 Line 1624A 375' North

Collar Elevation

Direction 45315°

Inclination 90 (n.)

Final Depth 80'3"

Core size AXT

Logged By *[Signature]*

Run	Core Recov.	Depth	Lithological Description	Mineralisation
	0%	G.L.-2'4"	Overburden	
		2'4"-10'6"	Extensively weathered basic pyroclastic, consisting of tuffite, grey in colour & containing 30% white clasts up to 0'3" in diameter.	0'02" cubes of py. 3%
	25%			
	55%	10'6"-12'2"	Tuffite containing clasts of shale & pumice? elongated in the cleavage direction and comprising 60% of the total. Joints heavily leached.	- 5% py. as black with rare crystals
		11'0"	Cleavage 30 to core axis.	
	80%	12'2"-12'6"	Well cleaved black shale - possibly drilled clast.	rare py.
	80%	12'6"-17'4"	Tuffite containing 60% shale & pumice? clasts elongated along the cleavage.	3% py. as black stringers & crystals. matrix with pressure fringes
		15'7"	cleavage 37 to core axis.	
	77%	17'4"-17'10"	Leached horizon with Fe & Mn oxides. Cleavage 35 to c./a.	gossan
		17'10"-33'1"	Tuffite with 60% clasts, white in colour & elongated in the cleavage direction.	2% py. both as stringers & clasts. Rare chalc.
	2%	33'1"-37'0"	Tuffite, grey in colour with 80% clasts up to 1" in size.	Occasional py. rare chalc.
		37'0"-42'9"	10% tuffite, remainder white clasts. These are approx. lozenge shaped & many are surrounded by 0'05" py.	Pyrite mainly as matrix surrounding clasts.
	8%			
	55%		stringers. Gradual decrease in clast % to the base.	
	86%	36'6"	Cleavage 20 to core axis.	

Run	Core recov.	Depth	Lithological Description	Mineralisation	
40'2"-42'9"	1'0"	41%	42'9"-48'0"	Grey/black tuffite with white clasts up to 0.1" diam. decreasing from 60% to 20%. Well cleaved with talc on the cleavage planes. Cleavage at 20 to core axis	0.1" crystals of pyrite in both tuffite & in the clasts. 1%
-44'0"	0'0"	0%			
-45'0"	0'4"	33%			
-47'11"	0'10"	28%			
-50'5"	2'0"	80%	48'0"-64'0"	Grey/black tuffite with 10% shale clasts & 20% white clasts (pumice?). Clasts are deformed with the long axis // to the cleavage at 24 to the core axis.	pyrite crystals, some with pressure fringes. also disseminated pyrite and rare pyrrhotite.
-52'11"	2'2"	84%			
-54'11"	1'8"	83%			
-57'11"	3'3"	75%	64'0"-80'8"	Grey/black tuffite with varying % of inclusions from 40%-90%. Size of clasts varies from 0.1"-0.5". They are poorly sorted and show a regular variation in diameter with increasing depth, changing from coarse to fine over intervals of - 1'. The transition is gradational & does not exhibit clear bedding.	pyrite crystals, also disseminated with rare blebs of pyrrhotite.
-62'11"	4'0"	80%			
-65'11"	2'6"	83%			
-71'9"	4'0"	71%			
-75'5"	3'4"	90%			
-80'8"	4'0"	76%			
			78'0"	cleavage 35 to core axis	
			80'8"	End of Hole	

Registered specs

14'
33'
37'
51'
67'
77'

SH 65 SW/2

Diamond Drill Core Log Sheet

Project No. 2

Date Commenced 28.2.72

Project 1092 N.Y.S.

Date Completed 3.3.72

Location 1. miles

Grid Refs. SH 65 SW 6194/5106 Line 1624A 450' North

Site Elevation

Direction ~~135~~ 135

Inclination 45

Final Depth 81'8"

Core size AXF

Logged by /

Core Recov.	Depth	Lithological Description	Mineralization
G.L.-1'6" 0'0" 0%	G.L.-1'6"	Overburden	
-3'1" 3'0" 46%	1'6"-12'3"	(I.G.S. terminology, Basic Pyroclastic) Extensively shattered & weathered tuffite. Cleavage 75 to core axis.	1% py. as blebs and crystals. rare pyrr. & chalc.
-12'3" 0'6" 12%			
-16'4" 2'0" 50%			
-18'0" 0'6" 30%	12'3"-25'0"	Light grey cleaved tuffite with 20% white pumice? inclusions up to 0.2" diam. Larger grey & white clasts are present up to 0.5" diam. All the clasts are irregular in shape and exhibit 2ndry. alt. Cleavage 75 to core axis.	Bleabs & crystals of py. surrounded by asbestiform pressure fringes. Rare chalc. & sph.
-22'8" 3'6" 75%			
-27'6" 4'0" 83%			
-32'0" 4'0" 89%			
-36'6" 4'0" 89%	25'0"-26'0"	Transition to a black shaly tuffite containing clasts, as above.	Rare py.
-40'8" 2'0" 48%			
-45'5" 4'0" 80%	26'0"-26'4"	4" horizon of coarser grained pumice? tuffite	0.5% total py. chalc, & sph.
-49'8" 4'0" 48%			
-54'1" 3'6" 79%	26'4"-36'10"	Cleaved, grey, banded tuffite containing several horizons up to 4" wide that are black well cleaved and composed mainly of shale. 2% white clasts 0.1" diam. uniformly distributed throughout.	Dissem. py. 1%. Rare chalc.
-57'8" 3'2" 88%			
-62'2" 3'4" 71%			
-66'8" 0'10" 28%			
-69'4" 3'1" 100%	36'10"-37'2"	Shale horizon or a large clast	
-72'8" 1'2" 34%	37'2"-38'0"	Grey cleaved tuffite with 20% white clasts. Changing from 0.75" diam. at top to 0.25" at the base.	Blebs of pyr. crystals of py.
-77'2" 1'0" 22%			
-81'8" 4'4" 96%	38'0"- 40'0"	Grey cleaved tuffite with shale & pumice inclusions up to 0.25" diam.	Crystals of py. < 0.5%. Rare chalc.

Run	Core Recov.	Depth	Lithological Description	Mineralisation
		40'0"-44'0"	Cleaved grey tuffite 20% clasts up to 0.5" diam. of shale & pumice.	Stringers of pyrr. & crystals of py. 1%. Rare chalc. & sph.
		44'0"-50'2"	Cleaved Grey tuffite with 50% large white clasts up to 0.4" diam. Many are elongated along the cleavage. The clasts show 3 repeat units of decreasing diam. indicating poor water sorting. No obvious bedding can be seen. Cleavage 75 to the core axis.	Py. crystals 0.02" in size & 0.5% rare stringers of pyrr. rare chalc. & sph.
		50'2"-67'0"	Cleaved grey tuffite 5% clasts 0.1" diam. Clasts are more numerous and larger from 50'8" -60'0", & 59'8"-60'10"	Py. crystals 0.5%, locally conc. in some of the larger clasts. Rare chalc. & ga.
		67'0"-81'8"	Cleaved gray tuffite 30% pumice clasts up to 0.5" diam. The larger clasts have irreg. outline whereas the smaller clasts are elongated in the cleavage direction. The variation indicates poorly graded bedding repeating at 67' 68' 72'4" & 77'. These features are so poorly exhibited that bedding & way-up structures cannot be determined.	Locally conc. blebs of py. & pyrr. isolated py. crystals. Total 0.5%. rare chalc, & sph.

End of Hole

Diamond Drill Core Log Sheet

D.D.N. No. 3

Date Commenced 6.3.72

Prospect 1692 H.Y.L.

Date Completed 10.3.72

Location N. Wales

Grid Refs. SH 65SW 6194/5107 line 1624A 350' north

Collar Elevation

Direction ~~315~~ 35°

Inclination 45

Final Depth 83'8"

Core Size AXF

Logged by *[Signature]*

Run	Core Recov.	Depth	Lithological Description	Mineralisation
G.L.-2'6"	0	0%	G.L.-2'6"	Overburden
-6'4"	1'4"	35%	2'6"-6'0"	'Basic Pyroclastic', Extensively weathered grey tuffite with 10% clasts up to 0.2" diam. Many clasts have been leached out leaving cavities filled with Fe & Mn oxides Cleavage 40 to core axis.
-9'11"	2'6"	70%		
-14'0"	2'3"	55%		
-18'0"	2'3"	100%	6'0"-18'0"	
-23'8"	2'9"	54%		Grey cleaved tuffite with up to 50% large clasts up to 0.4" diam. The clasts are of quartz & pumice. 2" leached zone. FeMn oxides 6" " " " "
-27'8"	3'8"	92%	13'6"	
-31'8"	3'0"	75%	14'8"-15'2"	
-36'2"	3'6"	78%	18'0"-23'6"	Grey cleaved tuffite with 10% clasts rarely exceeding 0.15"
-39'2"	3'6"	100%	23'6"-24'4"	Grey cleaved tuffite 40% clasts < 0.2" diam.
-42'2"	2'9"	92%		
-46'8"	4'2"	93%	24'4"-41'0"	Light grey basic tuffite with up to 5% clasts < 0.1", The clasts are locally conc. to give a series of bands, not > 2' in width separated by zones with < 2% clasts. Throughout there is a random distribution of clasts up to 0.5" diam.
-51'2"	4'4"	93%		
-55'8"	4'4"	93%		
-59'8"	1'5"	35%		
			41'0"-42'6"	Grey cleaved tuffite. Cleavage 45 to core axis.
			42'6"-44'0"	Grey cleaved tuffite, 40% clasts, size increasing with depth to 0.5" diam.

Rare chalc. py. & pyrr.

Rare sph. & py.

Rare py.

Rare py. chalc. & ga.

Rare pyrr.

Rare py. & ga.

Run	Core Recov.	Depth	Litnological Description	Mineralisation
-62'8"	3'0" 100%	44'0"-83'8"	Cleaved basic tuffite with b horizons of clasts.	stringers of pyrr. rare chalc. & sph.
-67'2"	4'2" 93%	59'8"-60'6"	50% yellow pumice? clasts up to 0.5" diam. in tuffite matrix.	
-71'8"	4'4" 93%	61'6"-62'4"	20% clasts up to 0.2" diam. some elongated in the cleavage direction at 50 to the core axis.	
-76'2"	4'6" 93%	66'2"-67'4"	several pygmatic quartz veins in tuffite then a transition at 66'10" to a white grey horizon of compact clasts.	
-80'8"	4'6" 100%			
-85'8"	2'0" 66%	71'2"-72'0"	Yellow clasts up to 1" diam. in tuffite matrix.	rare ga. crystals.
		End of Hole		

SH 65 SW/4

Diamond Drill Core Log, West

Project No. 4
Project 10,2 N.Y.L.

Date Commenced 13.3.72
Date Completed 16.5.72

Location N. 45°
Grid Refs. SH 65 SW 6193/5140 Line 1624A 450' north
Collar Elevation Direction ~~25~~ 135°

Inclination 45

Core Depth 80'4"

Core Size AXT

Logged by 23

Run	Core Recov.	Depth	Lithological Description	Mineralisation
G.L.-0'5"	0'0"	0%	G.L.-0'5"	Overburden
-1'6"	1'5"	100%	0'5"-16'0"	Rare py. & chalc.
-4'6"	3'0"	100%	16'0"-16'2"	2" quartz vein at 15 to the core axis.
-7'2"	1'0"	38%	16'2"-31'0"	Blebs of pyrr. rare chalc. ga. & py, crystals.
-11'8"	3'6"	78%	31'0"-31'6"	Sph. & py. crystals rare. mainly confined to the large clasts.
-16'2"	2'3"	50%	31'6"-35'2"	Blebs of pyrr. 1% rare sph. crystals.
-20'8"	3'6"	78%	35'2"-35'8"	Blebs of pyrr. rare sph.
-24'2"	3'2"	90%	35'8"-50'0"	Blebs of pyrr. rare chalc.
-27'2"	2'2"	73%		
-31'8"	2'10"	63%	37'2"-38'0"	
-35'0"	2'2"	61%		
-37'2"	2'2"	100%	46'2"	2" quartz Horizon.
-41'8"	2'8"	59%		Several pygmatic quartz veins throughout horizon
-46'2"	3'3"	72%		35'8"-50'

Run	Core Recov.	Depth	Lithological Description	Mineralisation
-49'2"	2'5" 80%	50'0"-53'0"	Tuffite containing 60% clasts up to 0.5" diam. mainly < 0.2" diam. 50'-50'4" is a well cleaved white tuffite horizon.	Blebs of pyrr. & chalc. Ga, & py. crystals. Total < 1%
-52'2"	3'0" 100%			
-56'8"	4'6" 100%			
-58'6"	3'4" 37%	53'0"-55'4"	Tuffite with 60% clasts < 0.1" diam.	Py. pyrr. & ga. total < 1%
-62'4"	1'3" 75%	55'4"-78'0"	Tuffite with a variable clast content and showing a banding due to changes in the size & number of the clasts.	Stringers of pyrr. Rare chalc. ga. & sph.
-66'10"	4'6" 100%			
-71'4"	4'0" 89%			
-74'4"	2'8" 94%	58'4"-58'8"	60% clasts up to 0.5" diam in tuffite matrix	
-77'4"	2'3" 56%	61'8"-62'4"	" " " " "	
-80'4"	3'0" 100%	68'10"-69'4"	" " " " "	
		71'4"-71'6"	2" quartz vein fissured & infilled with 2ndry Fe, Mn oxides.	sph. & ga.
		78'0"-80'4"	Tuffite containing 70% clasts of 0.1" diam, & also pumice clasts up to 1.5" in size. Cleavage 45° to the c./a.	Blebs of pyrr. py. rare chalc. & ga.
			End of Hole	

Diamond Drill Core Log Sheet

D.D.H. No. 5

Date commenced: 27.3.72

Prospect 1692 H.Y.L.

Date completed: 20.4.72

Location N. Wales

Grid refs: SH 65 SW 6263/5254 Line 1759A 2500' north

Collar elevation

Direction 142½T.

Inclination 45 (s.)

Final Depth 119'7"

Core Size EX to 20' AXI to
112'4" Ex to baseLogged by J. B. R.

Run	Core Recov.	Depth	Lithological description	Mineralisation
G.L.-3'6"	0'9" 21%	G.L.-4'	I.G.S. terminology 'basic pyroclastic'. Light grey cleaved tuffite, shale clasts 0.1" diam. comprise 30%	Leached zone, Fe Mn oxide. py. crystals less than 1%, blebs of sph. 0.1" diam. less than 1/2%.
-4'10"	1'4" 100%			
-9'4"	1'6" 33%	4'0"-5'0"	Light grey cleaved tuff. 2mm. thick pygmatic quartz veins present.	py. cubes, blebs of sph. rare ga. cubes. total less than 1%.
-9'10"	0'0" 0%			
-14'4"	4'0" 89%	5'0"-15'0"	Light grey tuffite with 20% quartz clasts & 20% shale clasts up to 0.1" diam. cleavage at 60° to c./a.	stringers of sph. also as blebs. 1% rare ga. & py. Many stringers show a complex zonation of quartz & sulphides.
-18'9"	3'6" 79%	10'1"	" " 75° to "	
-19'10"	0'6" 50%	14'1"	sev. 0.1" thick pygmatic quartz veins.	
-24'1"	1'11" 26%	14'4"-15'0"	Bedding 75° to c./a.	
-27'10"	2'4" 55%	15'0"		
-29'10"	1'8" 83%	15'0"-15'6"	abrupt transit. to v. fine grained grey cleaved tuffite. cleavage 72° to c./a. bedding 70 to c./a. opp. to cleavage	rare ga. crystals
-34'4"	3'3" 79%	15'6"-19'3"	Grey tuffite with 20% shale clasts. 0.1" thick pygmatic quartz veins present.	sph. as blebs & stringers less than 1/2%. rare ga.
-38'10"	4'6" 100%	19'3"-29'6"	gradational bands of light grey tuff & dark grey tuffite up to 4" in thickness. bedding in tuffite 60° to c./a.	stringers & veins of sph. 1% rare ga. & dissem. py.
		19'3"		
		29'6"-30'9"	grey/green chloritic tuffite with 15% shale clasts of 0.1" diam.	blebs of sph. < 1%. rare py.
		30'9"-30'10"	1" shale horizon	
		30'10"-31'5"	grey/black tuffite with 20% 0.1" diam. shale clasts.	blebs of sph. 1%
		31'5"-34'2"	grey/black tuffite, no clasts	rare sph.
		34'2"	bedding 60° to c./a.	

Run	Core recov.	Depth	Lithological Description	Mineralisation	
-43'4"	3'0"	66%	34'2"-47'6"	alternation of grey/black tuff & tuffite in bands of 2"-6" wide. Well cleaved at 70 to the c./a.	stringers & veins of sph. 0.1" wide. occ. blebs of sph. Total < 1%. rare ga. cubes 1/4" vein sph. at 38'8"
-49'10"	2'5"	36%			
-52'11"	1'8"	74%			
-56'7"	4'4"	96%	47'6"-49'10"	grey tuffite with 5% white/grey clasts up to 0.4" diam.	thin stringers of ga. < 1% " " " sph. 1%
-57'10"	1'0"	80%	± 49'4"-50'	Poor recovery. pieces of sheared rhyolite with Fe resids. in cavities. Fault?	
-59'11"	1'3"	100%			
-62'10"	3'7"	96%	50'0"-50'7"	Grey tuffite with 5% white/grey clasts up to 0.4" diam.	blebs & veins of sph. 1% rare ga.
-67'4"	4'2"	96%			
-71'10"	3'5"	78%	50'7"-69'2"	green/grey chloritised tuffite well cleaved with 20% quartz as 0.2" diam. blebs and elongated segregations. cleavage 70 to c./a.	2% blebs of sph. at top decreasing to < 1% at base rare py. & pyrr.
-76'4"	2'11"	65%			
-80'10"	3'8"	82%			
-84'10"	3'9"	94%	69'2"-76'0"	grey cleaved tuffite, occ. darker bands more strongly cleaved. Cleavage 70 to c./a.	pyrr. as veins & stringers 2% conc. from 73'6"-74'6" blebs of chalc. & py.
-89'4"	4'2"	100%			
-91'4"	2'3"	100%	76'0"-78'10"	green/grey well cleaved chloritised tuffite. cleavage 70 to c./a.	blebs of pyrr. elongated in cleavage direction. 2% segregations of chalc. 2%
-94'10"	3'0"	86%			
-98'4"	2'8"	76%	78'10"-79'2"	4" zone of irregularly shaped quartz veins with chalc.	10% chalco. traversing quartz veins. subord. pyrr.
-102'10"	3'4"	74%			
-107'4"	4'2"	93%	79'2"-80'0"	cleaved grey/black tuffite.	py. cubes & blebs. pyrr. 1%
-110'4"	3'0"	100%	80'0"-80'11"	1" rhyolite horizon	blebs of pyrr. 1%
-112'4"	1'6"	75%	80'11"-85'6"	grey/black cleaved tuffite, with 20% clasts 0.1" diam. cleavage at 60 to c./a.	chalc. 3% as small stringer & segregations in association with pyrr. Pyrr. as blebs elongated along cleav
-115'4"	0'7"	19%			
			85'6"-88'3"	grey/black cleaved tuffite with 10% py. crystals 0.1"	segregations of chalc. 1% rare pyrr.
			88'3"-89'0"	tuffite 60% mineralised	intergrowth chalc. & pyrr.
			89'0"-103'9"	tuffite with py. crystals	chalco. & pyrr. 2%
			103'9"-104'0"	thin rhyolite flow or large lithoclast.	
			104'-112'4"	grey/black cleaved tuffite with occasional rhyolite clasts.	veins & stringers of chalc. 1%

Hole 5

Run	Recov.	depth	Lithological Description	Mineralisation	
-115'4"	3'0"	100%	112'4"-118'	grey/black tuffite with 10% white clasts 0.1" in diam.	blebs of pyrr. 1% py. crystals. rare chalc
-119'7"	1'3"	100%	118'-118'4"	thin rhyolite flow. bedding at 60° to c./a.	
			118'4"-119'6"	grey/black tuffite with 10% white clasts.	stringers of chalc. & pyrr. 1%
			119'6"-119'7"	thin rhyolite flow or clast	

SH 65 SW/6

26.4.72
19.5.72

SH 65 SW 62.59 52.59

Direction 135
Core size AXT
Inclination 55
Sample 132'8"

Core No.	Depth (ft)	Interval (ft)	Description	Remarks	
G.L.	-0'6"	0'0"	Overburden		
(cased)	-9'8"	4'6"	50, 0'6"-7'3"	Light grey cleaved tuffite. Joints extensively leached. Cleavage 50 to core axis.	Rare chalc. py. & pyrr.
	-12'8"	0'11"	31, 7'3"-15'0"	Grey/green cleaved tuffite consisting of discontinuous bands of varying grain size approx. // to the cleavage. The bands are 0'1" wide. 1% white clasts 0'1" wide, many elongated in the direction of the cleavage.	Blebs of chalc. 0'5% Sph. as large blebs up to 0'15" diam. 0'5% rare ga. crystals.
	-14'8"	1'10"	92,		
	-17'8"	1'4"	44,		
	-18'8"	0'7"	56,		
			-10'8"	Cleavage 55 to core axis.	
	-22'8"	1'7"	40, -15'0"	0'5" zone of gossan.	Thin stringers of ga. adjacent to the gossan.
			15'0"-22'8"	Grey tuffite, slightly chloritised with no inclusions.	rare py. pyrr. and chalc.
	-24'8"	0'11"	47, -18'0"	Cleavage 45 to the core axis.	
	-27'8"	1'0"	33, 22'8"-22'10"	Leached zone in tuffite.	
			22'10"-28'2"	Grey/green cleaved tuffite.	Py. 1% rare pyrr. & chalc.
	-32'2"	2'2"	58,		
			23'0"-24'8"	0'3" pygmatic quartz veins	Blebs of chalc & pyrr. 0'5% Chalc. 5%
	-36'8"	2'8"	59, 24'8"	1" quartz vein.	
			28'2"-33'0"	As for 7'3"-15'0"	Dissem. py. crystals 1% 3% chalc. in veins.
			30'0"	Cleavage 60 to core axis.	
			32'0"	0'25" quartz veins in 4" band.	
			33'0"-38'5"	Grey/black cleaved tuffite with 2% clasts up to 0'5" dia. Cleavage 45 to core axis.	Py. cubes dissem. 1%. Chalc. stringers 0'5%
			38'5"-39'3"	Grey/green tuffite with 10% white clasts elongated along cleavage	Py. blebs & stringers 1%

All Banded
Pyrr.?

Banded
Pyrr. 1-8
L. Phylites



Run	Core recov.	Depth	Lithological Description	Mineralisation	
-38'3"	1'2"	78%	39'3"-46'0"	Grey/green cleaved tuffite.	Dissem. py, crystals, blebs of chalc. total 0.5% contains 5% chalc. rare ga. & py./pyrr.
			41'5"	0.25" quartz vein .	
-42'8"	3'3"	74%	41'6"	1" zone of elongated clasts in tuffite.	
-47'5"	2'3"	53%	46'0"-47'10"	Grey pumice? tuff. The center 10" of this zone is extensively shattered.	dissem. py. chalc. & ga. 0.5%
-50'8"	3'6"	100%	46'0"	bedding 70 to the core axis.	
			47'8"	cleavage 50 to the c./a.	
-53'8"	2'10"	94%	47'10"-53'7"	Abrupt transition to homog. grey/green v. fine grained tuffite. This changes with depth to a coarser pumice? tuff. The sequence repeats at 51'3"	0.5% chalc. & py. as blebs and also as small stringers along the quartz veins. Rare pyrr.
-58'2"	3'6"	78%			
			48'6"	1" quartz vein.	
-62'8"	3'7"	75%	49'3"	" " "	
			52'5"-52'8"	Leached argillaceous horizon.	Minor py. and partially oxidised chalc.
-65'8"	1'6"	50%	53'7"-53'9"	Mineralised zone	30% chalc. & 40% py.
			53'9"-59'2"	Grey/green tuffite with ptymatic quartz veins up to 0.2" in width. Towards the base of this horizon 10% py. crystals up to 0.1" in size.	Stringers & blebs of chalc. 2%. Also py. mainly as 0.1" crystals.
-68'8"	2'4"	67%			
-73'2"	3'9"	83%			
			59'2"-63'2"	V. fine grained grey/black tuffite/shale coarsening downwards to a true grey tuffite at 63'2".	Py. crystals 0.05" - 3%. Rare chalc.
-77'8"	1'8"	37%			
			63'2"-65'8"	grey tuffite, changing to grey/green tuffite with depth. Thin ptymatic quartz veins from 65'2"-8".	Blebs of py. & chalc.- 1%
-80'2"	2'9"	79%			
			65'4"	Cleavage 45 to c./a.	
-80'2"	2'6"	100%	65'8"	Bedding 45 to c./a.	
			65'8"-70'4"	Grey/black tuffite.	Rare chalc. & py. Locally
			69'0"	0.25" quartz vein.	5% combined in the veins.
			70'0"	" " "	
			70'1"-70'9"	Grey/black tuffite with 5% 0.1" diam. white clasts. Occ. 0.25" wide ptymatic quartz veins.	Up to 5% chalc. in the veins. Rare py. pyrr.

Run	Core Recov.	Depth	Lithological Description	Mineralisation
-83'8"	2'9" 92%	70'9"-72'7"	Grey/ green tuffite banded due to tuff/sediment ratio variation & resultant minor changes in grain size & colour.	Small pygmatic quartz veins 2% chalc. 1% chalc. & py. in the core.
-88'2"	2'9" 61%	72'7"-74'5"	Grey/green tuffite with 5% 0.1" diam. clasts. Several thin pygmatic quartz veins.	Rare chalc. & py.
-92'8"	1'10" 37%	74'5"-74'7"	2" mineralised zone in grey tuffite.	30% py. 15% chalc.
-97'2"	0'2" 89%	74'7"-83'0"	Green/grey tuffite with 20% light green clasts elongated along the cleavage direction.	3% stringers of pyrr.
		81'4"-81'6"	Several thin quartz veins.	5% chalc. 5% py. & pyrr.
		82'8"	0.2" quartz vein.	3% chalc. 7% py. & pyrr.
-97'8"	0'4" 66%	83'0"-85'0"	Grey/green tuffite with numerous small leached cavities. 0.07" diam.	minor py. pyrr. & chalc.
-101'8"	4'0" 100%	85'0"-92'8"	Transition to fine grained Shale/tuff, coarsening to a grey tuffite with depth. sequence repeats at 88'6".	py. & pyrr. 1%. Chalc. 0.5% as stringers.
-106'2"	4'2" 93%		Cleavage 43 to core axis at 89'	
-110'8"	4'6" 100%	92'8"-103'1"	Grey/green tuffite irregularly banded, consisting of fractions of coarse & fine tuffite. The junctions are both bedding & slump structures? the latter subsequently deformed by the elongation induced by cleavage.	Pyrr. as blebs & stringers. Rare chalc. & py.
-115'2"	3'2" 74%	99'4"	Bedding 55 to the core axis.	
		102'8"	cleavage 60 " " " "	
-119'2"	2'10" 70%	103'1"-103'7"	Grey/green tuffite with 20% white clasts.	Rare py. pyrr. chalc. & ga.
-123'8"	4'0" 89%	103'7"-106'9"	2" zone of grey/black shale/tuff, changing to grey/green tuffite with 5% white clasts.	Numerous small blebs of pyrr elongated in cleavage direction. Rare ga. & chalc.
-128'2"	3'10" 85%	106'9"-111'0"	Grey/green tuffite with 20% 0.3" white clasts.	pyrr. py, ga. & chalc. 1%
		109'0"	0.13" pygmatic quartz vein	
		111'0"-116'	Grey/green tuffite with finer grained darker bands.	stringers of pyrr. Rare py. chalc. & ga.

Run	Core Recov.	Depth	Lithological Description	Mineralisation
-132'8"	1'10" 37%	116'0"-132'8"	Grey/green tuffite with elongated white clasts 0'15" in size, also finer grained chloritic areas. Some are bedded? Others have irregular boundaries.	1% chalc. as veins. Elongated blebs of pyrr. & small cubes of py.
		125'4"-5"	1" quartz vein.	1% chalc. as stringers.
		125'7"-10"	irregular quartz veins	Irregular segregations of chlorite with rare contained chalc.
		128'- 129'6"	Large quartz vein	
End of hole 132'8"				

20.2.72
 3.3.72
 SN 05 SW 6134/5106 Line 1624A 450' North
 81'0"

Core Recov.	Depth	Stratigraphic Section	Remarks
0'0" - 0'0"	0'0" - 0'0"	G.L.-1'0"	Overburden
0'0" - 3'0"	3'0" - 46%	1'6" - 12'3"	(I.G.S. terminology, Basic Pyroclastic) Extensively shattered & weathered tuffite. Cleavage 75 to core axis. 1% py. as blebs and crystals. rare pyrr. & chalc.
3'0" - 8'0"	8'0" - 12%		
8'0" - 16'4"	16'4" - 50%		
16'4" - 18'0"	18'0" - 30%	12'3" - 25'0"	Light grey cleaved tuffite with 20% white pumice? inclusions up to 0'2" diam. larger grey & white clasts are present up to 0'5" diam. All the clasts are irregular in shape and exhibit 2ndry. alt. Cleavage 75 to core axis. Blebs & crystals of py. surrounded by asbestiform pressure fringes. rare chalc. & sph. HLD 39 at 13'
18'0" - 22'0"	22'0" - 75%		
22'0" - 27'0"	27'0" - 83%		
27'0" - 32'0"	32'0" - 89%		
32'0" - 38'0"	38'0" - 89%	25'0" - 26'0"	Transition to a black shaly tuffite containing clasts, as above. Rare py. HLD 40 at 25'
38'0" - 40'0"	40'0" - 48%		
40'0" - 48'0"	48'0" - 60%	26'0" - 26'4"	4" horizon of coarser grained pumice? tuffite. 0'5% total py. chalc, & sph.
48'0" - 54'0"	54'0" - 48%	26'4" - 36'10"	cleaved, grey, laminated tuffite containing several horizons up to 4" wide that are black well cleaved and composed of mainly of shale. 2% white clasts 0'1" diam. uniformly distributed throughout. Dissem. py. & chalc. HLD 41 at 32'
54'0" - 57'0"	57'0" - 80%		
57'0" - 60'0"	60'0" - 78%		
60'0" - 62'0"	62'0" - 20%		
62'0" - 67'0"	67'0" - 100%	36'10" - 37'2"	Shale horizon or a large clast
67'0" - 71'0"	71'0" - 34%	37'2" - 38'10"	Grey cleaved tuffite with 10% white clasts. Changing from 0'75" diam. at top to 0'25" at the base. Blebs of crystals of py. HLD 42 at 40'
71'0" - 77'0"	77'0" - 22%		
77'0" - 81'0"	81'0" - 96%	38'0" - 40'0"	Grey cleaved tuffite with shale & pumice inclusions up to 0'25" diam. Crystals of py. 0'5%. rare chalc.

Depth	Lithological description	Mineralization
44'0"-44'10"	Cleaved grey tuffite 20% clasts up to 0.5" diam. of shale & pumice.	Pyrr. of py. 1%. Rare chalc. & sp.
44'10"-50'2"	Cleaved grey tuffite with 20% large white clasts up to 0.5" diam. Many are elongated along the cleavage. The clasts show 3 repeat units of decreasing diam. indicating poor water sorting. No obvious bedding can be seen. Cleavage 75 to the core axis.	Py. crystals 0.5%, locally conc. in some of the larger clasts. Rare chalc. & sp.
50'2"-67'0"	Cleaved grey tuffite 5% clasts 0.1" diam. Clasts are more numerous and larger from 50'8"-60'0", & 59'8"-60'10"	Py. crystals 0.5%, locally conc. in some of the larger clasts. Rare chalc. & sp.
67'0"-81'8"	Cleaved grey tuffite 30% pumice clasts up to 0.5" diam. The larger clasts have irreg. outline whereas the smaller clasts are elongated in the cleavage direction. The variation indicates poorly graded bedding repeating at 67' 68' 72'4" & 77'. These features are so poorly exhibited that bedding & way-up structures cannot be determined.	Locally conc. blobs of py. & pyrr. isolated py. crystals. Total 0.5%. rare chalc. & sp.

HLD 43 at 43'

HFL 1 (Thin section) at 45'

HLD 44 at 54'

HLD 45 at 62'

HLD 46 at 80'

End of Hole

1000 0.4
 1000 0.4

15.5.72
 15.5.72

05 SW 8193/0140 Line 1624A 450' North
 1624A 450'

80'4"

100' AXE

100' AXE

Core No.	Core Recov.	Depth	Lithological Description	Mineralisation
0.1-0'5"	0%	G.L.-0'5"	Overburden	
1'0"	100%	0'5"-16'0"	Grey cleaved tuffite, very coarse textured due to numerous clasts .0'1" diam. In many horizons the clasts have been leached out & partially replaced by Fe & Mn oxides.	Rare py. & chalc.
3'0"	100%	16'0"-16'2"	2" quartz vein at 1y to the core axis.	
7'2"	38%	16'2"-31'0"	Grey cleaved tuffite 20% white clasts .0'1" diam. locally leached & replaced as above.	blebs of pyrr. rare chalc. ga. & py, crystals.
11'6"	75%	31'0"-31'6"	Grey cleaved tuffite with 20% pumice clasts up to 0'5" diam.	Sph. & py. crystals rare. mainly confined to the large clasts.
16'2"	50%	31'6"-35'2"	Grey cleaved tuffite 20% white clasts .0'1" diam. Cleavage 40 to the e./a.	blebs of pyrr. 1/2 rare sph. crystals.
20'6"	78%	35'2"-35'6"	40% clasts up to 0'5" diam. size decreasing downwards.	blebs of pyrr. rare sph.
25'2"	90%	35'6"-50'0"	Tuffite with 60% clasts of variable composition. size .0'1" diam. 2, up to 0'25"	blebs of pyrr. rare chalc.
27'2"	73%		Cleavage poor . of coarse texture.	
31'6"	85%	37'2"-38'0"	Clattered zone with Fe & Mn oxides.	
33'6"	81%			
36'2"	100%	46'2"	2" quartz horizon.	
38'6"	59%		Several pygmatic quartz veins throughout horizon	
40'6"	72%		35'8"-50'	

HLD 19 at 6'

HLD 20 - at 17'

HLD 53 at 31'

HLD 21 at 37'

HLD 54 at 49'

Depth	Core Recov.	Depth	Lithology and Description	Mineralization
50'0"	30%	50'0"-53'0"	Tuffite containing 60% clasts up to 0.9" diam. mainly 0.2" diam. 50'-50'4" is a well cleaved white tuffite horizon.	Blends of pyrr. & chalc. Ga. & py. crystals.
53'0"	37%	53'0"-55'4"	Tuffite with 60% clasts 0.1" diam.	Py. pyrr. & py. total 1%
55'4"	75%	55'4"-78'0"	Tuffite with a variable clast content and showing a banding due to changes in the size & number of the clasts.	Stringers of pyrr. rare chalc. ga. & sph.
58'4"	94%	58'4"-58'8"	60% clasts up to 0.5" diam in tuffite matrix	
61'8"	56%	61'8"-62'4"	" " " " "	
68'10"	100%	68'10"-69'4"	" " " " "	
		71'4"-71'6"	2" quartz vein fissured & infilled with 2ndry Fe, Mn oxides.	sph. & ga.
		78'0"-80'4"	Tuffite containing 70% clasts of 0.1" diam, & also pumice clasts up to 1.5" in size. Cleavage 45° to the c./a.	Blends of pyrr. py. rare chalc. & ga.
			End of Hole	

HFL 6 (Thin section)
at 52'

HLD 55 at 62'

HLD 56 at 70'

HLD 22 at 77'

Diamond Drill Core Log Sheet

W.D.N. No. 5
 Prospect 1092 N.Y.L.
 Location N. Wales

Date commenced: 27.3.72
 Date completed: 20.4.72

Grid refs. M 65 W 6205/6204 Line 1750 2500' Norad.

Sealar elevation

Direction: 142°E.

Inclination 4° (S.)

Final Depth 119'7"

Core line 8X to 20' and to 112'4" to base

Sampled by

Run	Core Recov.	Depth	Lithological description	Mineralization
G.L.-3'0"	0'9" 21%	G.L.-4'	I.G.S. terminology 'basic pyroclastic'. Light grey cleaved tuffite, shale clasts 0.1" diam. comprise 30%	leached zone, 10 mm. oxides. py. crystals less than 1%, blebs of sph. 0.1" diam. less than 1%.
-4'10"	1'4" 100%			
-5'4"	1'6" 33%	4'0"-5'0"	Light grey cleaved tuff. 2mm. thick pygmatic quartz veins present.	py. cubes, blebs of sph. rare ga. cubes. total less than 1%.
-5'10"	0'0" 0%			
-6'14"	4'0" 69%	5'0"-15'0"	Light grey tuffite with 20% quartz clasts & 20% shale clasts up to 0.1" diam. cleavage at 60° to c./a.	stringers of sph. also as blebs. 1% rare ga. & py. many stringers show a complex zonation of quartz & sulphides.
-6'10"	3'6" 79%	10'11"	" " 75° to "	
-6'10"	0'6" 50%	14'4"-15'0"	sev. 0.1" thick pygmatic quartz veins. Bedding 75° to c./a.	
-6'10"	1'11" 26%	15'0"		
-6'10"	2'4" 55%	15'0"-15'6"	abrupt transit. to v. fine grained grey cleaved tuffite. cleavage 72° to c./a. bedding 70° to c./a. opp. teched age	rare ga. crystals
-6'10"	1'6" 83%	15'6"-19'3"	Grey tuffite with 20% shale clasts. 0.1" thick pygmatic quartz veins present.	sph. as blebs & stringers less than 1% rare ga.
-6'14"	3'3" 79%	19'3"-29'6"	gradational bands of light grey tuff & dark grey tuffite up to 4" in thickness. bedding in tuffite 60° to c./a.	stringers & veins of sph. 1% rare ga. & dissem. py.
-6'10"	4'6" 100%	19'3"		
		29'6"-30'9"	grey/green chloritic tuffite with 10% shale clasts of 0.1" diam.	blebs of sph. < 1% rare py.
		30'9"-30'10"	1" shale horizon	
		30'10"-31'5"	grey/black tuffite with 20% 0.1" diam. shale clasts.	blebs of sph. 1%
		31'5"-34'2"	grey/black tuffite, no clasts	rare sph.
		34'2"	bedding 60° to c./a.	

HLD 1-11 from 5-105
 at 10' intervals
 HLD 12 at 108

Core no.	Core recov.	Depth	Lithological description	Mineralization	
-47'10"	3'0"	66%	37'2"-47'6"	alternation of grey/black tuff & tuffite in bands of 2"-6" wide. Well cleaved at 70 to the c./a.	stringers & veins of sph. 0.1" wide. occ. blebs of sph. Total < 1% rare py. cubes " vein sph. at 47'10"
-48'10"	3'3"	36%			
-49'10"	1'8"	74%			
-50'10"	4'4"	96%	47'6"-49'10"	grey tuffite with 5% white/grey clasts up to 0.4" diam.	thin stringers of sph. < 1% " " " " "
-51'10"	1'0"	80%	49'4"-50'	Poor recovery. pieces of sheared rhyolite with Fe resids. in cavities. Fault?	
-52'10"	1'3"	100%			
-53'10"	3'7"	96%	50'0"-50'7"	Grey tuffite with 5% white/grey clasts up to 0.4" diam.	blebs & veins of sph. 1% rare ga.
-54'10"	4'2"	96%			
-55'10"	3'5"	78%	50'7"-69'2"	green/grey chloritised tuffite well cleaved with 20% quartz as 0.2" diam. blebs and elongated segregations. cleavage 70 to c./a.	2% blebs of sph. at top decreasing to < 1% at base rare py. & pyrr.
-56'10"	2'11"	65%			
-57'10"	3'8"	82%			
-58'10"	3'9"	94%	69'2"-76'0"	grey cleaved tuffite, occ. darker bands more strongly cleaved. Cleavage 70 to c./a.	pyrr. as veins & stringers 2% conc. from 73'0"-74'6" blebs of chalc. & py.
-59'10"	4'2"	100%			
-60'10"	2'3"	100%	76'0"-78'10"	green/grey well cleaved chloritised tuffite. cleavage 70 to c./a.	blebs of pyrr. elongated in cleavage direction. 2% segregations of chalc. 2%
-61'10"	3'0"	86%			
-62'10"	2'8"	76%	78'10"-79'2"	4" zone of irregularly shaped quartz veins with chalc.	10% chalc. traversing quartz veins. subord. pyrr.
-63'10"	3'4"	74%			
-64'10"	4'2"	93%	79'2"-80'0"	cleaved grey/black tuffite.	py. cubes & blebs. pyrr. 1%
-65'10"	3'0"	100%	80'0"-80'1"	1" rhyolite horizon	blebs of pyrr. 1%
-66'10"	1'6"	75%	80'1"-85'6"	grey/black cleaved tuffite, with 20% clasts 0.1" diam. cleavage at 80 to c./a.	chalc. 2% as small stringer & segregations in association with pyrr. pyrr. as blebs elongated along cleav
-67'10"	0'7"	19%			
			85'6"-88'3"	grey/black cleaved tuffite with 10% py. crystals 0.1"	segregations of chalc. 2% rare pyrr.
			88'3"-89'0"	tuffite 60% mineralised	intergrowth chalc. & pyrr.
			89'0"-103'9"	tuffite with py. crystals	chalc. & pyrr. 2%
			103'9"-104'0"	thin rhyolite flow or large lithoclast.	
			104'-112'4"	grey/black cleaved tuffite with occasional rhyolite clasts.	veins & stringers of chalc. 1%

HFL 7 (Thin section) at 71'

HFL 8 (Thin section) at 102'

HFL 10+11 (Polished section) at 88'

HFL 12 (Polished section) at 86'

HFL 13 (Polished section) at 76'

run	interval	depth	lithological description	mineralogical notes
-118'4"	3'0"	100%	118'4"-118'7" grey/black tuffite with 10% white clasts 0.1" in diam.	bluish of pyrr. 1 py. crystals. rare shale
-118'7"	1'5"	100%	118'7"-118'8" thin rhyolite flow. bedding at 90° to e./s.	
			118'8"-119'3" grey/black tuffite with 10% white clasts.	remnants of shale. pyrr. 1%
			119'3"-119'7" thin rhyolite flow or clast	

Hole No 7

26.4.72

19.5.72

SI 65 SW

135

13218"

AM

0'-0'6"	0'10"	0	G.L.-0'6"	Overburden		
-0'6"	4'6"	50	0'6"-7'3"	Light grey cleaved tuffite. Joints extensively leached. Cleavage 50 to core axis.	Rare chalc. py. & pyrr.	HLD 25 at 5'
-12'8"	0'11"	31	7'3"-15'0"	Grey/green cleaved tuffite consisting of discontinuous bands of varying grain size approx. // to the cleavage. The bands are 0'1" wide, 1% white clasts 0'1" wide, many elongated in the direction of the cleavage.	Blobs of chalc. 0'5% Sph. as large blebs up to 0'15" diam. 0'5% rare ga. crystals.	HLD 26 at 14'
-14'8"	1'10"	92				
-17'8"	1'4"	44				
-18'8"	0'7"	58				
			-10'8"	Cleavage 55 to core axis.		
-22'8"	1'7"	40	-15'0"	0'5" zone of gossan.	Thin stringers of ga. adjacent to the gossan.	
			15'0"-22'5"	Grey tuffite, slightly chloritised with no inclusions.	rare py. pyrr. and chalc.	HLD 27 at 22'
-24'8"	0'11"	42	-18'0"	Cleavage 49 to the core axis.		
-27'8"	1'0"	33	22'8"-22'10"	Leached zone in tuffite.		
			22'10"-25'2"	Grey/green cleaved tuffite.	py. 1% rare pyrr. & chalc.	
-32'2"	2'2"	50				
			25'0"-25'15"	0'5" pyramidal quartz veins 1" quartz vein.	Blobs of chalc. & pyrr. 1% Chalc. 5%	
-33'8"	2'8"	57				
			32'2"-33'0"	As for 7'3"-15'0"	Dissem. py. crystals 1%	
			30'0"	Cleavage 60 to core axis.		
			32'0"	0'25" quartz veins in 4" band.	5% chalc. in veins.	
			33'0"-38'5"	Grey/black cleaved tuffite with 2% clasts up to 0'5" dia. Cleavage 49 to core axis.	py. cubes dissem. 1%. Chalc. stringers 0'5%	HLD 28 at 34'
			38'5"-39'3"	0'5% grey/green tuffite with 10% white clasts elongated along cleavage	py. blebs & stringers 1%	

Banded
Pyroclastics

L. Phylites

Core no.	Core recov.	Depth	Lithologic Description	Mineralization	
-41'0"	41'0"	75%	39'3"-46'0" 41'5"	Grey/green cleaved tuffite. 0'25" quartz vein.	Miner. py. crystals. 10% of chalc. total. 40% contains 5% chalc. 10% py. py./pyrr.
-41'0"	41'0"	75%	41'5"	1" zone of elongated crystals in tuffite.	
-46'0"	46'0"	53%	46'0"-47'10"	Grey pumice? tuff. the center 10" of this zone is exclusively shattered.	dissem. py. chalc. 10%.
-46'0"	46'0"	100%	46'0" 47'8"	bedding 70 to the core axis. cleavage 50 to the c./a.	
-47'10"	47'10"	94%	47'10"-53'7"	Abrupt transition to homog. grey/green v. fine grained tuffite. This changes with depth to a coarser pumice? tuff. The sequence repeats at 51'5!"	0'5% chalc. & py. as blebs and also as small stringers along the quartz veins. rare pyrr.
-48'10"	48'10"	75%	48'6" 49'3"	1" quartz vein. " " "	
-52'5"	52'5"		52'5"-52'8"	leached argillaceous horizon.	Minor py. and partially oxidised chalc.
-53'7"	53'7"	50%	53'7"-53'9"	Mineralised zone	30% chalc. & 40% py.
-53'9"	53'9"	67%	53'9"-59'2"	Grey/green tuffite with ptygmatic quartz veins up to 0'2" in width. towards the base of this horizon 10% py. crystals up to 0'1" in size.	Stringers & blebs of chalc. 2%. also py. mainly as 0'1" crystals.
-59'2"	59'2"	37%	59'2"-63'2"	v. fine grained grey/black tuffite/shale coarsening downwards to a true grey tuffite at 63'2".	Py. crystals 0'05" - 5%. Rare chalc.
-63'2"	63'2"	75%	63'2"-65'8"	grey tuffite, changing to grey/green to shive with depth. Thin ptygmatic quartz veins from 65'2"-8".	Blebs of py. & chalc. - 1%
-65'8"	65'8"	100%	65'8" 65'8"	cleavage 45 to c./a. bedding 45 to c./a.	
			65'8"-70'4" 69'0" 70'6"	Grey/black tuffite. 0'25" quartz vein. " " "	Rare chalc. & py. locally 5% combined in the veins.
			70'11"-70'9"	Grey/black tuffite with 5% 0'1" diam. white clasts. Occ. 0'25" wide ptygmatic quartz veins.	Up to 5% chalc. in the veins. Rare py. pyrr.

HLD 29 at 45'

HLD 30 at 55'

HLD 31 at 65'

Core No.	Core Recov.	Depth	Lithological Description	Mineralization
-83'0"	2'9"	98%	70'9"-72'7" Grey/green tuffite banded and to tuff/bedding. Rare variation & resultant minor changes in grain size & colour.	Small pyrr. & chalc. in the core.
-85'0"	2'9"	61%	72'7"-74'5" Grey/green tuffite with 5% 0.1" diam. clasts. Several thin pygmatic quartz veins.	Rare chalc. & py.
-87'0"	1'10"	37%	74'5"-74'7" 2" mineralised zone in grey tuffite.	30% py. 1% chalc.
-97'2"	0'2"	89%	74'7"-83'0" Green/grey tuffite with 20% light green clasts elongated along the cleavage direction. Several thin quartz veins.	3% stringers of pyrr.
-97'8"	0'4"	66%	81'4"-81'6" 82'8" 0.2" quartz vein.	5% chalc. 5% py. & pyrr. 3% chalc. 7% py. & pyrr.
-97'8"	0'4"	66%	83'0"-85'0" Grey/green tuffite with numerous small leached cavities. 0.07" diam.	minor py. pyrr. & chalc.
-101'0"	4'0"	100%	85'0"-92'8" Transition to fine grained Shale/tuff, coarsening to a grey tuffite with depth. sequence repeats at 85'0". Cleavage 43 to core axis at 85'	py. & pyrr. 1% chalc. 0.5% as stringers.
-103'2"	4'2"	93%	92'8"-103'1" Grey/green tuffite irregularly banded, consisting of fractions of coarse & fine tuffite. The junctions are both bedding & slump structures? the latter subsequently deformed by the elongation induced by cleavage. Bedding 55 to the core axis. cleavage 60 " " " "	Pyrr. as blebs & stringers. Rare chalc. & py.
-111'2"	3'2"	76%	99'4" 102'8"	
-112'2"	2'10"	70%	103'1"-103'7" Grey/green tuffite with 20% white clasts.	Rare py. pyrr. chalc. & ga.
-113'0"	4'0"	89%	103'7"-106'9" 2" zone of grey/black shale/tuff, changing to grey/green tuffite with white clasts.	Numerous small blebs of pyrr elongated in cleavage direction. Rare ga. & chalc.
-113'8"	3'10"	89%	106'9"-111'0" Grey/green tuffite with 20% 0.3" white clasts. 109'0" 0.15" pygmatic quartz vein.	pyrr. py. ga. & chalc. 1%
			111'0"-116' Grey/green tuffite with finer grained darker bands.	stringers of pyrr. Rare py. chalc. & ga.

HLD 32 at 75'
 as it starts
 bedding
 HLD 33 at 85'

HLD 34 at 105'
 HFL 9 (Thin section)
 at 108'

HLD 35 at 115'

Run	Core Recov.	Depth	Lithological description	Mineralization
-132' 0"	1110" 37%	110' 0"-132' 8"	Grey/green tuffites with elongated white clasts 0.15" in size, some finer stained chloritic areas. Some are lined? Others have irregular boundaries.	py. chalc. as veins. Small blebs of pyrr. & small cubes of py.
		125' 4"-5"	1" quartz vein.	py. chalc. as stringers.
		125' 7"-10"	irregular quartz veins	irregular segregation of chalcate with rare contained chalc.
		128' - 129' 6"	Large quartz vein	
End of hole 132' 8"				

HLD 36 at 120'

HLD 37 at 121'

HFL 14 Polished section at 123'

HFL 15 Polished section at 120'

Diamond Drill Core Log Sheet

U.S. GEO. 10.5
 Report Log# H.Y. 10.

U.S. GEO. 10.5.72
 Date Completed 10.5.72

Location R. 1133
 1/4 Sec. 31, T. 65N, R. 65W 6194/5107 line 16221 350' north

Surface Elevation

Direction 215° 35'

Inclination 45°

Final Depth 85' 0"

Core Size AXE

Logged by *[Signature]*

Run	Core Recov.	Depth	Lithological Description	Mineralisation
G.L.-2'6"	0%	G.L.-2'6"	Overburden	
-2'6"	1'4" 35%	2'6"-6'0"	'Basic Pyroclastic', Extensively weathered grey tuffite with 10% clasts up to 0.2" diam. Many clasts have been leached out leaving cavities filled with Fe & Mn oxides. Cleavage 40 to core axis.	Rare py.
-3'11"	2'6" 70%			
-4'10"	2'3" 55%			
-13'0"	2'3" 100%	6'0"-13'0"	Grey cleaved tuffite with up to 50% large clasts up to 0.4" diam. The clasts are of quartz & pumice.	Rare chalc. py. & pyr.
-23'8"	2'9" 54%			
-27'8"	3'8" 92%	13'6"	2" leached zone. FeMn oxides	
-31'0"	3'0" 75%	14'8"-15'2"	6" " " " "	
-33'0"	3'6" 78%	18'0"-23'6"	Grey cleaved tuffite with 10% clasts rarely exceeding 0.15"	Rare sph. & py.
-37'0"	3'6" 100%	23'6"-24'4"	Grey cleaved tuffite 40% clasts < 0.2" diam.	Rare py.
-41'0"	2'9" 92%			
-45'0"	4'2" 93%	24'4"-41'0"	Light grey basic tuffite with up to 9% clasts < 0.1", the clasts are locally conc. to give a series of bands, not > 2' in width separated by zones with < 2% clasts. Throughout there is a random distribution of clasts up to 0.5" diam.	Rare py. chalc. pyr.
-51'0"	4'4" 93%			
-55'0"	4'4" 93%			
-57'0"	1'5" 35%			
		41'0"-42'6"	Grey cleaved tuffite. Cleavage 45 to core axis.	Rare pyr.
		42'6"-44'0"	Grey cleaved tuffite, 10% clasts, size increasing with depth up to 0.5" diam.	Rare py. & pyr.

HLD 47 at 19'

HLD 48 at 40'

Core No.	Depth	Micrological Description	Mineralization
101"	100%	44'0"-85'8" Cleaved basic tuffite with 0 horizons of clasts.	stringers of pyrr. rare clin. & sph.
102"	92%	59'0"-60'0" 50% yellow pumice? clasts up to 0.5" diam. in tuffite matrix.	
103"	93%	61'0"-62'4" 20% clasts up to 0.2" diam. none elongated in the cleavage direction at 50 to the core axis.	
104"	95%	66'2"-67'4" several pyritic quartz veins in tuffite then a transition at 66'10" to a white grey horizon of compact clasts.	
105"	100%		
106"	66%	71'2"-72'0" Yellow clasts up to 1" diam. in tuffite matrix.	rare py. crystals.

End of Hole

HLD 49 at 55'
HLD 50 at 65'
HLD 38+51 at 73'
HLD 52 at 83'

Geological Log

Core No.	Depth	Lithological Description	Mineralization
01	G.L.-2'4"	Overburden	
	2'4"-10'6"	Extensively weathered basic pyroclastic, consisting of tuffite, grey in colour & containing 30% white clasts up to 0.5" in diameter.	0.02" cubes of py.
	10'6"-12'2"	Tuffite containing clasts of shale & pumice? elongated in the cleavage direction and comprising 60% of the total. Joints heavily leached. Cleavage 30 to core axis.	- 3% py. as in with rare cry.
	12'2"-12'6"	Well cleaved black shale - possibly drilled clast.	rare py.
	12'6"-17'4"	Tuffite containing 60% shale & pumice? clasts elongated along the cleavage. Cleavage 37 to core axis.	3% py. as in or stain. pressure.
	17'4"-17'10"	Dark grey tuffite with 20% clasts. Cleavage 37 to core axis.	
	17'10"-33'11"	Tuffite with 60% clasts, white in colour & elongated in the cleavage direction.	2% py. as in with rare cry.
	33'11"-37'10"	Tuffite, grey in colour with 60% clasts up to 0.5" in diameter.	occasional py. as in.
	37'10"-42'0"	10% tuffite, remaining white clasts. These are pumice? lower in number & size than those in 37'10"-33'11". Strain zone, cleavage 37 to core axis.	typical tuffite as in surrounding clasts.
	42'0"-45'6"	Cleavage 20 to core axis.	

HLD number
 refer to small core
 samples analyzed by
 BGS in 1980-81 by
 XRF
 Additional samples
 analyzed for Cl & F
 in 1985 & some for
 a range of elements by
 XRF.
 Tim Cotman 1986

HLD - 13 at 12'

HLD 14 at 22'

HFL 3 (Thin section)
 at 22'

HFL 2 (Thin section)
 at 37'

Core No.	Depth	Recovery	Interval	Lithological Description	Notes
-42'9"	4'0"	47%	42'9"-44'0"	Grey/black tuffite with white clasts 0.1"-0.5"	0.1" pyrite crystals in each tuffite clast.
-44'0"	4'0"	0%		clasts decreasing from 0.5" to 0.1" with increasing depth	
-45'0"	3'4"	32%		clasts 0.1" to 0.5"	
-47'11"	4'10"	36%			
-50'5"	2'0"	80%	46'0"-54'0"	Grey/black tuffite with 10% small clasts & 20% white clasts (pumice?). Clasts are deformed with the long axis // to the cleavage at 24 to the core axis.	pyrite crystals, also pressure fringes. also disseminated pyrite and some pyrrhotite.
-52'11"	2'2"	83%			
-54'11"	3'8"	83%			
-57'11"	3'5"	75%	64'0"-80'8"	Grey/black tuffite with varying % of inclusions from 0% - 90%. Size of clasts varies from 0.1" - 0.5". They are poorly sorted and show a regular variation in diameter with increasing depth, changing from coarse to fine over intervals of ~1'. The transition is gradual & does not exhibit clear bedding.	pyrite crystals, also disseminated with rare bits of pyrrhotite.
-62'11"	4'0"	80%			
-65'11"	2'6"	83%			
-71'9"	4'0"	71%			
-75'5"	3'4"	90%			
-80'8"	4'0"	76%			
			76'0"	cleavage 35 to core axis	
			80'8"	End of Hole	

HLD 15 at 50
HLD 16 at 54
HLD 17 at 64.
HFL 4 (Thurston)
at 54

HLD 18 at 73

Registered specs
14'
33'
37'
51'
67'
77'