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AUSTRALIAN CONSOLIDATED INDUSTRIES LIMITED

MINERAL RESOURCES DIVISION

MINERAL EXPLORATION IN E. L. 16/68

BALFOUR, NORTH-WEST TASMANIA

1970 - 1971

OPEN FILE

by

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SUMMARY

Twelve diamond drillholes with a total depth of 1771.29 metres were completed on five copper prospects near Balfour, North-west Tasmania, during the field season June, 1970 to June, 1971. The location of the drillholes was guided by the results of costean geochemistry, an Induced Polarisation survey and the location of old copper workings.

At the Clump Prospect, six drillholes covering a strike length of 750 metres have indicated the presence of a potentially economic copper deposit consisting of chalcopyrite in a pyritic quartz - quartzose - dolomite gangue, enclosed within a sequence of fine grained carbonaceous sediments. This mineralized zone is apparently parallel to the enclosing sediments and although breccia fragments within, and adjacent to, the mineralized zone, suggest emplacement of the sulphides in a shear zone a remobilized syngenetic origin is favoured. Leaching of the sulphides and dolomite has resulted in low core recovery from the mineralized zone and deeper drilling (360 to 460 metres) will be required to secure a complete intersection of the lode material.

Murray's Reward Prospect was the only copper producing area on the old Balfour mining field, at least 3000 tons of high grade (12 to 35 per cent Cu) ore being mined during the early part of this century. The only drillhole on this prospect intersected a zone of potentially economic copper mineralization within a sequence of carbonaceous and chloritic slates and phyllites. This intersection, together with the information gained from old underground workings is sufficient to justify further investigations on this prospect.

Geological investigations, including diamond drilling, were carried out on three other prospects, The Gully, Development and Blocks, but the results were not sufficiently encouraging to warrant further expenditure.

It is recommended that future investigations in the Balfour area should be restricted to the Clump Prospect and Murray's Reward Prospect and such investigations should include geological mapping, sampling and mapping of costeans and underground workings, diamond drilling and ground geophysics.

AUSTRALIAN CONSOLIDATED INDUSTRIES LIMITED

MINERAL RESOURCES DIVISION

MINERAL EXPLORATION AT BALFOUR, TASMANIA

1970-1971

1. INTRODUCTION

Australian Consolidated Industries Limited is presently engaged in a programme of mineral exploration on Exploration Licence 16/68 at Balfour, North-west Tasmania. The programme is aimed at proving the existence of copper orebodies. This report details the results of field work and allied investigations carried out during the field season June 1970 to June, 1971.

1.1 Location and Access

The programme of mineral exploration in EL16/68 is based at Balfour (Plan 1), an abandoned mining town in North-west Tasmania, some 48 km south of Smithton. Balfour is situated at a latitude and longitude of 41°16' S and 144°50' E respectively, and is 112 km from Smithton by road. The road is sealed as far as Marrawah about 50 km from Smithton. An unsealed road extends as far as the Nelson River some 26 km south of Marrawah, and is suitable for 2-wheel drive vehicles, but between the Nelson River and Balfour, a distance of 37 km, a 4-wheel drive vehicle is essential. Sand dunes, water holes and boggy ground are the main hazards between the Nelson River and Balfour, the latter two hazards becoming particularly difficult to negotiate during winter. An average driving time between Smithton and Balfour is 3 hours.

Balfour can also be reached by air from Smithton, a straight line distance of some 48 km (compared with 112 km by road). A rough airstrip some 450 metres long is situated about 3 km west of the Balfour township. Flying to Balfour from Smithton (flying time 20 minutes) is probably more cost-effective than travelling by road.

1.2 Climate

Very few meteorological records are available for Balfour, but information received from the Bureau of Meteorology indicates that the average and range of monthly and annual rainfall during the period 1909 to 1943 was as follows:-

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<u>Month</u>	<u>Mean Rainfall</u> (inches)	<u>Range (inches)</u>
January	3.34	0.75 to 8.45
February	3.34	0.44 to 6.43
March	4.37	1.63 to 9.17
April	6.35	0.69 to 13.26
May	7.81	2.44 to 17.42
June	8.79	0.76 to 14.78
July	9.21	3.63 to 18.31
August	9.49	4.63 to 19.68
September	7.73	3.23 to 13.35
October	7.01	1.66 to 15.13
November	5.39	1.99 to 12.14
December	5.00	1.42 to 10.46
Year	<u>77.83</u>	<u>54.24 to 97.83</u>

Judging from recent experience, summer is mild and relatively dry and rain may not fall for several months. Autumn and winter are generally cold with frequent heavy showers and extended periods of rain. Sleet and hail are common during winter and snow occasionally settles on the higher mountains.

1.3 Topography and Vegetation

The Frankland River, about 2 km east of Balfour, has deeply dissected a Tertiary (?) peneplain and forms the dividing line between heavy rain forest and rugged topography to the east and a gently sloping button grass plain to the west.

The major rivers in the vicinity of Balfour are the Frankland and Nelson rivers and Tin Creek. The Frankland is a tributary of the Arthur River to the north. The Nelson River rises at the foot of Mt. Balfour, flows NW and reaches the coast about 13 km north of Temma. Tin Creek is a major tributary of the Frankland and rises near Mt. Frankland.

Mt. Frankland (446.53 metres) and Mt. Balfour (434.65 metres) are the major mountains in the vicinity of Balfour and are situated some 3 km SSW and SW of Balfour respectively.

The old Balfour township is situated on a residual of Tertiary basalt.

1.4 A. C. I. Involvement at Balfour

In November, 1968, after a brief examination of the area, A. C. I. Operations Pty. Ltd. was granted an Exploration Licence (EL16/68) over an area of 537 square miles.

The results of the investigations carried out by A. C. I. prior to the programme of diamond drilling are documented in A. C. I. Technical Centre Report R 2512/69 entitled "Corporate Exploration of Tasmanian Mineral Resources, E. L. 16/68". In summary, these investigations consisted of examinations of old copper and tin workings, sampling of dumps and underground workings, a geochemical stream sediment sampling programme and an investigation of the coastal sand dunes for heavy minerals. The results of these investigations were sufficiently encouraging to warrant more detailed investigations and diamond drilling of the copper prospects commenced in June, 1970. A description and results of this drilling programme form the main subject of this report.

2. PREVIOUS INVESTIGATIONS

The first known reference to the Balfour area concerns a triangulation survey carried out during 1856.

Alluvial tin workings were known to be in existence in 1884 and have been intermittently worked on a small scale to the present day. The total tin production is unknown.

Sporadic cassiterite and wolframite mineralization in quartz veins on Specimen Hill (2 km west of Balfour), are probably the source of the alluvial tin. The location of the assumed granitic source of this mineralization is unknown, the nearest known granite occurring at Sandy Cape some 23 km to the SW.

The first copper reward, which ultimately became the only successful copper producing mine (Murray's Reward) in the Balfour area was applied for in 1901.

After the discovery of high grade copper ore at Murray's Reward, many public companies were floated to explore the Mt. Balfour mining field as it was then known. In spite of a large expenditure on surface and underground exploration and the discovery of several high grade but low tonnage copper deposits, no further economic ore bodies were revealed, although copper mineralization was detected along a 13 km strike length.

Exploration activities in the area reached a peak in 1909 at which time the Balfour township supported a population of about 800. From the year 1909 mining and exploration activities decreased and the township is now abandoned and overgrown and only one original building remains. A considerable number of trenches, adits, costeans and shafts remain to indicate the extent of the exploration and mining.

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Several reasons have been advanced to explain the failure of the Balfour mining field after its auspicious start. These reasons include insufficient capital and the failure of the shareholders to pay calls, lack of efficient communication between Balfour and the Port of Temma, excessive underground water, drop in price of copper and inefficient and wasteful methods of investigation. The main reason may simply be a lack of ore bodies.

The results of the early investigations and underground exploration are described by Ward (1911) and Moore (1912) and the more detailed descriptions of individual workings or prospects given later are taken from these two reports.

Since World War II the Balfour area has been included within large exploration licences held by RTZ and Pickards Mather, but except for a diamond drilling programme on Specimen Hill by BHP, it does not appear that the area was at any time examined in detail.

The BHP investigations (1964-66) were aimed at proving the existence of economic tin/wolfram mineralization on Specimen Hill (Plan 1) and to this end a number of costeans were constructed, mapped and sampled and six diamond drillholes were sunk, the deepest to about 275 metres. In addition, a ground magnetometric survey and a gravimetric survey of limited extent were carried out over Specimen Hill. The BHP programme was abandoned in 1966 after the drilling results had indicated uneconomic tin mineralization.

Between 1964 and 1968, a group of Smithton businessmen, the Smithton Syndicate, held a 25 square mile Special Mining Licence which included Murray's Reward Prospect, Specimen Hill and the Clump Prospect. The Syndicate carried out an Induced Polarisation survey of limited extent over a number of copper prospects. Although several significant I. P. anomalies were detected, no further investigations were carried out.

Several small mining leases in the vicinity of Specimen Hill have been held by local prospectors and on a 5 acre lease held by Mr. K. Jaeger of Smithton, a diamond drillhole was sunk to a depth of about 131 metres during May 1971. This drillhole was sited on a slight gravity anomaly but failed to intersect significant mineralization although trace amounts of chabopyrite and amenopyrite were noted in the core. The core from this drillhole is held in Smithton and has been made available to A. C. I. for logging and sampling.

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chabopyrite
amenopyrite

It is noteworthy that no subsurface investigations of the copper prospects have been undertaken since the area was abandoned some 60 years ago.

3. GEOLOGICAL EXPLORATION OF THE BALFOUR COPPER PROSPECTS

Introduction

The bulk of the investigations carried out in the Balfour area by the Mineral Resources Division of A. C. I. are concentrated

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in five areas (see Plan 1) -

- (a) The Clump Prospect
- (b) The Gully Prospect
- (c) The Development Prospect
- (d) The Blocks Prospect
- (e) The Murray's Reward - Central Prospect

On each of these prospects, diamond drilling has been carried out in conjunction with regional geological mapping, and mapping and geochemical channel sampling of costeans. These five prospects were within the area covered by an I. P. survey and a ground magnetometric survey.

On the basis of early records and the results of recent investigations it would appear that the Clump Prospect and the Murray's Reward - Central Prospect are the most promising in terms of potential economic copper mineralization. The remaining three prospects, although certainly containing copper mineralization, do not appear to have sufficient grade or continuity of mineralization to warrant further investigations.

Induced Polarisation Survey

An Induced Polarisation survey of the Balfour area was carried out by McPhar Geophysics Pty. Ltd. during the period March to May, 1970.

The survey covered an area extending from the old Pierpont Morgan mine (line 8000S) to the Clump Prospect (line 32000 N). The traverse lines were generally 487.7 metres apart except at Murray's Reward Prospect, Blocks Prospect and the Clump Prospect where detailed surveys were carried out on lines 45.7, 30.5 and 76.2 metres apart respectively. The traverse lines were generally 975.4 metres long, although the detailed surveys were carried out on lines 365.8 metres long.

Many I. P. anomalies were detected but the interpretation of the results was hampered by a lack of information regarding the geology and, particularly, the lithology of the area. Predictably, McPhar recommended further I. P. work in the form of extensions to existing I. P. traverses and a series of closer spaced traverses. These recommendations have not been acted upon. /

McPhar claim that, under favourable geological conditions, sulphide mineralization of less than 1 per cent by volume can be detected by I. P. methods. Pyrite alone occurs in sufficient quantities in most prospects to account for some of the I. P. anomalies. Many of the anomalies are attributed to the presence of graphite, particularly at the Clump Prospect where graphite appears to be associated with a line of brecciation and deformation along which the copper mineralization exists and thus, although copper

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sulphides are not necessarily being detected directly, the association of graphite and sulphide mineralization renders effective the use of I. P. methods as an exploration tool in the Balfour area.

Ground Magnetometric Survey

Discovery of magnetite in the core of DDH 6 at the Clump Prospect initiated a ground magnetometric survey of the Balfour Prospects. This survey was carried out along the pre-existing traverse lines of the I. P. survey.

No significant magnetic anomalies were detected although it was noted that the magnitude of the magnetic effects showed a marked tendency to increase towards the east.

3.1 The Clump Prospect

This prospect is situated about 9 km north of the Balfour township at the junction of the button grass and rain forest, some 400 metres west of the Frankland River. It takes its name from a prominent clump of heavy timber situated nearby on a circular residual of Tertiary basalt.

3.1.1 Previous Investigations

Low ridges of massive quartz, quartz fragments and other siliceous rocks define the mineralized lode and these have been investigated in the past by means of adits, trenches and shallow shafts.

The most extensive investigations of the Clump Prospect were carried out by the Mt. Balfour Copper Mines, NL, and consisted of an adit, shaft and associated drives and crosscuts which are shown on Plan 2 (original mine survey).

The adit was driven in a SSW direction and intersected minor copper mineralization about 81.1 metres from the portal. The mineralisation consisted of a quartz and dolomite vein containing minor amounts of pyrite, bornite and chalcopyrite. The slate adjacent to this vein was reported to be considerably "altered" (deformed?) and contained dolomite, quartz and copper stains.

The adit intersected the main lode at about 97.8 metres and a short (11.6 metre) drive in a NW direction followed the wall of the lode which consisted of brecciated slate cemented

3.1.1 (Cont'd)

with quartz and containing minor amounts of dolomite, pyrite and chalcopyrite. The No. 1 south drive also commenced at this point and followed the NE wall of the lode for 115.2 metres in a SE direction. The brecciated slate was cemented with quartz and contained minor amounts of dolomite, pyrite and chalcopyrite and a significant amount of graphite. The ore was reported to be cavernous after dolomite and to consist of a series of en echelon lenses. A secondary lode striking NE was intersected about 92.0 metres from the junction of the adit and the drive.

The mineralized zone intersected by the adit was about 30.5 metres thick and the No. 2 south drive commenced on the SW boundary of this zone and followed the wall of the lode at a SE direction although it tended to drift away from the wall and into the lode.

The two drives are connected by two crosscuts each of which afford a cross-section of the lode which, in summary, consists of a brecciated graphitic slate containing dolomite and mineralized (pyrite and chalcopyrite) quartzose bands. The lode was more or less cavernous.

The thickness of the mineralized zone decreases slightly to the SE from 30.5 metres at the adit to about 22.9 metres at the No. 2 crosscut.

Production of copper ore from the Clump workings is not recorded and it appears probable that no ore was shipped from this area. Ore grade material stacked at the adit portal consists of chalcopyrite and abundant pyrite within quartz; carbonaceous and graphitic slate containing minor amounts of sulphides, and quartz-dolomite with pyrite and chalcopyrite. Many of the blocks of lode material are, by present day standards, of particularly high grade.

3.1.2 Geology

Rock exposure at the Clump Prospect is very low (≤ 5 per cent), the area being overlain by a thin (0.3 to 1.9 metre) cover of eluvial quartzose rock fragments and a surface layer of peaty material.

The few rock outcrops indicate that the dominant lithology consists of pale grey siltstone and dark grey carbonaceous and graphitic shales siltstone and slate striking NW and dipping and younging to the NE (Plan 3). Cross-bedding, graded bedding,

microfaults and small dragfolds can be locally observed. Thin (≤ 2 mm) quartz veins and grey-white leucoxene porphyroblasts are common in parts and the sediments are commonly slightly chloritic. Pyrite is ubiquitous but is generally more common in the pale grey and slightly coarser members of the sediments.

The mineralized zones intersected by the drillholes consist of quartz and dolomite containing pyrite and chalcopyrite with lesser amounts of chlorite, graphite and traces of magnetite, actinolite and rare traces of secondary copper sulphides, notably covellite. On the surface, however, the mineralized zones are expressed by low ridges of massive but shattered quartz, quartzose fragments and other siliceous rocks and are commonly cavernous after abstraction of the dolomite. Sulphide minerals, particularly chalcopyrite, are rarely present at the surface. Where costeans have been cleared to bedrock, the mineralized zones can be observed to be parallel to the strike of the sediments and consist of barren quartz and quartzose fragments within a friable sandy matrix.

Deformation of the sediments has apparently taken place in the vicinity of the lode and fragments of carbonaceous sediments are commonly included within the lode material and graphite has been developed in these zones. Neither the sediments nor the emplacement of the sulphide mineralization have been dated but on lithological and structural criteria the sediments are either Younger Precambrian or Cambrian. The age of the mineralization is probably Cambrian or Cambro-Ordovician.

The only other lithology of note in this area is a small residual of Tertiary basalt about 1 km S.W. of the Clump Mine.

The mineralized zones in the Clump area appear to be concentrated along a single line parallel to the regional strike, this being a feature of most copper occurrences in the Balfour area.

3.1.3 Present Investigations - Ground Geophysics

A detailed I.P. survey was carried out at the Clump Prospect on sixteen lines, each 365.8 m long and 76.2 m apart. Definite and/or probable I.P. anomalies were detected on all 16 lines and aided in the formulation of a diamond drilling programme in this area. A line of definite I.P. anomalies trends N.W., roughly parallel to the regional strike, and a second line of probable I.P. anomalies occurs parallel to, and 120 m west of, this first line.

Costeans

Seven costeans (numbered 1 (SE) to 7 (NW) - see plan 3) at intervals of about 150 m and normal to the regional strike, were bulldozed to bedrock. The costeans range in length from

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60 to about 135 m and were mapped and sampled, the samples being geochemically assayed for Cu, Pb and Zn. The mapping of the costeans confirmed that the dominant rock type consisted of carbonaceous sediments with the mineralized zone occurring as barren quartz fragments in a grey-brown sandy matrix. The sediment lithologies can be sub-divided, somewhat arbitrarily, on the following criteria; degree of silicification or chloritication, colour, thickness and lithology of laminations or graded bedding, presence of quartz or quartz-carbonate veins, pyrite, microfaults or porphyroblasts but, with the exception of the lode material, it is virtually impossible to correlate these sub-divisions between adjacent costeans.

A further three costeans, two northwest of costean 7 and one southeast of costean 1 (see plan 3), were later constructed and sampled but were not mapped.

The copper values of the costean samples range from <2 to 500 ppm Cu. The costean sample assay values are plotted in histogram form (plan 4) and summarised in the frequency distribution table below. The assay values have an arithmetic mean, mode and median value of 27, 5 and 15 ppm Cu respectively and have a lognormal distribution.

Assay Intervals ppm Cu	Frequency	Frequency Per Cent	Cumulative Frequency Per Cent
0 to 10	95	35.3	35.3
11 " 20	70	26.1	61.4
21 " 30	32	11.8	73.2
31 " 40	24	9.0	82.2
41 " 50	20	7.3	89.5
51 " 60	8	3.0	92.5
61 " 70	3	1.1	93.6
71 " 80	4	1.5	95.1
81 " 90	1	0.4	95.5
91 " 100	2	0.8	96.3
101 " 110	3	1.1	97.4
111 " 120	1	0.4	97.8
121 " 130	1	0.4	98.2

In addition, the following high values were recorded (all ppm Cu); 200, 200, 210, 353, 500.

Copper values greater than 60 ppm Cu are arbitrarily considered to be anomalous.

The anomalously high values are usually associated with the leached lode material or with the adjacent sediments and the costean sample assay values appear to have a significant and positive correlation with grade of the core samples obtained from the associated drillhole beneath the costeans, i.e. high costean sample assay values are associated with high core sample assay values.

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Costean 2 (DDH.6) had one costean sample assaying 200 ppm Cu and a number of DDH.6 core samples assayed greater than 0.15 per cent Cu. Similarly, costean 6 (DDH.9) had a costean sample high of 210 ppm Cu and a DDH.9 core sample high of 1.52 per cent Cu. Conversely, costean 4 (DDH.4) yielded a costean sample high of only 23 ppm Cu and the DDH.4 core sample assay values were almost invariably less than 1000 ppm Cu. It would appear, therefore, that high (relatively) costean sample assay values reflect high sub-surface copper concentrations.

No Pb or Zn anomalies were reported.

Underground Sampling

A number of channel samples were taken over 1.52 metre intervals from the Clump mine adit walls (country rock) and from the lode exposed by the adit, No. 1 south drive and No. 1 crosscut (plan 2). The sampling did not cover the entire thickness of the lode and is therefore not representative but sufficient samples were taken for the assay results to give an indication of the grade of the leached and semi-leached lode material. The assay results were:

Location	Material	Mean % Cu	Range % Cu
1. Adit	Country rock	0.24	0.02 to 0.68
2. Adit	Lode	0.58	0.017 " 3.53
3. No. 1 drive	Lode	0.44	0.073 " 1.15
4. No. 1 crosscut	Lode	0.44	0.17 " 0.74

Almost all samples were of sub-economic grade although the high grade of potential orebodies at the Clump Prospect is indicated by the assay value of 13.3 per cent Cu for a specimen of mineralized material stacked at the adit portal.

Gold and silver fire assays were also carried out on the channel samples but no significant values were recorded except one silver value of 0.7 ozs per long ton. All gold values were less than 0.01 ozs per long ton, and almost all silver values were less than 0.1 oz per long ton.

Diamond Drilling

Six diamond drillholes (DDH.1, 2, 3, 4, 6 and 9) with a total length of 989.08 m have been drilled at the Clump Prospect along a strike length of 750 m (Plan 3). The first two drillholes (DDH.1 and 2) were sited on the edge of the button grass plain and drilled towards the northeast. The remaining four drillholes were sited on the side of the Frankland River Valley and drilled towards the southwest in order to obtain maximum depth penetration to avoid the zone of leaching.

The results of each drillhole, including drill-logs, core and sludge sample assay values, core recovery, geology and technical data are presented in Appendix A and the relevant drill sections in Appendix B.

The lithologies intersected by the drillholes may be summarised as follows:

Sediment Lithology comprises pale grey siltstone (chloritic in parts) and dark grey argillaceous carbonaceous and graphitic shales and slate. Graded bedding is common, cross-bedding rare and laminated and massive units are also common. Sedimentary (?) euhedral pyrite is ubiquitous but is commonly restricted to the pale grey and relatively coarse grained sediments. Concordant and discordant veins are also ubiquitous and consist of the following minerals occurring in various proportions; quartz, dolomite, chlorite, pyrite and chalcopyrite. The veins are generally 5 mm thick but greater thicknesses are not uncommon. Porphyroblasts are common in parts and consist mainly of leucoxene, and/or cordierite. Microfaults are common. Graphite is occasionally developed on bedding, joint and fault planes and appears to become more common towards the mineralized zones.

Lode Lithology is dominated by quartz, quartzose material and dolomite containing pyrite, chalcopyrite, minor magnetite, chlorite, actinolite and carbonaceous and graphitic material. Fragments and brecciated blocks of carbonaceous sediments commonly occur within or adjacent to the mineralized material.

The mineralized zones are commonly cavernous after carbonate and sulphides and herein lies the major difficulty in fully evaluating the Clump Prospect. The cavernous nature of the mineralized zones has resulted in poor core recovery and the grade and lithology of recovered material is therefore not representative of the whole of the mineralized zone. In some instances, non-rotating drillrods have fallen under their own weight. In particular, the basal 13.8 m of DDH.2 returned a core recovery of 7 per cent and in DDH.9 a 23.3 m interval returned only 9 per cent core recovery. Such zones of low core recovery probably consisted originally of dolomite, with lesser amounts of quartz and sulphides, which has been severely leached leaving a delicate framework of quartz having insufficient strength to support the weight of the drill string.

The cavernous zones yield considerable volumes of acidic water when tapped. Water from DDH.6 and DDH.9 flowed at the rate of 11000 and 13500 litres per hour respectively and it would appear that the mineralized zone at the Clump Prospect is severely leached and saturated. The high water flows hampered drilling at times by causing difficulties in connecting the wireline overshoot to the top of the core barrel inner tube.

The depth to the base of the leached zone is unknown but may well extend to the level of the nearby Frankland River. Deeper drilling will be necessary in order to secure complete recovery of a mineralized intersection.

The results of the drill holes (see Plan 3 for location) may be summarised as follows:-

DDH.1

The main mineralized zone was intersected between 54.18 and 76.46 m and averaged 0.25 per cent Cu over an estimated true thickness of 16.5 m. Sporadic mineralization in quartz/carbonate veins continued from 76.46 m to the final depth of 138.08 m.

54.18 to 56.20 m (87 per cent core recovery;
0.006% Cu)

White quartz containing fragments and bands of chloritic siltstone. Minor chalcopyrite occurs at base of unit.

56.20 to 57.20 m (100% core recovery;
0.33% Cu)

Pale grey talcose material containing fragments and brecciated bands of chloritic siltstone. Minor pyrite and chalcopyrite.

57.20 to 57.98 m (100% core recovery;
0.40% Cu)

Pale brown dolomite containing fragments of chloritic siltstone and veins of quartz and carbonate. Lesser amounts of massive white quartz contain irregular veins of dolomite. Minor pyrite and chalcopyrite.

57.98 to 61.60 m (90% core recovery;
0.21% Cu)

Pale grey dolomite containing sporadic fragments of chloritic and graphitic siltstone. Minor pyrite and chalcopyrite.

61.60 to 61.92 m (100% core recovery;
0.78% Cu)

Black deformed graphitic slate with few quartz and dolomite veins and veinlets. Minor pyrite and chalcopyrite.

61.92 to 63.84 m (100% core recovery;
0.029% Cu)

Massive white quartz with irregular blebs and veins of dolomite. Brecciated bands of chloritic and graphitic siltstone in parts. Traces of chalcopyrite.

63.84 to 67.50 m (100% core recovery;
0.22% Cu)

Pale grey recrystallized siliceous material with minor dolomite. Lesser amounts of grey-green silicified chloritic sediment with brecciated bands of black silicified graphitic siltstone. Abundant pyrite and minor chalcopyrite.

67.50 to 69.18 m (100% core recovery;
0.066% Cu)

Pale grey siliceous and sericitic material with common veinlets and blebs of dolomite. Few fragments of green chloritic siltstone. Talcose in parts. Common pyrite, rare chalcopyrite.

69.18 to 69.68 m (100% core recovery;
0.087% Cu)

Brecciated black graphitic slate separated by bands and veins of chloritic dolomite and siliceous material. Rare chalcopyrite.

69.68 to 71.21 m (100% core recovery;
1.00% Cu)

Pale grey-white siliceous material with few fragments of black graphitic slate and few dolomite veins and blebs. Minor disseminated chalcopyrite.

71.21 to 73.38 m (100% core recovery;
0.11% Cu)

Black silicified, graphitic and carbonaceous siltstone, brecciated in parts. Numerous chloritic quartz veins containing minor dolomite, pyrite and chalcopyrite. Lesser amounts of grey siliceous material with abundant fragments and brecciated bands of black graphitic slate. Abundant pyrite and chalcopyrite in parts.

73.38 to 74.58 m (100% core recovery;
0.41% Cu)

White quartz containing veins and blebs of dolomite and graphitic slate fragments. Minor pyrite and chalcopyrite.

74.58 to 74.83 m (100% core recovery;
0.048% Cu)

Black graphitic slate with few chloritic quartz veins containing minor pyrite and chalcopyrite.

74.83 to 76.46 m (100% core recovery;
0.10% Cu)

Quartz and siliceous material with blebs and veinlets of chlorite and dolomite. Traces of chalcopyrite.

DDH.2

A potential mineralized zone was intersected between 58.40 and 72.24 m at which depth the drillhole was abandoned because of extremely low core recovery. A composite sample of fragments recovered from the interval 60.0 to 72.2 m returned an assay value of 0.19 per cent Cu.

DDH.2 and DDH.6 were drilled towards each other from opposite ends of costean 2 and the drilling results of these two drillholes may be considered together.

The lithology of the core recovered from the potential zone of mineralization consisted of:

017

58.40 to 60.05 m (13% core recovery)

Grey to dark grey, silicified carbonaceous siltstone containing disseminated pyrite and thin veinlets of quartz, chlorite and pyrite occurring together in various proportions.

60.05 to 63.10 m (5% core recovery)

Fragmentary, cavernous milky white quartz containing fragments of black sediment and traces of leached carbonate. Minor pyrite and chalcopyrite.

63.10 to 66.14 m (< 2% core recovery)

Fragmentary milky white quartz containing sediment fragments.

66.14 to 69.19 m (13% core recovery)

Black graphitic slaty sediment containing numerous pyritic and chloritic quartz veins. Cavernous milky white quartz and grey siliceous material with traces of chalcopyrite and pyrite.

69.19 to 72.24 m (5% core recovery)

Fragmentary white quartz containing fragments of black argillaceous and carbonaceous sediment. Heavily pyritic, minor chalcopyrite.

DDH.3

A potentially economic mineralized zone was intersected between 61.97 and 84.43 m, the mean grade of this interval being 0.3 per cent Cu. The interval 71.47 to 84.43 m contained an average of 0.45 per cent Cu over an estimated true thickness of 9.2 m with individual assay values ranging from 0.012 to 2.27 per cent Cu. The lithology and grade of the mineralized zone was as follows:-

61.97 to 63.06 m (31% core recovery;
0.002% Cu)

Dark grey argillaceous and carbonaceous siltstone containing common quartz/cordiorite porphyroblasts and few chloritic veinlets. Minor amounts of milky white quartz containing irregular inclusions of graphitic sediments and few chlorite and carbonate blebs.

63.06 to 64.90 m (10% core recovery;
0.002% Cu)

Fragments of the following in approximately equal amounts; dark grey argillaceous carbonaceous and porphyroblastic siltstone; cavernous white vein quartz with minor chlorite and graphite; finely intermixed graphitic quartz and dolomite. Traces of pyrite and chalcopyrite.

64.90 to 69.19 m (20% core recovery;
0.13% Cu)

Consists dominantly of dark grey, argillaceous,

019

carbonaceous, graphitic and porphyroblastic (quartz/cordierite) siltstone; white quartz and chloritic and graphitic siliceous sediments with pyrite and minor chalcopyrite; milky white quartz containing pyrite and chalcopyrite.

69.19 to 69.90 m (72% core recovery; 0.023% Cu)

Dark grey to black argillaceous, carbonaceous and graphitic siltstone with few pyritic quartz veins containing minor chalcopyrite.

69.90 to 70.13 m (100% core recovery; 0.033% Cu)

Milky white quartz and pale grey siliceous material containing irregular fragments of graphite and graphitic sediments. Sporadic chlorite blebs. Minor pyrite and chalcopyrite.

70.13 to 71.47 m (37% core recovery; 0.018% Cu)

Milky white quartz with graphite veins. Cavernous grey siliceous material with crude banding defined by chlorite and graphite rich laminae.

71.47 to 71.80 m (100% core recovery; 0.54% Cu)

Milky white quartz and grey quartzose material containing irregular fragments of graphitic sediment. Abundant pyrite and minor chalcopyrite in bands and disseminated blebs.

71.80 to 72.90 m (> 95% core recovery; 0.035% Cu)

Milky white quartz containing rare fragments of chloritic sediments and graphitic and chloritic veinlets. Grey quartzose material containing fragments of graphitic sediment. Minor pyrite and chalcopyrite.

72.90 to 73.58 m (100% core recovery; 2.27% Cu)

Pale grey quartzose material with sporadic fragments of dark grey graphitic siltstone. Common chalcopyrite which locally exhibits a crude banding parallel to a preferred orientation of the graphitic fragments.

73.58 to 74.97 m (42% core recovery; 0.27% Cu)

Breccia consisting of angular fragments of dark grey graphitic siltstone and green chloritic material cemented with pale grey quartzose material containing minor pyrite and chalcopyrite.

74.97 to 75.78 m (100% core recovery; 0.021% Cu)

Dark grey argillaceous, carbonaceous and

020

graphitic siltstone containing common quartz/cordierite porphyroblasts and few chloritic and siliceous veins. Severely jointed with graphitic joint planes. Rare pyrite and chalcopyrite.

75.78 to 76.00 m (68% core recovery;
0.88% Cu)

Pale grey, slightly cavernous siliceous material containing angular fragments of dark grey sediment. Sporadic pyrite and chalcopyrite.

76.00 to 77.99 m (19% core recovery;
0.36% Cu)

Grey, cavernous siliceous material containing bands of angular chloritic sediment fragments. Sporadic pyrite and chalcopyrite.

77.99 to 78.33 m (97% core recovery;
0.12% Cu)

Two veins (3 cm and 15 cm thick) of grey quartzose material with bands of black argillaceous material and irregular patches of soft oxidised dolomite. The veins are separated by grey-green, chloritic, porphyroblastic, carbonaceous sediment.

78.33 to 79.18 m (84% core recovery;
0.42% Cu)

Severely deformed and brecciated graphitic sediment with numerous chloritic veinlets and blebs. Silicified in parts. Sporadic pyrite and chalcopyrite.

79.19 to 80.38 m (13% core recovery;
0.47% Cu)

A 5 cm band of massive pyrite; 5 cm band of brecciated graphitic and pyritic sediment; 5 cm band of dark green chlorite and dolomite.

80.38 to 81.38 m (61% core recovery;
0.54% Cu)

Pale grey and buff dolomite containing few chloritic blebs and fragments of chloritic sediment. Minor disseminated pyrite and chalcopyrite.

81.38 to 82.06 m (87% core recovery;
0.61% Cu)

Dark green to black chloritic and graphitic argillite with numerous veins and lenses of dolomite. Pale grey, finely brecciated talcose dolomite and fragments of grey-green chloritic sediment. Minor pyrite and chalcopyrite.

82.06 to 82.82 m (87% core recovery;
0.12% Cu)

Pale grey talcose dolomite with few radiating acicular crystals (wollastonite?) and pale grey finely brecciated talcose dolomite.

021

82.82 to 83.38 m (87% core recovery;
0.26% Cu)

Pale grey finely brecciated talcose dolomite and fragments of grey-green chloritic sediment. Common pyrite and chalcopyrite.

83.38 to 84.43 m (59% core recovery;
0.26% Cu)

Pale grey talcose dolomite, minor disseminated pyrite and rare chalcopyrite.

The mineralized zone of DDH.3 is characterised by the relative abundance of dolomite and pyrite, the presence of talc and chalcopyrite, evidence of brecciation and by low core recovery.

DDH.4

No potential mineralized zone of significant thickness was intersected by DDH.4, but rather a series of thin quartzose zones or vein systems containing minor chalcopyrite. The highest grade intersections were:

19.92 to 21.47 m (59% core recovery;
0.80% Cu)

Brecciated grey-green chloritic and carbonaceous siltstone containing a few chloritic quartz veins. Pale grey siltstone and dark grey argillaceous, chloritic and carbonaceous siltstone. Thick (24 cm) vein of quartz, quartzose material and chlorite containing common pyrite and chalcopyrite.

57.45 to 58.80 m (100% core recovery;
0.21% Cu)

Grey-green chloritic siliceous material containing fragments of argillaceous siltstone. Cavernous in parts and with common quartz/cordierite porphyroblasts. Abundant pyrite and minor chalcopyrite.

96.44 to 96.93 m (95% core recovery;
0.19% Cu)

Dark grey carbonaceous and graphitic siltstone, talcose in parts, and with a few quartz and chlorite veins. Common pyrite and minor chalcopyrite.

162.45 to 162.93 m (100% core recovery;
0.19% Cu)

Massive dark grey to black graphitic siltstone containing numerous quartz and quartz-chlorite veins. The chloritic veins contain minor chalcopyrite.

168.07 to 169.36 m (100% core recovery;
0.24% Cu)

Milky white quartz with sporadic grey siliceous patches. Abundant pyrite and minor chalcopyrite occurring in distinct bands.

These mineralized intersections of DDH.4 have no distinctive surface expression.

022

DDH.6

Two mineralized zones, separated by a thin barren zone, together forming a single major mineralized zone were intersected between 170.99 and 190.84 m and averaged about 1575 ppm Cu over an estimated true thickness of about 12.4 m. The reported grades (below) within this zone must be regarded as indications only of the true grade because of the non-representative nature of the recovered core. Minor copper mineralization was also intersected between 149.61 and 150.37 m. The grades and lithologies of the mineralized zone are:

149.61 to 150.37 m (100% core recovery;
2740 ppm Cu)

Quartz and quartz-chlorite containing abundant pyrite. Minor dark grey to black, argillaceous and carbonaceous siltstone with abundant leucoxene porphyroblasts and common dark green chloritic quartz veins. Sporadic chalcopyrite.

170.99 to 175.48 m (100% core recovery;
1440 ppm Cu)

White and pale yellow dolomite and quartz and brecciated carbonaceous siltstone with a quartz-chlorite-dolomite cement with minor disseminated pyrite and rare chalcopyrite. Minor amounts of chalcopyrite are associated with thin (≤ 2 mm) white quartz veins.

175.48 to 178.30 m (100% core recovery;
113 ppm Cu)

Massive dark grey to black argillaceous and carbonaceous siltstone containing abundant leucoxene porphyroblasts. Brecciated and pyritic in parts. Microfaults very common. Many veins consisting of quartz, dolomite, chlorite and pyrite in varying proportions.

178.30 to 183.43 m (80% core recovery;
1740 ppm Cu)

Mottled yellow-white and green, generally massive and slightly chloritic quartz-dolomite with sporadic pyrite and rare dark grey carbonaceous siltstone breccia zones. Massive and microfaulted carbonaceous siltstone containing many chloritic and pyritic quartz veins.

183.43 to 187.57 m (71% core recovery;
2520 ppm Cu)

Mottled, green, yellow, black and white, slightly chloritic quartz dolomite containing abundant pyrite. Few acicular actinolite crystals with radiating habit. Magnetite is common in parts. Few breccia zones of green chloritic siltstone. Rare chalcopyrite.

023

187.57 to 190.84 m (86% core recovery;
1570 ppm Cu)

Similar to the interval 178.30 to 183.43 m with common euhedral pyrite and white and pale yellow quartz-dolomite.

DDH.9

Extremely low (9 per cent) core recovery was experienced between 175.25 and 198.52 m but a mineralized zone containing 1.52 per cent Cu was intersected between 197.35 and 198.92 m and sludge sample assay values indicated the presence of a severely leached mineralized zone between about 178.30 and 198.52 m.

The grades and lithologies of the mineralized zone are as follow:-

175.25 to 188.08 m

No core recovered. Sludge sample assay values were:

Intersection (Metres)	Assay Value (ppm Cu)
174.65 to 175.57	198
175.57 " 177.39	350
177.39 " 178.30	770
178.30 " 179.22	4700
179.22 " 180.14	2125
180.14 " 181.05	2130
181.05 " 181.97	940
181.97 " 182.88	1375
182.88 " 183.80	4200
183.80 " 184.71	1330
184.71 " 185.63	1050
185.63 " 186.54	1920
186.54 " 187.46	1100
187.46 " 188.37	1430

188.08 to 190.50 m (35% core recovery;
60 ppm Cu)

Fragmentary but originally massive medium to dark green fine grained and featureless tuff or chloritic siltstone. Rare cavities.

190.50 to 196.00 m

No core recovered except 8 cm of material identical to that recovered from the interval 188.08 to 190.50 m. Assay values of sludge samples collected from this interval include the following:

Intersection (Metres)	Assay Value (ppm Cu)
190.20 to 191.12	1420
191.12 " 192.03	760
192.03 " 192.95	1560
192.95 " 193.86	620
193.86 " 194.78	620
194.78 " 195.69	650
195.69 " 196.61	600

024

196.00 to 196.30 m (82% core recovery;
170 ppm Cu)

Pale yellow-brown pitted and porous, very slightly chloritic dolomite. Moderately cavernous.

196.30 to 196.91 m - no core recovered.

196.91 to 197.35 m (41% core recovery;
110 ppm Cu)

Similar to the interval 188.08 and 190.50 m.

197.35 to 198.92 m (74% core recovery; 1.52% Cu)

White quartz and quartzose material containing abundant pyrite and common chalcopyrite. An indistinct banding is defined by chalcopyrite and irregular carbonaceous inclusions. Cavities after dolomite are common.

Summary and Discussion

The Clump Prospect has the following features:

1. A long potentially mineralized zone. This zone is perhaps 1500 m long judging from geochemical data, the results of the I.P. survey and the surface expression of the mineralized zone.
2. A significant thickness of the potentially mineralized zone. Sub-surface intersections of the mineralized zone are up to 20 m thick and the thickness appears to increase with increasing depth.
3. The mineralized zone is apparently concordant with the enclosing sediments and occurs on the surface as quartz and quartz fragments in a sandy matrix.
4. Copper anomalies occur at the surface in association with leached lode material or the adjacent sediments.
5. The mineralized zones at depth consist of quartz, quartzose material, dolomite, chlorite, graphitic and carbonaceous material, magnetite, talc, actinolite, pyrite and chalcopyrite contained within carbonaceous and graphitic sediments.
6. The mineralized zone has undergone severe leaching to a depth of at least 150 m.
7. A crude banding of sulphide minerals occurs in some portions of recovered core from the mineralized zone.
8. Brecciation has occurred adjacent to the mineralized zone which commonly contains breccia fragments.
9. The presence of leucoxene porphyroblasts suggests an intermediate to basic volcanic contribution to the sediments.

With the information available to date the origin of the mineralized zones cannot be determined with any degree of confidence. Two hypotheses appear possible:

(a) a syngenetic mineralized zone. The copper minerals concentrated by remobilization and deposition brought about by regional metamorphism.

(b) an epigenetic mineralized zone formed by low temperature hydrothermal deposition along a zone of structural weakness.

Further investigations at the Clump Prospect are justified but deeper drilling will be required to penetrate below the zone of leaching.

3.2. THE GULLY PROSPECT

This prospect is situated in rain forest on the side of the Frankland River Valley some 7 km north of the Balfour township (Plan 1).

3.2.1 Previous Investigations

At least two shafts and three adits are known to have been constructed during the early investigations of the area about 1910. High grade specimens consisting of chalcopryrite in a pyritic dolomite-quartz gangue have been observed on old dumps but no records of ore shipments exist.

No. 1 shaft was sunk to a depth of about 6.1 m and was reported to contain slight traces of copper mineralization.

No. 2 shaft lies several hundred metres north of No. 1 shaft and was sunk to a depth of about 24.4 m.

No. 1 adit was driven towards the west immediately below No. 2 shaft and a mineralized zone was exposed by three drives and two crosscuts. The mineralized zone at this level was reported to be 2.5 m thick and 24.4 m long and to contain chalcopryrite and secondary covellite and chalcocite in a gangue of dolomite and white sericite schist.

No. 3 adit was driven directly below No. 1 adit but had not been completed at the time of Moores examination and has since collapsed.

No. 2 adit is close to No. 1 shaft in the southern part of the prospect. This adit intersected a dolomite body about 4.2 m thick, which contained chalcopryrite and magnetite.

3.2.2 Geology

The lithology of the Gully Prospect is very similar to that of the Clump Prospect, consisting dominantly of pale grey siltstone and dark grey to black argillaceous and carbonaceous siltstone, shale and slate, slightly chloritic in parts and occurring in graded beds, laminated sequences or in massive units which strike N.N.W. and dip steeply E.N.E.

3.2.3 Present Investigations

Ground Geophysics

The Gully Prospect was not covered by the I.P. or magnetometric surveys.

Costeans

A total of seven costeans, numbered 1 (south) to

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7 (north) were bulldozed to bedrock normal to the regional strike, and five of these costeans (1, 2, 3, 6 and 7) were mapped and sampled (Plan 5). The costeans covered a strike length of about 475 m.

A number of anomalous copper values were reported from samples collected from the three southern costeans although the magnitude of the values decreases towards the north. These three costeans cover a strike length of about 80 m in the vicinity of No. 1 shaft and No. 2 adit and the anomalous zones can be correlated along the strike.

Costean 1 recorded a 10.2 m interval averaging 164 ppm Cu with individual assay values ranging from 88 to 335 ppm Cu. On either side of this anomalous interval copper values average 35 ppm Cu with individual values ranging from 22 to 55 ppm Cu. Similar copper distributions occur in costeans 2 and 3 but with decreased magnitudes.

The anomalous copper values in costean 1 occurred in iron-stained, dark grey and green chloritic and carbonaceous siltstone which is silicified and talcose in parts and contains common quartz veins up to 15 cm thick.

The anomalous values in costean 2 were associated with a milky white quartz vein with limonitic inclusions and with an iron stained pale green chloritic and carbonaceous siltstone.

The subdued anomalies in costean 3 were associated with iron stained chloritic and carbonaceous siltstone, silicified and containing common quartz veins in parts.

The lithology away from the anomalous zones consists generally of dark grey and green chloritic and carbonaceous siltstone, silicified in parts and with few quartz veins.

No significant geochemical copper anomalies were detected in costeans 6 and 7. These two costeans are adjacent to the No. 2 shaft and No. 1 adit from which high grade chalcopyrite specimens have been collected but the highest costean sample assay values from costeans 6 and 7 were only 60 and 80 ppm respectively and these were associated with pale grey siltstone and dark grey to black argillaceous and carbonaceous siltstones with traces of iron staining. These subdued high values occurred against an average background value of about 11 ppm Cu.

A few metres along strike from the No. 2 shaft occurs a one metre band of white shattered cavernous quartz and quartz fragments in a sandy matrix which probably represents the leached mineralized zone.

Diamond Drilling

One diamond drillhole (DDH.11) was drilled at the Gully Prospect but yielded discouraging results. A suspected mineralized zone was intersected between 107.87 and 111.83 m but core recovery was only 15 per cent. The core from this intersection consisted of chloritic quartz and quartz-dolomite which contained traces of chalcopyrite and assayed 2825 ppm Cu. A comparison of core and sludge sample assay values and the table of core recovery indicates that the mineralized zone may occur within the interval 107.87 and 109.73 m.

027

Further drilling is not warranted at the Gully Prospect at this stage.

3.3 THE DEVELOPMENT PROSPECT

The Development Prospect is situated on a steep western slope between Tin Creek and the Frankland River some 5 km north of the Balfour township.

3.3.1 Previous Investigations

Several trenches and short adits exposed the lode on the steep slope but the main exploration of the prospect was by means of an adit with associated drives.

The adit is 72.2 m long and was driven on a bearing of N 80° E magnetic. About 49.1 m from the adit portal a short drive (3.05 m) bearing north attempted to follow a copper bearing quartz-dolomite lode.

Two irregular drives were driven from the adit. No. 1 drive commences about 49.1 m from the portal and extends for 15.2 m on a bearing of 147° magnetic; then 4.6 m on a bearing of 094° magnetic; then 5.0 m on a bearing of 150° magnetic. The quartz-dolomite lode matter, appears to dip to the west but is poorly exposed and is considered to be irregular and discontinuous and may be occurring as short lenses. Minor amounts of recent copper carbonates and abundant limonite occur on the drive walls.

The No. 2 drive commences 58.8 m from the adit portal and extends 3.0 m on a bearing of 145° magnetic; then 3.7 m on a bearing of 176° magnetic; then 2.5 m on a bearing of 127° magnetic but no lode material was exposed.

High grade specimens of chalcopyrite and minor secondary copper sulphides in quartz-dolomite occur on a dump near the adit portal and the impression gained from a brief examination of the underground workings is that of an irregular or discontinuous quartz-dolomite lode.

3.3.2 Geology

The main lithology at the Development Prospect consists of a pale to dark green chloritic slate with lesser chloritic phyllite, all striking about north and dipping east. The mineralized zone consists of quartz and dolomite containing pyrite and chalcopyrite. High grade copper mineralization consisting of chalcopyrite and minor bornite and covellite in a white and brown pyritic quartz-dolomite gangue was found on an old dump but at this prospect, as with most others in the Balfour area, there is no evidence to suggest that copper ore was ever shipped out.

The surface expression of the mineralized zone consists of white shattered and slightly cavernous quartz and quartz fragments in a coarse arenaceous matrix, all bounded by chloritic slate and phyllite.

3.3.3 Present Investigations

Ground Geophysics

Two definite I.P. anomalies occur in Tin Creek several hundred metres west of the Development Prospect

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and require checking by geochemistry and mapping. No anomalies occur at the Development Prospect proper. No magnetic anomalies were detected at this prospect.

Costeans

Two costeans, about 50 m apart, were cleared to bedrock on either side of the main adit. These were mapped and sampled but no copper anomalies were detected. The mean assay value of the costean samples was 37 ppm Cu and individual values ranged from 25 to 58 ppm Cu.

At the eastern end of the northern costean are several intervals of dark grey to black carbonaceous siltstone which have been folded and deformed, have a strike discordant to that of the adjoining chloritic slates and phyllite, and which are believed to have fault boundaries.

The remaining costean exposures are dominated by chloritic slate, phyllite and quartzite brecciated and containing few quartz veins in parts.

Diamond Drilling

One drillhole (DDH.12) was drilled at this prospect to obtain sub-surface information on the lode. The drillhole intersected chloritic slate, phyllite and quartzite and a few quartz-dolomite veins containing trace amounts of chalcopyrite, the highest assay value being 0.07 per cent Cu over an interval of 2.45 m. No lode material corresponding to that on the nearby dump was intersected.

In view of the discouraging drilling results, it is recommended that no further investigations be carried out on the Development Prospect.

3.4 THE BLOCKS PROSPECT

The Blocks Prospect is situated on an open plain between Tin Creek and the Frankland River about 4 km north of the Balfour township and 1 km south of the Development Prospect (Plan 1).

3.4.1 Previous Investigations

The area now known as the Blocks Prospect was formerly held by the Balfour Blocks Copper Mines, N.L. and the Balfour Consolidated Copper Mines, N.L., and early investigations were undertaken about 1908-10.

Two shallow shafts 73.2 m apart were sunk to a depth of about 10.6 m on the main quartzose lode. The most northerly shaft was reported to have intersected high grade copper mineralization. A third shaft was sunk to a depth of 9.1 m on a second quartz lode east of the main lode. A large shaft was sunk between the two lodes to a depth of about 30.2 m and from this level one crosscut 21.3 m long intersected the west lode and another crosscut 6.1 m long met but did not completely intersect the eastern lode. Drives extend 36.6 m north and 27.4 m south from the end of the crosscut on the western lode and low grade and extremely leached ore was exposed. The eastern lode apparently consisted of pyritic quartz devoid of copper mineralization. All old shafts on the Blocks Prospect are now flooded. Numerous shallow

exploration trenches occur on the prospect. No ore was shipped from the Blocks Prospect.

3.4.2 Geology

The dominant lithology at the Blocks Prospect consists of chloritic slate, phyllite and siltstone which strike N.W. and dip steeply N.E. and which contain sporadic pyritic quartz veins and disseminated euhedral pyrite (Plan 6). Very little carbonaceous material exists. Graded bedding is locally preserved in chloritic siltstones.

The lode material exposed on the surface consists of white shattered and apparently barren quartz with a very variable along-strike thickness. The quartz lode is commonly cavernous or honeycombed and does not form a continuous topographic high, suggesting discontinuities of the lode. Only thin gossans of limited areal extent were developed along the line of the lode and these probably served as focal points during the early investigations of the area. The strike of the lode is parallel to that of the enclosing rocks but drilling results indicate that the lode dips steeply west and appears to lie parallel to a weakly defined schistosity.

West of the main lode is a low ridge of silicified chloritic siltstone and phyllite containing many quartz veins but apparently devoid of sulphide mineralization. This ridge coincides with the position of a line of definite I.P. anomalies detected during the detailed I.P. survey of the Blocks Prospect. No old workings occur on this ridge.

3.4.3 Present Investigations

Ground Geophysics

A detailed I.P. survey was carried out over the old Blocks Prospect workings on eight lines at 30.5 m intervals. Definite and probable I.P. anomalies were detected on all eight lines but the most notable feature of the survey is that the old workings, in which sulphide mineralization is known to occur, yielded only probable anomalies, while a continuous line of eight definite anomalies coincides with the low siliceous ridge to the west of the main lode. This line of anomalies was partially tested by DDH.8 and minor pyrite and chalcopyrite was intersected. These sulphides are not considered to be present in sufficient quantities to account for the anomalies and it is possible that higher concentrations of sulphides occur at a greater depth.

The ground magnetometric survey of the area failed to detect any magnetic anomalies.

Costeans

Five costeans covering a strike length of about 230 m were initially bulldozed to bedrock normal to the local strike and three of these costeans (No. 1 (north), No. 3 and No. 4 (south)) were mapped and sampled. Later, several short intermediate costeans were constructed but neither mapped nor sampled (Plan 6).

The lode material exposed in No. 1 costean was only 0.15 m thick although about 7.6 m to the south the lode has a thickness of 1.2 m. The lode consists of shattered, white barren quartz assaying only 33 ppm Cu. On either side of the lode is chloritic siltstone and phyllite, silicified in parts and commonly iron stained. Anomalous copper values (340 and 410 ppm Cu) occur over a 9.1 m interval on the western side and over a 14.0 m interval on the eastern side respectively. The remainder of the costean samples collected from the chloritic rocks of costean 1 average 27 ppm Cu. DDH.5 is situated at the western end of costean 1.

The lode material exposed in costean 3 also consisted of white shattered and apparently barren quartz with a few cavities after sulphides and dolomite. The lode is about 2.1 m thick at this point and assayed only 13 ppm Cu. Minor copper anomalies occur to the west of the lode in hard, dark green, sheared chloritic slate with common pyrite and quartz-pyrite blebs and minor iron-staining (120 ppm Cu) and in moderately to heavily silicified white fine grained quartzitic material (53 ppm Cu). Apart from these anomalous zones, the background copper values average 13 ppm Cu. DDH.7 is situated at the western end of costean 3.

The lode material exposed in No. 4 costean consists of white fractured quartz with a few cavities after sulphides and dolomite, and assayed 93 ppm Cu.

Anomalous copper and lead values (218 ppm Cu, 240 ppm Pb) are associated with a 2.75 m interval of red-brown chloritic slate and phyllite immediately east of the lode although it should be pointed out that this interval coincides with the position of an old dump and it is most probable that these high values are a result of contamination.

The assay values of samples from this costean are unusual in that several anomalously high lead values (240, 310, 375 and 570 ppm Pb) were reported. No lead minerals were observed during mapping of the costeans. DDH.8 is situated at the western end of costean 4.

Diamond Drilling

Three diamond drillholes (DDH.5, 7 and 8) were drilled on the Blocks Prospect. Full details are given in Appendices A and B, and the significant features may be summarised as follows:-

DDH.5

A mineralized zone consisting of white quartz containing pyrite, chalcopyrite and chlorite and a few cavities after dolomite was intersected between 47.63 and 48.32 m, an estimated true thickness of 0.55 m. Total sulphides were estimated at 10 to 12 per cent in the ratio pyrite : chalcopyrite = 60 : 40 but the reported grade for this interval was only 0.25 per cent Cu and it is considered that a sampling or analytical error has been committed.

The remainder of the core consisted of pale to dark green chloritic siltstone, phyllite and slate, silicified in parts.

DDH.7

A mineralized zone similar to that intersected by DDH.5 was intersected between 76.10 and 77.57 m. This interval assayed 2.085 per cent Cu over an estimated true thickness of 1.26 m and contained abundant pyrite.

DDH.8

This drillhole was set back further to the west than either DDH.5 or DDH.7 in an attempt to determine the cause of the I.P. anomalies to the west of the main lode. This attempt was partially successful in that moderately to heavily silicified green chloritic slate and phyllite containing pyrite, pyritic quartz veins and minor chalcopyrite was intersected between 37.95 and 40.45 m. This interval assayed 2750 ppm Cu.

A second mineralized zone containing 3975 ppm Cu was intersected between 118.05 and 119.17 m. This was a zone of low (13 per cent) core recovery, the recovered core consisting of dark green chloritic slate containing abundant pyrite and minor chalcopyrite. No lode material corresponding to that intersected by DDH.5 and DDH.7 was recovered.

Summary and Conclusions

The three drillholes at the Blocks Prospect failed to prove a mineralized zone of significant grade, thickness or continuity. This zone is discordant to the bedding but sub-parallel to a marked schistosity.

No further investigations of the Blocks Prospect are recommended although one drillhole sited to intersect the line of definite I.P. anomalies at a depth of, say, 60 m, would be necessary to guarantee that further drilling is not warranted.

It is suggested that high grade copper mineralization located during the early investigations of this prospect was associated with a distinct surface gossan and where no gossan exists no significant mineralization exists, this leading to the further suggestion that sulphide mineralization at the Blocks Prospect is discontinuous and occurs as small medium to high grade bodies within otherwise barren quartz:

3.5 THE MURRAYS REWARD PROSPECT

This prospect is situated on a prominent ridge about 0.5 km S.W. of the Balfour township, and is taken to include the area about the old Murrays Reward mine together with the adjacent area held by the old Central Mt. Balfour Copper Mines, N.L. (Plan 1).

3.5.1 Previous Investigations

The Murrays Reward mine and the Central Mt. Balfour Copper Mines, N.L. were the only recorded producers of copper ore in the Balfour area. Ward (1911) reported that 1296 tons of high grade ore had been shipped to Temma Harbour. Moore (1912) reported that during the five year period May 1907 to February 1912, ore valued at about £40,000 (probably about 3000 tons of ore) had been shipped, the grade of ore parcels ranging from 12 to 35 per cent Cu. Jennings et al (1967) report that the Central Mine produced 203 tons of ore (valued at \$2,956) and the Murrays Reward Mine produced 6,177 tons of ore (valued at \$116,518).

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Murrays Reward

Extensive underground exploration, by means of adits, shafts, drives and crosscuts, was carried out during the initial investigations and later exploitation of Murrays Reward mine (Plan 7). Many hundreds of metres of underground workings exist and detailed descriptions of these workings are fully described by Ward and Moore, and may be summarised as follows:-

- (a) Copper mineralization was first discovered where Tin Creek crosses the lode. A trench and a shallow (8.3 m) shaft on the northern side of Tin Creek proved the existence of pyrite, chalcopyrite and secondary copper mineralization in a quartzose gangue. About 2.5 tons of 5 per cent Cu ore were mined from the shaft.
- (b) No. 1 adit was driven from the eastern side of the ridge on a bearing of 254° magnetic and intersected about 44.2 m of dark grey to black (carbonaceous and graphitic?) slate striking about N.5°W. and dipping west at 80°. Copper mineralization was exposed in a vein 0.3 m thick some 44.2 m from the adit portal. The vein consisted of quartz containing chalcopyrite, pyrite, covellite and limonite and had a strike of N.32°W. and a dip of 65° S.W.

The main lode was exposed 52.7 m from the adit portal and consisted of a 3.7 m interval of pyrite, chalcopyrite, covellite and limonite in a honeycombed quartz gangue. The orebody at this point dipped steeply to the west and appeared to plunge towards the south. Driving, cross-cutting and stoping were carried out on this exposure of the orebody and a rise was driven to the surface. High grade ore was stoped out over a thickness of 1.5 m.

- (c) No. 2 adit is about 120 m south of No. 1 adit and was also driven from the east on a bearing of 246° magnetic. Difficulty was encountered in locating the lode and a number of drives and crosscuts were necessary to expose the orebody. Stopping was carried out over a width of 0.9 to 2.7 m and only the highest grade ore was mined. The orebody exposed by this adit dipped 75° west and consisted of the following, from footwall to hanging wall:

0.3 m of quartzose material containing numerous lenses and veins of chalcopyrite, covellite and pyrite.

0.76 m of massive ore consisting of chalcopyrite, chalcocite, covellite, pyrite and a little quartz.

1.22 m of material similar to that on the footwall.

- (d) No. 3 adit was driven from the western side of the ridge on a bearing of N.47°E. magnetic, some 150 m north of No. 1 adit. Close to the adit portal the slate is fractured and dips east but on the western side of the slope the slate strikes N.15°W. and dips towards the west.

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The lode material exposed by this adit is much less well defined than that exposed by adits 1 and 2 and extends over a thickness of about 18.3 m. The mineralized zone consists of quartz veins containing pyrite, chalcopyrite and covellite although some veins have been completely leached of sulphides. Little, if any, ore was mined from this adit although a minor amount of driving was carried out.

- (e) No. 4 adit was driven towards the south for 34.5 m from the southern bank of Tin Creek and proved the continuity of the lode.

Most of the old underground workings are now flooded or in a state of collapse.

Central Mt. Balfour Copper Mines N.L.

The long defunct Central Mt. Balfour Copper Mines N.L., had leases immediately adjoining the northern boundary of Murrays Reward and carried out extensive underground exploration on a continuation of the Murrays Reward lode (Plan 7).

The principal underground workings consist of:

- (a) No. 1 adit, 128 m long with associated drives and crosscuts having a total length of at least 260 m.
- (b) A shaft 55.5 m deep with associated drives and crosscuts having a total length of at least 115 m.
- (c) Other adits, drives and crosscuts north of the shaft having a total length of at least 316 m.

A limited amount of diamond drilling was carried out in this area before 1910 but with little success because of negligible core recovery.

A few hundred tons of ore was mined although no large orebodies were exposed.

No. 1 adit intersected about 21 m of slate, 30.5 m of sericitic slate with a number of small bands of quartz containing pyrite, chalcopyrite and covellite, and a further 76.5 m of westerly dipping slate. Drives off this adit exposed high grade copper mineralization in the slate and in a quartzose lode but the mineralization was not continuous and was commonly leached.

The shaft was sunk on the western side of the ridge and a long (73.1 m) drive to the east intersected only minor amounts of copper mineralization.

3.5.2 Geology

The dominant lithology of this prospect is chloritic, carbonaceous and graphitic phyllite, steeply dipping on either side of the vertical and striking approximately north. Chloritic slate and siltstone also occur and are silicified in parts. At the surface the lode material consists of shattered, white, barren quartz.

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3.5.3 Present InvestigationsGround Geophysics

A detailed I.P. survey was carried out along 16 survey lines normal to the local strike. The survey lines were 365.8 m long and were separated by intervals of 45.7 m, thereby covering a strike length of about 670 m.

Definite and/or probable I.P. anomalies were detected on all 16 lines and it was postulated (by McPhar Geophysics) that these anomalies reflect a continuous zone of sulphide mineralization. Graphitic slates and phyllite coincide with the line of anomalies and no doubt graphite contributes to the overall I.P. effects but the geology of the area is sufficiently well known to attribute much of the I.P. response to the presence of sulphide mineralization.

The line of anomalies is open at both ends and definite and probable anomalies were detected on lines 487.7 and 975.4 m north of the end of the detailed grid. Several probable anomalies but no definite anomalies were detected on lines south of the detailed grid. There is therefore no reason to suppose that the zone of mineralization as reflected by the I.P. anomalies does not extend several hundred metres beyond that interval indicated by the I.P. anomalies on the detailed grid.

No magnetic anomalies were detected during the ground magnetometric survey.

Costeans

No costeans were constructed in the immediate vicinity of the Murrays Reward mine because of the danger of copper contamination from old dumps.

As a preliminary step three costeans were bulldozed to bedrock across strike on the Central Mt. Balfour Copper Mines part of the prospect. These costeans were numbered 1 (south) to 3 (north) and were mapped and sampled. The western end of the No. 3 costean is adjacent to the main shaft, and the costeans cover a strike length of about 175 m.

A number of highly anomalous copper values, exceeding 1000 ppm Cu in several instances, were reported from all three costeans and the background values are also higher than in other prospects (Plan 8). The mean values and ranges for the three costeans are:

Costean	Mean	Range
	ppm Cu	
1	113	15 to 1200
2	83	13 to 502
3	246	18 to 1545

The anomalous values do not appear to be associated with any particular lithology or zone in the costeans. No copper mineralization was observed during mapping of the costeans.

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The eastern slope of the ridge consists mainly of green chloritic phyllite which contains a few quartz veins and which has been silicified in parts. The western slope consists mainly of green chloritic and grey carbonaceous phyllite and siltstone containing a few massive quartz lodes and silicified bands. In parts the surface quartz lodes can be observed to have an along-strike discontinuity and may occur as lenses rather than continuous lodes. At the top of the ridge small scale faults, micro-faults and quartz veins are relatively common and silicified siltstones and quartzites occur. It is suggested that the top of the ridge represents a zone of shearing or similar deformation and the mineralization may therefore occur along a structurally controlled zone. Further investigations are required to substantiate this hypothesis.

Underground Sampling

A number of channel samples over intervals of 1.52 m were taken from the three adits at Murrays Reward and from the adit on the Central Mt. Balfour area. The samples are not representative of the lode material but serve to give an indication of the grade of mineralization existing in the accessible workings. The following table is a summary of the assay results.

Location	Mean % Cu	Range % Cu
Murrays Reward		
Adit 1	0.10	0.009 to 0.42
Adit 2	0.31	0.035 to 0.90
Adit 3	0.70	0.089 to 2.35
Central Mt. Balfour		
Adit	0.17	0.086 to 0.27

In addition, a sample from the lode material in No. 1 adit, returned a value of 7.90 per cent Cu.

Gold and silver fire assays were also carried out on the adit channel samples with the following results:

Gold: The highest value detected was 0.01 ozs per long ton in a single sample from adit No. 1. The remaining samples contained less than 0.01 ozs per long ton.

Silver: The silver values ranged from less than 0.1 to 1.0 ozs per long ton with a mean value of 0.2 ozs per long ton. The highest value of 1.0 ozs was associated with a copper value of 0.15 per cent Cu in a sample from No. 1 adit. Only five samples (of a total of 30) returned values of less than 0.1 ozs per long ton.

Diamond Drilling

One diamond drillhole (DDH.10) was drilled at this prospect in order to gain sub-surface information on the character of the mineralized zone. The drillhole was sited so as to pass beneath the main shaft of Murrays Reward mine. A mineralized zone was intersected between 120.64 and 126.60 m and consisted of the following:

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120.64 to 121.76 m (86% core recovery; 1.25% Cu)

Dark grey to black, slightly talcose, carbonaceous and graphitic phyllite with several quartz-dolomite veins containing pyrite and chalcopyrite.

121.76 to 123.11 m (50% core recovery; 3483 ppm Cu)

Chloritic tuff(?) containing chloritic and pyritic quartz-dolomite veins. Minor chalcopyrite.

123.11 to 124.02 m (100% core recovery; 143 ppm Cu)

Porous, fine grained cream dolomite containing a few veins and blebs of quartz and rare traces of chalcopyrite and covellite.

124.02 to 125.45 m (100% core recovery; 4068 ppm Cu)

White quartz containing chloritic siltstone and phyllite fragments and minor dolomite. Rare disseminated chalcopyrite.

125.45 to 126.60 m (100% core recovery; 115 ppm Cu)

Identical to the interval 124.02 to 125.45 m.

The main mineralized zone falls within a broad zone of anomalous but sub-economic copper values between about 110.39 and 138.53 m. The mean copper content of this zone, including and excluding the main mineralized zone is 1287 and 362 ppm Cu respectively. The anomalous values do not appear to be restricted to any particular lithology and it is probable that the anomalies are caused by chalcopyrite-bearing quartz veins.

The close proximity of the Murrays Reward copper mineralization and the Specimen Hill cassiterite/wolframite mineralization instigated the assaying of three DDH.10 core samples for tin and mercury. The assay results were;

- 120.64 to 121.76 m; 50 ppm Sn, <0.1 ppm Hg, (1.25% Cu)
- 121.76 to 123.11 m; 5 ppm Sn, <0.1 ppm Hg, (3483 ppm Cu)
- 124.02 to 125.45 m; 50 ppm Sn, <0.1 ppm Hg, (4068 ppm Cu)

These results indicate that there is no connection between the mineralization of Specimen Hill and that of Murrays Reward.

4. PETROLOGY AND MINERALOGY

A number of representative drillcore specimens of country rock and lode material from DDH.6 (Clump Prospect), DDH.7 (Blocks Prospect) and DDH.10 (Murrays Reward Prospect) were forwarded to Mr. A.J. O'Toole (Consulting Geologist) for thin and polished section examination. Only the results of those specimens from the Clump Prospect have been received and the locations of those specimens within the drillcore are tabulated in the DDH.6 drillhole report (Appendix A).

The following comments are taken from Mr. O'Toole's initial report.

The principal rock types are carbonaceous slates, phyllites and quartzites formed by regional metamorphism (Greenschist Facies) of carbonaceous shales and siltstones. The sediment mineralogy is dominated by illite, chlorite and quartz with lesser amounts of dolomite, talc, muscovite, sericite, leucoxene, biotite and graphite. The sediments contain pyrite but no copper sulphides.

Sodium cobalti-nitrite staining tests failed to detect the presence of K-feldspar. K-feldspar is a characteristic constituent of devitrified tuffs, which are usually associated with acid volcanism and it would appear therefore that acid volcanism did not contribute to the composition of the sediments or the lode matter.

The sulphide mineralogy is very simple, the main sulphide mineral being pyrite with lesser amounts of chalcopyrite and trace amounts of marcasite (FeS_2), pyrrhotite (FeS_{n+1}), sphalerite (ZnS), galeña (PbS), arsenopyrite ($FeAsS$), tetrahedrite ($Cu_2S.Sb_2S_3$) and prargyrite ($Ag_2S.Sb_2S_3$). The sulphides are concentrated in veins and stringers. Exsolution textures were not observed, suggesting a low temperature emplacement of the sulphides. Evidence for hydrothermal replacement is slight, the chalcopyrite and pyrite being deposited contemporaneously. The source of the sulphides is unknown but textural evidence suggests low temperature mobilization and deposition, during regional metamorphism, from either underlying tuffaceous sediments or intermediate to basic volcanics, the presence of either of which in the Balfour area has yet to be confirmed.

Quartz is the major vein constituent and occurs together with chlorite, dolomite and pyrite in varying proportions.

5. GENESIS OF THE COPPER MINERALIZATION

Insufficient evidence is available with which to establish with any degree of confidence the origin of the copper mineralization in the Balfour area. Two hypotheses exist:

1. Remobilized syngenetic deposit. This hypothesis holds that the copper mineralization was originally deposited contemporaneously with the enclosing sediments and subsequently underwent remobilization and concentration in the present mineralized zones. In summary, this hypothesis is supported by the following features; simple sulphide mineralogy (pyrite and chalcopyrite), the apparent concordance of lode material and enclosing sulphides, the apparent absence of wall rock alteration, apparent depletion of copper in surrounding sediments, black shale lithology (by analogy with Mt. Isa mineralization), and the crude banding of sulphides observed in some parts of the recovered core.

2. Low temperature, structurally controlled hydrothermal deposit. This hypothesis holds that the sulphide mineralization was introduced by low temperature hydrothermal solutions into a zone

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of shearing or similar deformation and is supported mainly by the presence of breccia zones adjacent to the lode matter and breccia fragments within the lode matter.

The apparent absence of wall rock alteration and absence of sulphide exsolution textures certainly indicates a low temperature of emplacement. The evidence favours a remobilized syngenetic origin.

Sulphur isotope studies of chalcopyrite and pyrite, presently being undertaken, are expected to contribute to an understanding of the origin of the mineralization and results to date favour a syngenetic origin.

6. CONCLUSION

Further expenditure on exploration in the Balfour area is definitely justified on two of the five prospects investigated. The results of diamond drilling and allied investigations and the information available from previous underground exploration at the Clump and Murrays Reward Prospects give hope that economic concentrations of copper mineralization may be delineated by further drilling. High grade copper mineralization has been exposed by previous underground workings at both prospects and diamond drilling, at the Clump Prospect at least, has indicated that a sufficient strike length and thickness of the lode material may exist.

Drilling results and allied investigations at the other three prospects (Gully, Development and Blocks) indicate that a sufficient grade, thickness or continuity of mineralization does not exist and further investigations are therefore not warranted.

The great depth of leaching of the mineralized zones necessitates deeper drilling in order to secure a complete intersection of the mineralized zone.

Insufficient evidence is available to determine the origin of the mineralized zones. Two hypotheses exist:

1. Remobilized syngenetic deposit.
2. Low temperature, structurally controlled hydrothermal deposit.

The evidence available to date favours the first hypothesis. Sulphur isotope studies, presently being carried out, should yield further evidence concerning the genesis of the sulphides.

7. RECOMMENDATIONS

1. Future investigations are to be initially restricted to the Clump Prospect and Murrays Reward Prospect.
2. Clump Prospect
 - 2.1. At least two deep (≥ 360 m) drillholes to be drilled. Two drillholes sited so as to intersect the mineralized zones below costeans 2 and 6, i.e. deeper intersections

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of the mineralized zone below the intersections of DDH.6 and DDH.9. It is hoped that such drill-holes would:

- (a) determine the attitude of the mineralized zone,
- (b) yield complete recovery of the mineralized zone below the leached zone,
- (c) confirm whether the thickness of the mineralized zone increases with increasing depth.

2.2. Further investigations, including mapping and geochemical costean sampling, to be undertaken in the vicinity of the quartzose ridges south of the Clump Prospect proper. These ridges have a similar appearance and lithology to those occurring along the line of known mineralization and have not yet been examined. Drilling of this area would depend upon the results of the mapping and sampling.

3. Murrays Reward Prospect

3.1. Mapping of the Murrays Reward Prospect from south of Tin Creek to north of the Central shaft. Further costeans north of the Central shaft to be mapped and geochemically sampled.

3.2. At least four shallow (≤ 150 m) drillholes along the strike of the coincident I.P. anomalies and mineralized zones. The actual location of the drillholes to be determined by the results of mapping, geochemical costean sampling, the I.P. survey and literature search of relevant information.

3.3. Deeper drilling in this area to be dependant upon the results of the initial programme of shallow drilling.

4. Drilling of other prospects to be programmed only if the drilling programmes at the Clump Prospect and/or Murrays Reward Prospect are successful.

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AUSTRALIAN CONSOLIDATED INDUSTRIES LIMITED**MINERAL RESOURCES DIVISION****MINERAL EXPLORATION IN E.L. 16/68****BALFOUR, NORTH-WEST TASMANIA****1970 - 1971**

By

M.H. McINTYRE**August, 1971****CONTENTS:****Appendix A Drillhole Reports - DDH 1 to DDH 12 inclusive****Appendix B Drillhole Sections - DDH 1 to DDH 12 inclusive****Plans:**

1. Reference Plan of Balfour area .
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5. Gully Prospect, geochemical plan and costeans .
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AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

MINERAL RESOURCES DIVISION

635042

TASMANIAN EXPLORATION E.L.16/68

17th December, 1970.

REPORT ON D.D.H.1. CLUMP PROSPECT

H. G. Davies.

SUMMARY

DDH.1 at the Clump Prospect, was abandoned in caving ground at a depth of 138.08m. Mineralised material was encountered at 54.18m and the drill hole continued in target zone to 138.08m. The main mineralised zone was between 54.18m and 76.46m, (16.5m true width) and assayed 0.25% Cu and characterised by a high carbonate content. The true width of target zone is significantly wider in the drill hole than at the surface. Sulphide banding is present in parts of the core.

0.23%

D.D.H.1. - CLUMP PROSPECT

Grid Reference 459,010yN, 310,442yE
Collar level c.168.5m.
Inclination 50°
Direction 043° magnetic
Date drilled 24/6/70 - 9/8/70

1. OPERATIONAL DETAILS:

D.D.H.1. was drilled by Associated Diamond Drillers using a E.1000 rig. The rig arrived on site on 18th June, 1970 and was set up for drilling on 24th June. Drilling commenced on 30th June, following repairs to the injection pump.

1.1 Progress

Drilling progress can be summarised as follows:

<u>Week ended:</u>	<u>Footage:</u>
3/7/70	0-61'
10/7/70	61' - 42.1m
17/7/70	138-226' 42.10m - 68.9m
24/7/70	226-338' 68.9m - 103.0m
31/7/70	338-392' 103.0m - 119.4m
7/8/70	392-453' 119.4m - 138.08m

The drill hole was terminated at 138.08m. on 9/8/70. The drilling rate was poor due to the men employed being severely discouraged by the adverse weather conditions in the area. A second crew took over the rig on 3/8/70.

1.2 Drilling Conditions

NX casing was set at 1.22m. and BX casing at 12.35m. The remaining portion of the drill hole below 12.35m. was cored, using BX⁹ wireline equipment. Core recovery to 137.2m was excellent, but from 134.2m - 138.1m. the ground was soft, broken with small quartz fragments continually falling in the drill hole, cutting up diamond crowns. The drill hole was cemented twice, but due to porous ground conditions from 137.0m - 138.1m, some cement was lost. On drilling the cement out, the ground continued to cave badly and the drill hole was temporarily abandoned, the NX and BX casing being left in the hole for future re-

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1.3 Deviation

Simple acid tests were taken as follows:

0'	50°
15.25m	52.5°
30.5m	51°
61.0m	51.5°
91.5m	50.5°
122.0m	52.5°
137.25m	54.5°

The rapid deviation in the upper part of the drill hole was unexpected and may be due to drilling down dip of banded sediments of variable competence. The kick off around 137.25m reflects the soft graphitic formation at the base of the drill hole which caused caving and probably the development of a small cavity.

2. GEOLOGY:

The detailed core log is presented in Appendix A and may be brief summarised as follows:

0 - 54.18m. Banded and laminated sediments with chlorite and pyrite becoming more common with depth. Chalcopyrite occurred in this band at 36.80m.

		Intersection in metres.	
54.18m - 56.20m.	Quartz zone leached trace mineralisation.	2.02	0.
56.20m - 61.60m.	Carbonates mineralised.	5.40	0.
61.60m - 61.92m.	Slate - well mineralised.	0.32	0.
61.92m - 63.84m.	Quartz - trace mineralisation.	1.92	0.
63.84m - 69.18m.	Silica/dolomite mixture.	5.34	0.
69.18m - 69.68m.	Slate - trace mineralisation.	0.50	0.
69.68m - 71.21m.	Siliceous zone - moderate mineralisation.	1.53	1.
71.21m - 73.38m.	Slate - trace mineralisation.	2.17	0.
73.38m - 76.46m.	Siliceous material with slate bands.	3.08	0.
76.46m - 138.08m.	Slaty altered sediments with bands of mineralised carbonate and quartzose material.		

The sequence from 54.18m to the base of the drill hole is considered to be all target zone, but contained only trace amounts of chalcopyrite.

3. ASSAYS.

The drill core was originally split in half and one half split in two. Initial sampling involved taking one quarter core over 5 foot intervals, irrespective of lithology. The drill hole was resampled by Dr. P. Solomon, taking half core samples over the mineralised zone. The sample intervals and Cu. assay results are shown in Appendix B and mean values.

4. DISCUSSION.

The geology of the drill hole and the overlying costeans are shown on the drill section and indicate a dip of the mineralised zone of 815° towards the drill hole. The drill hole angle through the zone was 51° and the true width of the intersection 54.18m - 76.46m is 16.5m.

The unit 56.20m - 76.46m has a mean assay of 0.25% Cu. over a true width of 14.90m.

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The drill hole terminated in poorly mineralised ground and the total width of the target cannot be evaluated.

The drill hole also proved more mineralised material than is visible in the surface costean, a greater amount of carbonate and in parts of the core, the sulphides exhibited a distinct banding suggestive of a replacement origin rather than a hydrothermal mode of formation.

A.C.T. MINERAL RESOURCES DIVISION
TASMANIAN EXPLORATION

DDH. 1 - CLUMP PROSPECT.

Grid Reference: 459,010yN, 310,442yE.

Angle 50°

Direction: 035° Magnetic.

INTERVAL IN METRES		% recovery	DESCRIPTION
From:	To:		
0.	1.22		No core recovered.
1.22	1.85	100	Banded and laminated sequence of weathered light grey, grey and dark grey carbonaceous siltstones. Individual bands vary from 1½ cms. to 0.1 cm. and the thicker ones show an upward change in colour from light to dark grey associated with an increase in carbon and argillite content. The bases of all light grey bands are sharp and show small load cast structures. Dip + 6°, assuming normal facing. The unit is well jointed with a porous quartz vein as a joint infilling at 1.60m and at 1.52m chlorite bands occur parallel to a joint in the adjacent sediments.
1.85	3.66	100	Dark grey weathered carbonaceous and argillaceous siltstone containing a few thin light grey siltstone bands (<0.2 cms). The core is broken with evidence of frequent joints. Dip 0°.
3.66	9.34	100	As 1.22-1.85 metres with frequent joints, locally ironstained. Microfaulting present at 4.90m. At 6.40m. two joints intersect at 90°. Dips. 3.66-4.80m. + 5 to 0°. Dip. 4.80m.-5.20m. Increase to + 15 and return to + 2°. Dip. at 7.11m. + 4. Dip at 9.14m + 8°. Dip. at 7.50m + 6°. Dip. at 8.40m. + 8°. Thin continuous bands, lenses and patches of green chlorite are developed sporadically throughout and are aligned parallel to the bedding surfaces. They occur mainly in the darker more argillaceous sediments. The banding becomes finer towards the base of the sequence with local minor contortions. At 9.08m. several of the veins of chlorite, quartz and traces of carbonate are developed, cutting the bedding at 50°. A minor fold is developed at approximately 5.80m., the axial plane dipping at + 60° to the core long axis.
9.34	9.90	100	Dark green grey chloritic argillaceous siltstones, containing common thin lighter laminae exhibiting sharp bases, locally load cast; and gradational tops. The sequence is cut by several thin quartz and chlorite veins with small cavities and dip + 60°. Dip of sediments + 10°.
9.90	14.60	20 cms. loss core.	Dark grey carbonaceous siltstone with abundant thin light grey laminae up to 2 mm in thickness. Thicker 0.5 cm bands develop near base of the unit. Dips. + 10° at 10.10m. + 6° at 11.10m. - 30° at 11.70m. Axial plane at 11.43m dips + 50°. - 40° at 13.38m. - 12° at 12.65m. - 20° at c.13.50m. - 40° at 13.80m.

INTERVAL IN METRES		% Recovery	DESCRIPTION
From:	To:		
14.60	16.46		<p>The change in dip between 12.38m and 12.65m occurs rapidly at 12.55m associated with a minor fault filled with quartz, chlorite, minor pyrite and included grey siltstone fragments. The fault dips at c.40° and the dip change is also associated with a change in strike. (c.10°). Joints with chloritic surface and locally associated with quartz patches, are present throughout. Microfaults of 1-5 mm displacement become more common with depth.</p> <p>As 1.22-1.85m, but with bands up to 1 cm in thickness. Moderately well jointed with chlorite coating on some joint faces. Dips. + 15° at 14.96m. + 16° at 15.77m, Dip + 32° at 16.10m.</p> <p>The change in dip occurs at c.16.00m and is associated with a minor fault with crumpling of laminae and the development of disseminated chlorite. From 15.20m to 15.77m, several microfaults occur with a displacement of up to 1 cm. Chlorite and sporadic pyrite occur as joint infillings.</p>
16.46	28.35	c.60 cms core loss.	<p>Dark grey carbonaceous argillaceous siltstone with thin light grey silt laminae showing good basal load casts. The frequency of lamination is less than 9.90m-14.60m and rare grey bands (up to 1½ cms) are developed. Moderately well jointed with only rare chlorite films.</p> <p>Dips. + 13° at 16.79m, + 3° at 16.98m., + 4° at 18.00m. - 2° at 18.20m, -15° at 18.88m., - 2° at 19.46m, - 8° at 20.68m. -15° at 21.94m, +13° at 23.65m., - 4° at 24.85m., -10° at 25.79 (? core upside down).</p> <p>Change from -15° to + 13° occurs at 23.45m.</p> <p>Rare microfaults are present with chlorite and quartz infillings.</p>
28.35	36.80	40 cms lost.	<p>Dark grey carbonaceous - sparingly calcareous, siltstone with the light grey laminae exhibiting good basal structures. The unit is chloritic, the chlorite content becomes marked below 33.50m and well visible in the light grey sediments - pyrite locally developed concordantly within the light grey chloritic siltstone laminae. The unit is moderately well jointed, chlorite occurs on joint surfaces together with traces of graphite towards the base. Microfaults are present with small displacements, but filled with a siliceous, chlorite rich material. Some fault zones contain pyrite and chalcopyrite is developed in a 1 cm leached siliceous band at 28.46m.</p> <p>Dips at - 13° at 28.89m, - 2° at 29.40m. - 11° at 31.63m, - 8° at 32.43m, - 5° at 33.16m. 0° at 33.86m, -10° at 34.41m.</p> <p>Folds are at 34.26, dips at + 40° - mono clinal flexure. - 2° at 35.36: 0° at 36.70.</p>

INTERVAL IN METRES		% Recovery	DESCRIPTION
From:	To:		
36.80	37.48	100	A 2 cm thick light grey chlorite siltstone underlain by dark grey carbonaceous and argillaceous siltstone with thin light grey laminae. The base of the thick band displays good load casts. The upper 6 inches of core consists of silicified material with carbonate containing chlorite blebs and patches associated with quartz veins and mineralised with pyrite and chalcopyrite. Total sulphides 5%. Dip at 37.45m. - 14°.
37.48	44.94	100	As 9.90 to 14.60m. With disseminated chlorite throughout. Well developed joints with chlorite coatings. Several microfaults are developed of irregular trend, filled with quartz. Disseminated pyrite develops in lower part of the unit. Dips: - 20° at 38.50m. - 4° at 39.32m. - 12° at 40.12m. Slight flexure at 39.24m axis dips + 70°. Dips: - 2° at c.41m, - 93° at 41.76m. - 34° at 42.52m, - 23° at 43.84m, 0° at 44.90m. At 44.54m, a 10 cm unit occurs comprising several discordant veins of chlorite, quartz and silicified sediments with traces of pyrite. The veins dip at + 60°. A 1 cm chlorite rich vein occurs at 43.92 dipping at + 55°.
44.94	45.16	100	Silicified and recrystallised siltstone unit with patches, stringers and fragments of intensely chloritic sediment and cut by white granular quartz veins. A few small cavities present with relicts of carbonate. Well mineralised with pyrite and traces of chalcopyrite. Total sulphides 10%. The base of the unit is marked by very chloritic siltstone, contact dipping + 50°.
45.16	45.91	100	Dark grey very carbonaceous, chloritic siltstone with thin (<1mm) light grey siltstone laminae. Two well developed joints present with chlorite on graphitic coating. Four siliceous and chloritic veins with pyrite, between 0.5 and 2.5 cms in thickness, are present in the centre of the unit dipping at + 63°. Dip + 3° to 0° at base.
45.91	51.21	100	Dark grey very carbonaceous and chloritic siltstone with frequent thin greeny-grey chloritic siltstone laminae. Sporadic sharp joints with traces of graphite on faces. Dips: - 12° at 46.65m, - 15° at 47.40m, - 14° at 50.50m. At 50.40m, a 5 cm siliceous and chlorite rich vein dips at + 50° and is mineralised with chalcopyrite and pyrite. A similar mineralised irregular vein occurs at 51.01m containing buff carbonate patches (ferro-dolomite + ankerite). Approximate dip + 50°.

INTERVAL IN METRES		% Recovery	DESCRIPTION
From:	To:		
51.21	52.39	100 rec.	Dark grey, very carbonaceous sparingly chloritic siltstone, slightly silicified bearings thin light grey silt laminae (up to 2 mm) with load cast bases. Euhedral pyrite occurs along bedding surfaces and joint planes. Dip 0° at 51.25m, -15° at 52.00m, -18° at 52.30m.
52.39	54.18	90 +	As above, but cut by numerous veins varying from 0.5 cm to 5 cms in width. The sediments are moderately chloritic, contain disseminated pyrite and are silicified in the vicinity of the veins. Dip: -18° to -20° . A few microfaults are developed filled with dolomite. The veins consist of grey quartz with blebs, veinlets and irregular small patches of chlorite and disseminated pyrite throughout, often concentrated parallel to the contact. The adjacent sediments are chloritised, with local development of graphite aligned parallel to the contact. Dips of veins: $+40^{\circ}$, $+45^{\circ}$.
54.18	56.08	85 rec. approx.	White quartz with included fragments and bands of chloritised siltstone and common chlorite which occurs as small patches and discontinuous bands. The chlorite along many partings is schistose and in parts the boundaries of the included sediments show a definite orientation dipping at 35° - 45° . No mineralisation but a few leached cavities occur in the quartz and one vugh was noted.
56.08	56.20	100	Extensively chloritised and silicified siltstone with a few veins and blebs of white quartz. Total sulphide 2% consisting of chalcopyrite.
56.20	57.20	100	Light grey, talcose material containing fragments and broken bands of chloritised siltstone and blebs of chlorite. In parts, a schistosity is developed dipping at $+48^{\circ}$. The unit is mineralised with chalcopyrite and minor pyrite. Total sulphides c.1%.
57.20	57.80	100	Pale-Brownish, micritic ferro-dolomite with veins of carbonate and quartz and containing blocks and small fragments of extensively, locally completely chloritised siltstone. Schistosity locally developed dipping $\pm 45^{\circ}$. Mineralised with chalcopyrite and pyrite. Total sulphides c.2%, the carbonate containing only traces of mineralisation which is restricted to the altered included sediments.
57.80	57.98	100	Massive white quartz containing patches and irregular veins of ferro-dolomite containing chloritic wisps, blebs and fragments. Minor chalcopyrite and pyrite 0.5% max. (This unit is probably a quartz vein within enclosing units).

INTERVAL IN METRES		% Recovery	DESCRIPTION
From:	To:		
57.98	61.60	90	Light grey sparry ferrodolomite with subordinate amounts of micrite, weathering on core surface to a brownish colour. Sporadic inclusions of green chlorite and very chloritic and graphitic siltstone are present, abundant between 60.76m and 61.15m. A pronounced schistosity is shown within the inclusions and occasionally within the carbonates dipping 35° - 45° . Sporadic pyrite and chalcopyrite mineralisation mainly within and adjacent to argillaceous inclusions. Total sulphides < 0.5%.
61.60	61.92	100	Black, disturbed graphitic slate with chlorite blebs and patches and with irregular quartz veins and patches which break up the slate into fragments. Subordinate ferrodolomite is present as veinlets and small patches. Well mineralised with chalcopyrite and pyrite. Total sulphides 5-8%. Schistosity and banding dip 38° - 45° .
61.92	63.84	100	Massive white quartz with irregular patches and veins of pale buff ferro-dolomite and small chlorite blebs. A 1 cm black graphitic siltstone band occurs at the top of the unit dipping at 60° . Sporadically mineralised with pyrite and trace chalcopyrite associated with carbonates. Below 63.14, irregular, broken bands (0.5 to 2.5 cms in width) of black graphitic and chloritic siltstone are developed sporadically, all dipping in the same direction and associated with pyrite and minor chalcopyrite mineralisation. Total sulphide c. 0.5%. Dips: 38° , 37° , 35° .
63.84	64.24	100 ?	Green grey silicified, chloritic sediment with broken bands of black silicified graphitic siltstone and irregular blebs and veins of white quartz. Irregular patches and veins of ferro-dolomite occur throughout. Dip of bands, 40° , 35° . Well mineralised, total sulphides 3% - 5% mainly chalcopyrite with minor pyrite. A finely granular carbonate vein 1 cm wide occurs near the base of the unit.
64.24	67.50	100 ?	Light grey recrystallised siliceous material with 10-15% interstitial ferro-dolomite. Locally the carbonate content reaches 40% over 3-5 cms widths. The unit is heavily mineralised (20-30% total sulphides) with pyrite and small amount of chalcopyrite which is most abundant in the carbonate rich zones. In some cases, the chalcopyrite is surrounding pyrite. The pyrite varies in colour from white to gold (arsenopyrite - copper bearing pyrite?). The basal 5 cms are very siliceous and abut sharply against altered sediments. Dip 47° .
67.50	67.64	100 ?	As above, but with 40% included fragments of green silicified chloritic siltstone and 20% ferro-carbonate heavily mineralised with pyrite and minor chalcopyrite. Total sulphides 30%.

INTERVAL IN METRES		% Recovery	DESCRIPTION
From:	To:		
67.64	67.94	100	Light grey, siliceous and sericitic material with 10-20% ferro-dolomite as patches and veinlets. Suggestion of schistosity. 15% sulphides - pyrite and trace chalcopyrite.
67.94	68.20	100	As above, with included green chloritised sediment fragments.
68.20	69.18	100	As 67.64 to 67.94. With common chlorite blebs and included chloritised sediments showing locally a crude banding (dip 45°). The basal 10 cms are soft, talc rich with a marked schistosity and moderately well mineralised. 10% total sulphide, mainly pyrite and arsenopyrite with traces of chalcopyrite.
69.18	69.68	100	Black graphitic slate, locally chloritic occurring as broken bands and fragments separated by bands and veins of mixed ferro-dolomite/silicified material and chlorite containing pyrite (5% total sulphides). Dip of banding 50° , 52° , 50° .
69.68	71.21	100	Light grey-white, siliceous material, with sporadic included fragments of black graphitic slate, common between 70.60m and 70.90m and ferro-dolomite veinlets and patches. Total sulphides 5% mainly disseminated chalcopyrite with subordinate pyrite. 71.57m band of dominantly pyritic sulphides.
71.21	73.00	100	Black, silicified, graphitic and carbonaceous siltstone, the graphite being developed mainly along joints and fracture planes. Bedding vague but dips visible around 71.90m at $\pm 30^{\circ}$ to 35° . The unit is cut by numerous thin quartz veins \pm chlorite and carbonate which often occur along microfaults. Local brecciation develops in zones of high vein density. The veins vary from 0.1 cm to 2 cm in width and carry pyrite and chalcopyrite, the latter being common in the basal 40 cm of core. Total sulphides $<1\%$. The major veins dip 40° - 50° and the very thin veinlets having random orientation.
73.00	73.38	100	Grey, siliceous material, with abundant included fragments and broken bands of black graphitic slate. Ferro-dolomite occurs as patches and veinlets. Heavily mineralised with chalcopyrite and pyrite occurring as blebs and irregular bands concordant with the sediment banding. 10-15% total sulphides. Dip of sediments: 40° - 50° . Dip of mineralisation: 45° .
73.38	74.58	100	White quartz with ferro-dolomite patches and veins and graphitic slate inclusions. Dipping 30° - 40° . Sporadically mineralised with pyrite and chalcopyrite mainly along and within included sediments. Total sulphides 3-5%.

INTERVAL IN METRES		% Recovery	DESCRIPTION
From:	To:		
74.58	74.83	100	Black graphitic slate, (approx. schistosity dip 37°), well jointed, cut by thin veins of silicified material and quartz with ferro-dolomite chlorite. The veins and adjacent sediments are mineralised with pyrite and chalcOPYrite. Veins deep 40° . Total sulphide c.1%.
74.83	76.46	100	Siliceous material and quartz with ferro-dolomite and chlorite patches and veinlets containing two bands of chloritised, graphitic siltstones, (c.10 cms) heavily veined as above. Sporadic moderate pyrite and chalcOPYrite mineralisation. Total sulphides 5%.
76.46	77.10	100	Black silicified, graphitic and carbonaceous siltstone cut by numerous thin siliceous veins and patches, containing chlorite and irregularly distributed ferro-dolomite. All veins are mineralised with pyrite and chalcOPYrite. Total sulphide 3-5%. Dip of veins 30° - 40° .
77.10	79.66	100	Dark grey-black, carbonaceous siltstone bearing a few thin light grey laminae. Dips: - 12° at 78.80m, + 10° at 78.80m, at 78.60, change from 0° to + 12° . All other dips vary from 30° to 0° , but facing cannot be definitely proved. At 79.56m, minor fold axis dips at + 98° facing definite. Quartz porphyroblasts, hexagonal to irregular in shape, occur throughout the section locally associated with chlorite and carbonate. Mineralised siliceous veins (pyrite with chalcOPYrite) up to 5 cms wide occur sporadically throughout, dipping at between 45° and 60° . Total sulphide content <0.5%. Irregular joints show graphite on the faces with rare slickensides.
79.66	80.06	100	Green grey, chloritic, siliceous vein complex containing bands of black carbonaceous siltstone which die out with depth. Ferro-dolomite is patchily developed throughout, forming 70% over 10 cms. in the central portion of the unit. Mineralised with pyrite and chalcOPYrite. Total sulphides 10%.
80.06	83.32	100	As 77.10 to 79.66m. Dips: - 2° at 80.36m, + 5- 10° at 80.48m. Dip: + 2° increasing to $\pm 30^{\circ}$ at 81.38m, suggestion of near flat dip at base of core. Rare veins with only trace of mineralisation and graphite is developed on joint, surfaces.
83.32	83.54	100	Steeply inclined vein of mixed siliceous material, ferro-dolomite and some chlorite, heavily mineralised with pyrite and minor chalcOPYrite. Total sulphide 30%. Bedding/vein angle at base dips 118° .
83.54	84.74	100	As 77.10 to 79.66m, but with thin rare veins. Dips c.83.70m - 40° , 84.13m - 30° (facing difficult to interpret due to minor flexures).

635052

INTERVAL IN METRES		% Recovery	DESCRIPTION
From:	To:		
84.74	95.81	95	<p>Black, carbonaceous, siltstone with thin light grey laminae, quartz porphyroblast - often hexagonal in outline, and cut by numerous thin chlorite, quartzose material and carbonate veins often mineralised with pyrite and trace of chalcopyrite. Thicker veins occur as follows:</p> <p>17 cms. complex vein at 85.30m. 20% sulphide, pyrite, chalcopyrite. 15 cms. complex vein at 85.71m. 25% - 30% sulphide, pyrite, chalcopyrite. 10 cms. vein at 87.20m. 5% sulphide, pyrite. 7 cms. vein at 90.72m. 20% sulphide, pyrite. 15 cms. vein complex at 94.27m. 2-9% sulphide, pyrite. (Very siliceous).</p> <p>The basal 20-30 cms. contain numerous irregular small veins, strongly graphitic joints and abundant chlorite.</p> <p>Dips of sediments: + 54°, 55.09; ± 57° and 85.32, + 65°, 85.85m. +120°, at 87.97; + 120° at 90.00; +55° at 91.30m.</p> <p>Facing is very difficult to establish as minute crumpling occurs throughout unit.</p>
95.81	97.03		<p>Light grey sparry ferro-dolomite with occasional patches of milky-white quartz. The unit is traversed by thin veins consisting of a mixture of quartz and dolomite, dipping + 45°. At 96.70m, a 5 cm thick massive quartz vein occurs, dipping at 45°. Total sulphides 7%. Chalcopyrite traces.</p>
97.03	97.69		<p>Chloritised mudstone containing irregular veins and patches of milky-white quartz and sparry dolomite. Fracture planes are graphite coated. Total sulphides 2%. Chalcopyrite traces.</p>
97.69	98.15		<p>Siliceous material with fine grained dolomite traversed by thin quartz veins up to 1 cm thick, dipping 45°. Total sulphides 5%. Chalcopyrite traces.</p>
98.15	101.53		<p>Dark grey to black graphitic mudstone with 5% light grey siltstone. The zone is very distorted and has the appearance of a breccia. Veins consisting of quartz and chlorite up to 1 cm thick traverse the bedding, but are too distorted to determine the dip. Quartz porphyroblasts are well developed.</p> <p>Dip of bedding at 98.90m, 0°; at 99.60m, 10°; at 101.40m, 15°. Total sulphides 0.1%.</p>
101.53	102.09		<p>Zone comprised of dolomite, siliceous material and a small amount of talc, with fragments of angular graphitic mudstone. Total sulphides 15%. Chalcopyrite 0.2%.</p>
102.09	103.35		<p>Fragmented chloritic mudstone including bands of pyrite mixed with dolomite and silica, dipping 20°. The middle part of this zone is more dolomitic grading into a finer grained mixed dolomite-silica material at the base. Total sulphide 5%. Chalcopyrite traces.</p>

635053

INTERVAL IN METRES		% Recovery	DESCRIPTION
From:	To:		
103.35	103.75	90 approx.	Black, silicified graphitic and carbonaceous siltstone with sporadic thin veins (<2 cms) of quartz, ferro-dolomite and chlorite. Quartz porphyroblast occurs throughout. The veins are sparsely mineralised with pyrite and one joint face is covered with pyrite crystals. Strata dip c. 70.80°.
103.75	104.93	100	Ferro-dolomite containing quartzose patches. Heavily mineralised with pyrite, total sulphides 30-40%.
104.93	111.05	Losses: 104.93 to 107.29. 60% recovery	Black silicified, carbonaceous somewhat graphitic siltstone with little evidence of bedding above 108.25. Thin siliceous, carbonate and chlorite veins occur sporadically with euhedral pyrite with pure chloritic veinlets. Quartz porphyroblasts occur throughout. Dip: 25° at 108.30m, 42°, 109.10m; 25° at 109.70m. 45° at 110.60m. The basal 10 cm are very graphitic, slickensided and contain extensive ferro-dolomite veining.
111.05	112.00	100	Light grey ferro-dolomite containing a few chloritised graphitic fragments at the top and passing down into intensely chloritic and talc rich carbonate, soft, porous with local schistosity (40% chlorite). Below 111.45m, the chlorite content reduces to about 5% and the carbonate becomes compact and hard. Sporadically mineralised with pyrite - 1% total sulphides.
112.00	112.32	100	Black graphitic mudstone, fragmented by numerous small veins consisting of quartz, chlorite and carbonate. Slickensides are developed on graphitic surfaces and at the base of the core, a well mineralised (pyrite) zone of carbonate shows a well developed schistosity dipping 45°. Elsewhere mineralisation is very sporadic - total sulphides 1 - 2%.
112.32	112.57		Milky white massive quartz - no mineralisation.
112.57	114.15	100	As 111.05 to 112.00, with minor chlorite and a graphitic slate band 28 cms wide at 113.11m. Pyrite mineralisation - total sulphides 3-5%.
114.15	118.32	100	Dark grey-black, partly silicified carbonaceous and graphitic siltstone with thin light grey laminae and quartz porphyroblasts. A 5 cm wide milky quartz with ferro-dolomite band occurs at 115.11m. The whole sequence is cut by numerous thin (<2 cms) veins comprising siliceous material, carbonate and chlorite. The veins are well mineralised with pyrite and scattered crystals of pyrite occur throughout. Chalcopyrite is present in veins around 118.27m.

635054

INTERVAL IN METRES From:	To:	Recovery	DESCRIPTION
118.32	119.36	100	<p>Dips: from 114.15 to 117.50m. The dips are between 40 and 55° where visible. . . . At 117.50m, the dip changes to near parallel with the core, the axial plane dipping 48° cutting the bedding nearly at 90°; at 118.90m, the dip changes to 20°, but reverts to 50° at 118.25m. (Due to microfaulting and crumpling, the way up of beds cannot be determined. The split core also makes this more difficult). Dip at base 45°.</p> <p>Broken fragments of black silicified, graphitic and carbonaceous siltstone within a complex vein system of quartz, chlorite, silicified material and ferro-dolomite. Components form individual veins, or occur together in single veins. The thickest vein occurs at the base being 8 cms wide and consisting of milky quartz. Veins dip between 37° and 50°. The unit is well mineralised with pyrite and chalcopyrite. Total sulphide 10 - 12%.</p>
119.36	119.65		<p>Dark grey-black, very graphitic slate with numerous veins and blebs of quartzose material ferro-dolomite and chlorite aligned parallel to bedding. Thin cross cutting veinlets also occur and are of carbonate with minor white quartz. The veins are well mineralised with pyrite and trace of chalcopyrite. Total sulphide, 5%. Dip (bedding and vein) 52° - 55°. Thin cross cutting veins cut the bedding at c.90° and are displaced by microfaults.</p>
119.65	120.85		<p>Dark grey-black, graphitic, carbonaceous siltstone partly silicified with fine light laminations. Local incipient brecciation occurs. Thin concordant quartz carbonate veins occur sporadically throughout. Mineralised with pyrite tending to form bands parallel with the bedding. Total sulphides 2-3%. Dips + 45° at 120.62m, - 45° at 120.70m, (axial plane 90° to core). From 120.70 - 85m, anticline/syncline is present, the axial planes dipping + 60°.</p>
120.85	121.08		<p>As 119.36-119.65 with minor pyritic mineralisation.</p>
121.08	124.75		<p>Dark grey-black silicified graphitic slate/siltstone, bearing a few thin lighter laminae with abundant quartz porphyroblasts, often hexagonal and partly replaced by carbonate or pyrite. The unit is cut by veins from 0.2 cm to 3 cms wide, consisting of carbonate, quartz, and chlorite singly or together. Local microfaulting and crumpling of laminae occurs near veins. Dips (sediments): 52° at 121.05m, 30° at 121.35, 45° at 121.70. 45 - 50° to 123.40. (Minor fold between close to 2 cm vein dip 60°), 35° at 124.15; 55° at 124.65. Dip of veins: 50-52°.</p>

635055

INTERVAL IN METRES		% Recovery	DESCRIPTION
From:	To:		
124.75	125.40		Irregular fragments of black graphitic, silicified siltstone up to 2 cm in size. Set in a fine grey siliceous matrix. Thin ferro-dolomite veinlets cut the unit at random and irregular patches of carbonate occur sporadically throughout. Mineralised with dominantly euhedral pyrite - 3% total sulphides. The top and base of this unit is gradational.
125.40	129.90	100% recovery except 126.95m - 128.30m, where 90 cm missing.	Dark grey-black, silicified, graphitic slate/siltstone with a vague thin lighter lamination. Dips: 29° at 125.65m, from 125.65 - 126.40, series of shallow folds axis dipping 50°. Quartz/carbonate veins occur along and parallel to the fold axis which are locally microfaults. 21° at 126.55m; 40° at 126.90m. From 126.95-127.50m, the unit is broken-veined and very contorted. Between 127.30-128.74m, a series of small folds, axial planes dipping at 50°, with microfaults and developed and veined with a mixture of silica, chlorite carbonate. 15° at 129.20. From 129.20 to the base sediments. Dip 10-20°, but core cut by many microfaults between which small scale folds and crumples occur. Dip and faults 50-60°. The whole unit is mineralised with disseminated pyrite, which occurs locally in bands parallel to the bedding.
129.90	136.55	100	As above, the sediments dipping between 10 and 20° with numerous microfaults and minor crumples and folds, the axial planes dipping at 50-55°. From 125.40 - 136.55, thin quartz, carbonate and chlorite veins occur throughout, comprising one or all components. Dips 45° - 50°. Minor pyrite mineralisation.
131.55	138.08	20% recovery.	Black-dark grey graphitic silicified siltstone, very contorted with quartz vein up to 9 cm. in width containing fragments of sediment and mineralised with chalcopyrite. Losses reflect soft graphite bands. Total depth 138.08m, the drill hole being abandoned due to caving of the graphite bands.

SAMPLE INTERVALS AND ASSAY RESULTS

635056

SAMPLE NO.	INTERVAL		LENGTH IN METRES.	% Cu.
	From	To		
BAL. 0084	51.21m	54.18m	2.97	.007
0085	54.18m	56.20m	2.02	.006
0086	56.20m	57.20m	1.00	.33
0087	57.20m	57.98m	0.78	.40
0088	57.98m	61.60m	3.62	.21
0089	61.60m	61.92m	0.32	.78
0090	61.92m	63.84m	1.92	.029
0091	63.84m	67.50m	3.66	.22
0092	67.50m	69.18m	1.68	.066
0093	69.18m	69.68m	0.50	.087
0094	69.68m	71.21m	1.53	1.00
0095	71.21m	73.38m	2.17	.11
0096	73.38m	74.58m	1.20	.41
0097	74.58m	74.83m	0.25	.048
0098	74.83m	76.46m	1.63	.10
0099	76.46m	79.25m	2.79	.043
0100	79.25m	84.79m	5.54	.025
0101	84.79m	95.90m	11.11	.012
0102	95.90m	96.95m	1.05	.028
0103	96.95m	97.15m	0.20	.004
0104	97.15m	101.53m	4.38	.002
0105	101.53m	103.33m	1.80	.098
0106	103.33m	111.05m	7.72	.017
0107	111.05m	112.57m	1.52	.069
0108	112.57m	114.15m	1.58	.038
0109	114.15m	118.24m	4.09	.006
0110	118.24m	119.28m	1.04	.13
0111	119.28m	129.84m	10.56	.011
0112	136.58m	138.05m	1.47	.082
0113	138	to end.	(All sludge)	.023

055

635057

APPENDIX B (Contd.)

2.

SAMPLE NO.	INTERVAL		LENGTH IN METRES.	Cu %
	From	To		
BAL. 0031	42.07	43.59	1.52	.009
0032	43.59	45.11	1.52	.007
0033	45.11	46.64	1.53	.012
0034	46.64	48.16	1.52	.011
0035	48.16	49.69	1.53	.004
0036	49.69	51.21	1.52	.020
0991	129.84	.32.20	2.36	
0992	132.20	134.50	2.30	
0993	134.50	136.58	2.08	

056

73-947

635058

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION E.L.16/68

16th December, 1970.

REPORT ON D.D.H.2. CLUMP PROSPECT

H.G. Davies

SUMMARY

Diamond drill hole No. 2 at the Clump Prospect has been abandoned at a depth of 72.24 M. below collar in soft, cavernous and broken ground. The potential mineralised zone was encountered at 58.60 M. below collar and core recovery through the potential zone was approximately 5%. Copper and pyritic mineralisation was present in the fragments of core, the zone being extensively leached of carbonate and minerals, leaving a crude quartz network with soft carbonate residues.

D.D.H.2. - CLUMP PROSPECT

Grid Reference	459,299 N, 310,026 E
Collar level	c170.5 m.
Inclination	50°
Direction	034° magnetic
Date drilled	13/8/70 - 26/8/70

1. OPERATIONAL DETAILS:

D.D.H.2. was drilled by Associated Diamond Drillers Pty. Ltd., using an E.1000 Rig, which was set up on site ready for drilling on 13/8/70.

Drilling progress, together with engineering details are shown on Figure 1. NX Casing was set at 3.35 m. and BX Casing at 12.50 m. the remainder of the hole being cored using BX wireline equipment.

1.1 Drilling conditions

Appendix "A" shows the drill runs and core recovery and the numerous short core runs reflect moderately broken ground, which is also reflected in the core recovery. From the core recovered, jointing appears to be the main reason for drilling problems.

Below 58.50 M., core recovery was very low (about 5%), with the drilling string falling under its own weight. The hole was cemented to 63.10 M., but on re-entering the drill hole, only 10 cms. of cement was recovered, the remainder flowing away into the formation. On instructions from the site geologist, the hole was deepened to 69.19 M. in very soft ground and cemented again. On re-entering the hole no cement was found and extreme difficulty encountered getting the core barrel on bottom.

057

A further 3.05 metres were drilled in tight, caving ground with little recovery and the drill hole was abandoned for -

- (1) The main potential zone had been penetrated with no real core recovery.
- (2) To recover the hole casing would be required with significant cost and it is likely that similar ground conditions would be encountered below the casing shoe with further cementing and casing required.

1.2. Deviation

The deviation, measured by the acid tube method, showed a rapid build-up in the first 30.5 m. (see progress chart), but at 61.0 m. the angle had reduced significantly.

2. GEOLOGY:

The detailed geological log is presented in Appendix "B" and may be summarised as follows:

0 m - c.60.m Banded and laminated sediments becoming silicified and veined in the basal, 5 metres.

c.60.m - 72.40 m Mineralised zone.

The mineralised zone was soft and cavernous indicating -

- (a) The presence of old collapsed workings,
- (b) Solution of carbonate and metallic mineralisation.

The latter is believed to be correct as no workings have been located from a detailed examination of the ground surface and existing workings do not extend into the vicinity of D.D.H.2. Traces of carbonate were visible on parts of the porous recovered core and the potential zone probably consisted of a quartz network with soft clayey residues resulting from the breakdown of the carbonate and metallic minerals.

3. SAMPLING AND ASSAYS:

The core recovery in the potential mineral zone was very poor and no sludge sample was obtained due to complete loss of circulation. A composite sample of half the recovered fragments over the interval c.60.m - 72.40 m gave an assay of 0.19% Cu.

058

A.C.I. MINERAL RESOURCES DIVISION

D.D.H.2 - CLUMP PROSPECT

635060

DRILL RUNS WITH CORE RECOVERY.

Footage		Metric		Rec. Core in Metres.
0'	- 2'	0	- 0.61	0.48
2'	- 7'6"	0.61	- 2.29	1.70
7'6"	- 11'	2.29	- 3.35	1.06
11'	- 20'	3.35	- 6.09	2.48
20'	- 30'	6.09	- 9.14	1.67
30'	- 40'	9.14	- 12.19	1.75
40'	- 42'	12.19	- 12.80	0.63
42'	- 47'	12.80	- 14.33	1.48
47'	- 50'6"	14.33	- 15.40	0.88
50'6"	- 53'6"	15.40	- 16.31	0.71
53'6"	- 57'	16.31	- 17.37	1.06
57'	- 59'4"	17.37	- 18.08	0.70
59'4"	- 61'3"	18.08	- 18.66	0.60
61'3"	- 64'6"	18.66	- 19.65	1.02
64'6"	- 67'	19.65	- 20.42	0.78
67'	- 70'9"	20.42	- 21.56	1.10
70'9"	- 74'9"	21.56	- 22.78	1.21
74'9"	- 77'	22.78	- 23.47	0.62
77'	- 79'6"	23.47	- 24.23	0.80
79'6"	- 89'8"	24.23	- 27.33	3.08
89'8"	- 94'	27.33	- 28.65	1.40
94'	- 96'3"	28.65	- 29.34	0.68
96'3"	- 98'8"	29.34	- 30.08	0.80
98'8"	- 101'	30.08	- 30.78	0.74
101'	- 103'	30.78	- 31.39	0.65
103'	- 105'6"	31.39	- 32.15	1.00
105'6"	- 107'	32.15	- 32.61	0.46
107'	- 111'6"	32.61	- 33.98	1.39
111'6"	- 112'3"	33.98	- 34.21	0.35
112'3"	- 116'3"	34.21	- 35.43	} 1.00
116'3"	- 117'	35.43	- 35.66	
117'	- 121'2"	35.66	- 36.93	1.22
121'2"	- 125'	36.93	- 38.10	1.20
125'	- 127'	38.10	- 38.71	0.57
127'	- 129'3"	38.71	- 39.40	0.70
129'3"	- 131'10"	39.40	- 40.19	0.88
131'10"	- 140'4"	40.19	- 42.77	2.60
140'4"	- 145'9"	42.77	- 44.42	1.65
145'9"	- 147'	44.42	- 44.80	0.48
147'	- 150'6"	44.80	- 45.87	0.55

(Continued over..)

DRILL RUNS WITH CORE RECOVERY.

<u>Footage</u>	<u>Metric</u>	<u>Rec. Core in Metres.</u>
(Continued)		
150'6" - 152'5"	45.87 - 46.45	0.60
152'5" - 154'9"	46.45 - 47.16	0.65
154'9" - 156'7"	47.16 - 47.72	0.60
156'7" - 158'	47.72 - 48.15	0.65
158' - 159'	48.15 - 48.45	0.27
159' - 160'6"	48.45 - 48.91	0.46
160'6" - 164'2"	48.91 - 50.03	1.15
164'2" - 166'2"	50.03 - 50.64	0.64
166'2" - 170'9"	50.64 - 52.03	1.28
170'9" - 176'2"	52.03 - 53.68	1.65
176'2" - 181'5"	53.68 - 55.28	1.60
181'5" - 187'	55.28 - 56.98	1.68
187' - 189'6"	56.98 - 57.74	0.76
189'6" - 191'8"	57.74 - 58.40	0.66
191'8" - 197'	58.40 - 60.05	0.22
197' - 207'	60.05 - 63.10	0.15
207' - 217'	63.10 - 66.14	0.05
217' - 227'	66.14 - 69.19	0.40
227' - 237'	69.19 - 72.24	0.15

D.D.H.2. - CLUMP PROSPECT

Grid Reference.

Collar Level.

Direction: 034 Magnetic.

Page 1.

Inclination: 50°.

INTERVAL IN METRES		DESCRIPTION.	APPENDIX "B"
From	To		
00	c.6.50	<p>Light grey siltstone laminae and thin bands (< 0.5 cm. in thickness) and grey argillaceous carbonaceous siltstone. The individual light grey bands shows well developed basal structures - load casts and S scours. The total light grey content is about 25%. The upper 50 cm. contains a 3 cm. thick light grey siltstone bed showing upward colour grading and small-scale cross-stratification is developed in the basal 1 cm. Pyrite is developed along the lower portion of this band. The basal 30 cms. are dark grey and very carbonaceous.</p> <p>Dip. 0 - 0.75 M. + 2°; From 0.75 - 1.13 M. S. fold, axial plane dips + 32°; within this fold, numerous microfaults occur, often filled with quartz, chlorite + soft weathered carbonate veins. Disseminated pyrite occurs in the veins. From 1.13 - 2.36 M. Dip + 6° with local 0° dip at 2.25 M. Between 2.36 - 2.60 M. S. fold, axis dipping + 44°, microfaults and veins as 0.75 - 1.13 M. Dip 2.60 - 3.35 M, 0°; 3.35 - 5.00, - 15° From 5.00 to c.5.25. S. fold axis dips + 45 with w. minor microfaulting; Dip from 5.25 - c.6.50 M. - 12°. (Core loss makes basal boundary indefinite).</p> <p>The sequence is cut by sporadic thin quartz veins, + chlorite, carbonate and pyrite. Two veins directions are present dipping steeply and intersecting at 30° - 45°. Well developed joints, locally ironstained, are prominent and some quartz veins are parallel to the joints.</p>	
c.6.50	c.7.50	<p>Light grey often chloritic siltstone with bands and laminae of dark grey argillaceous siltstone which become increasingly common towards the base. Siltstone content c.70% overall. The grey siltstones display local small-scale cross-stratification.</p> <p>Dips - 8° to - 10° throughout but steepening to - 32° in basal 10 cms. of recovered core. The unit is well jointed, the joint surface locally ironstained with patchy development of chlorite.</p>	
c.7.50	16.31	<p>Banded and laminated sequence of light grey siltstone (< 1 cm.) and dark grey carbonaceous and argillaceous siltstone. Light grey siltstone content approx. 30% and these layers show minor cross-stratification, small load casts and/or scours and upward colour grading. Chloritic bands and chlorite blebs and patches occur sporadically below c.12.50 M. The unit is well jointed with quartz/chlorite infillings.</p> <p>Dips - 20° at c.7.70 M; - 12° at c.11.50 M; - 11 at 12.19 M; - 12° at 12.80 M; - 15° at 14.10. A microfault filled with quartz, chlorite and rare pyrite occurs at 14.21 M, dipping + 35° but striking at high angle to bedding strike.</p> <p>Dips at 14.35 M; - 28°; - 29° at 15.20 M; - 37° at 16.00 M; The sequence is well jointed with ironstained and chlorite coatings. Thin veins 1 - 2 cms. are sporadically developed, major veins occurring at 13.10 M, strike at 90° to bedding strike near vertical; 15.25 M, as above. Both these veins which occur</p>	

INTERVAL IN METRES		DESCRIPTION.
From	To	
16.31	29.00	<p>Dark grey carbonaceous and argillaceous siltstone bearing abundant thin (1 mm) light grey siltstone laminae. Disseminated chlorite occurs throughout. Thin chlorite/quartz veins cutting bedding at 90° occur throughout, major veins occurring as follows: 3 cm. chlorite with quartz at 16.85 M. 2.5 cm. quartz, minor chlorite and pyrite at 17.87 M. 4.0 cm. quartz, chlorite, minor pyrite at 18.66 M.</p> <p>2.0 cm. quartz, chlorite, minor pyrite at 19.58 M. Small microfaults are common with displacements of up to 2 cms. Pyrite occurs rarely along bedding surfaces and also on joint planes. Irregular patches of quartz with pyrite and cavities (carbonates?) occur in association with a microfault at 20.60 M. 6 cm. vein complex-quartz, chlorite, pyrite at 23.80 M. $\frac{3}{4}$ cm. vein \searrow to core, quartz, irregular cavities, minor chalcopyrite at 24.08. 4 cm. vein 90° to bedding, quartz, included sediment fragments and cavities at 24.20 M.</p> <p>Dips: - 35° at 16.65 M, - 26° at 17.50 M; - 34° at 19.00 M; - 47° at 19.80 M (Small scour here); - 37° at 20.50 M, - 41° at 21.75 M; - 42° at 22.70 M; - 48° at 23.45 M. - 37° at 24.15 M, - 39° at 25.25 M; - 43° at 26.35; - 48° at 27.25 M.</p> <p>From 28.00 M - 28.75, dip increases to 90° and then decreases. The change in dip is associated with intense microfaulting, chlorite, quartz veining and local brecciation. The axis is difficult to locate due to broken core.</p> <p>Dip, - 15° at 28.80 M.</p>
29.00	c.34.00	<p>As 16.31-29.00, but with fewer laminae and sporadic thin light grey siltstone bands (\angle 2 cms) and only rare thin quartz/chlorite veins. The thicker light grey siltstone band shows local small-scale cross-stratification, upward colour darkening, small load casts and minor scours. Pyrite occurs within the grey siltstones being confined to the lower (? cleaner and possibly coarser) parts of these bands. Chlorite is present disseminated throughout this unit. Moderately well jointed in parts.</p> <p>Dip, - 20° at 29.20 M; - 12° at 30.48 M. - 10° at 31.30 M; - 6° at 32.30 M; - 5° at 33.80 M; - 8° at 33.90.</p>
c.34.00	45.87	<p>As 16.31-29.00 with a few 1 cm. thick bands displaying sedimentary features listed in 29.00-34.00 unit. The boundaries above are gradational and somewhat subjective.</p> <p>Dips, - 48° at 34.25 (No change from last reading occurs at 34.20 axial plane dips + 40°) - 65° at 34.50; - 17° at 34.80; The above fold is an S, in the steep part of fold, graphite is developed with chlorite, local microfaults, irregular quartz patches.</p> <p>Dips; - 8° at 36.15 M; - 4° at 37.25 M; - 4° - 2° at 38.10 and then 0° to 2° to 43.07 M. + 8° at 43.30 M; + 10° at 44.20; + 7° at c.44.60 M; + 6° at c.45.70 M. From 43.07 M to the base, strong and locally dense joining is well developed striking at right angle to the bedding and</p>

INTERVAL IN METRES		DESCRIPTION.
From	To	
45.87	53.05	<p>Banded and laminated silicified light grey siltstone and dark grey, carbonaceous siltstone. Individual bands are up to 3 cms thick. The light grey bands show local cross-stratification, load casts, minor scours and a few ripple lenticles occur within the thinly laminated portions of the unit. Disseminated pyrite is present in the light grey siltstones together with minor patchy disseminated chlorite.</p> <p>Dips; +5° at 46.55; 0° between 49.20 and 51.73 M. +10° 47.90 M; +3° 52.90.</p> <p>The unit is moderately well jointed; the surfaces being coated with quartz, soft weathered ?carbonate, pyrite and minor chlorite, singly or mixed together. Gradational base due to slight dip of sediments relative to the core long axis.</p>
53.05	58.40	<p>Dark grey silicified carbonaceous siltstone bearing thin light grey siltstone laminae and rare bands (< 1 cms. wide). A few black carbonaceous and argillaceous bands are sporadically distributed. The grey siltstone displays good basal sedimentary features.</p> <p>Dips +3° at 53.70 M; 0° at 55.20 M; -5° at 55.40 M; 55.65 M to 56.87 M; Dip in 0°.</p> <p>-3° at 56.80; -10° at 57.10 M; -10° at 57.60 M, 23° at 58.05.</p> <p>The unit is well jointed, the joint faces often being filled/coated with a quartz, chlorite, pyrite assemblage. Dips +45 to +60°. Strike is N to bedding. Microfaults associated with quartz chlorite ± pyrite blebs occur in a 15 cms. unit at 57.15 M. Irregular blebs of pyrite occur in light grey siltstone at 57.60. The basal part of the unit becomes increasingly silicified and flinty.</p>
58.40	60.05	<p>22 cms. of core only recovered.</p> <p>Upper 20 cms. solid core: Grey-dark grey carbonaceous silicified siltstone, disseminated pyrite, quartz, chlorite and pyrite, occur singly or admixed in thin veinlets.</p> <p>2 cms. fragments of milky white quartz, small irregular cavities locally with brownish clayey film.</p> <p>Minor pyrite. Total sulphide < 0.1%.</p>
60.05	63.10	<p>15 cms. of fragments recovered. 1 fragment of siliceous material with 30% sulphides - pyrite, with chalcopyrite (minor). Remainder: Milky white quartz with irregularly distributed cavities lined brownish clay and with some broken included fragments of black sediment. Mineralisation restricted to quartz/sediment contacts - pyrite with chalcopyrite.</p>

INTERVAL IN METRES		DESCRIPTION.
From	To	
63.10	66.14	5 cms. of fragments - milky white quartz. with sediment fragments; silicified material; no mineralisation. Multicores fragment of silicified dark grey siltstone also present
66.14	69.19	40 cms. of fragments recovered. Upper 25 cms: Black graphitic slaty sediment cut by numerous thin quartz, chlorite veins which are mineralised with pyrite. A few hexagonal quartz porphyroblasts occur. Remainder: Milky white quartz and grey siliceous material with cavities filled with brownish clay Mineralised with chalcopyrite and trace pyrite. Total sulphides c.0.5 - 1%.
69.19	72.24	15 cms. of fragments recovered. Upper half: White quartz, included black argillaceous fragments. Heavily mineralised with pyrite and subordinate chalcopyrite. Total Sulphide: 30-40%, 2-3% chalcopyrite. Lower half: Massive milky white quartz with a few large, irregular cavities.

73-947

635066

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION EL.16/68.
REPORT ON DDH.3 - CLUMP PROSPECT.

3rd December, 1970
H. G. DAVIES.

SUMMARY:

DDH.3. at the Clump Prospect was terminated at a depth of 125.89m having penetrated mineralised material over the interval 61.97m - 84.43m. Core recovery in parts of the mineralised zone was poor especially above 71.47m, due to extensive leaching of carbonates. Individual assays were as high as 2.27%, the interval 71.47m - 84.43m assaying 0.45% cu. for a true width of 9.2m.

DDH.3 - CLUMP PROSPECT:

Grid Reference: 459,828N, 310,000E.
Collar Level: c.151.m.
Inclination: - 60°
Direction: 220° magnetic.
Date Drilled: 8/9/70 - 9/10/70.

1. OPERATIONAL DETAILS.

The rig was set up on site on 8/9/70 and drilling commenced on 11/9/70.

Drilling progress, together with engineering details, are shown on Figure 1. NX casing was set at 3.04m and BX casing at 9.15m, the remainder of the hole being cored with BX wireline equipment

1.1 Drilling Conditions:

Appendix A shows the drill runs and core recovery. From the surface to 35.7m, progress was slow due to badly jointed ground and all drilling fluids were immediately lost to the formation. The formation became less jointed between 35.7m and 58.0m when core loss became pronounced, due to soft graphite rich bands. The hole was cemented at 65.00m and at 69.3m, due to caving ground and poor core recovery. On drilling out the cement plug, full circulation was regained and the drill hole flowed water at 190 litres/hr. No sludge samples were taken between 69.3m and 72.6m for reasons unknown. Below this depth, full sludge samples were taken, although the sampling interval was 3 metres in parts of the mineralised zone, due to an error by the site geologist. At 76.2m, the water flow increased to 950 litres/hr, and caving occurred in areas of low core recovery where the carbonate minerals had been leached out from mineralised zones. Some water was lost at 78.4m, but regained after drilling a further 1 m. The drill hole was continued to a depth of 125.89m, the mineralisation terminating at 84.5m.

On completion, the drill hole was left open as an emergency source of water and the flow was approximately 1,200 litres/hr.

065

1. OPERATIONAL DETAILS (Continued).

1.2 Deviation:

The deviation, measured by the acid tube method, was as follows :

0.0m.	60.0°
15.25m.	61.5°
30.5m.	61.0°
45.7m.	57.5°
61.0m.	61.0°
76.2m.	57.5°
91.5m.	56.5°
106.75m.	55.0°
122.0m.	53.0°

The drill hole maintained good angle into the mineralised zone, but rapidly shallowed between 61.0m. and 122.0m.

2. GEOLOGY.

The detailed log is given in Appendix B, and may be summarised as follows :

			<u>Inter-Section in metres.</u>	<u>% Cu</u>
	0 - c.61.97m.	Flysch type sediments with sporadic veins.		
Mineralised Zone.	61.97m - 71.47m.	Poor core recovery; zones of leached quartz/carbonate material and graphitic siltstone, minor mineralisation.	9.50	0.1
	71.47m - 73.98m.	Quartz/quartzose zone.	2.51	0.8
	73.98m - 74.97m.	Leached zone, quartzose remnants, trace mineralisation.	0.99	0.1
	74.97m - 75.78m.	Graphitic Slate.	0.81	0.0
	75.78m - 77.99m.	Leached zone-quartzose remnants (sludge assay).	2.21	0.4
	77.99m - 79.19m.	Graphitic slate, moderate mineralisation.	1.20	0.3
	79.19m - c80.38m.	Massive sulphides and carbonate (core loss).	1.19	0.4
	80.38m - 84.43m.	Carbonates-moderate mineralisation (core loss at base).	4.05	0.3
	84.43m - 125.89m.	Flysch type sediments.		

3. ASSAYS.

The core was split in half and lithological units sent for assay. The full assay results are presented in Appendix C. and summarised above against the mineralised unit log. Due to high core loss, the assay results in the leached section of the mineralised zone must be considered only as a guide.

Assay for the interval 75.78m - 77.98m was based on sludge samples only.

4. DISCUSSION.

The geology of the drill hole and the overlying costean are shown in the drill section, indicating that the mineralised zone dips at 77° towards the drill hole.

The drill hole angle through the mineralised zone was approximately 58° . Thus the true width can be calculated by multiplying the core length by 0.71.

In DDH.3., the total intersection of mineralisation is 22.46m, or 16.95m. true width. The average grade between 71.47m - 84.43m was 0.45% Cu. over a true width of 9.2m. This zone excludes extensively leached material where no sludge samples were obtained.

Portions of well mineralised core material showed a distinct banding of the mineralisation, adding weight to the conclusion reached from DDH.1. that the mineralisation is of replacement origin.

067

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APPENDIX A.

DDH. 3 - CLUMP PROSPECT

DRILL RUN WITH CORE RECOVERY

MEASURED FOOTAGE		METRIC EQUIVALENTS		CORE RECOVERY	
From	To	From	To	Metres	Percentage
0.00	6.00	0.00	1.83	0.36	19.7
6.00	8.00	1.83	2.44	0.58	95.1
8.00	20.00	2.44	6.10	1.88	51.4
20.00	24.00	6.10	7.32	1.13	92.6
24.00	25.92	7.32	7.90	0.58	100.0
25.92	28.00	7.90	8.53	0.63	100.0
28.00	30.50	8.53	9.30	0.32	41.6
30.50	34.42	9.30	10.49	1.13	95.0
34.42	35.58	10.49	10.84	0.35	100.0
35.58	36.83	10.84	11.23	0.39	100.0
36.83	38.92	11.23	11.86	0.63	100.0
38.92	40.92	11.86	12.47	0.61	100.0
40.92	42.83	12.47	13.05	0.58	100.0
42.83	45.92	13.05	14.00	0.95	100.0
45.92	47.92	14.00	14.61	0.61	100.0
47.92	51.50	14.61	15.70	0.60	55.0
51.50	52.75	15.70	16.08	0.29	76.3
52.75	53.42	16.08	16.28	0.05	25.0
53.42	54.25	16.28	16.54	0.08	30.8
54.25	55.34	16.54	16.87	0.33	100.0
55.34	56.83	16.87	17.32	0.45	100.0
56.83	61.17	17.32	18.64	0.35	26.5
61.17	62.50	18.64	19.05	0.41	100.0
62.50	65.00	19.05	19.81	0.48	63.2
65.00	66.58	19.81	20.29	0.48	100.0
66.58	68.00	20.29	20.73	0.44	100.0
68.00	69.42	20.73	21.16	0.43	100.0
69.42	70.08	21.16	21.36	0.20	100.0
70.08	71.00	21.36	21.64	0.12	42.9
71.00	71.92	21.64	21.92	0.28	100.0
71.92	72.83	21.92	22.20	0.28	100.0
72.83	74.58	22.20	22.73	0.53	100.0
74.58	75.34	22.73	22.96	0.23	100.0
75.34	76.75	22.96	23.39	0.30	69.8
76.75	78.34	23.39	23.88	0.49	100.0
78.34	80.50	23.88	24.54	0.66	100.0
80.50	82.58	24.54	25.17	0.57	90.5
82.58	84.58	25.17	25.78	0.61	100.0
84.58	86.34	25.78	26.32	0.54	100.0
86.34	87.00	26.32	26.52	0.20	100.0
87.00	89.34	26.52	27.23	0.65	91.5
89.34	90.83	27.23	27.68	0.41	91.1
90.83	92.42	27.68	28.17	0.44	89.8
92.42	95.75	28.17	29.18	0.95	94.1
95.75	97.00	29.18	29.57	0.39	100.0
97.00	98.50	29.57	30.02	0.45	100.0
98.50	100.00	30.02	30.48	0.46	100.0
100.00	102.58	30.48	31.27	0.79	100.0
102.58	105.25	31.27	32.08	0.81	100.0
105.25	109.67	32.08	33.43	1.35	100.0
109.67	112.83	33.43	34.39	0.86	89.6
112.83	117.00	34.39	35.66	1.27	100.0
117.00	123.08	35.66	37.51	1.85	100.0
123.08	127.75	37.51	38.94	1.43	100.0
127.75	132.34	38.94	40.34	1.15	82.1
132.34	132.83	40.34	40.49	0.15	100.0
132.83	136.17	40.49	41.50	1.01	100.0
136.17	140.42	41.50	42.80	1.30	100.0

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MEASURED FOOTAGE		METRIC EQUIVALENTS		CORE RECOVERY	
From	To	From	To	Metres	Percentage
140.42	144.25	42.80	43.97	1.17	100.0
144.25	147.00	43.97	44.81	0.84	100.0
147.00	152.67	44.81	46.53	1.72	100.0
152.67	155.17	46.53	47.30	0.72	93.5
155.17	157.00	47.30	47.85	0.55	100.0
157.00	158.92	47.85	48.44	0.59	100.0
158.92	160.92	48.44	49.05	0.61	100.0
160.92	164.42	49.05	50.12	1.07	100.0
164.42	167.00	50.12	50.90	0.46	59.0
167.00	171.17	50.90	52.17	1.27	100.0
171.17	181.00	52.17	55.17	3.00	100.0
181.00	183.00	55.17	55.78	0.26	42.5
183.00	184.42	55.78	56.21	0.40	93.0
184.42	186.83	56.21	56.95	0.76	100.0
186.83	188.50	56.95	57.46	0.49	98.0
188.50	191.25	57.46	58.26	0.60	75.0
191.25	196.92	58.26	59.98	0.64	37.0
196.92	202.16	59.98	61.59	0.16	26.0
202.16	203.42	61.59	61.97	0.12	32.0
203.42	207.00	61.97	63.06	0.34	31.0
207.00	213.00	63.06	64.90	0.18	10.0
213.00	227.00	64.90	69.19	0.84	20.0
227.00	229.00	69.19	69.80	0.44	72.0
229.00	229.92	69.80	70.08	0.30	100.0
229.92	230.08	70.08	70.13	0.05	100.0
230.08	234.50	70.13	71.47	0.50	37.0
234.50	235.92	71.47	71.90	0.47	100.0
235.92	238.25	71.90	72.61	0.68	95.0
238.25	241.92	72.61	73.73	1.10	100.0
241.92	242.75	73.73	73.98	0.23	91.0
242.75	246.00	73.98	74.97	0.20	20.0
246.00	247.42	74.97	75.40	0.46	100.0
247.42	248.67	75.40	75.78	0.31	100.0
248.67	249.42	75.78	76.00	0.15	68.0
249.42	251.00	76.00	76.49	0.12	24.0
251.00	255.92	76.49	77.99	0.25	17.0
255.92	257.00	77.99	78.33	0.33	97.0
257.00	259.16	78.33	78.99	0.64	100.0
259.16	267.00	78.99	81.48	1.46	61.0
267.00	277.00	81.48	84.43	2.59	87.0
277.00	285.08	84.43	86.87	2.46	100.0
285.08	287.08	86.87	87.48	0.63	100.0
287.08	289.16	87.48	88.11	0.57	90.0
289.16	297.00	88.11	90.53	2.38	99.0
297.00	303.16	90.53	92.41	1.66	91.0
303.16	307.00	92.41	93.58	1.17	100.0
307.00	312.67	93.58	95.30	1.60	94.0
312.67	317.00	95.30	96.62	0.96	73.0
317.00	323.00	96.62	98.35	1.83	100.0
323.00	327.00	98.35	99.67	1.32	100.0
327.00	332.16	99.67	101.25	1.58	100.0
332.16	334.50	101.25	101.96	0.68	95.0
334.50	337.50	101.96	102.87	0.91	100.0
337.50	347.00	102.87	105.77	2.90	100.0
347.00	354.00	105.77	107.90	2.23	100.0
354.00	357.00	107.90	108.82	0.51	71.0
357.00	358.75	108.82	109.35	0.40	76.0
358.75	360.33	109.35	109.84	0.49	100.0
360.33	364.83	109.84	111.21	1.32	98.0
364.83	370.83	111.21	113.04	1.83	100.0
370.83	375.25	113.04	114.38	1.34	100.0
375.25	379.33	114.38	115.57	1.26	100.0
379.33	387.00	115.57	117.96	2.41	100.0
387.00	397.00	117.96	121.01	3.05	100.0
397.00	407.00	121.01	124.06	3.05	100.0
407.00	413.00	124.06	125.89	1.83	100.0

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A.C.I. MINERAL RESOURCES DIVISION

APPENDIX B.

TASMANIAN EXPLORATION

DDH.3 - CLUMP PROSPECT.

GRID REFERENCE: 459,828N
310,000E

COLLAR REFERENCE: c.151m.

Direction: 048° true. Page 1.
Inclination: 60°

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
0	c.1.50	0.0m c.0.6m c.0.8m	+ 39° + 39° + 36°	Finely banded and laminated sequence of light grey siltstone and grey very carbonaceous silty mudstone (25% siltstone). The light grey siltstone bands and laminae show sharp bases, are locally load cast, and grade upwards into more argillaceous material. The sequence is well jointed, joint surfaces being commonly iron-stained and weathered. Locally a cleavage is developed in the argillaceous units, inclined at 12° to the bedding. A bedding plane lineation is locally developed. Disseminated cavities after pyrite, containing limonite and haematite, occur within the siltstones (95% sulphides oxidised; Total original sulphide < 0.1%)
c.1.50	c.3.65	c.1.8m c.1.88m c.1.94m c.1.97m c.2.10m c.2.25m c.2.39m c.2.55m c.3.50m c.3.55m	+ 39° + 47° + 52° + 50° + 51° + 45° + 47° + 45° + 45° + 43°	Grey-dark grey carbonaceous, very argillaceous siltstone with occasional thin (2mm-2cms) light grey siltstone bands (esp. at c.1.88m and at c.3.55m) showing erosional bases, and upward grading (5% siltstone). The siltstone bands contain small iron-stained cavities and thin iron-stained fractures. The argillaceous sediments are massive, with suggestions of a rough banding. At c.1.93m, a fine (< 1/2 mm) quartz vein dips at + 50° and at c.1.96m, another fine (<< 1/2 mm) quartz-chlorite vein intersects the bedding at 65°. The sequence contains frequent iron-stained joints and at c.2.00m, an irregular band of chlorite blebs and patches is developed, dipping + 47°. The chlorite band shows minor flexures and occasional small limonite stained fibrous cavities. Leucoxene is present in abundance as small flecks aligned with bedding. A cleavage is developed locally in the very argillaceous units, inclined at 25° to the bedding. Total original sulphides << 0.05%. Sulphides 100% oxidised.
c.3.65	6.10	c.4.86 c.5.47	+ 47° + 51°	Grey-dark grey, carbonaceous, very argillaceous siltstone, with occasional thin (2mm) light grey siltstone bands showing erosional bases and upward grading. At c.3.70m, the siltstone bands are tightly micro folded and micro faulted (10% siltstone). The unit is well jointed, joint and bedding planes locally coated with patches of limonite and chlorite. A cleavage is developed locally in the more argillaceous units, inclined at 22° to the bedding. Numerous thin (1 mm- 7 mm) quartz veins transect the units in all directions. The veins, locally micro folded, are cavernous, and contain substantial amounts of chlorite and pyrite. Chalcopyrite is a minor constituent. Total original sulphides 0.1%. Sulphides 50% oxidised.

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
6.10	c.9.55	c.7.50 c.7.90 c.8.20	+ 47° + 53° + 47°	Dark grey carbonaceous, very argillaceous silty mudstone, with occasional thinner units of siltstone/mudstone bands and laminae. (10% siltstone). The sequence is well jointed. Joint surfaces have a limonitic coating. Numerous very thin quartz veins traverse the sequence. Mineralisation is poor. Total original sulphides < 0.05%. Pyrite is associated with thin quartz-chlorite veins. The veins show leached cavities with little sign of oxidation. At c.8.53m, a 1 cm wide mineralised argillaceous unit occurs, containing 20% granular pyrite. White specks of leucoxene are present in abundance throughout the sequence.
c.9.55	c.11.88	c. 9.74 c.10.95	+ 45° + 45°	Finely banded and laminated sequence of light grey siltstone and dark grey carbonaceous and argillaceous siltstone (30% siltstone). The siltstone/mudstone units vary from 1 mm to 10 cms. in width. The bases of the siltstone bands are sharp and show local erosion and load cast structures. The siltstone layers contain subhedral pyrite and numerous cubic cavities. Total original sulphides < 0.1%. Sulphides 1% oxidised. Abundant leucoxene is present within the argillaceous sediments.
c.11.88	c.12.33	c.12.20	+ 46°	As c.9.55m - c.11.88m, with a siltstone content of 50%. Thicknesses of the units vary from 0.5 mm to 3 mm. The sequence is well jointed in places and local minor fracturing is present. Occasional thin quartz veins (< 0.55 mm), cut the bedding at 45°. Mineralisation is poor. Small amounts of quartz, chlorite and pyrite occur in micro gashes and fractures. Total original sulphides << 0.05%. Leucoxene is abundant in the more argillaceous units.
c.12.33	c.13.08	c.13.08	+ 38°	As c.9.55m - c.11.88m, with a siltstone content is 20%. Mineralisation is restricted to the light grey siltstone bands, where finely divided pyrite occurs occasionally in semi-spherical, diffuse edged pockets (esp. at c.12.60) Cavities after pyrite are common. Total sulphide < 0.1%.
c.13.08	c.14.86	c.13.91	+ 48°	Grey-dark grey, carbonaceous, very argillaceous, massive, siltstone. Fine white elongated flecks (leucoxene ?) and small micas identify the bedding. Bedding surfaces have a sub-pearly lustre due to aligned micas, and a faint lineation. The sequence is well jointed and fine (< 1 mm) quartz veins follow joint planes. The quartz veins contain finely disseminated pyrite and abundant chlorite. At c.13.20 m, an irregular-quartz-chlorite vein is developed, (c.1 cm) cutting the bedding obliquely at 27° and at a shallow angle to the core. The vein is locally microfolded and the chlorite tends to occur in a

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.14.86	c.16.82	c.14.94 c.15.84 c.16.77	+ 49° + 45° + 45°	<p>The quartz is cavernous and contains pyrite. Mineralisation in the sequence is confined to the fine quartz-chlorite veins. Total original sulphides <0.1% Sulphides not oxidised, but numerous cavities after pyrite are present.</p> <p>As for interval c.9.55m - c.11.88m, with a light grey siltstone content of c.40%, and units vary <1 mm to 2 mm in thickness. Jointing is moderately well developed, and small kink folds are common at c.15.90m, where bedding planes have a sub-pearly lustre (micas) and a lineation is developed, approx. perpendicular to strike. Occasionally, very fine quartz veins (<0.5mm) at the bedding. Between c.15.00m and c.15.70m, the sediments are silicified and cut by quartz veins (1-2mm). Mineralisation is poor, restricted to the basal part of the light-grey bands and laminae where very finely divided pyrite occurs in micro fractures and cavities. Limonite stains are only very occasionally present on bedding and joint surfaces. Total original sulphides <0.05%. Sulphides are not oxidised, but a few pinpoint cavities are present</p>
c.16.82	c.20.12	c.18.59 c.19.19 c.20.10	+ 39° + 52° + 48°	<p>Broadly banded and laminated sequence of light grey siltstone and dark grey carbonaceous and argillaceous siltstone (40% siltstone). Individual units vary in thickness from <0.05 mm to 10 cm. The light grey siltstone bands have sharp erosional bases and grade upwards into dark grey argillaceous material. The sequence is well jointed. Bedding surfaces have a sub-pearly lustre due to mica and at 18.67m, c.19.35m, and c.19.93 m bedding surfaces are semi-lustrous, have a soft soapy feel, due to a coating of graphite, and are heavily striated. Most bedding planes have a lineation developed approx. perpendicular to strike. At c.19.00m quartz veining is well developed along joints, the veins containing numerous cavities. Finely disseminated pyrite occurs in the light grey silty layers and a 1 mm vein consisting entirely of pyrite, occurs at c.16.87m. Total sulphides <0.1%. Chlorite is associated with quartz veins, and finely disseminated leucoxene is present in the more argillaceous units.</p>
c.20.12	c.21.66	c.20.19 c.20.38 c.20.96 c.21.20 c.21.60	+ 46° + 47° + 48° + 47° + 47°	<p>As for c.9.55m - c.11.88m with light grey siltstone content of 50%. The sequence is moderately well jointed and is occasionally cut by fine (<1 mm) quartz and quartz-carbonate veins.</p>

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.21.66	c.22.65	c.22.10	+ 42°	Micro folding and faulting are all well developed at c.20.13m, c.20.37m and c.20.97m. Micro gashes are developed at the base of the siltstone bands at c.20.58m, and are partially filled with decomposed carbonate. A green grey chloritic siltstone band occurs between c.20.50m and c.20.65m. Mineralisation is present at the base of this band, in the form of granular pyrite. Leached cavities are numerous. Total sulphides <0.1%.
c.22.65	c.24.18	c.22.70 c.22.90 c.23.60 c.23.90 c.24.10	+ 50° + 45° + 48° + 53° + 48°	Light grey-dark grey massive, carbonaceous argillaceous siltstone, with a single zone of light grey siltstone bands and laminae. (5% siltstone). The sequence is well jointed, and is transected by occasional fine quartz veins (<1 mm). Bedding planes either exhibit a sub-pearly lustre and are striated (esp. close to the silty zone), or are micaceous with a vague lineation. Mineralisation absent.
c.24.18	c.26.27	c.24.68 c.25.17 c.25.75	+ 53° + 47° + 41°	Finely banded and laminated sequence of dark grey carbonaceous argillaceous siltstone and light grey siltstone. (40% siltstone). The light grey siltstone bands and laminae show sharp erosional bases, locally loadcast, and grade upwards into finer carbonaceous material. A 10 cm massive argillaceous siltstone unit occurs at c.23.50m. The sequence is well jointed, joints commonly being filled with a quartz-carbonate-chlorite mixture. Bedding planes are soft, sub-pearly and semi-graphitic, with a lineation almost perpendicular to strike. Mineralisation is restricted to the quartz-carbonate veins. Very finely disseminated pyrite infills, and often is the only vein constituent remaining after leaching of the carbonate. Total sulphides <0.05%.
				Light-grey - grey, massive, carbonaceous and argillaceous siltstone with occasional lightgrey siltstone bands and laminae. The siltstone bands have sharp erosional bases, locally truncated, and grade into finer carbonaceous material. Light grey siltstone content 15%. The sequence is well jointed, and quartz-carbonate-chlorite veins follow joints at c.24.22m, c.24.51m, c.24.67m, c.26.00m, and 26.20m. Bedding surfaces have a sub-pearly lustre and are semi-graphitic, exhibiting a lineation perpendicular to strike. The siltstone units over the interval c.25.35m - c.25.70m, have undergone a high degree of silicification. Pyrite occurs in the quartz-carbonate-chlorite veins at c.24.83m, c.25.70m, and c.26.10m. Total original sulphides <0.1%

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.26.27	c.26.74	c.26.55	+ 41°	As for intervals c.22.65m - c.24.18m, light grey siltstone content 50%. Micro fracturing and faulting is well developed at c.26.40m, the sequence is well jointed, and quartz infillings along joints are common.
c.26.74	c.27.90	c.27.00 c.27.40	+ 40° + 37°	As for intervals c.24.18m - c.26.27m, light grey siltstone content 20%. The sequence is well jointed with quartz-carbonate-chlorite infilling the joints. Pyrite occurs in quartz-carbonate veins. Total sulphides < 0.1%.
c.27.90	c.28.84	c.27.95 c.28.40	+ 39° + 45°	As for interval c.22.65m - c.24.18m, very finely laminated. Between c.27.90m and c.28.26m, light grey siltstone content 30%. The sequence is moderately well jointed with quartz and carbonate infillings; some siltstone bands are microfolded and faulted. Mineralisation is poor, restricted to joint infillings. Very finely divided pyrite. Total original sulphides < 0.05%.
c.28.84	c.29.70	c.29.25	+ 46°	Grey massive carbonaceous and argillaceous siltstone with leucoxene aligned along bedding planes. Fine (<1 mm) quartz veins cut the sequence. The sequence is well jointed and 2 sets of lineation are developed on joint surfaces intersecting at 55°. Silicification is marked at c.28.91m. Finely divided granular pyrite occurs on joint planes. Total sulphides < 0.05%.
c.29.70	c.35.45	c.29.88 c.30.35 c.30.90 c.31.25 c.31.40 c.32.00 c.32.35 c.32.45 c.33.00 c.33.30 c.33.75 c.34.28 c.34.55 c.34.90 c.35.32	+ 40° + 40° + 48° + 41° + 42° + 44° + 39° + 38° + 49° + 40° + 35° + 42° + 43° + 46° + 50°	Finely and broadly banded, and laminated sequence of grey carbonaceous and argillaceous siltstone and light grey siltstone (25%). The sequence contains thin zones of very fine lamination (c.30.35m, c.30.70m, c.31.15m, c.32.00m, c.33.45m, and c.35.00m), and zones of massive argillaceous siltstone (c.30.05m - c.30.25m, c.33.87m - c.34.18m). Elsewhere banding is fine or broad. The sequence is well jointed and joint planes exhibit a distinct lineation (c.35° to core). At c.33.60m, a small but extensively fractured zone occurs mineralised with quartz-carbonate-chlorite veins infilling the fractures. Mineralised veins of quartz-carbonate-chlorite occur along cleaved bedding planes and joints at c.31.91m and c.32.12m. Quartz porphyroblasts appear at c.31.80m and tend to prefer the finer, more argillaceous layers. Chlorite occurs on semi-graphitic bedding planes as blebs and patches at c.31.35m. A wide chloritic band occurs over the interval c.33.08m - c.33.30m, with large irregularly shaped patches of very finely divided pyrite. This band is cut by fine quartz veins and fractures. Pyrite mineralisation occurs within the light grey siltstone (c.30.85m and c.34.44m), as finely disseminated particles along joints (c.32.00m) and fractures (c.33.60m) and as large crystals in small quartz

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.35.45	c.39.77	c.35.60	+ 42°	As for the interval c.22.65m - c.24.18m with 30% siltstone. This sequence is well jointed and quartz-carbonate veins commonly follow the jointing pattern. Zones of <u>very</u> finely laminated sediments occur between c.37.00m - c.37.16m:- c.38.60m - c.38.71m, c.39.46m - c.39.56m; c.37.66m - c.37.78m. Quartz porphyroblasts occur intermittently in the argillaceous units. Fine (≤ 1 mm) quartz-carbonate-chlorite veins traverse the beds. Pyrite mineralisation occurs as extremely finely divided grains accumulated thickly on joint surfaces (c.35.62m) or thinly as encrustations on bedding surfaces (c.38.40m). Pyrite also occurs as large crystals and pockets of finely divided grains at the bases of the siltstone bands, and in well developed quartz-carbonate veins which follow joints and cross the bedding obliquely. Total sulphides $< 0.1\%$.
		c.35.90	+ 43°	
		c.36.35	+ 40°	
		c.36.70	+ 40°	
		c.37.26	+ 48°	
		c.37.72	+ 45°	
		c.38.05	+ 44°	
		c.38.50	+ 40°	
		c.38.92	+ 44°	
		c.39.25	+ 45°	
c.39.77	c.41.50	c.40.14	+ 53°	As c.22.65m - c.24.18m; siltstone content 20%. The sequence is moderately well jointed, and the entire interval is traversed by numerous, locally highly folded and fractured, mineralised quartz-carbonate-chlorite veins ($< 1\text{mm}-1.5\text{cms}$). Micro fracturing and folding is associated with the extensive veining. Quartz porphyroblasts are developed in the more argillaceous units. From c.40.00m to c.40.35m, the sediments are very chloritic and chlorite forms a border around the quartz-carbonate veins. The carbonate is partially leached. Pyrite mineralisation is restricted to the quartz-carbonate-chlorite veins. Total sulphides 0.1%.
		c.40.90	+ 47°	
		c.41.50	+ 42°	
c.41.50	c.42.11	c.42.00	+ 43°	Grey, massive, carbonaceous and argillaceous siltstone with isolated light grey siltstone blebs and laminae and fine leucoxene. The sequence is well jointed and joint planes exhibit a distinct lineation. Extremely fine quartz stringer veins cut the beds along the length of the core. No mineralisation.
c.42.11	c.42.68	c.42.27	+ 42°	As for interval c.22.65m - c.24.18m; siltstone content 25%. Cross stratification is developed in a siltstone layer at c.43.00m. The sequence is well jointed and traversed by a few mineralised, but highly leached quartz-carbonate veins. The majority of veins are locally microfolded and cut the bedding obliquely, but a few follow joints and bedding planes. Local microfaulting is present and quartz porphyroblasts are common in the more argillaceous layers.
		c.42.65	+ 44°	

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.				Pyrite occurs in the quartz-carbonate-chlorite veins, and in the basal layers of a chloritic siltstone band at c.43.00m. Cavities are common in this unit. Total sulphides 0.05%. Sulphides not oxidised, majority removed.
c.42.68	c.45.44	c.43.15 c.43.30 c.44.15 c.44.58 c.44.98	+ 43° + 45° + 43° + 46° + 51°	Grey-green massive, carbonaceous, argillaceous, chloritic siltstone with occasional light grey siltstone bands and laminae (10% siltstone). Otherwise similar to c.24.18 - c.26.27. Siltstone content 10%.
c.45.44	c.45.54	c.45.51 c.46.05 c.46.25 c.47.58 c.47.96 c.48.00 c.48.95 c.49.45 c.49.87 c.50.29 c.51.15 c.51.45 c.51.81 c.52.11	+ 43° + 42° + 43° + 47° + 43° + 44° + 41° + 45° + 43° + 43° + 44° + 41° + 40° + 43°	Dark grey carbonaceous mudstone with light grey siltstone bands. Siltstone content 30%. Thickness of the units varies from 1 mm to 5 cm. The base of the siltstone is sharp and has load cast structure developed. The zone is well jointed and contains disseminated pyrite mainly contained within the siltstone. Total sulphide less than 0.1%.
c.45.54	c.55.17		+ 50°	As above but/ units become more massive and more graphitic. Thickness of units vary from 3 cm to 20 cm. The zone is traversed by occasional thin quartz veins. Total sulphides less than 0.1%.

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STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip	
c.55.17	c.56.21		45°-60°	Dark grey, carbonaceous and graphitic blocky argillaceous siltstone with common quartz or cordierite porphyroblast rarely replaced by a pyrite/carbonate mixture. Bedding is indistinct but leucoxenes show good parallelisation. Between 55.17m - 55.78m, the sequence is microfaulted and folds are present with abundant graphite or slip surfaces. Thin unmineralised quartz veinlets are also present in this sub-unit. The remainder of the unit has sporadic joints (or bedding surfaces) with graphite rich surfaces. Core loss is likely to be associated with the soft microfaulted graphitic zone.
c.56.21	c.56.95		+ 50°	Dark grey-black carbonaceous and graphitic argillaceous siltstone with thin lighter green-grey chloritic bands and laminae 1mm - 2 cms wide. (20% total). These show good upward grading, minor load casts/scours. Many of the bedding surfaces are very graphitic with evidence of movement parallel to the bedding. Small porphyroblast occasionally near hexagonal in shape are very common (quartz or cordierite). Very thin irregular quartz veinlets are common, a 1 cm wide vein at 56.67 m cuts the bedding at 10-20° is microfaulted and consists of quartz, chlorite patches near the margin and minor fine disseminated chlorite.
c.56.95	c.57.00			Quartzose band comprising irregular patches is of milky quartz in a grey siliceous matrix containing silicified fragments of black sediment. Small amounts of chloritic material are also present and blebs usually associated with the sediment inclusions. Mineralised with fine euhedral pyrite and euhedral chalcopyrite. Total sulphides c.1%.
c.57.00	c.57.64		55°	Dark grey carbonaceous siltstone with thin light grey bands and laminae (<0.5cm) having upward grading and minor compactional structures, which decrease in abundance with depth. (Total light grey content 20%). Quartz or cordierite porphyroblasts occur in a few more argillaceous bands. At the upper contact, graphite is well developed and the core is fragmented. The basal 10 cms contain thin quartz veinlets and graphite becomes common on bedding surfaces. The unit is well jointed, the joint/bedding angle being 70° with similar strikes. No mineralisation.

077

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STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.57.64	c.58.26		35°	Dark grey-black brecciated very graphitic argillaceous siltstone with lighter silty bands which have been broken into fragments. Chlorite bands and patches are common, the bands marking the boundaries of the main disturbed zones. Quartz-cordierite, pseudo-hexagonal porphyroblasts are abundant throughout, locally replaced by buff carbonate. A few quartzose blebs and thin milky quartz veinlets are present and one soft carbonate/chlorite/quartz veinlet was noted. (1-2 mm). The carbonate is very leached. Core losses occur in the very graphitic units.
c.58.26	c.58.51			As 57.00m- 57.64m, but severely microfaulted with abundant chlorite as disseminations in the sediments, veins and patches. A few light grey quartzose blebs and veinlets are present.
c.58.51	c.61.97			Very poor recovery in this zone. Recovered core comprises dark grey very argillaceous graphitic siltstone with abundant quartz-cordierite pseudo-hexagonal porphyroblast. A few slightly lighter laminae are present (<10% total). Bedding where visible varies from 50° to parallel to the core, indicating folding in this section. Graphite is common on bedding surfaces and also on the numerous joint faces. A few ferro-carbonate patches are present in the upper portion of the unit and quartzose patches and veins with associated chlorite are present in the basal few centimetres of recovered core. No mineralisation visible.
c.61.97	c.63.06		50°	Poor core recovery. The upper 3 cms. comprises milky quartz containing irregular wisps and laminae of very graphitic sediment. A few small patches of chlorite and decomposed carbonate occur. No mineralisation. A few small soft fragments of quartz/chlorite/leached carbonate with inclusions and wispy laminae of graphite were recovered beneath the quartz vein. Majority of core loss probably occurs in this type of lithology. The remaining core recovered comprises dark grey carbonaceous argillaceous siltstone with a few lighter laminae containing common quartz/cordierite porphyroblasts, frequently pseudo-hexagonal. Thin chlorite veinlets are sporadically developed. The unit is well jointed.

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.63.06	c.64.90			Recovery 10%. Fragments recovered comprise (in approx. equal amounts) dark grey, carbonaceous and argillaceous siltstone with porphyroblasts. White vein quartz with cavities lined with patchy chlorite (carbonate leached) locally containing graphite coatings. Finely intermixed quartz and buff carbonate with stringers of graphite. Mineralised with fine pyrite and traces of chalcopyrite (1-3%).
c.64.90	c.69.19		30°	20% recovery. Upper 5 cms. Dark grey very graphitic argillaceous siltstone with siliceous patches and abundant chlorite veins. 25 cms. Dark grey carbonaceous and graphitic, argillaceous siltstone with quartz/cordierite porphyroblasts and disseminated pyrite in basal 3 cms. Bedding indistinct. A few thin quartz veins are present. 8 cms. This core of this unit is continuous with unit above. Milky-quartz with thin irregular graphitic wispy laminae tending to produce a pseudonodular texture. Mineralised with pyrite and chalcopyrite. Total sulphides 6-7%, 1% chalcopyrite. 20 cms. Intermixed white quartz and chlorite/graphite siliceous sediments. Mineralised with pyrite and subordinate chalcopyrite. Total sulphides 2-3%. This unit is very broken and most of core loss occurs in this type of lithology. 26 cms. As 25 cms. unit.
c.69.19	c.69.90		50°	Dark grey-black carbonaceous/graphitic very argillaceous siltstone with thin lighter laminae < 2 mm (<10% total). Quartz veins up to 1 cm wide with a few quartz blebs occur and are mineralised with chalcopyrite and pyrite. The bedding, vein intersection is approximately 20°.
c.69.90	c.70.13			Milky white quartz and light grey siliceous material containing numerous wispy bands and irregular fragments of graphite and graphitic sediment. Chlorite patches are sporadic throughout. Total sulphides 1-2% comprising chalcopyrite and pyrite in approximately equal proportions.
c.70.13	c.71.47			Core recovery 37%- no sludge collected. Upper half of core comprises milky quartz with veins of graphite. Trace of pyrite. Lower half; grey siliceous material with irregular cavities, clay lined showing a banding through chlorite and graphitic rich laminae. Mineralised with pyrite and trace chalcopyrite. Total sulphides 1%.

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STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.71.47	c.71.80		50° - 45°	Milky quartz and greyish quartzose material containing wispy laminae and irregular fragments of black graphitic sediment. Small cavities rarely with quartz crystals occur throughout (carbonate removed). Well mineralised with pyrite and chalcopyrite occurring in bands and disseminated patches. Total sulphides 12%.
c.71.80	c.72.00			Milky white quartz with rare fragments of chloritised sediment, black graphite and rose chlorite veinlets. <0.5% pyrite.
c.72.00	c.72.90			Mottled milky white quartz and greyish quartzose material with included fragments and wispy laminae of graphite rich sediments producing pseudonodular texture. Bands of milky quartz are also present. The milky quartz is mineralised with traces of pyrite and the quartzose material carries pyrite and chalcopyrite. Total sulphide \leq 1%.
c.72.90	c.73.58		45° - 50°	Light grey quartzose material with sporadic angular inclusions of dark grey graphitic siltstone and a few wispy irregular laminae. The unit is very well mineralised with chalcopyrite. Total sulphides 3%. Locally the chalcopyrite shows a crude banding parallel to the orientation of the included sediment fragments. Small cavities are locally present - solution of carbonate.
c.73.58	c.73.73			As above but angular sediment fragments increase to a true breccia. Total sulphides 3%, 2% chalcopyrite.
c.73.73	c.74.97			Poor core recovery below 73.98m. Light grey quartzose material with bands, laminae and included fragments of green chloritic material and dark grey graphite rich sediment. Cavities up to 1 cm in diameter are common lined with quartz crystals and/or chlorite (cavities due to solution of carbonate). During drilling the string was falling under its own weight and core loss is probably due to extensive cavities. Minor pyrite (< 1%) with trace of chalcopyrite in core. Sludge sample shows more sulphide.

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.74.97	c.75.78		45° - 50°	Dark grey, carbonaceous, graphitic, argillaceous siltstone, with common quartz/cordierite porphyroblasts - bedding indistinct and distorted. The unit is severely jointed with strong development of graphite on joint surfaces. Between 74.15 m and 74.45 m, veins up to 3 cms in width are common comprising siliceous material with common small cavities, chlorite coating along boundaries, included chlorite patches. These veins are poorly mineralised with pyrite and chalcopyrite.
c.75.78	c.76.00			c.70% recovery. Interbanded light grey siliceous material with included angular dark grey sediment fragments, small cavities are present throughout. Mineralised with pyrite and chalcopyrite. Total sulphides 8%, 3% chalcopyrite minimum.
c.76.00	c.77.99			Core recovery very poor, many core fragments rounded and rolled. Recovered core comprises grey siliceous material with bands of included angular chloritised sediment fragments, graphitic rich wispy laminae and bands. Cavities are present throughout (carbonate?). The core is variably mineralised in bands of between 3% and 40% sulphide. Overall estimated mean 10%, 3% chalcopyrite and 7% pyrite. Some of the chalcopyrite is amorphous and friable.
c.77.99	c.78.33		45°	The sequence comprises two veins 3 cms and 15 cms wide respectively separated by 7 cms of green grey intensely chloritised carbonaceous sediment with numerous quartz/cordierite porphyroblasts, cavities and blebs or patches of soft buff carbonate. The veins comprise grey quartzose material with included bands and wispy laminae, of black argillaceous material and approx. 20% irregular patches of soft weathered buff carbonate concentrated mainly in the centre of the thicker vein. The veins are heavily mineralised with 30-40% sulphide comprising large (5 mm) pale pyritohedrons and traces of chalcopyrite.
c.78.33	c.79.19		30° - 50°	Severely disturbed very graphitic sediment with numerous irregular veinlets, blebs and patches of chloritic material. The overall internal structure indicates severe brecciation. Quartz/cordierite porphyroblast are common in the dark argillite. From 78.33-78.76m. Sporadic pyrite mineralisation with trace chalcopyrite. Total sulphides 2%. From 78.76m. Blebs and bands of chalcopyrite locally with covellite staining and possible chalcocite. Total sulphides 10%, 4% chalcopyrite. From 78.99-79.19m. Silicified in upper 10 cms, 20% sulphides mainly cubes of pyrite and trace of chalcopyrite.

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.79.19	c.80.38			15 cms. of core recovered from this unit comprising 5 cm band of massive pyrite dodecahedrons and cubes (≤ 5 mm) granular texture, no chalcopyrite visible. 5 cms as 78.33m-79.19m mineralised 15% pyrite with traces of chalcopyrite. 5 cms deep green dendritic chlorite/buff ferrocarbonate admixture. No visible mineralisation.
c.80.38	c.81.30			Light grey and buff micritic ferro-dolomite with possible minor amounts of quartzose material with a few chloritic patches and pale chloritised sediment fragments. Locally the carbonate is soft and friable and very porous. The unit is mineralised with very fine grained pyrite and chalcopyrite, the mineralisation being patchy and disseminated. Total sulphides 2%, chalcopyrite 1%.
c.81.30	c.81.40			Greeny-black, chloritised graphitic argillite disrupted by numerous veins and lenses of both micritic and sparry ferro-dolomite producing a brecciated appearance. Trace only of pyrite and chalcopyrite.
c.81.40	c.82.06		50°	Light grey finely brecciated talcose ferro-dolomite and fragments of green-grey chloritised sediment. (< 3 mm). Between 81.56 m and 81.62 m, a sheared zone of interbanded greeny serpentinite and white talc is developed with blebs and patches of ferrodolomite. Sporadically mineralised with fine (< 2 mm) pyrite and chalcopyrite. Total sulphides c.1%, chalcopyrite c.0.5%.
c.82.06	c.82.24			Light grey fine grained, locally talcose, ferro-dolomite with a few radiating acicular crystals (? wollastonite) and a patch of sparry carbonate. (1 cm). Mineralised with 1% chalcopyrite with some pyrite. Total sulphides 2%.
c.82.24	c.82.82		50°	As 81.40m - 82.06m, with a 2 cm lineated talc zone at 82.30 m. Included fragments up to 1 cm in width. Mineralisation 1% total sulphide, 0.3% chalcopyrite.
c.82.82	c.83.38			As 81.40m - 82.06m. Total sulphides 15%, chalcopyrite 0.5-0.10%. The pyrite occurs as dodecahedron up to 0.5 cm wide and as very fine cubes. (< 1 mm)
c.83.38	c.84.43			As 82.06m - 82.24 m, with one 2 cm wide zone of included greeny grey chloritic graphitic sediment at 83.45. No core recovered below 84.00m. (All core fits about this level). The basal part of recovered core is soft and friable and the lost core is likely to be very weathered carbonate material. Base of mineralisation taken at 84.43 m. Total sulphides 5% pyrite with 0.5% chalcopyrite. The sulphides are fine grained and disseminated through the carbonate.

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.84.43	c.86.87	84.90m	74°	Dark grey finely banded and laminated carbonaceous argillaceous siltstone. The bands comprise lighter, less argillaceous material and vary in thickness from < 1m to 1 cm, the thicker bands showing an upward grading and minor scour features. (Total light sediment 15%). Quartz/cordierite porphyroblasts are common throughout, occurring mainly in the more argillaceous units. The unit is cut by sporadic veins and irregular veinlets of quartz/chlorite and carbonate ± pyrite and chalcopyrite, up to 2 cms wide. Some veins are associated with microfaults. Veins intersecting bedding at an acute angle.
		85.80m	75°	
		86.80m	75°	
		86.87m	90°	
		Veins dip 30° - 60°		
c.86.87	c.87.17			Breccia comprising angular fragment of black sediment up to 4 cms wide in a finely granular matrix of siliceous material, carbonate and chlorite with traces of pyrite.
c.87.17	c.87.36			3 cm vein of finely granular siliceous material, buff ferrocarbonate and chlorite no mineralisation underlain by 6 cm of carbonaceous argillaceous siltstone as 84.43 - 86.87. A 7 cm dominantly micritic carbonate vein with siliceous material and disseminated chlorite forms the base of the unit. Mineralised with pyrite and minor chalcopyrite. Total sulphide for unit < 0.5%.
c.87.36	c.88.85	87.50m	60°	Dark grey argillaceous and carbonaceous siltstone with lighter more silty bands and laminae. (1mm- 5 cm. Total lighter content 30%. The lighter bands show an upward grading and repetitive nature, the upper more argillaceous zones of each graded unit containing porphyroblasts (quartz/cordierite). Sporadic veins and veinlets cut the sequence and are composed of a quartz/chlorite/carbonate mixture with traces of pyrite. At 87.48, 5 cms of vein fragments occur comprising siliceous material, chlorite and included sediment fragments with 15% sulphides; 1-2% chalcopyrite.
		88.30m	60°	
		88.80m	65°	
c.88.85	c.94.90	89.25m	60°	Dark grey-black carbonaceous very argillaceous siltstone with 15% of lighter siltstone occurring as very thin laminae (c.1mm) and occasional sporadic thin bands showing minor basal structures and fine upward grading. The unit becomes increasingly more silty with depth over the basal 1.60m. Quartz/cordierite porphyroblasts occur abundantly in the more argillaceous units. Fine pyrite occurs sporadically in the light grey silty bands. The sequence is cut by a few irregular veins of quartz/carbonate/chlorite up to 1 cm in width often associated with small microfaults, and are most common in the basal 1.5% metres. The veins show small leached cavities and minor pyrite. The walls of the veins are very chloritic over 1-2 mms. The unit is patchily jointed. Graphite
		90.00m	60°	
		90.75m	65°	
		91.55m	70°	
		92.30m	60°	
		93.00m	65°	
		93.90m	55°	
		94.75m	60°	

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.94.90	c.96.30 (approx)			Basal boundary uncertain due to core loss. Major veins zone comprising intermixed grey quartzose material, buff carbonate and chlorite blebs and patches with numerous included angular fragments of finely laminated dark grey argillaceous siltstone in the upper 60 cms. The lower portion of the core contains only a few small chloritised fragments. The unit contains cavities from 1 m - 1 cm in size, due to removal of ferro-dolomite patches. Mineralised with pyrite, total sulphide 3%.
c.96.30	c.96.62		60° - 65°	Interbanded and laminated light grey siltstone and dark grey carbonaceous and argillaceous siltstone. (50% light grey siltstone) porphyroblasts present in argillaceous sediments. The unit is cut by numerous thin quartz/chlorite veinlets.
c.96.62	c.97.06			Brecciated zone comprising angular fragments of dark grey carbonaceous and argillaceous siltstone with abundant porphyroblasts in a matrix of finely granular siliceous material, chlorite and carbonate, the latter being leached out in parts leaving small cavities. Sporadically mineralised with pyrite; total sulphide c.1%.
c.97.06	c.97.20		65°	As 96.30-96.62m.
c.97.20	c.97.88			Dark grey carbonaceous and argillaceous siltstone with 20% light grey laminae and a few thin bands (< 1 cm) severely intruded by finely granular siliceous material/carbonate/chlorite veins which tend to brecciate the sediment and in some instances, fragments of sediment are included in the veins. The veins contain about 0.5% pyrite.
c.97.88	c.100.92	99.67m 100.85m	65° 65°	Dark grey and argillaceous siltstone becoming more siliceous with depth, with quartz-cordierite porphyroblasts containing 15% of light grey siltstone, locally pyritic, as very thin laminae and bands up to 1.5 cms. wide. The bands show upward grading, irregular bases (load cast and/or scours). The unit contains sporadic, non-oriented, thin veinlets and irregular patches of quartz with chlorite. At 100.17m, a 2 cm wide vein of white quartz with chlorite blebs and small cavities (after carbonate) contains brecciated angular fragments of sediment associated with microfaulting. No visible mineralisation.

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.100.92	c.101.96			Zone comprising mainly siliceous 20%/carbonate 20%/chlorite 60%, vein material with thin interbeds of argillaceous siltstone. The vein material contains included angular fragments of dark grey sediment, green chloritised sediments up to 2 cms in width. Some small cavities present due to carbonate removal. Quartz/cordierite porphyroblasts abundant in the sediment bands and fragment. The vein material is mineralised with pyrite and chalcopyrite. Total sulphides 1-2% with 0.5% chalcopyrite.
c.101.96	c.103.53		60°	Dark grey carbonaceous siltstone with 20% lighter siltstone bands with scattered porphyroblasts averaging 3 mm in diameter in the dark grey sediment. The sequence is cut by common small microfaults with local crumpling of lamination adjacent to the fault planes. At 102.10m, a fold occurs, the axis dipping at 60°. The unit is cut by common irregular quartzose/carbonate/chlorite veins and veinlets (up to 2 cms wide) totalling 20% of the unit. The veins occur along microfaults and graphite is developed on slickensides adjacent to the veins. The veins are randomly oriented and contain locally included fragments of sediment. The veins are mineralised with traces of pyrite.
c.103.53	c.108.35	104.26m 105.15m 105.72m 106.22m 107.00m 107.75m 108.25m	55° 55° 60° 53° 60° 67° 58°	Dark grey argillaceous and carbonaceous siltstone with 20%-30% of light grey siltstone as thin laminae (c.1m) and bands (up to 1 cm wide). The bands show upward grading and minor basal irregularities. Quartz/cordierite porphyroblast occurs throughout being restricted mainly to the darker lithology. Quartz/chlorite/carbonate veins occur as follows: 6 cms vein at 104.21m - chloritised and dark grey sediment fragments included in the vein. Minor pyrite mineralisation. 8 cms vein at 105.25m - included fragments as above. 1 cm vein at 105.77m - runs parallel to core over 30 cms. with local small offshoots, rare included sediment fragments. 3 cm vein at 107.67m 30° to core - few chloritised sediment fragments trace 2 cm vein at 107.90m - milky white quartz with chlorite blebs. pyrite.
c.108.35	c.109.84			Some core lost in this zone which consists sediments as above intruded by many quartz/chlorite/carbonate (partly leached) veins with included chloritised sediment and dark grey sediment fragments. Total vein material 50% with only traces of pyrite. Veins occur along joints and microfaults and graphite occurs along vein boundaries.

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.109.84	c.110.77	110.14m 110.65m	65° 67°	As 103.53m-108.35m, with no major veins but sporadic numerous thin veinlets of quartz/carbonate/chlorite.
c.110.77	c.111.05			Quartz/carbonate/chlorite vein system with numerous cavities after carbonate with included angular fragments chloritised sediments. Mineralised with 5% sulphides - pyrite and traces of chalcopyrite.
c.111.05	c.111.20			Dark grey disturbed carbonaceous siltstone cut by microfaults and thin quartz veinlets.
c.111.20	c.111.54			Breccia zone comprising angular fragments of dark grey carbonaceous siltstone, partly chloritised, up to 3 cms in width in a matrix of finely granular quartz/chlorite/carbonate vein material. Trace pyrite.
c.111.54	c.111.96		57°	Major veins rich in chlorite with quartz and carbonate containing a few large (3-4 cm) included fragments of dark grey and green grey chloritised siltstone. Heavily mineralised with pyrite and minor chalcopyrite (0.5%). Total sulphide 8-10%.
c.111.96	c.113.90		80°	Dark grey argillaceous and carbonaceous siltstone with 40% light grey siltstone occurring as thin laminae and band vary between 0.5 cm and 5 cm in thickness. The siltstone band shows small-scale cross-stratification, minor scour, load casts, fine upward grading and small-scale slumping. Generally cycles can be recognised consisting of light grey siltstone; sharp base ± cross stratificating passing upwards into finer laminated sediment and finally to a dark grey argillaceous unit with porphyroblasts. The cycles vary in thickness from about 1 cm to 5/7 cms. A few microfaults are present filled with thin quartz veins and patchy mineralised with pyrite.
c.113.90	c.114.38			Dark grey carbonaceous and argillaceous siltstone with a few light bands and laminae (<.1 cm), severely disturbed and cut by numerous thin quartz veins and quartz/chlorite patches, mineralised with traces of pyrite. Graphite present on vein contacts.
c.114.38	c.114.48		47° - 50°	Quartzose vein with common disseminated chlorite and thin dark grey wispy sediment inclusions. Mineralised with pyrite and chalcopyrite. Total sulphide 3%, 2% chalcopyrite.

STRATIGRAPHIC INTERVAL IN METRES		DIP OF BEDDING		DESCRIPTION.
From	To	Depth	Dip.	
c.114.48	c.116.22		80° ± 5°	As 111.96m- 113.90m. Very well developed cycles and sedimentary features as before with sporadic worm tubes in argillaceous sediment filled with light grey silty material derived from the overlying siltstone layer.
c.116.22	c.116.40			Greeny grey, extensively chloritised and silicified siltstone containing sub-rounded fragments of more chloritic material (primary sedimentary features) heavily mineralised with pyrite and minor chalcopyrite. Total sulphide 15%.
c.116.40	c.117.05		90°	Massive unit of grey carbonaceous siltstone with 10% light grey silty laminae and some complex sedimentary disturbance feature. A 1 cm quartz vein with bands of chlorite of each wall occurs concordant with the bedding at 116.75m. Gradational base.
c.117.05	c.117.57			Light grey chloritic siltstone showing an erosive base and an upward progression from planar lamination to cross-stratification to planar lamination with argillaceous laminae. Cut by several closed joints with pyrite infillings. The above two units form one graded bed.
c.117.57	c.123.53		80° - 90°	Banded sequence of dark grey carbonaceous and argillaceous siltstone with 40-50% light grey siltstone. The sequence comprises series of graded units from 2 cms to 27 cms in thickness consisting of light grey siltstone resting sharply or erosively on argillaceous material with well developed load casts in parts passing upwards into darker finer sediment becoming dark grey at the top. Small-scale cross-stratification occurs in the lower parts of some of these units. A 2 cm quartz vein with sediment fragments concordant with the bedding occurs at 123.23 m.
c.123.53	c.124.41			Massive dark grey argillaceous fine sandstone with abundant leucoxene and very disturbed bedding (sedimentary process - organic, worms ?) Disseminated pyrite.
c.124.41	c.125.89		80° - 90°	Broadly banded (10 cm + each band) grey laminated quartzite and dark grey chloritic argillaceous sandstone with common leucoxene. The quartzites shows cross-stratification and the laminae are formed of carbonaceous material. A thin penecontemporaneous conglomeration occurs at 125.42m. A few thin quartz veinlets are present.

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APPENDIX C

CLUMP PROSPECT D.D.H.3

635089

SAMPLE IDENTIFICATION AND ASSAY RESULTS

Sample No.	Interval in Metres	Length in Metres	% Copper
0058	64.90-69.19 upper 30 cms of low recovered core		.010
0059	64.90-69.19 central 28 cms of recovered core		.38
0060	64.90-69.19 basal 26 cms of recovered core		.007
0061	69.19-69.90	0.71	.023
0062	69.90-70.13	0.23	.033
0063	70.13-71.47	1.34	.018
0064	71.47-71.80	0.33	.54
0065	71.80-72.90	1.10	.035
0066	72.90-73.58	0.68	2.27
0067	73.58-73.98	0.40	.012
0068	Sludge 73.98-74.97	0.99	.38
0069	74.97-75.78	0.81	.021
0070	75.78-76.00	0.22	.88
0071	Sludge 76.00-76.49	0.49	.25
0072	Sludge 76.49-77.99	1.50	.40
0073	77.99-78.33	0.34	.12
0074	78.33-78.99	0.66	.51
0075	78.99-79.19	0.20	.13
0076	79.19-80.38	1.19	.47
0077	80.38-81.38	1.00	.54

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635090

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Sample No.	Interval in Metres	Length in Metres	% Copper
0078	Sludge 78.99-81.38	2.39	.93
0079	81.38-82.06	0.68	.61
0080	82.06-82.82	0.76	.12
0081	82.82-83.38	0.56	.26
0082	83.38-84.43	1.05	.26
0083	Sludge 81.38-84.43	3.05	.55
0145	52.35-57.65	5.30	.005
0146	57.65-64.92	7.27	.002
0147	84.43-87.29	2.86	.004
0148	87.29-90.01	2.72	.010
0149	90.01-95.10	5.09	.001
0150	95.10-99.06	3.96	.013
0151	99.06-100.91	1.85	.006
0152	100.91-102.91	2.00	.038
0153	102.91-107.59	4.68	.002
0154	107.59-112.01	4.42	.012
0155	112.01-114.43	2.42	.004

MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION EL.16/68

25th January, 1971.

RESULTS OF DDH.4 - CLUMP PROSPECT

H. G. Davies.

SUMMARY

DDH.4. at the Clump Prospect, has been completed at a depth of 181.05 metres below collar.

A series of thin zones of mineralisation were proved of low grade. Many of these thin zones have no surface expression. The best intersection was 1.29 m. of 0.24% Cu.

D.D.H.4 - CLUMP PROSPECT.

Collar Reference	460.320N. 309622.E.
Collar Level	c.+ 152.m.
Inclination	60°
Direction	217° magnetic
Date Drilled	12.10.70 - 10.12.70.

1. OPERATIONAL DETAILS:

D.D.H.4 was drilled by Associated Diamond Drillers using a E.1000 rig, which was set up on site ready for drilling on 12.10.70. Drilling progress, with engineering details are summaries on Figure 1. NX casing was set at 3.05m. and BX casing at 110.0m.

1.1 Drilling Conditions

Appendix A. shows the drill runs and core recovery. From 0.0m. to 23.9m. core recovery was good although severe jointing resulted in very short runs. Between 25.9m and 29.6m. the core recovery was very poor in broken ground. The loss was partly attributable to the inexperience of the drilling crew. The drill hole was cemented at 29.0m. To 110.0m. progress was satisfactory although core recovery was very variable and losses occurred in all zones of interest; excessive bit weight was one reason for this loss. At 110.0m, the ground became very graphitic, broken and soft with water flowing from the drill hole. On putting rods at this level, the drill hole collapsed and leaned to 11.0m. After many mechanical delays, the drill hole was completed at 181.05m. with core recovery improving following a change in drillers. On completion, the drill hole was flowing water at 1200 g.p.h.

1.2 Deviation

Hole deviation, measured by acid tube and Tropari was as follows:

Collar	60°	217
15.2m.	61.5°	218 est
30.4m.	59.5°	220 est.
45.6m.	59°	221 est
60.9m.	58°	222 est
91.3m.	50°	226
152.2m.	43°	232
167.4m.	45.5°	233 est
180.0m.	44.5°	235 est.

2. GEOLOGY:

The detailed log is given in Appendix B. and may be summarised as follows:

		<u>Intersection.</u>	<u>Cu.</u>
0.00 - 19.92m.	Flysch sediments. 11.5 - 19.92	8.42	0.018
19.92 - 21.47m.	Sediments cut by common veins with chalcopyrite.	1.55	0.80
21.47 - 57.45m.	Flysch sediments with sporadic veins.	35.98	0.034
57.45 - 58.80m.	Siliceous zone, brecciated with pyrite and chalcopyrite.	1.35	0.21
58.80 - 91.06m.	Flysch sediments with sporadic veins.	32.26	0.010
91.06 - 97.94m.	Bands of quartz, veined graphitic siltstone, talcose mudstone. The veins and bands are of quartz + chlorite and carbonate (poor core recovery).	6.88	0.058
97.94 - 150.47m.	Flysch sediments with veins bearing pyrite and chalcopyrite.	52.53	0.007
150.47 - 153.75m.	Chloritic mudstone with porphyroblasts, brecciated in parts with veins of quartz, chlorite carbonate - mineralised.		
153.75 - 168.07m.	Flysch with mineralised veins.		
168.07 - 169.36m.	White quartz - heavily mineralised.		
169.36 - 181.05m.	Flysch sediments.	11.79	c.001.

3. ASSAYS:

The core was split in half and lithological units sent for assay. Assays are presented in Appendix C. and summarised above against the log in Section 2.

4. DISCUSSION:

A series of thin mineralised zones were penetrated in the drill hole, the majority of which have no surface expression.

When considered with the results of D.D.H.1, 2 and 3, the current drill hole was located off a mineralised lens.

APPENDIX A - CORE RECOVERY CHART

<u>From</u>	<u>Metric</u>	<u>To</u>	<u>Core Recovery</u> <u>in Metres</u>	<u>% Core</u> <u>Recovery</u>
0.00		2.74	2.22	81
2.74		5.88	2.02	64
5.88		6.64	1.07	100
6.64		7.41	0.66	90
7.41		8.18	0.82	96
8.18		8.68	0.46	92
8.68		9.76	1.05	99
9.76		10.17	0.41	100
10.17		11.27	1.02	93
11.27		11.90	0.69	94
11.90		12.92	1.00	100
12.92		14.33	1.44	100
14.33		15.32	1.03	100
15.32		15.50	0.18	100
15.50		16.49	0.96	100
16.49		16.67	0.18	100
16.67		17.37	0.70	100
17.37		17.85	0.49	100
17.85		19.53	1.67	100
19.53		20.42	0.48	54
20.42		20.57	0.08	50
20.57		21.10	0.40	70
21.10		21.51	0.21	67
21.51		22.07	0.57	100
22.07		22.68	0.60	100
22.68		23.04	0.31	100
23.04		23.47	0.48	100
23.47		23.90	0.22	47
23.90		24.16	0.20	77
24.16		24.57	0.35	81
24.57		25.08	0.30	67
25.08		25.38	0.03	24
25.38		25.79	0.08	20
25.79		26.52	0.12	17
26.52		27.82	0.27	23
27.82		29.57	0.23	15
29.57		29.87	0.30	100
29.87		30.18	0.31	100
30.18		30.84	0.65	100
30.84		31.93	0.42	40
31.93		32.61	0.61	100
32.61		33.57	0.95	100
33.57		33.95	0.14	37
33.95		34.41	0.49	94
34.41		35.32	0.15	16
35.32		35.66	0.20	59
35.66		36.37	0.63	89
36.37		37.49	1.07	96
37.49		37.89	0.33	83
37.89		38.42	0.48	91
38.42		38.83	0.37	90
38.83		39.29	0.40	81
39.29		39.82	0.53	100
39.82		40.63	0.81	100

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635094

<u>From</u>	<u>Metric</u>	<u>To</u>	<u>Core Recovery</u> <u>in Metres</u>	<u>% Core</u> <u>Recovery</u>
40.63		41.37	0.71	100
41.37		43.71	2.34	100
43.71		44.40	0.65	94
44.40		44.80	0.23	58
44.80		45.33	0.24	45
45.33		45.79	0.33	72
45.79		46.13	0.35	100
46.13		46.51	0.14	37
46.51		47.70	0.75	63
47.70		49.22	1.52	100
49.22		49.83	0.61	100
49.83		51.15	1.32	100
51.15		52.07	0.92	100
52.07		54.10	2.03	100
54.10		55.40	1.30	100
55.40		56.54	1.14	100
56.54		59.44	2.82	98
59.44		60.84	1.40	100
60.84		62.08	1.24	100
62.08		64.24	2.16	100
64.24		66.14	1.90	100
66.14		68.70	2.56	100
68.70		71.93	3.13	96
71.93		72.11	0.18	100
72.11		72.41	0.30	100
72.41		72.54	0.13	100
72.54		73.81	1.27	100
73.81		74.37	0.56	100
74.37		75.89	1.52	100
75.89		77.90	2.01	100
77.90		80.11	2.18	98
80.11		80.82	0.61	86
80.82		81.93	1.11	100
81.93		82.52	0.59	100
82.52		83.08	0.56	100
83.08		83.56	0.48	100
83.56		84.43	0.87	100
84.43		85.65	1.22	100
85.65		86.16	0.20	40
86.16		88.02	0.86	46
88.02		89.69	1.22	73
89.69		92.33	2.64	100
92.33		93.08	0.75	100
93.08		93.44	0.36	100
93.44		94.10	0.19	28
94.10		94.51	0.36	88
94.51		95.12	0.11	18
95.12		95.38	0.18	71
95.38		95.70	0.22	69
95.70		96.01	0.31	100
96.01		96.57	0.43	77
96.57		96.77	0.20	100
96.77		97.36	0.51	86
97.36		97.94	0.23	39
97.94		98.47	0.20	38
98.47		98.91	0.14	31
98.91		99.06	0.15	100
99.06		99.69	0.53	84
99.69		100.79	0.69	63
100.79		101.02	0.15	67
101.02		101.17	0.03	15
101.17		101.42	0.25	100

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<u>From</u>	<u>Metric</u>	<u>To</u>	<u>Core Recovery in Metres</u>	<u>% Core Recovery</u>
101.42		102.71	0.43	33
102.71		103.17	0.46	100
103.17		105.13	1.96	100
105.13		106.60	1.47	100
106.60		107.16	0.56	100
107.16		108.15	0.99	100
108.15		108.48	0.26	80
108.48		108.81	0.33	100
108.81		109.34	0.35	65
109.34		109.57	0.18	78
109.57		109.85	0.28	100
109.85		113.23	3.38	100
113.23		116.12	2.89	100
116.12		119.02	2.90	100
119.02		121.90	1.88	100
121.90		122.51	0.61	100
122.51		125.23	2.72	100
125.23		126.45	1.22	100
126.45		127.86	1.41	100
127.86		130.13	2.27	100
130.13		131.24	1.11	100
131.24		133.12	1.88	100
133.12		136.22	3.10	100
136.22		137.41	1.19	100
137.41		139.27	1.86	100
139.27		140.83	1.56	100
140.83		143.57	2.74	100
143.57		145.37	1.80	100
145.37		146.41	1.04	100
146.41		147.50	1.09	100
147.50		149.30	1.80	100
149.30		149.46	0.16	100
149.46		150.50	1.04	100
150.50		152.93	0.68	28
152.93		153.75	0.67	82
153.75		154.53	0.78	100
154.53		155.98	1.45	100
155.98		156.61	0.63	100
156.61		157.07	0.28	61
157.07		158.32	1.25	100
158.32		159.78	1.06	73
159.78		160.48	0.70	100
160.48		161.92	1.29	90
161.92		162.28	0.36	100
162.28		162.56	0.28	100
162.56		163.49	0.93	100
163.49		164.53	1.04	100
164.53		164.93	0.40	100
164.93		166.72	1.79	100
166.72		168.60	1.67	100
168.60		169.47	0.87	100
169.47		169.67	1.07	100
169.67		170.53	0.86	100
170.53		171.30	0.77	100
171.30		172.04	0.51	69
172.04		172.73	0.46	67
172.73		173.56	0.65	78
173.56		173.63	0.07	100
173.63		175.31	1.68	100
175.31		175.87	0.56	100
175.87		176.88	0.68	67
176.88		178.55	1.67	100
178.55		181.05	2.50	100

A.C.I. MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION

DDH. 4

PROSPECT: CLUMP

Grid Reference: 460.320.N. 309.622.E.

Angle 60°

Direction: 217° magnetic.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
0.00	5.85	+60° at 0.80m. +55° at 2.50m. +65° at 3.60m. +65° at 5.00m.	Dark grey carbonaceous, argillaceous siltstone with 10-15% lighter grey siltstone bands up to 7 cms in thickness showing: Sharp bases with small scours and load casts. Small scale cross stratification in the lower portion. A fine upward gradation into argillaceous siltstone. The unit is well jointed, the joints in the upper 2.5 metres being open, very iron-stained. Many joints have thin quartz vein linings. A few small microfaults cut the core.
5.88	7.46	70° at 6.55m. 70° at 7.00m. 72° at 7.40m.	Finely banded and laminated unit of dark grey carbonaceous and argillaceous siltstone and light grey siltstone, the two lithologies forming thin upward fining cycles from 2 cms - 9 cms in thickness, and comprising: ↑ Dark grey argillaceous carbonaceous siltstone grading upward. Light grey-grey siltstone + small scale and cross stratification. Light grey siltstone, sharp base + load casts and scours. A few thin lightgrey siltbands and laminae (<1 cm) with sharp tops and bases are also present. The unit is moderately well jointed with local ironstained and/or chloritic surfaces. Rare thin quartz veinlets ≤ 1 mm are developed.
7.46	7.84		Gradational unit of fine chloritic sandstone with sharp erosional base, small scale cross-stratification passing upwards into laminated chloritic siltstone and grading gradually upwards in dark grey very carbonaceous argillaceous siltstone bearing leucoxene. In the latter unit, several vague bands occur suggesting further cyclic sedimentation.
7.84	8.36	67° at 8.00m.	As 5.88-7.46m, with a few chloritic joints. A thin ½ cm siltstone bed at the base containing a thin band of subhedral pyrite concordant with the bedding.
8.36	8.59	70° at 8.50m.	Dark grey carbonaceous and argillaceous siltstone bearing common leucoxene and showing a few bands of very slightly lighter sediment. The unit is cut by three thin quartz veins, the upper vein also containing chlorite and a few cavities.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
8.59	10.37	72° at 9.00m. 72° at 9.71m. 72° at 10.30m.	As 5.88m-7.46m with cyclic units becoming thicker with depth (1-4 cms at top; 8 cms near base) and grey siltstone content becoming less (30% at top and 10% at base). Some of the light grey siltstone bands are very siliceous and chloritic. The unit is moderately well jointed with quartz/chlorite only occurring as vein infillings. A thin (1 cm) concordant quartzose vein with abundant chlorite and pyrite occurs at 9.04m. Major veins dip 30° - 35°.
10.37	11.45		Massive unit of dark grey carbonaceous, somewhat argillaceous, leucoxene rich siltstone with a few chlorite and quartz filled joints with occasional cavities which dip 30° - 40°. A concordant 2 cms wide quartz/chlorite vein with pyrite marks the base of the unit.
11.45	11.72	68°	As 10.37m-11.45m, with 5% light grey siltstone as fine laminae and bands up to 1.5 cms thick. A sharply bounded 5 cm green-grey laminated siltstone bed marks the base of the unit.
11.72	12.62		As 10.37m - 11.45m.
12.62	15.40		Graded sequence comprising units from 5-15 cms in thickness consisting of: ↑ Upward grading dark grey carbonaceous siltstone with leucoxene ± thin light grey laminae, (1 mm), Light grey siltstone - irregular base ± small scale cross stratification. This unit is 3 cms thick. Thin concordant quartz/chlorite veins with common pyrite occur as follows: 2 cms at 12.88m - 30% pyrite, 2 x 0.3 cm at 15.12m. A 2 cm dense chlorite band with minor quartz and some included sediment fragments occurs at 15.07m. Dip consistent at 67° - 72° except at 14.97m where a small S kink occurs axial surface dipping 35° and associated with a similarly folded ½ cm wide vein of quartz and chlorite with 30% pyrite.
15.40	16.00		As 10.37m - 11.45m with rare joints dipping 25-30°.
16.00	17.54		Thinly banded unit comprising cyclic units of: ↑ Dark grey carbonaceous ? argillaceous siltstone. Upward gradation ± thinly laminated light grey-dark grey unit. Light grey siltstone with erosional bases and load casts. This lithology is generally less than 3 cms thick. A 6 cm. small-scale cross-stratified light grey siltstone band occurs at 17.00m. A small fault system running near parallel to the core occurs between 16.67m and 17.37m.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
			The main fault zone is between 0.5 and 1 cm wide filled with irregular sediment fragments in a siliceous and very chloritic matrix. Chlorite blebs are also present. The main fault is restricted to between 16.67m and 17.20m, but below this, a series of thin microfaults are developed often with chloritic blebs and infillings. The sediments show several small S kinks with the axial plane dipping 25° - 30°. The main fault may be part of an S kink zone. Sediment dips to top of fault zone 70-75° consistently. Within the fault zone, the sediments are disturbed, but at the base of the unit, the dip is 70°.
17.54	17.97	67°	Dark grey carbonaceous and argillaceous siltstone with minor leucoxene and <10% of thin (<2 mm) light grey siltstone laminae. The unit is cut by several thin chlorite + quartzose veins with patchy pyrite dipping 35°.
17.97	18.30	52° at 18.50m 60° at 18.25m	Greeny grey carbonaceous siltstone cut by numerous irregular chlorite veinlets. Chlorite blebs, patches and disseminations are common.
18.30	19.06	72° at 18.86m	Dark grey-grey carbonaceous siltstone with a few finely graded light grey-grey units up to 6 cm thick, in the basal 30 cms. The graded units show no visible sedimentary features except sharp bases to the light grey-grey siltstone. The unit is cut by common chlorite lined joints dipping 30° with thin irregular chlorite veinlets.
19.06	19.92	62° at 19.12m	Massive unit of grey carbonaceous siltstone with a few vague lighter laminae in the upper 10 cms. A few vaguely bounded chloritic zones are present and the unit is cut by numerous very thin chlorite + quartz veinlets dipping 30°. A concordant 0.3mm quartz vein occurs at 19.74m dipping 61°.
19.92	20.00		Core lost in this zone, lower boundary, -2 cms + 30 cms. Severely contorted unit of irregular fragments and bands of green-grey chloritic carbonaceous siltstone surrounded and injected by quartz/chlorite veins. The unit is approaching a breccia in structure. The veins and adjacent sediments are patchily mineralised with pyrite. Total sulphide 5%.
20.00	20.76		Low core recovery, fragments recovered comprise dark grey argillaceous and carbonaceous siltstone with lighter bands. The unit is very strongly jointed with one thin (<1 mm) irregular quartz/chlorite vein at 20.49m.
20.76	21.00	40° - 45° approx.	Vein comprising finely intermixed quartz, quartzose material and chlorite heavily mineralised in the upper 15 cms with chalcopyrite and subordinate pyrite. Total sulphides 15%, 10% chalcopyrite.
21.00	21.10	48°	Thinly laminated light grey siltstone, the laminae comprising slightly more carbonaceous material.

635099

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
21.10	21.47	40°	Some core lost. The upper 8-10 cms comprise heavily chloritised argillaceous siltstone severely disturbed with common chlorite blebs. Heavily mineralised with pyrite and chalcopryrite. Total sulphides 15%, 4-5% chalcopryrite. The remainder of the core comprises a quartz/chlorite/trace carbonate finely granular vein with irregular included chloritised sediment fragments up to 1 cm wide. Mineralised with chalcopryrite and trace pyrite. Total sulphide 5-8%.
21.47	23.90	45° at 21.60m 40° at 22.20m 31° at 22.55m From 22.55m to 22.92 dip inc. to 55° adj. to 6 cm vein at 22.80m. 30° at 22.92m 26° at 23.37m 25° at 23.52m	Thinly banded unit comprising cyclic units of: ↑ Dark grey argillaceous and carbonaceous siltstone. ↑ Light grey siltstone upgrading, with sharp locally irregular base. The units generally are < 2.5 cm wide. Several bands of finely laminated light grey and dark grey material (1 mm thickness) develop at 22.75m and from 23.47m. The sediment are very fractured and cut by veins as follows: ↑ ½ - 1 cm vein of quartz minor chlorite + cavities at 21.45m, dipping 30°, mineralised pyrite and chalcopryrite in equal amounts. Total sulphides 4%. A 6 cms wide brecciated chlorite rich vein of silicified material occurs at 22.80m, mineralised with pyrite. Dip 40° cutting bedding at c.90°. Throughout the unit thin quartz/chlorite veinlets are developed dipping 20-35°, frequently associated with small microfaults. A small kink band occurs at 23.50m. axial plane, dipping 40° and intersecting the bedding at right angles. Base of unit difficult to pick due to very broken core and some core loss.
23.90	31.98	46° at 24.30m 35° at 24.70m 40° at 27.75m 32° at 29.70m 43° at 31.70m	Substantial core loss in this unit. Dark grey carbonaceous argillaceous siltstone with rare thin laminae (< 1 m) and thin light grey siltstone bands at 30.05m and in the basal 10 cms. Total light grey siltstone content < 2%. The sequence is severely jointed, the major joints dipping 25-30° and 35-45° respectively, intersecting at 100° - 120°. The joint surfaces are commonly graphitic along slickensides, and frequently contain chlorite coating. A ½ cm quartz/chlorite with 20% pyrite vein occurs at (29.50 m) dipping c.20°, the adjacent sediments being extensively chloritised over about ½ cms. Small randomly oriented quartz veinlets are also sporadically developed.
31.98	32.63	35° - 45°	Dark grey carbonaceous siltstone bearing abundant thin light grey siltstone laminae (< 1 m) comprising 15% of the total unit. The unit is cut by several quartz chlorite veins up to ½ cm wide, the widest vein at the base of the unit bearing 25% pyrite and included chloritised sediment fragments. Dip of veins c.30° intersecting bedding at c.75°.

635100

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
32.63	32.73	30° at top to 5° to 40° at base.	As above lithology, but severely microfaulted and injected by numerous thin quartz veinlets and lenses, producing a brecciated appearance.
32.73	33.13	40°	Vein system with c.5 cm band of laminated carbonaceous siltstone at 32.98m. The veins comprise angular fragments of green chloritised siltstone set in a quartzose matrix heavily mineralised with pyrite and very minor chalcopyrite. Total sulphides 10%. Upper vein contact dips 40°, lower contact 25-27°, with very graphitic surfaces.
33.13	33.52	51°	Massive dark grey carbonaceous and argillaceous siltstone cut by thin quartz veins with chlorite and pyrite dipping at c.25°. A few lighter vague laminae are present, the bedding dipping at 51°.
33.52	33.95		As 33.13m-33.52m, with thin light grey siltstone laminae (≤1 m) comprising 10-15% total sediment. A 2 cm quartz vein with chlorite blebs occurs at the base of this unit.
33.95	35.50	32° at 34.30m 0° + 10° from 34.41 to 35.32m.	Dark grey carbonaceous and argillaceous siltstone with thin light laminae (≤1 mm) cut by numerous microfaults and joints and intruded by quartz/chlorite + pyrite veins and veinlets. Total sulphide <.1%. Black graphite is developed on many of the joint surfaces dipping at 30°. Some bedding surfaces are also graphitic with minor slickensides. Minor fold, but core loss makes detailed analysis impossible
35.50	36.04	43° at 36.10m. 44° at 36.85m.	Cyclic unit comprising thin cycles (0.5 cm up to 2 cm) as follows: ↑ Dark grey argillaceous carbonaceous siltstone, + thinly interlaminated units. Light grey siltstone with minor basal irregularities. Total silt content c20%) The unit is cut by a few microfaults filled with quartz/chlorite mixture.
36.92	40.14	44° at 37.50m. 43° at 38.50m. 46° at 39.50m. 47° at 40.00m.	Interbanded sequence comprising upward fining cycles from light grey, frequently chloritic siltstone to dark grey carbonaceous and argillaceous siltstone from 0.5 cms to 8 cms. in thickness. The bases of the light grey siltstones are sharp with small erosion features and load casts. Thin laminations are present in the argillaceous units of some cycles. The unit is moderately jointed, the joints having graphitic and chlorite rich surfaces.

635101

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
40.14	41.30	45° - 50°	Dark grey carbonaceous, argillaceous siltstone with leucoxene, massively bedded and cut by a series of irregular quartz, chlorite + pyrite veins and patches. Rare light grey silty laminae are present. Chalcopyrite is present in the wider veins. Total sulphides <0.1%; trace chalcopyrite.
41.30	41.60	50°	As 40.14m - 41.30m, but with light grey siltstone bands (≤ 1 cm) and laminae totalling 15% of the unit.
41.60	42.29	5° - 30°	Dark grey carbonaceous and argillaceous siltstone with irregular lenses/bands and blebs of light grey-grey siltstone. The unit has the appearance of a flow brecciated zone (sedimentary). A few chlorite/quartz veins and microfaults cut the unit.
42.29	45.79	60° at 42.52m 55° at 42.22m 40° at 44.60m 40° at 45.36m	Finely banded unit of light grey siltstone as bands (≤ 1 cm) and thin laminae and dark grey argillaceous and carbonaceous siltstone, the light grey silt content becoming less with depth, 25% to 10%. The unit is well jointed with graphite on listric surfaces. A 2 cm quartz vein with common chlorite blebs and patches occurs at 42.89m, dipping at c.20°, heavily mineralised with pyrite. Total sulphides 10-15%. A 2.5-3.0cm. vein of similar material 25° and with 30% - 40% pyrite occurs at 43.27m. A 2 cm wide concordant quartz vein with minor chlorite patches occurs at 43.20m. The remainder of the unit contains scattered irregular quartz/chlorite veinlets.
45.79	47.10	54° at 47.60m 60° at 48.80m 58° at 49.60m	Dark grey carbonaceous and argillaceous siltstone, massively bedded with rare thin light grey siltstone bands (< 1 cm). The unit is very chloritic from 45.79m to 46.13m. and severely jointed between 45.95m and 46.51m. (Some core loss occurs in very jointed units). Graphite is developed on joint surfaces and thin quartz veinlets are common in the severely jointed zone.
47.10	49.72	54° at 47.60m 60° at 48.80m 58° at 49.60m	Dark grey carbonaceous and argillaceous siltstone with 10-15% light grey siltstone occurring as bands up to 7 cms thick with marked upward fining, erosional bases and sporadic load casts. Thin laminae (≤ 2 mm). The siltstone/argillaceous siltstone graded units vary from 3 cm to 60 cm in thickness. The unit is sporadically jointed with chlorite rich surfaces. Thin (1 cm) quartz/chlorite veins are present between 49.09m and 49.22m, dipping at 45° and well mineralised with pyrite and minor chalcopyrite.
49.72	53.35m		Dark grey massive carbonaceous and argillaceous siltstone with minor leucoxene in parts and no visible bedding. The unit is cut by veins of quartz/chlorite + minor carbonate varying in thickness from 1 mm to 2.5 cms. The more significant veins are as follows: ↑ 1 cm wide at 49.9m, dipping 37° - 5% pyrite mineralisation. ↑ 2 cm wide at 50.26m, dipping 33° - 25% pyrite.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION	635102
From	To			
53.55	55.40	58° from 53.35 to 53.65m At 53.65m dip inc. to 80-85° At 54.10m, dip returns to 64° Dip from 54.18m to 55.40m inc. 60° red- ucing to 50° in basal 10 cms.	<p>At 51.35m; a lens of chlorite/quartz is present pinching out into a narrow veinlet. 1.5 cm wide vein at 51.72m dipping 12°, 20% pyrite, 1% chalcopyrite. Below, 51.70m thin veinlets dip between 10° and 25°. Quartz/cordierite porphyroblasts develop below 51.00m and are common throughout.</p> <p>Thinly banded and laminated sequence of dark grey carbonaceous argillaceous siltstone and light grey siltstone (30%). The light grey bands locally show sharp bases and a vague upward grading. Sporadic beds (≤ 7 cm) of dark grey sediment are present. Between 53.65m and 54.10m, the sequence is severely microfaulted with abundant quartz chlorite veins and veinlets with an average dip of 30-35°. This zone probably represents a minor kink band. At 53.95m, milky quartz veins and blebs occur in a 10 cm unit. The quartz veins dip 45°. In an 8 cm unit at 54.10m, cross cutting faulted quartz veins, patches and blebs occur with common leached cavities.</p>	
55.40	57.12	50°	<p>Massive zone of light grey-grey siltstone and dark grey carbonaceous siltstone with gradual change from one lithology to another and no true bedding visible. A 4 cm siltstone band occurs at the top of the unit, separated from the massive zone by an argillaceous siltstone band.</p>	
57.10	57.45	80°	<p>Interbanded light grey siltstone and dark grey argillaceous carbonaceous siltstone, the bands being ≤ 10 cm, the light grey content being 15%. The unit becomes increasingly chloritic with depth and in the basal 5-10 cms is cut by quartz/chlorite veins with common cavities.</p>	
57.45	57.63		<p>Green-grey siliceous material heavily mineralised with 60% pyrite occurring as subhedral crystals up to 0.5 cms in diameter.</p>	
57.63	57.70		<p>Green grey siliceous material with 50% included fragments of argillaceous siltstone, moderately chloritised. 5-8% pyrite as above.</p>	
57.70	58.53		<p>Green-grey siliceous chloritic material with sporadic sub-angular fragments of banded greenish siltstone. The siliceous material is very porous due to small irregular cavities up to 1 cm wide. Mineralised with 20-30% pyrite in crystals up to ½ cm in diameter with trace of chalcopyrite. The basal 8 cms containing 5% chalcopyrite and minor pyrite.</p>	
58.53	58.80		<p>Breccia of dark green-grey argillaceous siltstone fragments in a siliceous matrix. The included fragments contain abundant quartz/cordierite porphyroblasts.</p>	

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
58.80	59.44		Dark grey grey chloritic argillaceous siltstone with common quartz/cordierite porphyroblasts up to 3 mm in diameter cut by numerous quartz/chlorite and leached quartzose veins producing a brecciated appearance. Few veins are patchily mineralised with pyrite. Total sulphides < 0.1%.
59.44	60.75	60° - 65°	Dark grey carbonaceous and argillaceous siltstone bearing light grey siltstone laminae and bands (< 2 cms) comprising 10-15% of the total unit. The thicker bands show erosional bases and a fine upward grading. Quartz/cordierite porphyroblasts are abundant and up to 0.3 cm in diameter. A quartz/chlorite vein, 2 cms thick cuts the sequence at 59.70m. Rare quartz veinlets cut the unit at irregular angles.
60.75	61.00		Green grey quartzose vein with common chlorite blebs and patches and some chloritised sediment fragments up to 1 cm. in length. Porous with small cavities. Upper contact dips 60°, lower contact dips 34°. Total sulphides 8%, pyrite with 0.5-1% chalcopyrite.
61.00	68.20	Sediment dips 65° from 61.00m to 62.68m. 56° at 62.28m. 55° at 62.68m. 62° at 63.30m. 56° at 64.15m. 54° at 65.15m. 54° at 65.75m. 55° at 66.50m. 60° at 67.40m. 57° at 68.10m.	Dark grey carbonaceous and argillaceous siltstone with bands and laminae of light grey siltstone (10-15% total sediment). The bands reach 5 cms in thickness and comprise the basal half of a graded unit up to 25 cms thick. Well defined graded units occur sporadically separated by thinly banded and laminated sediment. The graded units comprise: ↑ Dark grey argillaceous, carbonaceous siltstone with variable leucoxene, upward grading + laminae. Light grey siltstone + small-scale cross stratification. <u>erosion.</u>
68.20	69.16		The more argillaceous sediments contain common quartz/cordierite porphyroblasts. Dark grey argillaceous and carbonaceous siltstone, massive with a c.6 cm irregularly bounded siltstone occurs at the base of the unit.
69.16	71.68	53° - 58°	As 61.00m - 68.20m, with a large irregular chloritised band at 71.55m.
71.68	72.24	34° - 35°	Interbanded light grey and dark grey siltstone severely microfaulted and cut by a complex network of quartz/chlorite veins containing chloritised sediment fragments. Total vein matter 60% containing 1% pyrite.

635103

635104

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
72.24	72.81		Dark grey massive carbonaceous and argillaceous leucoxene rich siltstone with common quartz/cordierite porphyroblasts up to 2 mm in diameter. The unit is cut by a few thin (≤ 3 mm) quartzose veins dipping 30-40°.
72.81	74.21	60° to 74.21 50° to 54° to base.	As 61.00m - 68.20m, the basal 20 cm containing well developed slump/flow structures in thinly banded sediments.
74.21	76.45	50° to 55°	Interbedded units of dark grey carbonaceous and argillaceous leucoxene rich siltstone, massive with scattered quartz porphyroblasts (≤ 3 mm) reaching 50 cm in thickness and thinly laminated units of dark grey and light grey material; the laminae ≤ 1 mm. The unit is moderately well jointed with rare thin quartz veins dipping 20-30°.
76.45	76.72		Dark grey carbonaceous mudstone with light grey siltstone. Thickness of units $\frac{1}{2}$ mm to 3 cm. The zone is heavily distorted and traversed by numerous microfaults. Numerous thin quartz/chlorite veins cut the bedding at 30-50°. Quartz porphyroblasts well developed up to 4 mm diameter. The quartz/chlorite veins contain traces of chalcopyrite.
76.72	77.49		Dark grey carbonaceous mudstone with light grey siltstone. Sedimentary units becoming thicker with an increase in silt content, occasional quartz/chlorite veins cut the bedding max. thickness 2 mm. Porphyroblasts well developed, traces of oxidised pyrite occur within the veinlets.
77.49	78.68		Very distorted dark grey carbonaceous mudstone with occasional laminae of light grey siltstone. The zone is traversed by random oriented quartz/chlorite veins. The major veins occur at 77.60m being 6 cm wide and at 77.94m being 20 cm thick. These veins consisting of fragments of chloritised mudstone surrounded with a matrix of quartz/chlorite. The matrix is heavily leached and contains 5% pyrite with traces of chalcopyrite.
78.68	79.67		Massive dark grey carbonaceous mudstone, traversed by numerous thin cavernous quartz/chlorite veins. A few sporadic quartz porphyroblasts are developed within this zone. Traces of pyrite occur within the veins.
79.67	85.80		Dark grey carbonaceous mudstone with light grey siltstone, thinly laminated to 81.97. At this depth, a massive unit of 20 cm occurs consisting of dark grey carbonaceous mudstone, followed by fair lamination as above.
85.80	87.62		Zone comprising quartz with included fragments of graphitic mudstone. Fractured surfaces of the quartz are graphite coated. The quartz contains occasional patches

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
87.62	91.06	48° 34.43 at 35° 35.65 at 35° 88.00 at 30°	Massive dark grey-black mudstone with occasional lighter silty bands traversed by thin quartz/chlorite veins containing pyrite from 0.5% to 2%. Porphyroblasts are well developed within the mudstone.
91.06	91.38		Milky white quartz with lenses of carbonate and patches of chlorite. Mineralised with traces of pyrite. Boundaries of quartz dip 20°.
91.38	92.86		Dark grey to black carbonaceous graphitic mudstone. Traversed by mixed quartz/carbonate veins up to 5 mm in width. These veins are irregular, distorted and dip at 45°. They contain pyrite and traces of chalcopyrite. Porphyroblasts are well developed in the upper half of the sequence. At 92.60m a 3 cm thick vein occurs consisting of quartz with abundant pyrite and 20% of cavities. The basal 8 cm consist of quartz veinlets containing chlorite and fragments of mudstone.
92.86	93.52	45°	Massive unit of dark grey-black mudstone, well jointed and intruded by numerous thin quartz veins containing pyrite.
93.52	96.14		Only fragments recovered, heavy core loss. Zone comprises of veins of massive white quartz and mixed quartz and chlorite. Other fragments consist of fractured dark grey-black mudstone traversed by thin quartz/chlorite/dolomite veinlets. Total sulphide 2%, chalcopyrite 0.1%.
96.14	96.44		Milky white quartz containing 10% dolomite as irregular patches. Chlorite occurs along small fracture planes in the quartz. The sequence is mineralised with pyrite occurring within the carbonate patches and along fracture planes. Total sulphide 2%.
96.44	96.56		Dark grey carbonaceous/graphitic mudstone, traversed by numerous thin irregular quartz veins, well jointed with joint surfaces, showing graphitic polish. Total sulphides 8%. Traces of chalcopyrite.
96.56	96.86		The upper half of this zone is very talcose grading into a chloritic mudstone with depth. The basal 2 cm are very siliceous with 20% cavities. The zone contains 40% pyrite and traces of chalcopyrite.
96.86	96.92	40° - 45°	Vein unit consisting of a 1 cm wide vein of chlorite (40% pyrite) separated from a massive white vein with traces of pyrite by a 1 cm band of graphitic mudstone.
97.36	97.94		Only 21 cms of core recovered comprising quartz/dolomite/chlorite veins in soft black graphitic mudstone. Total sulphides 10%, chalcopyrite .2%.
97.94	98.07		Soft black graphitic mudstone containing small lenses of quartz and thin veins of mixed quartz and chlorite. Total sulphides 2% chalcopyrite traces

635105

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
98.07	102.71	99.9m = -10° 101.2m = + 40° 101.4m = + .0° 102.71m = + 45°	Dark grey carbonaceous mudstone with light grey siltstone bands and laminae which vary between 1 mm - 1 cm in thickness. This zone is traversed by numerous thin quartz veins dipping 40-45°. A 1 cm thick quartz/chlorite vein occurs are 99.36m, cutting the bedding at 40°.
102.71	107.39	40° - 45°	Dark grey carbonaceous mudstone grading at the base of the units into light grey siltstone. The thickness of the units varies from ½ mm to 3 cm. Numerous thin quartz veins cut the bedding at 90°. Traces of pyrite are contained within the siltstone, leucoxene up to ≤1 mm is present within the mudstone.
107.39	108.20		Massive unit of dark grey carbonaceous mudstone with the basal section grading into a light grey siltstone. Well jointed.
108.20	109.98		Dark grey carbonaceous mudstone with light grey siltstone at the base of the units. Zone is very distorted with numerous small scale faults cutting the bedding. Zone contains numerous quartz veins mixed with chlorite. A fold occurs at 108.20, the axial plane dipping at 31°.
109.98	115.04	45° - 50° 110.34m = 45° 111.25m = 45° 112.16m = 48° 113.07m = 55° 113.98m = 45°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the units. Total siltstone content approx. 30-40%. The siltstone mudstone contact is sharp with load cast structures, well developed. Traces of pyrite are present within the silty layers and leucoxene is present in the mudstone. Numerous veins consisting of quartz and quartz mixed with chlorite cut the bedding. The veins vary in thickness from ½ mm to 2 cm, dipping 45-50°. The more prominent veins occur as follows: 110.34m - 8 mm thick comprising quartz + chlorite. 111.00m - 5 mm thick comprising quartz + 20% pyrite + 30% cavity. 114.15m - 2 cm thick milky white quartz. 114.95m - 4 cm thick vein system comprising quartz chloritised fragments in the bedded mudstone with traces of pyrite.
115.04	116.12	115.20m = 45° 115.81m = 40°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. Siltstone content approx. 30%. Thickness of units vary between ¼ mm to 3 cm. The top 20 cm are very distorted caused by small scale faulting, the fault planes being infilled with quartz and dip at - 30°. Traces of pyrite are contained along the silty bands and within the veins. Leucoxene occurs within the mudstone.

635106

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635107
From	To			
116.12	117.32	116.43m = 48° 117.17m = 30°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. Siltstone content approx. 15%. Thickness of units $\frac{1}{4}$ mm - 2 cm. Occasional thin quartz veins cut the bedding dipping at 35°. Traces of pyrite are present in the siltstones and leucoxene is contained within the mudstone.	
117.32	117.59	- 30°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. The zone is distorted due to small scale faulting. The upper 10 cm are intensively microfaulted with fault planes dipping at - 30°. Pyrite 1 to 2 mm in diameter occurs along the siltstone layers. Leucoxene is present within the mudstone.	
117.59	124.03	45°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. Siltstone content approx. 25%. A drag fold occurs at 119.17 - 120.17, axial plane dipping at 45°. The sedimentary units vary in thickness between $\frac{1}{4}$ cm - 3 $\frac{1}{2}$ cm. The siltstone/mudstone contacts are sharp and show well developed load cast structures. Occasional thin quartz veins dipping at - 30° to - 40° cut the bedding. At 121.9, a joint coated with pyrite dips at - 45° and traces of pyrite occur within the siltstone layers whilst leucoxene is present in the mudstone.	
124.03	124.33		Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 25%). Thickness of units $\frac{1}{4}$ mm to 5 mm. A major fault dips at + 10° and is infilled with quartz mixed with chlorite. Other veins up to 3 mm thick show extensive cavities. Traces of pyrite are contained within the vein and in the siltstone layers.	
124.33	132.15	50° - 55°	Dark grey carbonaceous argillaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 25%). Thickness of the units vary from $\frac{1}{4}$ mm to 3 cm. Load cast structures are developed at the siltstone/mudstone contact and the siltstones exhibit occasional cross-stratification and small scours. Traces of pyrite are contained along the silty bands whilst leucoxene occurs within the mudstone. A swarm of thin quartz veins occur between 125.30m - 125.60m, dipping parallel with the core axis. A 2 cm wide fault occurs at 129.99m dips at + 30°, showing brecciation and with an infilling of quartz mixed with chlorite and fragments of graphitic mudstone. A small drag fold occurs at 129.50m, with a boxwork of thin quartz veins along the axial plane dipping at + 50°. A fault dipping at + 25° with a displacement of 5 mm occurs at 131.34m, lined with a 1 cm thick vein containing fragments of carbonaceous mudstone in a cavernous quartz matrix. At 132.10m, a 5 cm band of chloritised mudstone occurs conformable to the bedding with a 2 mm thick quartz vein dipping at -25° and cuts the centre band. At the centre of the band, a concentration of pyrite occurs along the bedding planes.	

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
			635108
132.15	132.36		Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. Zone is intensively faulted with 2 sets of faults dipping at +50° and -40°. Fault planes are infilled with cavernous quartz mixed with chlorite and pyrite.
132.36	132.66	+ 50°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 20%). Thickness of units 1/4 mm - 2 cm. A 5 cm wide chloritised mudstone band conformable to the bedding occurs at 132.40m, containing a marked increase of pyrite along the silty bands. Total sulphide less than 0.1% Leucoxene is contained within the mudstone.
132.66	134.70	133.22 = 45° 133.88 = 70°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 30%). Thickness of units vary from 1/4 mm to 4 cm. The upper 20 cms are drag folded - the axial plane dipping -45°, associated with parallel microfaults. 2 sets of thin quartz veins cut the bedding with residues of carbonate dipping at -50° and 0°. Traces of pyrite are contained within the silty bands and leucoxene is contained within the mudstone.
134.70	135.31	55° - 60°	Dark grey to black carbonaceous mudstone with lighter grey siltstone at the base of the sedimentary units. (Total siltstone content approx. 5%). Thickness of units vary from 1 mm to 5 cm. One thin quartz vein dipping +5° extends from the top to the base of this zone. Traces of pyrite are contained within the more silty layers and abundant leucoxene is contained within the mudstone.
135.31	135.86		The top half of this zone consists of dark grey mudstone with light grey siltstone bands - the mudstone/siltstone boundaries are diffused and distorted. The basal half of the sequence comprises chloritised mudstone with 2 thin quartz veins dipping at 45°. At the intersection, one quartz vein with a siltstone bedding layer, a 2 mm diameter chalcopyrite bleb is present. Specks of chalcopyrite up to 1/4 mm diameter are contained within a 2 cm band at the centre of the chloritic mudstone. Total sulphides - 0.5%, chalcopyrite - 0.05%.
135.86	139.47	45° - 48°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 25%). Thickness of sedimentary units vary from 1 mm to 2 cm. The zone is traversed by occasional thin quartz veins dipping at -20°. Joint surfaces are coated with pyrite. Traces of pyrite are present within siltstone bands and leucoxene is present in the mudstones.

635109

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
139.47	140.05	45°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. The unit is severely faulted and brecciated with fault planes dipping at + 45°. Numerous thin quartz veins traverse the zone forming a boxwork. At 139.67m, a 3 cm thick vein occurs consisting of milky white quartz with chloritic patches and pyrite is present along the contact with the mudstone.
140.05	141.13	140.09m = 35° 140.12m = 100° 141.10m = 35°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the units. (Siltstone content 30%). Cross stratification and small scours are well developed in the siltstone. The zone comprises a drag fold, the sediments dipping as follows: 140.09m + 35°; 140.12m + 100°; 141.10m + 35°. The axial surface of the fold dips at + 50°, and is associated with milky white quartz veins parallel to the axial surface. Traces of pyrite are contained in the siltstone layers and leucoxene is present within the mudstones.
141.13	141.69	+ 40°	Dark grey to black carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 5%). Units are 2 cm to 10 cm thick, and are traversed by thin quartz veins dipping at 15-25°. Traces of chalcOPYrite are present in one 2 mm thick vein. Leucoxene is very abundant within the mudstone.
141.69	144.46	+ 40°	Dark grey carbonaceous mudstone with a marked increase in light grey siltstone content at the base of the sedimentary units. (Siltstone approx. 50%). Units vary in thickness from 1/4 mm to 4 cm. Finely laminated sequences are present within the thicker units. Quartz veins traverse the zone dipping at 0°, and + 45°, and vary in thickness from 0.1 mm to 5 mm. The thicker veins are cavernous and contain up to 10% pyrite. Occasional chlorite patches occur within the zone. Pyrite is present within the siltstone layers and leucoxene occurs in the mudstone.
144.46	147.88	45° - 50°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 30%). Thickness of units vary from 1/4 mm to 10 cm. The zone is traversed by numerous thin quartz veins 1 mm to 2 mm thick, dipping at + 25° and + 45°. A 2 cm thick milky white quartz vein occurs at 145.52m containing fragments of chloritised mudstone. An 8 cm wide chlorite vein system occurs at 145.72m. A 3 cm thick brecciated band occurs at 146.28m, comprising fragments of carbonaceous mudstone within a matrix of quartz and chlorite. The zone is well jointed with joint surfaces coated with quartz and graphitic slickensides. Traces of pyrite occur within the siltstone layers and leucoxene is present within the mudstones. The leucoxene shows a marked increase in size with depth and are up to 1 1/2 mm in diameter.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635110
FROM	TO			
147.88	149.51	50° - 55°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 70%). Thickness of units vary from 1 mm to 10 cm. Occasional thin quartz veins traverse the unit dipping at -10° and -35°. At 2 cm thick milky white quartz vein occurs at 149.10m. Traces of pyrite are present in the siltstone layers and leucoxene occurs in the mudstones.	
149.51	150.47	35° - 40°	Dark grey carbonaceous mudstone, slightly silicified, with indistinct layers of light grey siltstone. Irregular thin quartz veins are present throughout this zone. The top 5 cm comprises a brecciated vein system of fragments of mudstone within a quartz/chlorite matrix. A speck of chalcopyrite 2 mm diameter occurs within the quartz zone. This zone is well jointed with joint surfaces being coated with chlorite and talc. Traces of pyrite and chalcopyrite are contained within the quartz/chlorite veins. Quartz/cordierite porphyroblasts are well developed.	
150.47	150.70		Green-grey chloritic mudstone cut by veins consisting of siliceous cavernous material mixed with chloritic fragments and with pyrite and chalcopyrite. Total sulphide of the veins c.10%, chalcopyrite c.5%. The veins dip at -15°. The sulphides occur parallel to the vein wall. It is possible that over this zone a considerable core loss occurred.	
150.70	151.16	+ 20°	Dark grey slightly greenish carbonaceous mudstone with a dense concentration of porphyroblasts which are 1 mm - 3 mm in diameter and becomes denser towards the base of this zone. The porphyroblasts are stretched along a banding. The zone has the appearance of brecciation with the chlorite and mudstone fragments being stretched and following the same banding. The zone is well jointed with slickensides developed. (The porphyroblasts are of a soft material to be sent for analysis).	
151.16	153.11		43 cms recovered in the form of fragments of vein material of green chloritic mudstone intruded by veins of quartz mixed with chlorite and sulphides. Total sulphides 3%, chalcopyrite 1 - 2%. (This zone is of high Cu potential and reference will be taken of the sludge sample for chemical assay).	
153.11	153.75		The upper 5 cm comprise massive light grey siltstone grading into a breccia consisting of angular fragments of chloritised mudstone and siltstone within a matrix of quartz mixed with chlorite. The quartz/chlorite mixture contains occasional pyrite and chalcopyrite. Total sulphide less than 0.1%.	

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635111
From	To			
153.75	155.32	10° - 20° 55° - 60°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 40%). Thickness of units vary from 1 mm to 6 cm. The siltstone/mudstone contacts are diffused. The zone is traversed by numerous quartz veins 1/2 mm to 2 mm in thickness containing variable amounts of chlorite. The veins contain occasional specks of chalcopyrite and pyrite. Traces of pyrite are present within the silty layer and leucoxene occurs within the mudstones. Total sulphides < 0.1%.	
155.32	156.16	+ 55° - + 60°	Massive units of light grey medium grained siltstone, occasional grading into a grey carbonaceous mudstone at the top of the sedimentary units. (Siltstone content 30%). At 155.70m, a 15 cm thick siltstone band has been chloritised and intruded by 1 cm thick siltstone band has been chloritised and intruded by 1 cm thick siliceous vein dipping at + 10° to + 15°, traces of pyrite are contained within this zone.	
156.16	156.75	55°	Light grey-cream medium grained porous siltstone/fine sandstone. A cavernous vein consisting of quartz and chlorite with 7% chalcopyrite occurs at 156.16, dipping at + 45°.	
156.75	157.56	55°	Greenish-grey medium grained siltstone/fine sandstone. The zone is traversed by numerous 1 - 2 mm wide quartz/chlorite veins dipping at 5° to 10° and contains numerous 2 to 5 mm long tabular cavities, poorly mineralised.	
157.56	158.27	+ 25°	Light grey porous siltstone/fine sandstone with occasional diffused chlorite patches. The zone contains carbonaceous and graphitic mudstone pebbles with the long axis dipping at + 50°. Abundant tabular cavities occur at the basal 20 cm. Numerous thin veins consisting of quartz and chlorite cut the bedding. The tabular cavities are probably after carbonate.	
158.27	160.68	55°	Light grey-green siltstone/fine sandstone with occasional patches of creamy coloured siltstone. The zone is traversed by numerous thin quartz veins dipping at 55-60°. The bedding is indistinct and dips c. 55°.	
160.68	162.45	35° - 40°	Light grey-green siltstone with an increase of dark grey mudstone at the top of the sedimentary units. Thickness of units vary from 2 cm to 15 cm. At 161.00m, a 10 cm thick vein system occurs comprising brecciated fragments of chlorite siltstone and dark grey carbonaceous mudstone. The siliceous cavernous veins contain traces of chalcopyrite. At 161.80, dark grey carbonaceous pebbles up to 1 1/2 cm in diameter are present over a width of 10 cm.	

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635112
From	To			
162.45	162.93	+ 45°	Massive unit of dark grey to black graphitic mudstone, traversed by numerous thin quartz and quartz/chlorite veins. The chloritic veins contain up to 10% chalcopyrite and dip at 35°. Leucoxene is contained within the graphitic mudstone. Total sulphide 0.2%.	
162.93	163.54	+ 45°	Green-grey siltstone with patches of creamy coloured siltstone and occasional bands of dark grey carbonaceous mudstone. Veins up to 1 cm thick cut the bedding dipping 10° to 20° and consisting of quartz or quartz mixed with chlorite. The top 10 cm contain cavities with minor chalcopyrite. The veins contain specks of chalcopyrite.	
163.54	164.33		Massive unit of dark grey carbonaceous mudstone traversed by thin veins of quartz mixed with chlorite containing traces of chalcopyrite. Total sulphides < 0.1%.	
164.33	165.55	45° - 50°	Light grey yellow tinged siltstone with laminae of darker grey siltstone at the top of the units and occasional bands of chloritic siltstone. Thin veins cut the sequence consisting of siliceous chloritised material dipping at + 10-15° containing traces of chalcopyrite. The zone contains tabular cavities and occasional graphitic mudstone pebbles. (Max. 4 mm diameter).	
165.55	167.28	55° - 60°	Dark grey carbonaceous graphitic mudstone with light grey siltstone at the base of the sedimentary units - thickness of units vary between 1 cm - 10 cm, (siltstone content approx. 50%). The mudstone/siltstone contacts are sharp and show load cast structures. Thin quartz veins cut the bedding dipping at 45°. Traces of pyrite are contained within the siltstone bands and in the veins. Leucoxene is present within the mudstone.	
167.28	168.07	Top 50° Base 70°	Dark grey carbonaceous/graphitic mudstone with light grey siltstone at the base of the sedimentary units. The zone is cut by siliceous veins, increasing in density with depth. The veins dip at + 10° to + 20°, and contain traces of chalcopyrite.	
168.07	169.36		Milky white quartz with occasional grey siliceous patches, heavily mineralised with pyrite and chalcopyrite. A few cavities are present, (carbonate). The sulphides show a distinct banding dipping 50°. The sulphide content increases gradually with depth, the basal 20 cm containing 25% sulphides (3-4% chalcopyrite). The upper 1.18m contains 8-10% pyrite and c.0.5% chalcopyrite. A few joint surfaces are present coated with graphite and chlorite.	
169.76	169.90	55°	Finely laminated dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 50%). Thickness of units ¼ mm to 10 mm. The zone is traversed by numerous thin cavernous quartz veins dipping + 15°. Traces of pyrite occur in the silty bands and leucoxene is present within the mudstone.	

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635113
From	To			
169.90	172.95	55° - 60°	Dark grey to black carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. (Siltstone content approx. 40%). A cavernous 3 cm thick quartz vein containing fragments of chloritic mudstone occurs at 171.19m, dipping at + 30°. Numerous thin veins dipping at the same angle occurs throughout the zone. Traces of pyrite occurs in the silty bands and leucoxene is present within the mudstone.	
172.95	176.51	173.02m + 55° 173.53m + 60° 174.35m + 80° 175.26m + 70°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. Slight increase in siltstone content as compared to zone above. The zone is traversed by thin quartz veins dipping + 35° to + 40°. The veins are occasionally strongly chloritic and contain traces of pyrite. Traces of pyrite are also present in the siltstone bands and leucoxene occurs in the mudstone.	
176.51	179.72	176.78m + 40° 178.61m + 0.0° 179.22m + 10°	Dark grey carbonaceous mudstone with light grey siltstone at the base of the sedimentary units. The zone is progressively more distorted towards the base, and is cut by numerous thin irregular quartz veins dipping at + 45° and - 15°. The zone contains occasional zones of brecciation in which the mudstone is chloritised. Traces of pyrite are present within the veins and in the siltstone layers.	
179.72	181.05		Strongly brecciated zone comprising fragments of dark grey carbonaceous mudstone 1 cm to 3 cm in diameter within a siliceous slightly chloritised matrix. The brecciation follows a distinct banding dipping at + 20°. Occasional milky white quartz veins traverse the zone dipping at 45° with traces of pyrite. End of hole.	

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APPENDIX C

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SAMPLE INTERVALS AND ASSAY RESULTS

<u>Sample No.</u>	<u>Interval in Metres</u>		<u>Length in</u> <u>Metres</u>	<u>% Cu.</u>
	<u>From</u>	<u>To</u>		
BAL 0114	11.5	19.92	8.42	.018
0115	19.92	21.47	1.55	.80
0116	21.47	23.90	2.43	.042
0117	23.90	32.53	8.63	.012
0118	32.53	33.13	.60	.14
0119	33.13	35.50	2.37	.011
0120	35.50	42.71	7.21	.051
0121	42.71	43.31	.60	.026
0122	43.31	50.26	6.95	.044
0123	50.26	52.07	1.81	.096
0124	52.07	57.45	5.38	.007
0125	57.45	58.80	1.35	.21
0126	58.80	59.44	.64	.005
0127	59.44	60.75	1.31	.005
0128	60.75	61.00	.25	.10
0129	61.00	71.68	10.68	.004
0130	71.68	72.24	.56	.039
0131	72.24	77.60	5.36	.001
0132	77.60	78.68	1.08	.088
0133	78.68	85.80	7.12	<.001
0134	85.80	87.62	1.82	.058
0135	87.62	91.06	3.44	.003
0136	91.06	91.38	.32	.015
0137	91.38	93.52	2.14	.046
0138	93.52	96.14	2.62	.062
0139	96.14	96.44	.30	.026
0140	96.44	96.93	.49	.19
0141	96.93	97.36	.43	.017
0142	97.36	97.94	.58	.041
0143	97.94	102.71	4.77	.004
0283	102.71	108.20	5.49	.004
0284	108.20	109.98	1.78	.009
0285	109.98	115.04	5.06	.004
0286	115.04	117.59	2.55	.007
0287	117.59	124.03	6.44	.009
0288	124.03	132.15	8.12	.007
0289	132.15	134.70	2.55	.006
0290	134.70	139.47	4.77	.030

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<u>Sample No.</u>	<u>Interval in Metres</u>		<u>Length in</u>	<u>% Cu.</u>
	<u>From</u>	<u>To</u>	<u>Metres</u>	
0291	139.47	144.46	4.99	.002
0292	144.46	147.88	3.42	.003
0293	147.88	149.51	1.68	< .001
0294	149.51	150.47	.96	.073
0295	150.47	150.70	.23	
0296	150.70	151.16	.46	.008
0297	151.16	153.11	1.95	
0298	153.11	153.74	.63	.070
0299	153.74	156.16	2.42	.035
0300	156.16	158.27	2.11	.11
0301	158.27	160.68	2.41	.004
0302	160.68	162.45	1.77	.078
0303	162.45	162.93	.48	.19
0304	162.93	163.54	.61	.14
0305	163.54	165.55	2.01	.025
0306	165.55	167.28	1.73	.011
0307	167.28	168.07	.79	.067
0308	168.07	169.04	.97	.077
0309	169.04	169.36	.32	.77
0310	169.36	172.95	3.59	.003
0311	172.95	179.72	6.77	< .001
0312	179.72	181.05	1.33	< .001

End of
Hole

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73-947
635116

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

MINERAL RESOURCES DIVISION.

TASMANIAN EXPLORATION E.L.16/68.

2nd May, 1971.

REPORT ON DDH.5 - BLOCKS PROSPECT.

M. H. McIntyre.

SUMMARY

DDH.5 at the Blocks Prospect was successfully completed at a depth of 54.86 metres.

A mineralised zone, consisting of white quartz containing chlorite, pyrite and chalcopyrite, was intersected between 47.63 and 48.32 m., and estimated true thickness of 0.55m.

Within this mineralised quartz ^{zone} area, a few large cavities containing ^{ed} chalcopyrite, pale brown carbonate residue and euhedral quartz and pyrite. The chalcopyrite occurs as irregular blebs and veins and in pyrite-chalcopyrite aggregates.

The mineralised zone assayed only 0.25% Cu. and it is considered that a sampling error has occurred, either in the splitting of the core or in sample preparation at the laboratory. The copper content of this zone is visually estimated to be between 1.0 and 2.0% Cu.

The mineralised quartz-carbonate vein strikes N.25°W. and dips about 75° SW. The country rocks consist of chloritic siltstones and phyllites, silicified in parts.

DDH.5 - BLOCKS PROSPECT.

Grid Reference:	445 724 N, 313 756 E.
Collar R.L.:	650.4 feet.
Angle:	60°
Direction:	060° magnetic.
Date drilled:	10-12-70 to 6-1-71.
Drilling rate:	4.99 metres per shift.

1. OPERATIONAL DETAILS.

1.1 Drilling Details:

This hole was drilled with a Mindrill F.30 diamond drill rig. Drilling commenced on December 10th, 1970, and the hole was completed on January 6th, 1971, after the drillers took a 16-day break over the Christmas period.

NX casing was seated at 6.10m and the hole drilled to 30.5m. with NQWL equipment. BX casing was seated at 30.5m and the hole completed with BQWL equipment. The drilling progress and engineering details are graphically described by Fig. 1.

1.2 Drilling Conditions:

Drill runs and core recovery are shown in Appendix A.

Core recovery was generally satisfactory although drill runs were often short. A few silicified zones proved difficult to penetrate. Very broken ground below 52.4m yielded poor core recovery and the hole collapsed slightly at this depth.

Sludge samples were collected over 0.9 m. intervals.

1.3 Drillhole Deviation:

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Collar:	60°	
15.24 m.	61°	acid-tube
30.48 m.	59.5°	" "
45.72 m.	58.5°	" "

2. GEOLOGY.

The complete drill log is given in Appendix B and may be summarised as follows:

0 to 47.63 metres:

Pale to dark green chloritic siltstone and phyllite, silicified in parts. Thin (≤ 5 mm) quartz veins are common. Pyrite is common throughout the length of the core and occurs as disseminated crystals and associated with quartz veins. Original graded bedding is locally preserved. This sequence is massive in parts and contains a few porphyroblasts of (?) chlorite.

47.63 to 48.32 metres:

White quartz containing chlorite, pyrite and chalcOPYrite and a few cavities after carbonate. Total sulphides estimated at 10 to 12% in the ratio; pyrite : chalcOPYrite = 60:40. True thickness about 0.55 m.

48.32 to 54.86 metres:

Similar to the interval 0 to 47.63 m.

3. SAMPLING AND ASSAYING.

The following lithological intervals in the vicinity of the mineralised zones were split and assayed for copper.

Intersection. (metres)	Interval (Metres)	Sample No.	Assay value (% Cu.)
37.49 to 38.86	1.37	BAL.0344	0.46
38.86 " 42.67	3.81	0345	< 0.001
42.67 " 43.28	0.61	0346	0.003
43.28 " 44.34	1.06	0347	< 0.001
44.34 " 45.84	1.50	0348	< 0.001
45.84 " 47.63	1.79	0349	0.068
47.63 " 48.32	0.69	0350	0.25
48.32 " 53.34	5.02	0351	0.004

The assay values for the intervals represented by the samples BAL.0344 and BAL.0350 are suspect and are believed to be incorrect. Sample BAL.0344 contains no visible copper mineralisation, but is reported to assay 0.46% Cu. Sample BAL.0350 which represents the mineralised intersection (chalcOPYrite and pyrite in quartz) is reported to assay only 0.25% Cu, but is visually estimated to contain between 1 and 2% Cu. Assaying of one-quarter of the core is not recommended.

The following lithological intervals were assayed for Cu. in order to determine the background copper values for the Blocks Prospect.

..//..

Intersection (Metres)	Interval (Metres)	Sample No.	Assay value (% Cu)
4.65 to 4.88	0.23	BAL.0572	13
4.88 " 5.72	0.84	0573	28
5.72 " 6.32	0.60	0574	15
6.32 " 6.81	0.49	0575	18
6.81 " 10.95	4.14	0576	8
10.95 " 12.65	1.70	0577	10
12.65 " 13.14	0.49	0578	20
13.14 " 14.53	1.39	0579	< 3
14.53 " 17.68	3.15	0580	5
17.68 " 18.47	0.79	0581	8
18.47 " 18.70	0.23	0582	8
18.70 " 19.79	1.09	0583	15
19.79 " 21.70	1.91	0584	23
21.70 " 24.15	2.45	0585	23
24.15 " 25.98	1.83	0586	18
25.98 " 26.44	0.46	0587	13
26.44 " 29.10	2.66	0588	3
29.10 " 31.49	2.39	0589	5
31.49 " 32.86	1.37	0590	15
32.86 " 33.12	0.26	0591	3
33.12 " 37.49	4.37	0592	23

The mean value of these samples is 13 ppm Cu. with a range from <3 to 28 ppm. Cu.

4. DISCUSSION.

Sulphide mineralisation occurs at the Blocks Prospect in the form of pyrite and chalcopyrite which is almost exclusively restricted to a single major quartz vein, although minor pyrite mineralisation is ubiquitous. This quartz vein contains carbonate and cavities after carbonate and has a very variable thickness, both along-strike and down-dip, in one instance the thickness varying from 0.15 to 1.2 m. in an along-strike distance of only 7.6m. The vein strikes N.25°W. and dips about 75° SW.

The country rocks consisting of chloritic siltstone and phyllite also strike N.25°W., but dip towards the East. A weakly defined schistosity dips West and is roughly parallel to the dip of the mineralised vein.

Enclosed: Fig. 1: Drilling progress and engineering details.
Appendix A: Drill runs and core recovery.
Appendix B: Drill log.

APPENDIX A - CORE RECOVERY CHART

DDH.5 - BLOCKS PROSPECT NO. 1.

METRIC		CORE RECOVERY	% CORE
From	To	In Metres.	RECOVERY
0.	2.28	0.66	29
2.28	3.05	0.25	32
3.05	4.57	0.15	10
4.57	5.64	0.61	57
5.64	6.40	0.61	80
6.40	6.78	0.38	100
6.78	8.53	0.99	56
8.53	8.74	0.20	100
8.74	9.65	0.91	100
9.65	10.18	0.53	100
10.18	10.49	0.30	100
10.49	11.30	0.79	98
11.30	12.70	1.32	94
12.70	14.15	1.45	100
14.15	15.85	1.70	100
15.85	17.40	1.55	100
17.40	17.78	0.38	100
17.78	19.00	1.22	100
19.00	20.42	1.42	100
20.42	22.10	1.68	100
22.10	22.48	0.38	100
22.48	23.27	0.79	100
23.27	24.99	1.73	100
24.99	25.98	0.38	38
25.98	26.44	0.46	100
26.44	27.66	1.22	100
27.66	28.93	1.27	100
28.93	30.48	0.58	38
30.48	31.39	0.64	70
31.39	31.59	0.20	100
31.59	32.31	0.72	100
32.31	32.61	0.25	83
32.61	34.44	1.83	100
34.44	35.15	0.71	100
35.15	35.97	0.82	100
35.97	37.49	1.37	90
37.49	38.10	0.61	100
38.10	38.18	0.08	100
38.18	39.01	0.83	100
39.01	40.23	1.22	100
40.23	42.06	1.83	100
42.06	42.67	0.61	100
42.67	45.11	2.44	100
45.11	46.86	1.75	100
46.86	48.31	1.45	100
48.31	48.77	0.46	100
48.77	49.15	0.38	100
49.15	50.29	1.14	100
50.29	50.90	0.61	100
50.90	51.92	1.02	100
51.92	53.24	1.06	75
53.24	53.85	0.30	60
53.85	54.86	0.15	15

A.C.I. MINERAL RESOURCES DIVISION

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Page 1

TASMANIAN EXPLORATION

DDH. 5. PROSPECT: BLOCKS Grid Reference: 445 724 N, 313 756 E. Angle 60° RL.650.4' Direction: N60°E Magnetic

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
0	2.29	15° at 1.52m. 0° " 1.83m.	Pale brown to grey, quartzose sandy siltstone with few darker carbonaceous bands up to 2 cm thick. Pale brown colouring due to weathering of chlorite, rock becoming greener with increasing depth. Load casts and graded bedding indicate younging towards the East. Minor microfaulting occurs. Rare disseminated pyrite.
2.29	4.65		Pale green chloritic, slightly sandy siltstone. Similar to interval 0 to 2.29m, but less weathered. Sporadic disseminated pyrite, both oxidised and as euhedral crystals.
4.65	4.88		White to pale grey, friable siltstone. Rare narrow (≤ 1 mm) quartz veins with rare lensoid quartz/pyrite aggregates.
4.88	5.72		Hard and compact, pale to dark grey silicified sandy siltstone, containing few pale green slightly chloritic bands. Well jointed. Rare pyrite. Porous.
5.72	6.32		Pale grey, friable, very fine-grained siltstone, slightly sericitic. Few narrow (≤ 2 mm) quartz veins.
6.32	6.81	15° at 6.40m.	Hard and compact, highly silicified sandy siltstone. Colour banded dark grey to black and pale grey. Similar to interval 4.88 to 5.72m. Slightly sericitic. Well jointed with rare slickensided and chloritic joint faces.
6.81	10.95	20° at 7.01m. 15° " 8.53m. 20° " 10.05m.	White to pale grey and slightly darker grey, slightly laminated siltstone with occasional bands (≤ 1 cm) of darker, argillaceous and carbonaceous siltstone. Leucoxene porphyroblasts common. Few narrow (≤ 2 mm) quartz veins. Joints common, often chloritic. Becomes harder and darker towards base. Between 10.21 and 10.36m: hard and compact, mottled dark grey and pale green silicified quartz sandstone containing elongate, pale green chloritic pebbles (≤ 12 mm). Common disseminated euhedral and anhedral pyrite. Joints faced with dark green-black chlorite. A zone of deformation.
10.95	12.65	25 to 30° @12.49m.	Hard and compact, pale to dark grey-green silicified siltstone. Numerous, narrow (≤ 2 mm) quartz veins, also small lensoid quartz bodies (≤ 10 mm), often cavernous and usually containing traces of very fine-grained pyrite. Irregular narrow partings, faced with slightly sericitic chlorite, rarely slickensided.

635121

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
12.65	13.14	Approx. 20° at 16.46m.	Irregularly banded, pale grey-green and dark grey siltstone. The darker bands are argillaceous and carbonaceous and up to 3 cm thick and often include irregularly elongate fragments of coarser grained siltstone. Fine-grained pyrite common. Sericitic common in both dark and pale bands. (chlorite?) porphyroblasts occur in pale siltstone bands. Few quartz veins (≤2 mm) often slightly cavernous. Pyrite also occurs as elongate (30 x 1 mm) bodies sub-parallel to bedding. Graded bedding common. Pyrite apparently restricted to paler and coarser siltstone bands.
13.14	14.55		Pale cream/brown siltstone, locally silicified. Numerous irregular, cavernous quartz veins to 3 cm thick. Silicified zones often cavernous after carbonate. Rare pyrite.
14.55	17.68		Similar to interval 10.95 to 12.65m. Compact and silicified dark grey-green siltstone. Numerous irregular joints, often chlorite filled. Numerous dense, white quartz veins (≤2 mm), often with diffuse boundaries. Two generations of quartz veins may be present. (a) Narrow (≤1 mm) irregular veins with variable thickness and diffuse boundaries. (b) Thick (≥2mm) less irregular and with sharp boundaries.
17.68	18.47	40° at 18.59m.	Pyrite common, forming 1% of rock. At about 14.63m. rock is very strongly silicified with rock fragments being cemented by dense white, slightly translucent quartz which is slightly cavernous in parts. At about 17.37m, small fault with chloritic slickensiding. Fault parallel to long axis of core.
18.47	18.70		Extremely dense, mottled white and green quartz and silicified siltstone. Original bedding (?) planes defined by thin (< 1mm) discontinuous trains of chlorite. Contains thick, white and irregular quartz veins with diffuse boundaries. Minor microfaulting occurs. Pyrite occurs as small (≤0.5mm) euhedral crystals and fine-grained aggregates (≤1 mm) usually restricted to joint planes.
18.70	19.79		Pale grey-green siltstone with few narrow (≤1 cm) dark grey argillaceous and carbonaceous bands. Rare sericite. Chlorite on joint planes.
			Pale to dark green, slightly friable, chloritic and slightly sandy siltstone. Massive and silicified in places. Narrow quartz veins (≤3 mm) common, occasionally slightly cavernous after pyrite. Pyrite common, forming ≤2% total rock.

635122

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
19.79	21.70	40° at 20.12m.	Pale to dark green chloritic siltstone with few dark argillaceous and carbonaceous siltstone bands. Rock is generally porous. Common pyrite ($\leq 1\%$ total rock), occurring as euhedral crystals and as finegrained aggregates, usually parallel to bedding. Few small (< 0.5 mm) dark green (chlorite?) porphyroblasts. Rare graded bedding and microfaulting. Few, slightly cavernous quartz veins (≤ 1 mm).
21.70	24.15	30° at 21.95m. 30° " 23.62m.	Pale to dark green slightly silicified sandy siltstone with few narrow (≤ 1 mm) dark grey argillaceous and carbonaceous bands. Few dark grey-green porphyroblasts. Common pyrite ($\leq 2\%$ total rock) usually occurring as fine-grained aggregates parallel to bedding. Rare narrow (≤ 1 mm) quartz veins.
24.15	25.98	20-30° at 25.14m.	Similar to interval 21.70 to 24.15m., but more argillaceous and less silicified. Pale green and compact chloritic siltstone with few small elongate (≤ 5 mm) fragments dark grey carbonaceous siltstone aligned parallel to bedding. Microfaulting noted to intersect bedding at slight angle. Pyrite common only in basal 30 cms and is associated with small quartz lenses parallel to bedding. Bedding planes indistinct.
25.98	26.44	15-20° at 26.05m.	Similar to interval 21.70 to 24.15m. Pyrite common, forming approximately 2% total rock. Microfaulting common.
26.44	29.10	25-30° at 28.49m.	Pale to dark green, compact and massive chloritic siltstone, with few coarser grained units within sequence. Bedding poorly defined. Pyrite common as anhedral aggregates (≤ 2 mm) often aligned parallel to bedding. Few discontinuous quartz veins (to 5 cm thickness) often cavernous after pyrite. Jointing common with chloritic joint planes. From 28.38 to 28.58m, the rock is paler and more silicified with numerous cavernous pyritic quartz veins (≤ 5 mm). Pyrite occurs as euhedral crystals (≤ 1 mm) and anhedral aggregates (≤ 2 mm).
29.10	31.49	0-10° at 30.17m.	Dark grey-green silicified chloritic siltstone with quartzitic appearance. Strongly silicified between 30.78 and 31.49m to become in parts, a slightly mottled green but dominantly white, quartz vein. Few other quartz veins (≤ 5 mm), usually slightly cavernous after pyrite. Few small pyritic aggregates (≤ 1 mm) often associated with chlorite and chloritic sediments rather than quartz. Poor core recovery.
31.49	32.86	30° at 32.61m.	Dark green, slightly sandy chloritic siltstone, generally massive but with few indistinct bedding planes which contain rare sericite grains. Pyrite common (up to 5% in some sections of a few cms). Few quartz veins (≤ 8 mm) usually with irregular boundaries and often associated with pyrite. Vague cross-bedding in parts chloritic and slickensided, microfault dipping 0°.

635123

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
32.86	33.12		Pale green chloritic siltstone, with few narrow (≤ 1 mm) chloritic veins. Generally featureless with poorly-defined bedding. Rare pyrite.
33.12	37.49		Similar to interval 31.49 to 32.86m, but bedding often much better defined, with laminations of dark grey and green and paler green siltstone with slightly diffuse boundaries. Slightly silicified in few places. Brecciated and strongly pyritic between about 33.53 and 33.83m, with elongate and sub-rounded fragments (usually 2-5 mm. but up to 20 mm) of pale green chloritic siltstone and dark grey carbonaceous siltstone in matrix of pale chlorite and fine-grained pyrite aggregates (≤ 8 mm). Dragfolds with associated cleavage prominent at 35.05, 35.35 and 36.58m. Elongate pyrite aggregates (≤ 3 mm) aligned parallel to cleavage. Pyrite also in rounded aggregates (≤ 10 mm) also apparently parallel to cleavage. Few quartz veins (≤ 10 mm) extremely cavernous after carbonate. Occasional microfaulting.
37.49	38.86	30-40° at 38.0m.	Similar to intervals 31.49 to 32.86m and 33.12 to 37.49m, but apparently less deformed. Pale to dark green chloritic siltstone with poorly defined bedding. Few massive and generally featureless units to 10 cm. Few pyritic quartz veins to 3 mm and few cavernous (after pyrite) quartz veins. Also occasional disseminated pyrite. Between about 38.18 and 38.40m, exists a more deformed and finely laminated zone with well developed cleavage dipping at 70°. Elongate pyrite aggregates aligned parallel and sub-parallel to cleavage.
38.86	42.67	10-20° at 39.17m. 10-20° " 41.90m.	Pale green, argillaceous chloritic siltstone. Generally massive with poorly defined bedding. Pyrite common in irregular, deformed quartz/pyrite veins and blebs (≤ 2 mm), as sub-rounded aggregates (particularly at 40.62, 41.02, 41.35 and 42.21m) and in thin (≤ 2 mm) discontinuous bands sub-parallel to bedding). Rare darker, argillaceous and carbonaceous bands (≤ 5 mm) with few load casts. At about 41.55m, dip changes abruptly from 80°+ to 0° suggesting dragfolding. Poorly jointed.
42.67	43.28	50-60° at 42.97m.	Dark green chloritic siltstone. Bedding only moderately well defined with lamination to 3 mm. Prominent cleavage approximately normal to bedding. Pyrite common (about 2%) occurring as relatively large (≤ 8 mm) fractured elliptical finegrained aggregates parallel to bedding. Also as fine (< 1 mm) acicular and elongate bodies, parallel to cleavage. Chlorite also parallel to cleavage. Common microfaults with rare quartz and pyrite. Dragfold at about 43.20m. with axis parallel to cleavage. Poorly jointed.

635124

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
43.28	44.34	60°	Pale to dark green massive chloritic siltstone. Very poorly defined bedding. Few white quartz veins (≤ 2 mm) with rare cavities, probably after pyrite. Pyrite common as : (i) Sub-rounded aggregates (≤ 2 mm) usually concentrated in zones (≤ 10 mm) parallel and sub-parallel to bedding. (ii) Associated with quartz veins particularly at about 44.14m. (iii) Lensoid to oöicular bodies parallel to cleavage which is defined by this pyrite.
44.34	45.84	65°	Moderately jointed. Minor microfaulting at base.
45.84	47.63		Similar to interval 44.34 to 45.84m, but more massive and bedding extremely poorly defined. Slight cleavage defined by small (≤ 1 mm) white, soft elongate porphyroblasts (leucoxene ?) and minor pyrite. Quartz veins and veinlets common, often normal to bedding. Pyrite common as euhedral crystals (≤ 2 mm) and as sub-rounded aggregates. Basal 20 cm. of unit contains minor (≤ 2 mm) veins and blebs of chalcopyrite and pyrite and rare chalcopyrite parallel to cleavage. Chalcopyrite content $< 0.1\%$. Well jointed, with dark green-black chloritic joint faces. Common microfaulting.
47.63	48.32	45°	<u>MINERALISED ZONE:</u> White, slightly translucent quartz containing irregular and discontinuous veins and blebs of dark green chlorite, pyrite and chalcopyrite. Few large cavities contain euhedral quartz and pyrite, chalcopyrite and pale brown carbonate residue. Pyrite occurs as euhedral crystals (≤ 5 mm) and as sub-rounded fine-grained aggregates (≤ 3 cm). Chalcopyrite occurs as irregular dendritic and anhedral blebs and veins (≤ 3 cm) and also as pyrite/chalcopyrite aggregates. Total sulphides estimated at 10 to 12% in the ratio; pyrite:chalcopyrite = 60:40. Irregular fractures occasionally filled with sulphides but usually chloritic. Secondary copper mineralisation absent. Boundaries of unit relatively sharp and well defined, but irregular. Mineralisation has vague banding, dipping 40-50°. True width about 0.55m.
48.32	53.34		Similar to interval 45.84 to 47.63m. Essentially a massive pale to dark green chloritic siltstone, with poorly defined bedding and cleavage roughly normal to bedding and defined by elongate pyrite aggregates. Between 48.31 and 48.77m. is abundant coarse (≤ 15 mm) quartz veins and lenses; this part of unit being moderately silicified. Quartz veins common - two main sets each dipping at 45° and intersecting at 90°, usually ≤ 3 mm, but up to 5 mm.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635125
From	To			
53.34	54.86		<p>Rarely cavernous after pyrite and/or carbonate. At about 53.27m, the unit is cavernous and consists of a delicate quartz/chlorite network. Slightly coarser towards base. Well jointed with chloritic joint faces. Minor microfaulting. Trace of chalcopyrite (<< 0.1%) at about 53.80m.</p> <p>Pale to dark green fine-grained chloritic siltstone. Very broken. Poor core recovery.</p> <p><u>HOLE COMPLETED AT 54.86m.</u></p>	

TASMANIAN EXPLORATION E.L.16/68

29th April, 1971

REPORT ON D.D.H.6. CLUMP PROSPECT

M.H. McIntyre

SUMMARY

D.D.H.6. at the Clump Prospect was successfully completed at a depth of 265.14 m.

A major mineralized zone was intersected between 178.30 and 190.84 m. and consisted of pyritic and chloritic carbonate and quartz-carbonate containing minor and apparently sub-economic amounts of chalcopyrite. Minor amounts of magnetite and actinolite also occur within the mineralized zone.

The mineralized zone averaged 1950 ppm Cu. over an estimated true thickness of 7.8 m. A secondary mineralized zone between 170.99 and 175.48 m. assayed 1440 ppm Cu. over an estimated true thickness of 2.8 m.

Core recovery in the mineralized zones was low due to the leaching of the carbonate material, and averaged 73 per cent.

Minor chalcopyrite (2740 ppm Cu.) also occurs in a pyritic quartz and quartz-chlorite vein system intersected between 149.61 and 150.37 m.

D.D.H.6. - CLUMP PROSPECT

Grid Reference	459 687 N 310 438 E
Collar R.L.	482.0 feet
Angle	60°
Direction	220° magnetic
Date Drilled	14/12/70 to 6/2/71
Drilling Rate	7.16 m. per shift

1. OPERATIONAL DETAILS:1.1. Drilling Details

The Mindrill F30 drill rig was moved from the site of D.D.H.4. and drilling commenced on 14th December, 1970.

NX casing was seated at 28.34 m. and BX casing at 141.1 m. The drilling progress and engineering details are graphically described by Fig. 1. The hole was completed on 6th February, 1971.

1.2. Drilling Conditions

Drill runs and core recovery are given in Appendix A.

Core recovery above about 182 m. was almost invariably 100 per cent but in the vicinity of the mineralized zone (particularly in the interval 182.3 to 193.2 m.) core recovery was much reduced due to leaching of the carbonate material, and averaged only 73 per cent. Several short drill runs within this interval failed to recover core.

Water return was lost between about 15.0 and 25.0 m. but was recovered after the hole was cased. Water return was again lost between 84.74 and 89.30 m. but was later recovered.

At about 183.2 m. water was issuing from the hole at a rate greater than 800 litres per hour, increasing to greater than 11000 litres per hour at a depth of 198.0 m.

Above the leached mineralized carbonate zone drilling progress was generally satisfactory, the hole advancing 53.0 m. in two successive shifts. A few zones of soft or broken ground hindered progress in places. Progress below the carbonate zone was also generally satisfactory although slowed in places by hard carbonaceous quartzite.

Sludge samples were collected over intervals of 0.9 m. and those collected between 179.83 and 192.65 m. were split and assayed for copper. The assay values are tabulated later.

1.3. Drillhole Deviation

The drillhole surveys were as follow:-

Collar	600	@ 220° mag.
50	15.24 metres	60° 220
100	30.48 "	62° 222
150	45.72 "	62° 223
200	60.96 "	62° 224
250	76.20 "	62° at 225° magnetic
300	91.44 "	63.5° 225
350	106.68 "	61.5° 223
400	121.90 "	57.0° at 221° magnetic
450	137.14 "	55.5° 221
500	152.40 "	51.5° 223
550	167.64 "	50.5° 225
600	182.90 "	50.0° 221
650	198.14 "	49.5° 229
700	213.40 "	47.0° at 231° magnetic
750	228.64 "	49.5° 233
800	243.80 "	49.0° 235
850	259.04 "	45.5° 231

265.1
228.6
36.5

This drillhole, in common with earlier drillholes at the Clump Prospect, showed a marked tendency to shallow with increasing depth.

2. GEOLOGY

The complete drill log is given in Appendix B and may be briefly summarised as follows:-

0 to 170.99 Metres

Dark grey to black argillaceous and carbonaceous siltstone. Graded bedding is pronounced in parts and finely laminated sequences are common.

Leucoxene (?) porphyroblasts are very common in parts and are usually restricted to black argillaceous and carbonaceous units. The unit contains sporadic disseminated pyrite which is usually restricted to the pale grey siltstone bands occurring at the base of the graded beds.

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Microfaults are common. Quartz and quartz-chlorite veins are also common but carbonate and quartz-carbonate veins are rare although increasing in number with depth. Only very rare traces of chalcopyrite occur.

170.99 to 178.30 Metres

Mottled pale yellow (carbonate), white (quartz), green (chlorite) and grey-black (carbonaceous siltstone fragments). This interval is basically a brecciated carbonaceous siltstone with a quartz-chlorite-carbonate cement.

178.30 to 190.84 Metres

Mineralized Carbonate Zone

Massive and slightly chloritic quartz-carbonate containing abundant euhedral pyrite and minor amounts of magnetite, actinolite and chalcopyrite. A few breccia zones of chloritic and carbonaceous siltstone occur within this unit.

190.84 to 265.14 Metres

Broadly similar to the interval 0 to 170.99 m. but commonly recrystallized to a black carbonaceous quartzite.

3. SAMPLE AND ASSAY RESULTS

Three types of samples were collected from the products of D.D.H.6. and, in addition, a comprehensive suite of specimens was collected for thin and polished section examination. The three types of samples are:

- (a) core samples from, and adjacent to, the mineralized zone.
- (b) sludge samples from the mineralized zone.
- (c) core samples of relatively uniform lithology collected in order to determine the background values of Cu., Pb. and Zn.

The assay results were:

(1) Core samples from mineralized zone

Intersection (Metres)	Interval (Metres)	Sample No.	Assay (ppm Cu.)
149.61 to 150.37	0.76	BAL 0474	2740
150.37 to 155.45	5.08	0475	600
155.45 to 170.99	15.54	0476	300
170.99 to 175.48	4.49	0477	1440
175.48 to 178.30	2.82	0478	113
178.30 to 183.43	5.13	0479	1740
183.43 to 187.57	4.14	0480	2520
187.57 to 190.84	3.27	0481	1570
190.84 to 207.20	16.36	0482	235
207.20 to 210.96	3.76	0483	45
210.96 to 215.73	4.77	0484	23
215.73 to 218.88	3.15	0485	60
218.88 to 224.21	5.33	0486	40
224.21 to 228.15	3.94	0487	400
228.15 to 234.66	6.51	0488	60
234.66 to 236.46	1.80	0489	80
236.46 to 240.34	3.88	0490	60
240.34 to 244.48	4.14	0491	90
244.48 to 246.49	2.01	0492	290
246.49 to 247.91	1.42	0493	110
247.91 to 253.85	5.94	0494	80

It will be noted that, although the main mineralized zone averages about 1950 ppm Cu., this value can only be considered as an approximation because of the considerable core loss in this interval.

(2) Sludge samples from the mineralized zone

The assay values of the sludge samples were:-

Intersection (Metres)	Interval (Metres)	Sample No.	Assay (ppm Cu.)
179.83 to 180.74	0.91	BAL 0683	730
180.74 to 181.66	0.92	0684	660
181.66 to 182.57	0.91	0685	880
182.57 to 183.49	0.92	0686	840
183.49 to 184.40	0.91	0687	2640
184.40 to 185.32	0.92	0688	2270
185.32 to 186.23	0.91	0689	3000
186.23 to 187.15	0.92	0690	2460
187.15 to 188.06	0.91	0691	3080
188.06 to 188.98	0.92	0692	2370
188.98 to 189.89	0.91	0693	2090
189.89 to 190.81	0.92	0694	1560
190.81 to 191.72	0.91	0695	1780
191.72 to 192.64	0.92	0696	1390
192.64 to 193.55	0.91	0697	Not Received

The mineralized zone as defined by the sludge sample assay values coincides approximately with that defined by core logging and sampling. It will be noted that the sludge samples give a slightly higher Cu. value than the core samples. The sludge samples average 2560 ppm Cu. between 183.49 and 189.89 m., while the core samples between a similar intersection average about 2100 ppm Cu. The average values over the main mineralized zone, however, are remarkably similar, the core samples averaging 1950 ppm Cu. and the sludge samples 1910 ppm Cu. This is a fairly high degree of correlation and suggests that the sludge samples accurately reflect the true grade of copper mineralization.

(3) Core samples for Cu, Pb and Zn background values

Intersection (Metres)	Interval (Metres)	Sample No.	Assay (ppm)		
			Cu.	Pb.	Zn.
9.23 to 9.73	0.50	BAL 0651	20	35	68
14.30 to 14.63	0.33	0652	13	35	50
19.79 to 20.15	0.36	0653	3	38	43
20.96 to 21.26	0.30	0654	20	38	38
25.09 to 25.47	0.38	0655	3	25	50
29.55 to 29.87	0.32	0656	38	33	43
32.97 to 33.25	0.28	0657	5	33	35
35.46 to 35.87	0.41	0658	25	28	30
43.05 to 43.41	0.36	0659	5	25	38
48.18 to 48.66	0.48	0660	38	20	33
53.09 to 53.47	0.38	0661	18	35	38
57.45 to 57.63	0.18	0662	10	25	40
62.05 to 62.51	0.46	0663	8	30	48
64.56 to 64.92	0.36	0664	10	35	38
68.46 to 68.97	0.51	0665	8	30	33
72.54 to 72.84	0.30	0666	13	35	35
77.21 to 77.46	0.25	0667	8	38	63
86.38 to 86.81	0.43	0668	15	28	28
91.11 to 91.98	0.87	0669	5	28	35
95.25 to 95.68	0.43	0670	18	23	10
99.87 to 100.24	0.37	0671	8	25	13
105.34 to 105.63	0.29	0672	10	35	23
110.39 to 110.69	0.30	0673	460	45	20

(Continued)

(3) Core samples for Cu, Pb and Zn background values (Continued)

Intersection (Metres)	Interval (Metres)	Sample No.	Assay (ppm)		
			Cu.	Pb.	Zn.
113.84 to 114.37	0.53	BAL 0674	20	28	23
116.50 to 117.03	0.53	0675	13	28	20
122.23 to 122.61	0.38	0676	73	25	23
130.68 to 131.11	0.43	0677	10	30	23
136.22 to 136.52	0.30	0678	18	30	33
148.16 to 148.46	0.30	0679	5	95	25
255.27 to 256.14	0.87	0680	20	30	25
258.81 to 259.37	0.56	0681	18	20	28
264.85 to 265.14	0.29	0682	13	25	48

These samples were taken in order to determine the background values of Cu, Pb and Zn, and each sample consisted of a relatively uniform lithology.

The range of values and arithmetic mean for the assay values excluding sample BAL 0673, are:-

	Cu. (ppm)	Pb. (ppm)	Zn. (ppm)
Mean	16	40	35
Range	3 - 73	20 - 95	10 - 68

The range of values of Cu, Pb and Zn in black slate are (from Hawkes & Webb; Geochemistry in Mineral Exploration):

Cu	-	20 to 300 ppm
Pb	-	20 to 400 ppm
Zn	-	100 to 1000 ppm

The range of values of the core samples from D.D.H.6., particularly those of Cu and Zn, are relatively low, for reasons unknown.

A comprehensive suite of rock specimens was collected from the D.D.H.6. core for thin and polished section examination and will be the subject of a separate report. The specimens were collected from the following depths; T.S. indicating thin section, P.S. indicating polished section.

Specimen No.	Depth (metres)		Specimen No.	Depth (metres)	
CP 1	246.44	T.S./P.S.	CP 16	112.86	T.S.
2	13.00	T.S.	17	132.34	T.S.
3	16.95	T.S./P.S.	18	133.79	T.S.
4	23.83	T.S.	19	138.51	T.S./P.S.
5	31.75	T.S.	20	142.47	T.S./P.S.
6	52.73	T.S./P.S.	21	149.15	T.S.
7	60.11	T.S./P.S.	22	155.75	T.S./P.S.
8	63.01	T.S.	23	159.11	T.S./P.S.
9	70.25	T.S.	24	162.45	T.S.
10	75.23	T.S.	25	168.91	T.S.
11	99.06	T.S./P.S.	26	171.30	T.S.
12	101.85	T.S.	27	173.61	T.S./P.S.
13	103.63	T.S.	28	174.85	T.S./P.S.
14	106.22	T.S./P.S.	29	177.91	T.S.
15	107.74	T.S.	30	178.39	T.S./P.S.

Specimen No. Depth (metres)

CP 31	180.54	T.S.
32	181.73	T.S./P.S.
33	183.43	T.S./P.S.
34	185.79	T.S.
35	186.45	P.S.
36	186.68	T.S./P.S.
37	187.49	T.S./P.S.
38	189.10	T.S.
39	191.38	T.S.
40	193.87	T.S.

Specimen No. Depth (metres)

CP 41	196.90	T.S.
42	207.50	T.S.
43	220.66	T.S.
44	228.74	T.S.
45	229.57	T.S./P.S.
46	234.92	T.S.
47	244.56	T.S.
48	245.61	T.S./P.S.
49	246.97	T.S.
50	249.33	T.S.

M.H. M. J. M.

April 1971.

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APPENDIX A.

CORE RECOVERY CHART

DDH.6 - CLUMP PROSPECT

<u>From</u>	<u>METRIC</u>	<u>To</u>	<u>CORE RECOVERY</u> <u>In metres.</u>	<u>% CORE</u> <u>RECOVERY</u>
0.00		1.14	0.20	18
1.14		2.54	1.00	71
2.54		4.06	1.22	80
4.06		5.26	0.50	42
5.26		6.20	0.94	100
6.20		8.53	2.15	98
8.53		11.58	3.00	98
11.58		13.20	1.60	100
13.20		14.63	1.43	100
14.63		16.64	2.01	100
16.64		17.68	1.04	100
17.68		19.05	1.32	100
19.05		19.79	0.74	100
19.79		20.73	0.95	100
20.73		23.78	3.05	100
23.78		26.78	3.00	100
26.78		26.83	0.05	100
26.83		26.98	0.15	100
26.98		29.87	2.89	100
29.87		31.70	1.83	100
31.70		32.92	1.22	100
32.92		35.97	3.05	100
35.97		38.59	2.62	100
38.59		39.02	0.43	100
39.02		42.07	3.05	100
42.07		44.39	2.32	100
44.39		45.12	0.73	100
45.12		48.17	3.05	100
48.17		50.19	2.02	100
50.19		51.22	1.03	100
51.22		54.27	3.05	100
54.27		55.90	1.63	100
55.90		57.30	1.40	100
57.30		60.35	3.05	100
60.35		61.04	0.69	100
61.04		63.40	2.36	100
63.40		66.73	3.33	100
66.73		69.12	2.39	100
69.12		72.28	3.16	100
72.28		72.51	0.23	100
72.51		74.47	1.96	100
74.47		77.52	3.05	100
77.52		77.95	0.43	100
77.95		79.40	1.45	100
79.40		80.97	1.57	100
80.97		82.50	1.53	100
82.50		84.74	2.24	100
84.74		86.61	1.87	100
86.61		86.78	0.17	100
86.78		87.19	0.41	100
87.19		87.75	0.56	100
87.75		90.47	2.72	100
90.47		92.91	2.44	100
92.91		93.82	0.91	100
93.82		94.43	0.61	100
94.43		94.94	0.51	100
94.94		95.68	0.74	100
95.68		96.52	0.84	100
96.52		96.93	0.41	50
96.93		97.84	0.91	100
97.84		99.82	1.98	100
99.82		102.94	3.12	100

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<u>From</u>	<u>METRIC</u>	<u>To</u>	<u>CORE RECOVERY</u> <u>In metres.</u>	<u>% CORE</u> <u>RECOVERY</u>
102.94		104.19	1.25	100
104.19		105.84	1.65	100
105.84		107.31	1.49	100
107.31		109.12	1.91	100
109.12		110.69	1.57	100
110.69		110.79	0.10	100
110.79		111.74	0.95	100
111.74		112.35	0.61	100
112.35		113.84	1.49	100
113.84		115.09	1.25	100
115.09		118.23	3.14	100
118.23		121.18	2.95	100
121.18		121.70	0.52	100
121.70		122.99	1.29	100
122.99		124.28	1.29	100
124.28		125.88	1.60	100
125.88		127.18	1.30	100
127.18		128.58	1.40	100
128.58		130.21	1.63	100
130.21		130.43	0.22	100
130.43		132.33	1.40	100
132.33		132.89	0.56	100
132.89		133.30	0.41	100
133.30		133.85	0.55	100
133.85		134.27	0.42	100
134.27		135.20	0.93	100
135.20		135.48	0.28	100
135.48		135.78	0.30	100
135.78		136.22	0.44	100
136.22		136.52	0.30	100
136.52		137.90	1.38	100
137.90		138.08	0.18	100
138.08		139.32	1.24	100
139.32		139.50	0.18	100
139.50		139.72	0.22	100
139.72		140.70	0.98	100
140.70		141.66	0.96	100
141.66		141.84	0.18	100
141.84		142.63	0.79	100
142.63		143.36	0.71	100
143.34		144.81	1.47	100
144.81		145.07	0.26	100
145.07		145.53	0.46	100
145.53		147.29	1.76	100
147.29		147.95	0.66	100
147.95		148.53	0.58	100
148.53		148.78	0.25	100
148.78		149.61	0.83	100
149.61		150.22	0.61	100
150.22		150.37	0.15	100
150.37		151.00	0.48	76
151.00		152.38	1.38	100
152.38		152.78	0.40	100
152.78		154.84	1.30	59
154.84		157.89	3.05	100
57.89		158.40	1.01	100
158.90		160.55	1.01	62
160.55		161.77	1.22	100
161.77		162.04	0.27	100
162.04		162.31	0.27	100
162.21		163.98	1.67	100
163.98		167.03	3.05	100
167.03		168.67	1.64	100
168.67		170.08	1.41	100
170.08		173.13	3.05	100
173.13		176.18	3.05	100
176.18		176.86	0.68	100
176.86		177.17	0.31	100

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<u>METRIC</u>		<u>CORE RECOVERY</u>	<u>% CORE RECOVERY</u>
<u>From</u>	<u>To</u>	<u>In metres.</u>	
177.17	177.83	0.66	100
177.83	178.31	0.48	100
178.31	179.93	1.47	90
179.93	180.11	0.18	100
180.11	182.29	2.18	100
182.29	183.43	0.28	24
183.43	184.32	0.89	100
184.32	184.62	0.08	25
184.62	184.93	0.13	42
184.93	185.34	0.08	19
185.34	185.80	0.38	83
185.80	186.33	0.20	38
186.33	186.96	0.63	100
186.96	187.57	0.56	92
187.57	188.38	0.81	100
188.38	189.61	1.73	85
189.61	189.92	0.05	17
189.92	190.22	0.	0
190.22	190.77	0.20	36
190.77	191.43	0.40	61
191.43	191.73	0.	0
191.73	192.04	0.08	25
192.04	192.34	0.02	8
192.34	192.65	0.	0
192.65	192.95	0.10	33
192.95	193.25	0.	0
193.25	193.56	0.31	100
193.56	193.86	0.31	100
193.86	194.47	0.61	100
194.47	194.57	0.10	100
194.57	196.15	1.58	100
196.15	196.68	0.53	100
196.68	196.88	0.20	100
196.88	198.01	1.13	100
198.01	200.58	2.57	100
200.58	203.63	3.05	100
203.63	205.76	2.13	100
205.76	208.81	3.05	100
208.81	209.11	0.30	100
209.11	209.46	0.35	100
209.46	212.62	3.16	100
212.62	214.85	2.23	100
214.85	215.84	0.99	100
215.84	218.89	3.05	100
218.89	221.94	3.05	100
221.94	224.21	2.27	100
224.21	224.99	0.70	90
224.99	228.04	2.97	97
228.04	229.34	1.30	100
229.34	230.50	1.16	100
230.50	233.33	2.83	100
233.33	233.54	0.21	100
233.54	234.64	0.85	65
234.64	237.18	2.54	100
237.18	238.48	1.30	100
238.48	240.15	1.52	41
240.15	243.19	3.04	100
243.19	246.24	3.05	100
246.24	247.07	0.83	100
247.07	247.93	0.86	100
247.93	249.29	2.36	100
249.29	251.93	2.64	100
251.93	252.34	0.41	100
252.34	255.39	3.05	100
255.39	256.30	0.91	100
256.30	258.44	2.14	100
258.44	261.18	2.74	100
261.18	261.49	0.31	100
261.49	264.53	3.05	100

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635135

<u>From</u>	<u>METRIC</u>	<u>To</u>	<u>CORE RECOVERY</u> <u>In metres.</u>	<u>% CORE</u> <u>RECOVERY</u>
264.53		265.14	0.61	100

DDH.6 COMPLETED AT 265.14 METRES.

A.C.I. MINERAL RESOURCES DIVISION

Page 1

TASMANIAN EXPLORATION

635136

DDH. 6. PROSPECT: CLUMP Grid Reference: 444 210N, 313 805E. Angle 60° RL. 657.0' Direction: 220° magnetic.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
0	1.14		Yellow sandy clay.
1.14	5.26	50 - 55°	Dark grey, generally massive, argillaceous and carbonaceous siltstone with thin zones containing light grey siltstone laminae (≤ 2 mm) in the upper portion of the unit. The upper 1 - 2 mm containing soft porous zones. A 5 cm thick siltstone band occurs at about 1.5m. and contains common limonite staining after pyrite. The unit is well jointed, joint planes commonly iron-stained. Quartz veins (≤ 5 mm) occur within the central portion of the unit, dipping 0-10°, and contain cavities after pyrite and ? carbonate.
5.26	6.28	70°	Unit comprising cyclic zones up to 8 cm thick. Each cyclic zone consists of: <u>Top:</u> Dark grey argillaceous and carbonaceous siltstone with rare thin laminae (< 1 mm) <u>Base:</u> Light grey siltstone with sharp basal boundary, few load casts and sporadic pyrite cavities. Light grey siltstone content about 30%. The unit contain a few ironstained joints and thin (≤ 2 mm) quartz veins with few cavities after pyrite. The quartz veins appear to occur along microfaults. Dip of veins 0-10°.
6.28	8.85	60°	Dark grey, ^{massive} argillaceous and carbonaceous siltstone with abundant leucoxene and sporadic, thin siltstone laminae (≤ 2 mm) rarely showing upward grading. Light grey siltstone content $< 5\%$. Between 7.63 and 8.28m, a zone of very finely laminated light grey and dark grey sediments is cut by thin (≤ 3 mm) quartz veins with cavities after pyrite, and minor microfaulting, dipping 10-20°. Sporadic joints, usually ironstained, occur throughout, also rare cavities after pyrite.
8.85	12.13	65-70° between 8.85m-12.00m.	Similar to interval 5.26 to 6.28m, with minor microfaulting, sporadic joints locally ironstained, and rare pyrite occurring in lightgrey siltstone. Minor leucoxene occurs in the dark grey sediments. Light grey siltstone content about 20%. From 12.00m. to base, the dip shallows and then increases suggesting a small dragfold with axial plane dipping about 30°.
12.13	16.64	Where distinct dips 80-90°. Point of change not recorded.	Similar to interval 6.28 to 8.85m. The upper 25 cms. are chloritic, with common irregular blebs and veins of pyrite and is cut by thin irregular, heavily leached (? carbonate) quartz veins (≤ 3 mm). In the remainder of the unit, sporadic pyrite blebs (≤ 7 mm) occur.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
			Total sulphides <0.1%; Sporadic jointing, rarely ironstained. A few thin (< 2mm) quartz veins dip 0-20°; rare quartz veinlets dip 90°.
16.64	19.29	80-90°	Similar to interval 5.26 to 6.28m, with sporadic zones of finely laminated light and dark grey siltstones, (light grey siltstone content about 20%). Between 16.64 and 17.68m, the sequence is intensely microfaulted, very well jointed and is cut by a few thin quartz veins. Dip of deformed unit: 60-80°. In the remainder of the unit microfaults, joints and quartz veins (< 3mm) are less common. Pyrite occurs in the light grey siltstone and in the veins. Total sulphides <0.1%.
19.29	20.50		Dark grey, massive, carbonaceous, siltstone with common leucoxene and a few lighter laminae in the upper 40 cms. A few thin quartz veinlets occur.
20.50	23.18	70-80°	Similar to interval 5.26 to 6.28m, with about 20% light grey siltstone. A massive dark grey carbonaceous siltstone band with common leucoxene occurs between 22.22 and 22.58m. A 25 cms unit showing grading upwards from light grey to dark grey siltstone occurs at 22.75m. Rare microfaults. The unit is poorly jointed with a few thin (< 2 mm) quartz veins containing cavities and pyrite. Quartz veins dip 20-30°. Thin bands (3-4mm) of pyrite occur over a 10 cm section at 21.9m, and are parallel to bedding. Disseminated pyrite also occurs in light grey siltstone unit.
23.18	24.28		Dark grey, massive argillaceous and carbonaceous siltstone with a slight mottling effect due to common irregular, slightly lighter lens-like masses dipping 60°. Microfaults are locally present and may be responsible for the disruption of an original indistinct banding. Pyrite occurs sporadically in the lighter inclusions. Joints present in basal part of the unit, often filled with quartz, chlorite and pyrite.
24.28	25.48	80°	Similar to interval 6.28 to 8.85m, with a few joints in the upper part of the unit filled with quartz, chlorite and pyrite. Locally microfaulted. Pyrite in light grey laminae. A few thin quartz veins (< 1 mm) dip 15-20°.
25.48	28.15	70-75°	Dark grey carbonaceous siltstone with leucoxene and thin, light grey siltstone bands (< 5 cms) showing sharp, locally eroded base, few load casts and upward grading. Thicker siltstone bands with upward grading, occur as follows: 8 cms at 25.84m: Well laminated, rare pyrite, cross-bedded, microfaulted, slightly silicified.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
28.15	31.00		<p>8 cms at 27.30m: As above. 10 cms at 27.60m: Massive, indistinct grading. Rare Joints. Pyrite present in base of light grey siltstone bands. Sporadic thin pyritic quartz veins dip at 15-25°. Suggestions of slight chloritisation in few of light grey siltstone bands.</p> <p>Basal boundary uncertain due to poor core recovery. Dark grey, massive, carbonaceous siltstone with traces of pale grey siltstone bands with pyrite (< 5 mm) and well developed small scours. A few soft porphyroblasts occur. A rounded, pyritic, included fragment (7cm long) of pale grey laminated siltstone occurs at about 29.22m. Many thin quartz veinlets are often associated with microfaults and dip about 35°. Jointing more common towards base. At about 31.00m., an inferred fault occurs. Core fragments are graphitic and slickensided. Core loss likely in this section.</p>
31.00	32.30		<p>Similar to interval 5.26 to 6.28m. About 20% light grey siltstone. The lighter coloured sediments have a greenish (chloritic) tinge. The unit is intensely microfaulted and fractured, slickensided and graphitic surfaces common, also irregular blebs of chloritic material. Quartz veins common, usually with cavities. Traces of pyrite. The veins contain included sediment fragments. Pyrite occurs in the pale grey sediments. Main quartz veins dip 10-20°, thinner veins dip 0-5°.</p>
32.30	33.52		<p>Dark grey massive, carbonaceous siltstone. A few veins (2 - 3 mm) of quartz/chlorite (with pyritic cavities) dipping 15°. Pyrite occurs as spherical aggregates and euhedra (< 3 mm) in the siltstone.</p>
33.52	36.13	60° 70° at base.	<p>Similar to interval 5.26 to 6.28m. with 10-15% pale grey siltstone. A 5 cms. chloritic zone with common pyrite and chlorite porphyroblasts occurs at 34.83m. Few thin quartz veins dipping 10-20°. Rare joints.</p>
36.13	37.84	40° at 36.25m. 50° " 37.15m.	<p>Dark grey carbonaceous siltstone with sporadic, thin (< 5 mm) light grey, graded siltstone bands. Light grey siltstone content < 5%. Severely microfaulted throughout with quartz infillings. The upper and basal 30 cms. are intensely brecciated and contain graphitic slickensides, included fragments and common quartz, quartz/pyrite and quartz/chlorite veins. A few veins are cavernous after ? carbonate. Suggestion of increase in depth towards base.</p>

635139

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
37.84	39.20		Dark grey, massive carbonaceous siltstone with few thin, irregular quartz veins.
39.20	47.75	60° at 39.25m. 40° " 39.50m. 40° " 40.30m, increasing to 50° at 40.80m. 70° at 41.50m. 70° " 44.39m. 65-70° between 44.39 and 37.75m.	Banded sequence of rhythmic units varying in thickness from about 1 to 20 cms. Each unit comprises: <u>Top:</u> Dark grey, carbonaceous siltstone often containing finely laminated units in thicker bands. <u>Base:</u> Light grey siltstone, sharp base with few scours and load casts, cross-bedding in some thicker units, pyrite parallel to bedding, one unit of convolute bedding. Slightly chloritic in parts. Light grey siltstone. content 30-35%. Minor microfaulting. Few quartz veins (< 2 mm dipping 20° and locally 10-5°. Fold axis dipping 30° at 39.32m.
47.75	48.68		Dark grey massive, carbonaceous siltstone with few thin (<2 mm) quartz veins dipping 25-30°.
48.68	50.00	70-75°	Similar to interval 39.20 to 47.75m. Minor pyrite in pale grey siltstone. Quartz veins dip 20-25°.
50.00	50.59		Similar to interval 47.75 to 48.68m.
50.59	53.00	About 70°	Series of rhythmic units from 3-50 cms. thick. Light grey siltstone content 15-20%. The thicker units show marked erosion features, load casts, cross-bedding, planar lamination and contain ? worm tubes. Minor pyrite. A penecontemporaneous breccia/conglomerate with fragments up to 5 cms. occurs between 51.92 and 52.13m. At 52.77m. a 22 cm unit consists of; in the upper part, a dense dendritic network of chlorite with pyrite surrounding minute sediment fragments. In the lower part, deformed graphitic slate and severely microfaulted banded siltstone with chloritisation of the paler sediment. Sporadic thin quartz veins dip 20°.
53.00	55.45	65° at 54.10m. 40° " 54.50m. 40-45° to base.	Similar to interval 39.20 to 47.75m. the units being up to 10 cms. thick. Pale grey siltstone content about 20%. A few irregular quartz veins, often associated with microfaults.
55.45	59.15	(a) Upper 20 cm change from 45° → 70° → 30° (b) 50° at 56.40m. 40-55° at 57.10m, possible flexure 45° at 57.50m. 50-55° at 58.30m.	Dark grey carbonaceous siltstone, essentially massive, but with an indistinct grey banding (<1 cm) and locally contains thin, pale grey siltstone bands (< 5 cm) which show upward grading, load casts and erosion features. Common microfaults often quartz filled. Slickensided at about 58.0m. at 57.05m.

635140

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
59.15	59.60		Similar to interval 39.20 to 47.75m, with units 5-10 cm thick. Well microfaulted. Pale grey siltstone content about 15%.
59.60	59.80		Dark grey massive carbonaceous siltstone.
59.80	60.35		Dark grey-green, very chloritic banded siltstone brecciated so that original banding now consists of pale green-grey fragments in a darker matrix. The central 16 cm is noticeably banded with pyrite occurring as irregular blebs and disrupted veins and laminae associated in part, with quartz veins. Total sulphides 2-5%.
60.35	66.33	30° at 60.80m. 30° " 61.65m. Below 61.93m dip increases to 45-50° 55° at 62.68m. Below 62.68m dip is 40-50° with a number of small kink bands. The axis of which dip about 30-45°.	Dark grey, slightly chloritic, carbonaceous siltstone with about 10% moderately chloritic grey-green siltstone occurring as graded bands up to 10 cms thick. These beds show well developed scours and load casts. Slightly more massive bands (<30 cms) of dark grey siltstone occur within the sequence. A 25 cm zone of fine (1 mm) laminations occurs at 64.93m, with common microfaults. A fault zone occurs at 61.35m, dipping 20°. Fault zone (2 cms) is filled with friable graphitic, slickensided material. The sequence is cut by numerous thin irregular quartz veins, the more continuous veins dipping 20-25°. Traces of pyrite occur in the paler sediments.
66.33	71.18	45-50°	Similar to interval 39.20 to 47.75m, with a pale grey siltstone content of 20-25%. Individual units up to 10 cm. thick and slightly chloritic in pale grey siltstone bands. Sporadic microfaults and joints. Very minor thin irregular quartz veinlets dip 0-15°. At 67.97m, a series of graphitic joints occur, one joint containing a 1. cm thick quartz/chlorite vein with small cavities and one fleck of chalcopyrite.
71.18	72.36	50°	Dark grey carbonaceous siltstone with rare lighter laminae and bands (<1 cm) and minor leucoxene. Rare thin, irregular quartz veinlets.
72.36	76.47	50-55°	Similar to interval 39.20 to 47.75m, individual units being up to 7 cm thick. Locally chloritic, particularly towards base. The unit is moderately well-jointed in the lower section with graphitic surfaces. Quartz with rounded cavities occurs on few joint surfaces. Rare thin quartz veinlets dipping 0-50°, parallel to bedding. At the top of the sequence small cavities on a ? bedding surface may be trace fossils.
76.47	77.49	45°	Dark grey, slightly chloritic carbonaceous siltstone with very sporadic, thin paler laminae and bands. Pale grey siltstone content < 5%. Very rare thin quartz veins dip 40° and 60°, intersecting at 80°. Rare joints usually lined with quartz and chlorite.

635141

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
77.49	80.21	50-60°	Dark grey carbonaceous siltstone with few graded units up to 12 cm thick. Slightly chloritic towards base of unit. Few fine (≤ 1 mm) laminations at about 78.54m. Few erosional and scour features. Moderately jointed, rare slickensided and graphitic surfaces at about 79.02m. Common leucoxene porphyroblasts (< 1 mm) aligned parallel to bedding, particularly at 79.33m. Pale siltstone content about 10%. Few narrow quartz veins (≤ 2 mm) dipping 0 to 30°. At about 80.14m: thin (≤ 2 cm) pebble conglomerate containing elongate, black siltstone pebbles up to 2 cm long, but usually about 1-3 mm, in dark grey siltstone matrix. Rare pyrite.
80.21	80.97	50°	Dark grey slightly chloritic siltstone, the sequence comprising a series of cyclic zones (≤ 5 cm) each zone consisting of: <u>Top:</u> Dark grey, poorly laminated, carbonaceous siltstone with abundant leucoxene. <u>Base:</u> Pale grey, coarser siltstone band (≤ 5 mm). Pale grey siltstone content 10-15%. Moderately well jointed, very few quartz veins.
80.97	82.14	50°	Dark grey, massive and generally featureless carbonaceous and slightly chloritic siltstone. Few graded units (≤ 10 cm) at base. Rare quartz veins.
82.14	85.67	45-50°	Similar to interval 80.21 to 80.97m. Dark grey, carbonaceous and slightly chloritic siltstone. The sequence consists of a series of graded units generally < 5 cm thick but up to 10 cms. The graded units consist of pale grey-green, slightly chloritic and featureless siltstone (≤ 10 mm) at base and dark grey carbonaceous siltstone at top. Weakly jointed. Few quartz veins. Minor load casts and erosion features in some graded units. Minor microfaulting. At 84.89m. occurs a pale green chloritic vein (< 5 mm) associated with locally moderate microfaulting. Some graded units are finely laminated with alternating pale and dark grey siltstone laminae ($\ll 1$ mm).
85.67	87.50	60°	Dark grey, carbonaceous siltstone. Generally massive but with few zones (≤ 5 mm) of laminated (≤ 1 mm) siltstone consisting of alternating light grey and dark grey-black siltstone laminae. Few graded units. Core fragmentary at about 87.17m (10-15 cm) otherwise poorly jointed.
87.50	89.18		Graded siltstone units (≤ 8 cm) consisting of pale grey, very slightly chloritic siltstone at base grading up to grey-black, argillaceous siltstone at top. Pale grey siltstone content about 15%. Usually a sharp contact between graded units with few load casts and erosional features. Poorly jointed. Rare quartz veins. Leucoxene (?) porphyroblasts common.

635142

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
89.18	89.61	55°	Massive dark grey carbonaceous siltstone containing common leucoxene porphyroblasts and rare euhedral pyrite. Few yellow-white quartz/carbonate (?) veins dipping about 25°. Rare pale grey siltstone laminae (≤ 2 mm).
89.61	90.76	50°	Similar to interval 87.50 to 89.18m. Abundant leucoxene porphyroblasts. The pale grey siltstone is slightly chloritic. Rare quartz veins.
90.76	92.02	45-50°	Similar to interval 89.18 to 89.61m. Very abundant leucoxene porphyroblasts otherwise dark grey, generally featureless carbonaceous siltstone slightly banded with pale grey siltstone laminae in basal 20 cm.
92.02	93.83		Massive dark grey, argillaceous and carbonaceous siltstone. Thin (< 10 cm) sequence of pale grey slightly chloritic finely laminated siltstone at about 92.60m. Rare euhedral pyrite. Microfaulting and pyritic quartz veins and veinlets common in top 30 cms. and dip 20-30°. Well jointed - core fragmented in parts.
93.83	95.18		Similar to interval 87.50 to 89.18m. Pale grey siltstone content approximately 20%. Minor microfaulting in parts, faults often quartz filled.
95.18	96.47	40-45°	Massive, dark grey carbonaceous siltstone containing abundant leucoxene porphyroblast. Rare graded units to 5 cm. Few quartz veins dipping about 30°. Few pyrite veins (≤ 2 mm), usually discontinuous and dipping 20° and 30° in opposite directions. Moderately jointed.
96.47	97.84	55°	This unit consists of a number of graded sub-units (≤ 7 cm). At top 25 cms: finely laminated (≤ 1 mm) sequence of pale grey, slightly chloritic siltstone and dark grey siltstone with marked erosional features. Many quartz veins and veinlets, usually < 1 mm. Larger quartz veins carry rare chlorite and pyrite. Sporadic disseminated pyrite in siltstone. Leucoxene porphyroblasts common. Poorly jointed.
97.84	99.51		Fault zone consisting of mottled green-white brecciated siltstone invaded by quartz, chlorite and pyrite, particularly between 98.68 and 99.06m. in which section pyrite constitutes 15-20% of rock. The top 45 cm consists of pale grey-green siltstone similar to remainder of unit, but less chloritic and contains much less quartz and pyrite. Most pyrite in single quartz vein (≤ 4 cm). Very rare ($< 0.1\%$) chalcopyrite. Finely laminated dark grey siltstone included in basal 25 cm.
99.51	100.36	40°	Similar to interval 87.50 to 89.18m. Dark grey carbonaceous siltstone in graded units (≤ 4 cm). Few chloritic veins (≤ 3 mm) dipping 20-30°.
100.36	102.22	50°	Massive dark grey slightly chloritic siltstone. From 100.73 to 101.08m, a series of graded units with thin pale grey slightly chloritic siltstone (≤ 5 mm) at base, grading up to dark, argillaceous and carbonaceous siltstone.

635143

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
102.22	103.65	45°	<p>Common quartz, quartz/chlorite and pale yellow quartz/carbonate veins (≤ 5 mm) dipping 30-40°. Common leucoxene (?) porphyroblasts. Poorly jointed.</p> <p>Banded pale slightly green, grey and dark grey-black graded units consisting of argillaceous and carbonaceous siltstone and slightly chloritic siltstone in units up to 5 cm. Both argillaceous and coarser siltstone bands often finely laminated. Sharp contacts between graded units. Leucoxene porphyroblasts common. Pale siltstone content approximately 20%. Micro-faults common, dipping about 30°. Faults often filled with quartz or yellow quartz carbonate.</p>
103.65	107.47	40°	<p>Massive, dark grey argillaceous and carbonaceous siltstone. Between 105.88 and 106.26m. is finely laminated pale grey-green and dark grey graded units of slightly chloritic siltstone and argillaceous and carbonaceous siltstone. Quartz and quartz/chlorite veins (≤ 5 mm) common. Traces of pale yellow to buff carbonate present in few veins, common quartz veinlets (≤ 0.5mm). Veins often dipping 0-5°. Leucoxene porphyroblasts become larger (≤ 2 mm) and more common towards base of unit. Moderately well jointed, often with graphitic joint faces. Minor traces of chalcopyrite ($< 0.1\%$) at 107.34m, associated with quartz/chlorite vein.</p>
107.47	109.27	40°	<p>Similar to interval 103.65 to 107.47m, but banding more common and large (≤ 3 mm) euhedral porphyroblasts very common. Cavernous quartz and quartz/chlorite veins, often 5 mm and usually associated with pyrite occur at/or between: 107.74m. 108.30 and 108.40m. 108.51 and 108.63m. Traces ($< 0.1\%$) chalcopyrite occurs between 108.51 and 108.63m. Graded units more common than in interval 103.65 to 107.47m, and often finely laminated. Minor microfaulting.</p>
109.27	112.17		<p>Brecciated, dark and pale (with pale green tinge) grey argillaceous and carbonaceous siltstone with abundant, large (≤ 7 mm) euhedral and lensoid porphyroblasts of leucoxene and abundant quartz and pyritic quartz/chlorite veins (≤ 3 cms) dipping randomly. Joint faces often dark green-black chlorite coated. Common microfaulting. Pyrite about 2-4%. Minor traces ($< 0.1\%$) chalcopyrite.</p>
112.17	114.35	50°	<p>Similar to interval 100.36 to 102.22m. Quartz/chlorite veins common but little pyrite, and quartz/carbonate veins absent. Microfaulting common.</p>

635144

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
114.35	124.66		A sequence of graded units of argillaceous and carbonaceous siltstone, usually finely to very finely laminated but rarely massive. Graded units usually ≤ 5 cm. Euhedral and anhedral porphyroblasts common, usually ≤ 2 mm. Quartz, quartz/chlorite and quartz/carbonate (usually cavernous) veins common (≤ 1 cm) and often dip $30-40^\circ$. Quartz veinlets (< 1 mm) common. Microfaulting common, usually forming vein site. Rare pyrite.
124.66	126.73	55°	Massive, dark grey to black argillaceous and carbonaceous siltstone containing numerous euhedral to anhedral leucoxene porphyroblasts (≤ 2 mm). Numerous quartz/chlorite and quartz/chlorite/carbonate veins (≤ 1 mm) usually pyritic, rarely chalcopyritic (total chalcopyrite $< 0.1\%$). Dip of veins uniform at 25° .
126.73	133.60	60° at 127.08m. 60° " 128.45m. 60° " 130.18m. 60° " 132.26m.	Medium grey and dark grey-black graded units of argillaceous and carbonaceous siltstone. Graded units generally about 8 cm. The graded units consist of medium grey siltstone (at base) grading almost imperceptibly up to dark grey-black argillaceous and carbonaceous siltstone. Numerous leucoxene porphyroblasts aligned parallel to bedding. Common quartz, yellow carbonate, quartz/chlorite and quartz/carbonate veins and veinlets (≤ 10 mm) only rarely cavernous. Dip of veins $15-25^\circ$. Few graphitic joint surfaces, rarely slickensided. Graded units become more graphitic and more finely laminated towards base. Prominent breccia zone between 132.34 and 132.62 m. with yellow-white, quartz/carbonate vein (slightly cavernous), sporadic pyrite and common graphitic and slickensided fault planes. Slightly microfaulted in parts. The unit is more massive between 128.61 and 129.06m.
133.60	137.75	60° at 135.61m.	Massive dark grey to black argillaceous and carbonaceous siltstone. Few leucoxene porphyroblasts (≤ 1 mm). Common graphitic joint surfaces - generally very well jointed. Few, usually pyritic, quartz and quartz/chlorite veins (≤ 10 mm), the quartz/chlorite veins often dipping about 30° while the fine quartz veins dip about 45° . Between 133.65 and 133.85m; a breccia zone with slightly pyritic and chloritic vein quartz cement. Bedding rarely distinct.
137.75	140.24		Similar to interval 126.73 to 133.60m. Breccia zone with common quartz/chlorite vein between 137.75 and 138.16m. Few porphyroblasts leucoxene (?) (≤ 2 mm). Rare euhedral pyrite (≤ 1 mm) both disseminated and associated with quartz and quartz/chlorite veins. Rare chalcopyrite ($< 0.01\%$) particularly in quartz vein (approximately 7 cm) at 138.51m.

635145

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
140.24	141.32		Massive, dark grey, argillaceous and carbonaceous siltstone, commonly with graphitic joint surfaces. Rare, leucoxene porphyroblasts (≤ 1 mm). Quartz and quartz/chlorite vein complexes common to 1 cm ^{thick} carrying minor ($< 0.1\%$) chalcopyrite at about 141.14m. Minor microfaulting.
141.32	145.07	60° at 141.66m. 50° at 142.63m. 50° " 143.34m. 65° " 144.86m.	Series of graded pale and dark grey argillaceous and carbonaceous siltstones: Graded units (generally ≤ 4 cm) often finely to very finely laminated. Between 141.96 and 142.42m, the sequence is massive, similar to interval 140.24 to 141.32m. Quartz vein (≤ 10 mm) common. Rare euhedral (≤ 4 mm) disseminated pyrite. Pale grey siltstone is slightly chloritic between 143.01 and 143.18m. Few leucoxene porphyroblasts towards base. Severe deformation occurs between 143.57 and 144.82m, in the form of microfaulting, folding and chaotic brecciation. Zone of deformation includes common highly reflective graphitic and slickensided surfaces, but only rare pyrite.
145.07	147.39	50° at 145.57m. 65° " 146.86m.	Massive, dark grey, argillaceous and carbonaceous siltstone containing common leucoxene porphyroblasts (≤ 2 mm) and graded units (≤ 8 cm) in parts. Quartz, quartz/chlorite and quartz/chlorite/carbonate (often slightly cavernous) veins (≤ 10 mm) common. Microfaulting common with few graphitic and slickensided surfaces. Well jointed.
147.39	149.61	60°	Pale and dark grey, argillaceous and carbonaceous siltstone in graded units (≤ 5 cm) and often finely laminated (≤ 1 mm) with alternate pale and dark grey laminae. Pale grey siltstone content approximately 5%. Abundant euhedral and anhedral mottled grey-green and grey-yellow porphyroblasts, (≤ 4 mm) often with radiating structure. Porphyroblasts more abundant towards base of unit and are parallel and sub-parallel to bedding. Quartz, quartz/chlorite and quartz/chlorite/carbonate veins (≤ 10 mm) common, particularly towards base of unit and dip 30-60°. Few microfaults, usually marked by veins. Common graphitic joint surfaces.
149.61	150.37		Quartz and quartz/chlorite containing abundant pyrite. Minor, dark grey to black, argillaceous and carbonaceous siltstone with abundant porphyroblasts (leucoxene?) and common dark green quartz/chlorite veins. Highly reflective graphite on some joint faces. Rare traces ($< 0.1\%$) chalcopyrite. Very well jointed - core fragmentary with core loss.

635146

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
150.37	155.45	50° at 164.22m.	Very fragmentary, dark grey to black, massive, argillaceous and carbonaceous siltstone containing abundant euhedral to anhedral porphyroblasts (≤ 2 mm) leucoxene (?). Common quartz and mottled white, pale yellow and green, pyritic quartz/chlorite/carbonate veins particularly between 151.51 and 152.27m. Carbonate slightly leached in parts. Highly reflective graphite on some joint faces.
155.45	170.99		Massive, dark grey to black, argillaceous and carbonaceous siltstone containing abundant euhedral to anhedral grey-green and pale yellow-grey porphyroblasts (≤ 2 mm) some of which (usually euhedral) have radiating structure. Between 155.68 and 155.93m, common white quartz and green, pyritic quartz/chlorite veins. This part of the unit is brecciated with sub-rounded to angular fragments of dark grey argillaceous and carbonaceous siltstone cemented by quartz and pyritic (and slightly chalcopyritic) quartz/chlorite. Veins dip at various angles. Total sulphides for the interval 155.68 to 155.93m. is approximately 5%; total chalcopyrite $\leq 0.5\%$. Between 158.93 and 159.66m; slightly to moderately leached quartz and mottled white, yellow and green quartz/chlorite/carbonate veins with common euhedral pyrite (≤ 3 mm) and rare chalcopyrite ($< 0.1\%$). Pyrite also occurs as veins. All veins usually irregular and deformed and often coincide with brecciated zones. Other quartz and quartz/chlorite/carbonate veins (≤ 15 cms) common throughout this sequence and are usually slightly to moderately cavernous. Veins have variable dips. Microfaulting very common. Numerous fine (≤ 0.5 mm) irregular and discontinuous quartz veins, particularly at about 166.83m. Few graphitic joint surfaces. This sequence is characterised by the abundance of discrete carbonate veins.
170.99	175.48		Mottled, pale yellow (carbonate), white (quartz) and green (chlorite) and grey-black carbonaceous siltstone fragments. Top 1.83m and basal 0.61m. consist of brecciated carbonaceous siltstone with quartz/chlorite/carbonate cement with sporadic disseminated pyrite and rare chalcopyrite ($\ll 0.1\%$). The central 2.05m. consists of white and very pale yellow quartz and carbonate with many irregular fractures. The chalcopyrite is apparently associated with minor (≤ 2 mm) white quartz veins. Total sulphides $< 1\%$.
175.48	178.30		Similar to interval 155.45 to 170.99m, but carbonate veins less common.

635147

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
178.30	190.84		<p>Similar to interval 170.99 to 175.48m.</p> <p><u>Mineralised Carbonate Zone:</u></p> <p>This zone may be subdivided into three units -</p> <p>(i) <u>178.30 to approx. 183.43m.</u> Mottled yellow-white and green, generally massive and slightly chloritic quartz carbonate with sporadic euhedral pyrite and rare, dark grey carbonaceous siltstone breccia zones (≤ 10 cm). Between about 179.42 and 180.10m occurs a massive and microfaulted, dark grey carbonaceous siltstone containing many irregular and discontinuous quartz veins and veinlets (≤ 3 mm), often slightly chloritic and pyritic. Few leucoxene (?) porphyroblasts and rare disseminated pyrite. Leucoxene porphyroblasts occur also between 180.74 and 181.04m, in dark grey carbonaceous siltstone.</p> <p>(ii) <u>183.43 approx. to 187.57m. approx.</u> Mottled green, pale yellow, black and white slightly chloritic quartz/carbonate containing abundant euhedral pyrite ($\leq 5\%$). Few dark green, fibrous to acicular, euhedral actinolite, often with radiating habit. Magnetite common between about 186.64 and 186.81m. and less common between about 184.12 and 190.22m. Few breccia zones of green chloritic siltstone. Very rare (< 0.1%) chalcopyrite. Recovered core (see Appendix A) only slightly to moderately leached although core recovery was low.</p> <p>(iii) <u>187.57 approx. to 190.84m.</u> Similar to interval 178.30 to approx. 183.43m, with common euhedral pyrite and white and pale yellow quartz/carbonate.</p>
190.84	207.20	<p>75° at 196.92m.</p> <p>75° " 198.03m.</p> <p>75° " 199.80m.</p> <p>70° " 200.56m.</p> <p>65° " 202.56m.</p> <p>75° " 204.99m.</p>	<p>Generally massive, dark grey quartzite and medium grey recrystallised sandy siltstone and carbonaceous siltstone. Extremely hard in parts. Few darker bands of recrystallised carbonaceous siltstone forming graded units with paler siltstone. Few narrow zones (≤ 10 cm) containing dark grey carbonaceous siltstone fragments. Finely laminated in parts. Sporadic graded bedding, cross-bedding and erosional features. Few load casts and (?) worm burrows. Few quartz veins (≤ 5 mm), often dipping 0-20°, and occasional leached quartz/carbonate veins. Sporadic leucoxene (?) porphyroblasts in dark grey carbonaceous siltstone. Rare slickensided and chloritic fault planes. Rare graphitic joint planes, occasionally associated with fine grained pyrite. Sporadic disseminated pyrite.</p>
207.20	210.96	<p>80° at 207.28m.</p> <p>80° " 208.34m.</p> <p>80° " 210.78m.</p>	<p>Medium grey with slightly green tinge, and dark grey-black graded siltstone units (≤ 5 cm) with abundant leucoxene porphyroblasts particularly in the dark grey-black siltstone bands. The graded units consist of:</p> <p>Medium grey and slightly green (chloritic?) siltstone at base grading gradually up to dark grey argillaceous and carbonaceous siltstone. Few load casts and erosional features. Few quartzite units (≤ 0.46m) similar to interval 190.84 to 207.20m. Poorly jointed. Rare quartz veins.</p>

635148

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
210.96	215.73	70° at 212.79m.	Similar to interval 190.84 to 207.20m, but with slightly green (chloritic?) tinge, common small (≤ 1 mm) leucoxene porphyroblasts and few units of dark grey argillaceous and carbonaceous siltstone also containing abundant leucoxene porphyroblasts. Few minor folds and microfaulting at about 210.23m. Few quartz veins (≤ 3 mm) commonly dipping 15-20°. Between 213.85 and 214.15m. is a slightly to moderately leached, white and fragmentary quartz/carbonate.
215.73	218.88	85°	Finely (often < 1 mm), but irregularly laminated pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. Leucoxene (?) porphyroblasts common, particularly in dark grey carbonaceous siltstone. Sporadic quartz, quartz/chlorite and quartz/carbonate (usually slightly cavernous) veins (≤ 4 mm), slightly pyritic in parts and with variable dip. Also rare scattered acicular carbonate (?) crystals (≤ 2 mm). Rare disseminated pyrite. Few microfaults.
218.88	224.21	70° at 219.03m. 70° " 223.75m.	Graded units of pale grey, very slightly chloritic siltstone and dark grey argillaceous and carbonaceous siltstone. Abundant porphyroblasts (≤ 2 mm) leucoxene. Common quartz, quartz/chlorite, quartz/carbonate and pale yellow carbonate veins and veinlets (≤ 2 cms) of variable dip and which commonly coincide with microfaults. Other, non-mineralised microfaults common. Carbonate veins usually only slightly cavernous. Few load casts and worm burrows (?).
224.21	228.15	60° at 225.89m. 50° " 227.41m.	Graded units (≤ 25 cm) of pale grey and slightly chloritic siltstone (at base) and dark grey argillaceous and carbonaceous siltstone containing abundant leucoxene porphyroblasts (at top). Few quartz/chlorite and quartz/carbonate veins and pale yellow carbonate veins (≤ 10 mm), slightly to moderately cavernous. Veins have variable dips but commonly dip about 25°. Few minor microfaults.
228.15	234.66		Silicified and recrystallised, white and pale grey to black siltstone and carbonaceous siltstone and quartzite. Extremely hard in parts, commonly with conchoidal fracture. Bedding generally indistinct. Common quartz veins (≤ 15 mm) usually with diffuse boundaries. The thicker quartz veins often appear to contain a core of slightly translucent quartz within white opaque quartz. Common carbonate and quartz/carbonate veins (usually ≤ 10 mm), but about 30 cm between 228.44 and 228.74m. Slightly to moderately cavernous. Common pyritic quartz/carbonate/actinolite veins with rare magnetite (particularly at about 229.60m). The actinolite occurs as dark green acicular and fibrous crystals, often in radiating aggregates. Dip of veins variable. Few euhedral and anhedral porphyroblasts occur in dark grey, slightly silicified argillaceous and carbonaceous siltstone towards base. Few narrow (≤ 3 cm) zones containing angular to rounded siltstone pebbles. Minor microfaulting.

635149

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
234.66	236.46	Approx. 80° at 234.74m. 70° " 236.18m.	Similar to interval 215.73 to 218.88m. Few quartz and quartz/chlorite veins and carbonate and quartz/chlorite/carbonate veins and veinlets, commonly irregular and discontinuous and generally ≤ 10 mm thick. Minor microfaulting.
236.46	240.34	75° at 237.38m. 75° " 238.69m.	Massive, medium to dark grey, slightly to strongly silicified and recrystallised carbonaceous siltstone with few dark grey to black argillaceous and carbonaceous siltstone bands (≤ 7 cm) containing numerous leucoxene porphyroblasts (≤ 1 mm). Sporadic carbonate, chlorite/carbonate and quartz/chlorite/carbonate veins and veinlets (≤ 2 cm), slightly to heavily cavernous. Rare quartz veins. At approximately 238.61m, there occurs about 8 cm of bedded, brown-green, fine-grained sediments, slightly porous. Few scattered siltstone pebbles (≤ 2 cm).
240.34	244.48	85° at 240.60m. 60° " 241.51m. 70° " 242.72m. 50° " 243.50m. 40-45° " 244.41m.	Graded siltstone units of variable thickness (usually about 3 cm, but often larger) consisting of medium grey siltstone (at base) grading up to dark grey to black argillaceous and carbonaceous siltstone containing numerous leucoxene porphyroblasts (≤ 1 mm) at top. Massive in parts with marked erosional features towards base of unit and slump (?) structure at about 240.91m. Porphyroblasts tend to be larger (≤ 2 mm) and more common towards base. Quartz veins and veinlets common, often irregular and discontinuous. The larger quartz veins (≤ 10 mm) often with cavities after (?) carbonate. Few quartz/carbonate and quartz/chlorite/carbonate veins (≤ 5 mm) only slightly cavernous occur towards base of unit.
244.48	246.49		Mineralised carbonate vein system containing abundant pyrite, very rare traces of chalcopyrite and magnetite. The unit consists of a silicified and recrystallised dark grey carbonaceous siltstone containing a complex network of veins and veinlets, often irregular and discontinuous, and irregular masses of one or combinations of the following minerals; quartz, pyrite, carbonate, chlorite, magnetite and actinolite. The carbonate is only slightly cavernous. Pyrite occurs as disseminated aggregates and veins and rarely along joints. Poorly jointed.
246.49	247.91		Similar to interval 244.48 to 246.49m, but vein system occurs in intensely recrystallised and extremely hard carbonaceous quartzite and forms a much smaller proportion of the unit, than in the interval 244.48 to 246.49m.

635150

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
247.91	253.85	75° at 251.87m. 85° " 252.69m.	Similar to interval 215.73 to 218.88m. Unit consists of alternating thin (<5 mm) bands of pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. Few quartz and carbonate veins (<2 mm). Few graded siltstone units and sporadic slump structures. Microfaults common particularly at about 248.24m.
253.85	257.40	70° at 254.61m. 70° " 256.84m.	Massive, medium to dark grey recrystallised siltstone (quartzite) with few graded units of pale to medium grey siltstone and dark grey to black argillaceous and carbonaceous siltstone, containing abundant leucoxene (?) porphyroblasts. Rare quartz veins and veinlets.
257.40	260.46		Similar to interval 247.91 to 253.85m.
260.46	265.14		Massive dark grey recrystallised siltstone containing few scattered rounded siltstone pebbles and few graded siltstone units similar to interval 253.85 to 257.40m. Few narrow zones (<5 cm) of well rounded siltstone pebble conglomerate. Poorly jointed.
			Hole completed at 265.14 m.

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73-947

635151

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION EL.15/68

18th February, 1971.

RESULTS OF DDH.7, BLOCKS PROSPECT.

M. McIntyre.

SUMMARY

DDH.7 at the Blocks Prospect was completed at a depth of 102.71 metres.

A mineralised zone consisting of white quartz containing chalcopyrite and abundant pyrite and with common cavities after carbonate, was intersected between 76.10 m and 77.57 m. This mineralised zone assayed 2.085% Cu. over an estimated true thickness of 1.26m and on trace amounts of chalcopyrite occur away from this zone, although disseminated pyrite and quartz/pyrite veins are ubiquitous throughout the length of the drill hole.

The mineralised quartz/carbonate vein strikes about N25°W and dips about 65°SW and appears to be sub-parallel to a generally weakly defined schistosity in the chloritic siltstones and phyllites of the country rock.

DDH.7 - BLOCKS PROSPECT.

Grid reference	444 412 N, 313 830 E.
Collar R.L.	669.2 feet.
Angle	60°
Direction	N 51 E Magnetic.
Date drilled	9.1.71 to 23.1.71.
Drilling rate	7.9 metres per shift worked.

1. OPERATIONAL DETAILS:

1.1 Drilling Details -

The Mindrill F30 drill rig was moved from the DDH.5 site on January 7th and 8th and drilling commenced on January 9th, 1971.

NX casing was seated at 13.10 metres and the hole was completed with NQWL equipment. The drilling progress and engineering details are graphically shown in Figure 1.

1.2 Drilling Conditions -

Drill runs and core recovery are shown in Appendix A. Core recovery was relatively low to 13.10m because of inherent low recovery when using casing bits. Below 13.10m. core recovery was almost invariably 100% although drill runs were often short because of the habit of the schistose country rock to split along planes of schistosity and block the core barrel inner tube.

Water return was lost at about 87.2m and the hole was cemented twice before the water return was recovered.

Sludge samples were collected over 0.9m intervals.

1.3 Drill Hole Deviation -

The drill hole surveys were as follows:

Collar	60°	
15.24m	58.5°	acid-tube.
30.48m	56.5°	" "
45.72m	56.5°	" "
60.96m	56°	" "
60.96m	56°	at 062° magnetic (Tropari)
76.20m	53°	acid-tube.
91.46m	51°	" "

2. GEOLOGY:

The complete drill log is given in Appendix B and may be summarise as follows:

0 to 23.47m.

Pale to dark green, moderately to heavily silicified chloritic sediments containing numerous quartz and pyritic quartz veins and trace amounts (< 0.01%) of chalcopyrite. Disseminated pyrite als common.

23.47 to 76.10m.

Pale to dark green chloritic siltstone and phyllite, slightly silicified in parts. Sedimentary features, including graded bedd locally well preserved. Quartz veins and disseminated pyrite comm Extremely rare (<< 0.01%) chalcopyrite.

76.10 to 77.57m.

Mineralised zone consisting of white quartz containing chalcopyrit and abundant pyrite and with cavities after carbonate.

77.57 to 102.71m.

Similar to interval 23.47m to 76.10m, but contains few quartz/ carbonate veins. Pyrite common. Extremely rare chalcopyrite.

3. SAMPLE ASSAYS:

The following lithological intervals were split and assayed for copper.

<u>Interval.</u>	<u>Sample No.</u>	<u>Assay Value (% Cu</u>
60.35m - 63.55m.	BAL.0404	0.0035
63.55m - 66.27m.	0405	0.0043
66.27m - 72.97m	0406	0.008
72.97m - 74.06m	0407	0.0195
74.06m - 76.10m	0408	0.275
76.10m - 77.57m	0409	2.085
77.57m - 82.22m	0410	0.0075
82.22m - 83.46m	0411	0.0203
83.46m - 83.99m	0412	0.0035
83.99m - 87.47m	0413	0.003
87.47m - 88.24m	0414.	0.0308
88.24m - 89.78m	0415	0.0038

4. DISCUSSION:

The copper mineralisation in the Blocks Prospect area as revealed by DDH.7 consists of chalcopyrite associated with a single major → pyrite's quartz/carbonate vein discordant to the bedding of the cow rocks and apparently sub-parallel to a generally weakly defined schistosity.

4. DISCUSSION (Continued):

The mineralised vein strikes N25°W and dips 65°SW. Copper values away from this zone are negligible.

The country rocks are finegrained sediments metamorphosed in the greenschist facies and consist of chloritic siltstones and phyllite silicified in parts.

Encls:

- Fig. 1 Drilling progress and engineering details.
- Appendix A. Drill runs and core recovery.
- Appendix B. DDH.7 Drill Log.

APPENDIX A - CORE RECOVERY CHART.

DDH.7 - BLOCKS PROSPECT:

METRIC		CORE RECOVERY	% CORE
From	To	In Metres.	RECOVERY.
0.00	0.61	0.56	92
0.61	1.22	0.51	83
1.22	1.83	0.46	75
1.83	2.44	0.53	68
2.44	5.49	2.18	72
5.49	6.10	0.61	100
6.10	6.71	0.15	25
6.71	9.75	1.52	50
9.75	12.19	1.22	50
12.19	13.10	0.36	39
13.10	14.63	1.52	100
14.63	16.00	1.37	100
16.00	17.52	1.16	76
17.52	18.13	0.61	100
18.13	19.20	1.07	100
19.20	20.12	0.92	100
20.12	20.42	0.30	100
20.42	21.64	1.22	100
21.64	22.25	0.61	100
22.25	23.47	1.22	100
23.47	25.37	1.90	100
25.37	26.21	0.84	100
26.21	26.66	0.45	100
26.66	27.73	1.07	100
27.73	28.04	0.31	100
28.04	28.19	0.15	100
28.19	30.33	2.14	100
30.33	31.70	1.37	100
31.70	32.76	1.06	100
32.76	33.63	0.87	100
33.63	34.75	1.12	100
34.75	35.81	1.06	100
35.81	36.76	0.95	100
36.76	37.57	0.81	100
37.57	38.49	0.92	100
38.49	39.02	0.53	100
39.02	39.80	0.78	100
39.80	40.78	0.98	100
40.78	42.21	1.43	100
42.21	43.23	1.02	100
43.23	44.19	0.96	100
44.19	46.18	1.99	100
46.18	46.63	0.45	100
46.63	48.46	1.83	100
48.46	49.58	1.12	100
49.58	51.64	2.06	100
51.64	52.63	0.99	100
52.63	53.80	1.17	100
53.80	55.48	1.68	100
55.48	56.48	1.00	100
56.48	58.09	1.61	100
58.09	60.60	2.51	100
60.60	61.87	0.84	66
61.87	63.22	1.35	100
63.22	65.20	1.98	100
65.20	66.75	1.55	100
66.75	69.19	2.44	100
69.19	70.71	1.52	100
70.71	72.23	1.32	86
72.23	74.06	1.83	100
74.06	77.11	3.05	100
77.11	79.50	1.52	64
79.50	81.08	1.58	100
81.08	82.30	1.22	100

METRIC		CORE RECOVERY		% CO.
From	To	In Metres		RECOV
82.30	83.52	0.66		54
83.52	85.95	2.43		100
85.95	87.62	1.67		100
87.62	88.24	0.62		100
88.24	90.42	2.18		100
90.42	92.05	1.63		100
92.05	93.14	1.09		100
93.14	96.01	2.87		100
96.01	96.31	0.30		100
96.31	99.00	2.69		100
99.00	100.58	1.58		77
100.58	100.89	0.31		100
100.89	101.80	0.91		100
101.80	102.71	0.91		100

A.C.I. MINERAL RESOURCES DIVISION

Page 1

TASMANIAN EXPLORATION

DBM.7

PROSPECT: BLOCKS

Grid Reference: 444 412 N 313830 E.

Angle 59°

RL.669.2'

Direction: 052° magnetic.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
0	2.74	20 - 30°	Pale to dark green (often mottled white-green on fine scale), slightly silicified chloritic siltstone. Prominent white and slightly cavernous quartz veins (≤ 7 mm) at about 1.67m and 2.13m. Smaller quartz veins (≤ 1 cm) common and often occurring parallel to cleavage. Usually pyritic. Jointing common. Cleavage dips 70°.
2.74	5.49	45°	Similar to interval 0 to 2.74m, but pale green and finer grained. Bedding only vaguely defined. Cleavage, defined by elongate pyrite aggregates, normal to bedding. Quartz veins (≤ 3 mm) and veinlets common, variable dip. Poorly jointed.
5.49	9.60		Similar to interval 0 to 2.74m. Becomes much more silicified towards base. Usually dark green. Laminations poorly defined, but usually ≤ 1 mm. Minor disseminated pyrite. Pyritic quartz veins common.
9.60	13.18		White, pale green and mottled white-green quartz and heavily silicified chloritic siltstone. Minor chalcopyrite ($< 0.1\%$) occurs in small (≤ 3 mm) irregular and dendritic aggregates but occasionally as thin (≤ 1 mm) discontinuous veins. The chalcopyrite is usually associated with quartz and quartz/chlorite veins and with pyrite, although both chalcopyrite and pyrite occur alone. Pyrite occurs as euhedral crystals and anhedral fine-grained aggregates. The quartz veins within this unit often have diffuse boundaries and occasional cavities after pyrite and ? carbonate. Well jointed. Quartz veins commonly dip about 45°. N.B. This zone coincides with eastern margin I.P. anomalies, Blocks Prospect.
13.18	17.68	20-30° at 16.76m	Hard, massive, medium-dark green, very even textured, coarse and silicified chloritic siltstone. Mottled green-white on fine scale. Quartz veins common, often dipping 50-60°, often pyritic and with diffuse boundaries. Disseminated pyritic aggregates throughout unit. Rare, narrow (< 0.5 mm) pyrite veins. At about 16.76 m, vague bedding with few pebbles non-silicified green siltstone. Laminations with diffuse boundaries up to 4 mm. Moderately well jointed.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
17.68	19.96		Similar to interval 13.18 to 17.68m., but softer and moderately friable, pale green porous, fine-grained chloritic siltstone. Quartz veins (≤ 3 mm) common with dip, ^{about} 50°. Rare chalcopyrite in quartz vein at about 19.89m. Small elongate blebs dark green chlorite aligned parallel cleavage. Cleavage dips 25°.
19.96	23.47		White quartz veins, often with diffuse boundaries and completely silicified chloritic siltstone. Mottled white and dark grey-green. Chlorite present as minute grains in siliceous matrix. Quartz veins (≤ 2 cm) common, often with dips of about 50°. Pyrite common as narrow irregular veins and disseminated small aggregates. At about 23.17 m. occurs a quartz/pyrite vein about 2 cm. thick. Quartz veins have few cavities after pyrite. Very well jointed.
23.47	34.59	35° at 24.38m. 30°-0°-10° @24.99 35° at 26.36m. 5° " 26.66m. 30° " 27.27m. 35° " 27.57m. 30° " 28.73m. 20° " 30.33m. 35°-0°-10° @31.54 15-20° at 32.00m. 30° at 32.30m. 15-20° at 33.21m. 30° at 33.53m.	Banded pale grey-green and dark grey-green graded units of chloritic siltstone; graded units consist of : Top - dark grey-green argillaceous siltstone. Base - pale grey-green siltstone. Load casts and erosional features common. The graded units are often finely laminated, and are usually ≤ 10 cms although thicker, more massive units do occur. Few quartz veins (≤ 3 mm), dipping 50-60°, often slightly pyritic and occasionally cavernous. Pyrite almost invariably restricted to the pale coarser bands and usually occurs as disseminated subhedral, fine-grained aggregates, although euhedral pyrite occurs in quartz veins. Moderately jointed but core usually parting parallel to bedding. Minor microfaulting.
34.59	36.19	30° at 34.75m. 45° " 35.51m.	Pale green, even-textured chloritic siltstone. Finely laminated in part, but bedding generally poorly defined. Few quartz veins (≤ 3 mm) and veinlets, often slightly cavernous (after pyrite) and occasionally slightly pyritic. Quartz veins dip 40-50°. Pyrite also occurs parallel to the bedding as fine-grained anhedral aggregates. Moderately jointed, joint surfaces often chloritic.
36.19	37.05		Similar to interval 34.59 to 36.19m., but extremely pitted and cavernous, usually along quartz veins. Cavernous after pyrite and ? carbonate. Sporadic euhedral pyrite and oxidised pyrite. Few deformed quartz veins (≤ 5 mm). Moderately jointed.
37.05	38.55	20 - 30°	Similar to interval 34.59 to 36.19m.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
38.55	40.23	30° at 38.71m. 30° at 39.01m. 40° at 39.16m. 30° at 39.62m.	Similar to interval 34.59 to 36.19m., but compact and banded, dark grey-green, and pale grey-green units (≤ 2 cm) making up graded units. Finely laminated, laminations usually ≤ 1 mm. Rare narrow quartz veins (≤ 2 mm), dipping 40-50°. Anhedral pyrite parallel to bedding.
40.23	51.82	25° at 40.08m. 25° " 40.68m. 30° " 41.45m. 25° " 42.20m. 30° " 42.97m. 25° " 43.50m. 30-35° " 44.04m. 25° " 44.80m. 30° " 45.56m. 20° " 47.31m. 30° " 49.63m. 20° " 50.44m. 20-30° " 51.82m.	Similar to interval 38.55 to 40.23m., but cyclic graded units much paler, much softer and very porous. Few graded units to about 10 cms., but usually ≤ 7 cms. Few quartz veins and veinlets (≤ 3 mm), dipping about 45° and occasionally pyritic. Occasional pyrite parallel to bedding. Also pyrite blebs (≤ 5 mm) in coarser siltstone bands. Dark grey-green porphyroblasts (< 1 mm) common, usually occurring in pale and coarser siltstone bands. Load casts locally preserved. Moderately well jointed, joints often quartz filled. Microfaulting, common. Very dark colour banding in parts about 43.89m. Massive units, usually compact, between 46.18 and 46.64m.
Approx. 51.82	60.35	25° at 52.05m. 25° " 53.65m. 20-25° " 55.31m. 20° " 56.69m. 15-20° " 57.60m. 20° " 58.57m. 5-0° " 59.58m.	Similar to interval 40.23 to 51.82m., but more compact and bedding much less well defined and colour banding absent. Cleavage is more prominent and microfaulting more common. Quartz and quartz pyrite veins, (≤ 5 mm), often cavernous becoming much more common. Minute (≤ 0.5 mm) dark green porphyroblasts ubiquitous. Rare yellow-white quartz/carbonate veins (≤ 2 mm) dip about 40°. Becomes less porous towards base. Cleavage: 50-60° 60° 55-60° 40° 45° 55° 55-60°
60.35	63.55		Banded dark and pale grey argillaceous siltstone with faint green chloritic tinge, forming graded units to ≤ 2 cms. Prominent cleavage and common microfaulting. Dark green porphyroblasts common in paler bands. Fractures and microfaults usually quartz filled and usually parallel or sub-parallel to cleavage. Core parts parallel to cleavage.

635159

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
FROM	TO		
Approx. 63.55	66.27	20-0° at 61.42m. 0-10° " 61.72m. 25° " 62.40m.	Few quartz veins (≤ 3 mm). Rare anhedral pyrite. Drag folds common, axis parallel to cleavage. Cleavage: 40-45° 50° 50° Similar to interval 60.35 - 63.55m., but much paler and more chloritic. Bedding and cleavage both very well defined. Yellow-orange quartz/carbonate and carbonate veins (≤ 2 mm) at about 65.07m, dipping 20°. Occasional anhedral pyrite, usually in pale relatively coarser bands. Drag folds common. Moderately jointed, core usually parts parallel to cleavage. Cleavage: Cleavage is approximately normal to bedding. 50° 55-60° 40°
Approx. 66.27	72.97	30-20° at 64.16m. 35° " 64.92m. 50° " 65.73m.	Similar to interval 63.55 to 66.27m, but bedding and cleavage very indistinct. Slightly harder - silicified? Common quartz veins (≤ 3 mm) dipping about 45°. Also pyrite and quartz/pyrite veins, and narrow (≤ 1 mm) irregular quartz veinlets. Fault with slickensided, chloritic and quartzose surface at 69.19 m. Bedding becomes slightly more well-defined towards base of unit which apparently consists of a series of graded sub-units to about 7 cm. Very minor traces ($\ll 0.1\%$) chalcopyrite occur in a quartz/pyrite vein at about 72.08m. Well jointed. Cleavage: 35° 35°
72.97	74.06	About 50°	Pale green plastic clay. Dark green, even-textured, porous and pitted chloritic, tuffaceous or quartz sandstone? Basal 25 cms. similar to basal section of interval 66.27 to 72.97m. Bedding very indistinct.
74.06	76.10		Mottled, pale and dark green slightly silicified chloritic siltstone. Bedding generally poorly defined. Many quartz veins and veinlets, often irregular and deformed. One large (≤ 5 cm) quartz vein at about 75.20m. contains approximately 8 to 10% chalcopyrite in dendritic aggregates. Larger veins commonly dip about 50°, but veinlets have random orientation. Pyrite common in quartz veins. Microfaulting common, faults often quartz-filled. Becomes pale grey-green and more silicified in basal 40 cms.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
76.10	77.57		<p><u>Mineralised Zone:</u> White quartz containing chalcopyrite and abundant pyrite. Common cavities (≤ 4 cm) after carbonate, occasionally with pale brown carbonate residue. Many dark green chloritic siltstone breccia fragments, particularly on hanging wall. Euhedral pyrite (≤ 15 mm) common. Chalcopyrite apparently restricted to top 95 cm. of unit and particularly to the interval 76.48 to 76.83 m. At about 76.58m: thick (25 mm) irregular pyritic chalcopyrite vein. Elsewhere chalcopyrite occurs as dendritic aggregates up to 3 cm. diameter but usually ≤ 10 mm. Total sulphides estimated 10 to 14% in the ratio : Py:Cpy = 60:40. Dip of quartz vein on footwall, about 25°.</p>
77.57	82.22	20°	<p>Dark green, relatively coarse and massive chloritic sediment. Slightly silicified throughout and heavily silicified with pyritic quartz veins (≤ 5 cm) in top 70 cm. Bedding and cleavage vaguely discernable, bedding dipping about 20° and cleavage (defined by elongate pyrite aggregates) approximately normal to bedding. Quartz veins common, often pyritic, dipping about 50°. Well jointed in places. At 80.52 to 80.67m. pale cream-brown talcose (?) chloritic sediment similar to interval 82.22 to 83.46m.</p>
82.22	83.46		<p>Dark khaki-brown, even-textured and compact, very fine-grained chloritic and talcose sediment. Few fine (< 0.5mm) chlorite veins dipping about 30°. Quartz veins and pyrite absent, although large (≤ 5 mm) euhedral pyrite crystals occur with euhedral quartz in very broken core at approximately 82.30m., may be caved material. Only about 50% core recovery.</p>
83.46	83.99		<p>Similar to interval 77.57 to 82.22m. Many irregular fractures. Slightly silicified with disseminated pyrite (≤ 1 mm).</p>
83.99	87.47		<p>Very pale to very dark, massive, extremely fine-grained talcose and chloritic sediment. Waxy appearance. Occasional large (≤ 5 mm) euhedral pyrite. Dragfolds apparent at about 85.19m., axis dipping about 45°, otherwise generally featureless. Common, small (< 1 mm) anhedral dark green porphyroblasts. Common, very fine (< 0.5 mm) dark green, (chloritic?) veinlets often dipping about 25° or 40°. Few quartz veins (≤ 3mm) usually with abundant euhedral to anhedral pyrite.</p>

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
87.47	88.24	0-10°	Dark green highly silicified chloritic siltstone. Coarsely laminated (1-2 mm). Pyritic quartz veins common, often dipping at 40° and 0°, and often consist of fine networks after leaching of pyrite and carbonate. Rare traces (<< 0.1%) chalcopryrite. Well jointed.
> 88.74	89.78	0-5° at 89.30	Very porous and slightly friable, pale and dark green chloritic siltstone. Moderately deformed with few darker argillaceous and carbonaceous bands (≤ 10 mm). Small porphyroblasts (≤ 1 mm) very common, aligned parallel to cleavage. Few dragfolds. Moderately laminated. Few narrow irregular and discontinuous pale yellow carbonate veinlets. Rare quartz veins, rare pyrite. Poorly jointed. Cleavage dips 45° at 89.30m.
89.78	91.36		Similar to interval 83.99 to 87.47m.
91.36	96.09	0-90°	Extremely deformed, finely laminated and graded, pale green, relatively coarse chloritic siltstone and dark grey argillaceous and carbonaceous siltstone. Extremely porous. Dragfolding common. Microfaulting very common, faults often quartz filled. Bedding dips very variable. Cleavage (often forming sites of quartz veinlets) dips 30-40°. Few, narrow (≤ 1 mm) yellow carbonate veins dipping 0-10°. Rare euhedral and anhedral pyrite, disseminated and also associated with quartz veins. About 95.10 to 95.71, deformed worm burrows.
96.09	100.33		Similar to interval 91.36 to 96.09m. except for the presence of abundant thick (≤ 5 cm) yellow-white quartz/carbonate veins. This unit is also slightly silicified and non-porous and contains minor traces (< 0.1%) of chalcopryrite, at about 99.06m. The chalcopryrite is apparently not associated with the carbonate. The quartz/carbonate veins are slightly to strongly cavernous.
100.33	102.71	0-10° Indistinct.	Pale green and dark green, slightly silicified, even textured, chloritic siltstone. Very broken in parts. Few dark green porphyroblasts (≤ 1 mm). Few cavernous quartz veins dipping 20° and 40-45°. Fine-grained. Rare pyrite. DDH.7 completed at 102.71m.

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.MINERAL RESOURCES DIVISIONTASMANIAN EXPLORATION EL.16/68.

4th July, 1971.

REPORT ON DDH.8 -BLOCKS PROSPECT.

M. H. McINTYRE.

SUMMARY

DDH.8 at the Blocks Prospect was completed at a depth of 203.63m.

Two distinct mineralised zones were intersected:

- (a) 37.95m to 40.45m. Pale to dark green chloritic phyllite and slate, silicified in parts and containing quartz, quartz-pyrite and pyrite veins with sporadic chalcopryrite blebs. Assay value; 2750 ppm. Cu, 28 ppm. Pb, 31 ppm. Zn.
- (b) 118.05m. to 119.17m. Dark green recrystallised chloritic slate containing common euhedral pyrite and minor chalcopryrite. Assay value; 3975 ppm. Cu, 45 ppm. Pb, 145 ppm. Zn.

A few minor copper anomalies associated with chalcopryrite in quartz veins occur between the two main mineralised zones.

DDH.8 - BLOCKS PROSPECT.

Grid Reference: 444 210 N, 313 805 E.
 Collar R.L.: 657 feet.
 Angle: 50°
 Direction: 052° magnetic.
 Date drilled: 27.1.71 to 11.5.71.
 Drilling rate: Approx. 4.25 metres per shift.

1. OPERATIONAL DETAILS.1.1 Drilling Details:

DDH.8 was commenced on 27th January, 1971, and was temporarily abandoned on 8th March. The hole was re-entered on 23rd April, and completed on 11th May, 1971.

NX casing was drilled to 21.34m and the hole advanced to 70.71m. with NQWL equipment. BX casing was seated at 70.71m. and the hole advanced to 118.87m. with BQWL equipment. AX casing was seated at 118.87m. and the hole completed at 203.63m. with AQWL equipment.

1.2 Drilling Conditions:

Drill runs and core recovery are listed in Appendix A.

NX casing was drilled to 21.34m. without the core barrel and core recovery to this depth was about 7%. Between 21.34m. and 75.59m., full core recovery was experienced. Core recovery between 75.59m. and 79.86m. was 39%. Low core recovery (40%) was again experienced between 83.11m. and 87.78m. Between 115.21m. and 119.17m., core recovery was less than 70%. Other minor core losses were experienced.

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The hole was twice cemented at about 70.56m. and BX casing seated. Hard silicified material hindered progress in parts.

Sludge samples were not collected because of the complete loss of water return below about 30.5m.

Substantial core loss occurred below about 115.21m. and, as it was desirable to supplement core samples with sludge samples, it was decided to ream further BX casing down the hole in an effort to effect recovery of water return. The BX casing however, was jammed in the hole and, in spite of the use of casing jacks, could not be removed. The rig was then moved to Murrays Reward Prospect to drill DDH.10 and await the arrival of AX casing and AQWL equipment.

After a delay of six weeks, AX casing was seated at 118.87m. and the hole was re-entered with AQWL equipment. Below this depth, the ground was badly fractured in parts, drill runs were commonly short and progress was slow.

1.3 Drillhole Deviation:

The results of the drill hole surveys were:

Collar	51°	106.68m.	44.5°
15.24m.	51°	121.90m.	43°
30.48m.	51°	137.14m.	41°
45.72m.	51°	152.40m.	38°
60.96m.	50°	167.64m.	39°
76.20m.	49°	182.90m.	36.5°
91.44m.	48°	198.14m.	35.5°

DDH.8, in common with all drill holes in the Balfour area, showed a marked tendency to shallow with increasing depth, this tendency being most marked below about 90m.

2. GEOLOGY.

The complete drill log is given in Appendix B. and may be summarised as follows:

0 to 21.34m.

NX casing was drilled to this depth and very little core was recovered. Sludge specimens indicated that the basic rock type was a green pyritic and chloritic sediment.

21.34m. to 34.90m.

Pale to dark grey-green chloritic slate and phyllite, moderately to heavily silicified in parts. Pyritic quartz veins are common.

34.90m. to 42.61m.

Pale to dark green chloritic slate and phyllite, silicified in parts. Quartz, quartz-pyrite and pyritic veins are common and contain rare blebs of chalcopyrite. This intersection averages 1050 ppm. Cu although the bulk of the copper mineralisation occurs between 37.95m and 40.45m., this interval averaging 2750 ppm.Cu.

42.61m. to 118.05m.

Pale to dark green chloritic quartzite, slate and phyllite, moderately to heavily silicified and extremely hard in parts. A few bands of dark grey carbonaceous phyllite occur below about 94m. Medium green, pitted, porous, tuffaceous (?) band (35 cm) occurs at about 87.35m. Quartz veins, usually pyritic and with diffuse boundaries, are common. A few quartz veins contain rare traces of chalcopyrite. Sporadic euhedral pyrite occurs throughout. Sedimentary structures, including cross-bedding, are locally preserved. Few microfaults and slickensided fault planes. Rare chlorite porphyroblasts.

118.05m. to 119.17m.

Dark green, silicified chloritic slate containing abundant (25%) euhedral pyrite and minor chalcopyrite. Core recovery over this interval was only about 13%. Assay values; 3975 ppm. Cu, 45 ppm. Pb, 145 ppm. Zn.

119.17m. to 151.16m.

Pale to dark green chloritic phyllite and slate, extremely fine grained and finely foliated in parts. Few pyritic quartz veins. Very rare chalcopyrite. Few chlorite porphyroblasts.

151.16m. to 159.88m.

White quartz containing numerous irregular and discontinuous chloritic veins, belbs and stringers and a few thicker (\leq 86 cm) bands of dark green chloritic slate and siltstone.

Few irregular pyrite blebs and rare cavernous carbonate veins and blebs. Very rare chalcopyrite.

159.88m. to 165.81m.

Green and grey-green chloritic phyllite and slate.

165.81m. to 169.47m.

White quartz similar to the interval 151.16m. to 159.88m.

169.47m. to 203.63m.

Chloritic slate and phyllite with lesser amounts of dark grey carbonaceous and graphitic slate. Microfaults common. Few quartz and quartz-carbonate veins and veinlets.

3. SAMPLE AND ASSAY RESULTS.

The bulk of the core of DDH.8 was split and assayed for Cu, Pb and Zn, with the following results:

INTERSECTION (metres)	INTERVAL (metres)	SAMPLE NO. BAL.	ASSAY VALUE(ppm)		
			Cu	Pb	Zn
21.34 to 24.99	3.65	1155	15	23	28
24.99 to 26.82	1.83	1156	13	38	28
26.82 to 28.95	2.13	1157	13	30	28
28.95 to 31.10	2.15	1158	23	30	30
31.10 to 33.00	1.90	1159	23	33	35
33.00 to 34.90	1.90	1160	23	65	30
34.90 to 37.95	3.05	1161	50	25	38
37.95 to 39.47	1.52	1162	2475	30	35
39.47 to 40.45	0.98	1163	3175	25	25
40.45 to 42.61	2.16	1164	495	25	20
42.61 to 44.04	1.43	1165	78	18	30
44.04 to 45.11	1.07	1166	390	20	30
45.11 to 47.57	2.46	1167	105	30	25

INTERSECTION (metres)	INTERVAL (metres)	SAMPLE NO. BAL.	ASSAY VALUES (ppm)		
			Cu	Pb	Zn
47.57 to 49.07	1.50	1168	88	25	25
49.07 to 50.90	1.83	1169	50	23	23
50.90 to 52.48	1.58	1170	970	23	30
52.48 to 54.15	1.67	1171	385	28	23
54.15 to 55.47	1.32	1172	75	25	28
55.47 to 57.71	2.24	1173	38	30	38
57.71 to 59.13	1.42	1174	55	30	45
59.13 to 60.42	1.29	1175	30	28	38
60.42 to 62.61	2.19	1176	23	35	35
62.61 to 64.00	1.39	1177	18	25	30
64.00 to 65.57	1.57	1178	20	28	30
65.57 to 66.99	1.42	1179	35	30	30
66.99 to 69.29	2.30	1180	490	103	20
69.29 to 72.12	2.83	1181	23	25	33
72.12 to 75.59	3.47	1182	33	28	35
75.59 to 78.10	2.51	1183	55	33	28
78.10 to 80.93	2.83	1184	25	30	30
80.93 to 81.95	1.02	1185	33	28	28
81.95 to 87.43	5.48	1186	25	28	38
87.43 to 87.78	0.35	1187	150	58	185
87.78 to 89.92	2.14	1188	25	28	30
89.92 to 92.33	2.41	1189	38	28	30
92.33 to 94.14	1.81	1190	190	25	30
94.14 to 97.12	2.98	1191	195	20	33
97.12 to 99.52	2.40	1192	38	28	43
99.52 to 100.36	0.84	1193	25	38	38
100.36 to 102.96	2.60	1194	8	33	45
102.96 to 104.54	1.58	1195	10	28	35
104.54 to 106.55	2.01	1196	18	33	58
106.55 to 108.95	2.40	1197	20	28	40
108.95 to 110.26	1.31	1198	8	18	33
110.26 to 112.16	1.90	1198	18	23	30
112.16 to 113.45	1.29	1200	28	28	33
113.45 to 115.09	1.64	1201	20	28	38
115.09 to 117.78	2.69	1202	63	23	45
117.78 to 118.05	0.27	1203	53	53	83
118.05 to 119.17	1.12	1204	3975	45	145
119.17 to 121.45	2.28	1205	30	30	55
121.45 to 124.23	2.78	1206	20	28	40
124.23 to 125.43	1.20	1207	13	33	15
125.43 to 128.00	2.57	1208	33	25	25
128.00 to 130.48	2.48	1209	45	23	30
130.48 to 132.55	2.07	1210	38	23	23
132.55 to 134.70	2.15	1211	35	25	35
134.70 to 137.35	2.65	1212	25	28	23
137.35 to 139.91	2.56	1213	13	23	20
139.91 to 143.08	3.17	1214	25	38	28
143.08 to 145.70	2.62	1215	8	23	15
145.70 to 148.98	3.28	1216	15	20	30
148.98 to 151.16	2.18	1217	13	25	25
151.16 to 153.90	2.74	1218	13	15	48
153.90 to 155.75	1.85	1219	20	25	98
155.75 to 157.50	1.75	1220	18	15	45
157.50 to 157.85	0.35	1221	93	23	138
157.85 to 158.50	0.65	1222	15	10	25
158.50 to 159.25	0.75	1223	30	25	100
159.25 to 159.88	0.63	1224	8	20	60
159.88 to 161.00	1.12	1225	8	40	35
161.00 to 163.37	2.37	1226	15	28	38
163.37 to 165.81	2.44	1227	25	30	38
165.81 to 167.57	1.76	1228	18	15	38
167.57 to 169.47	1.90	1229	15	15	30
169.47 to 172.21	2.74	1230	15	28	40
172.21 to 174.86	2.65	1231	28	38	80
174.86 to 177.04	2.18	1232	38	35	48
177.04 to 179.17	2.13	1233	18	33	48
179.17 to 182.42	3.25	1234	23	33	50
182.42 to 186.86	4.44	1235	23	55	58
186.86 to 189.08	2.22	1236	25	40	58
189.08 to 190.05	0.97	1237	73	28	55

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Core logging and sample assay values indicate the existence of two separate and distinct mineralised zones.

(a) 37.95m. to 40.45m.

Assay value 2750 ppm Cu, 29 ppm Pb, 31 ppm Zn. This zone occurs within a sequence of pale to dark green chloritic slate and phyllit intersected between 34.90m and 42.61m. This unit has been moderately to heavily silicified in parts and contains minor blebs and veins of chalcopyrite most commonly associated with pyritic quartz veins.

(b) 118.05m. to 119.17m.

Assay value 3975 ppm Cu, 45 ppm Pb, 145 ppm Zn. This zone consists of dark green chloritic sediment containing abundant pyrite and minor chalcopyrite.

Other anomalous Cu concentrations (100 to 1000 ppm Cu) occur between these two mineralised zones and almost invariably consist of chalcopyrite in pyritic quartz veins.

Anomalous Pb and Zn values are rare and where present, are associated with Cu mineralisation.

No sludge samples were collected.

4. CONCLUSION.

Two mineralised zones containing anomalous but sub-economic concentrations of chalcopyrite, were intersected by DDH.8.

The first or shallower zone is expressed on the surface by a low ridge of white silicified sediments containing no apparent sulphide mineralisation. The presence of this zone was unsuspected although it coincides with an I.P. anomaly.

The second and deeper zone occurs at the base of an interval of considerable core loss which may have been caused by leaching of a carbonate-rich and potentially mineralised zone.

On the basis of the assay results of the DDH.8 core, it is considered that further drilling of the Blocks Prospect is not warranted.

DDH.8 - BLOCKS PROSPECT NO. 3.

Drill runs and core recovery.

Depth in Metres.	Core Recovery.	
	Metres.	Percent.
0 to 0.61	0.08	13
0.61 " 3.66	0.18	6
3.66 " 10.36	0.46	7
10.36 " 15.24	0.46	9
15.24 " 21.34	0.30	5
21.34 " 22.86	1.52	100
22.86 " 24.99	2.13	100
24.99 " 25.45	0.46	100
25.45 " 25.91	0.46	100
25.91 " 26.82	0.91	100
26.82 " 28.34	1.52	100
28.34 " 28.95	0.61	100
28.95 " 30.11	1.16	100
30.11 " 32.31	2.20	100
32.31 " 34.75	2.44	100
34.75 " 35.97	1.22	100
35.97 " 36.83	0.86	100
36.83 " 37.43	0.60	100
37.43 " 38.27	0.84	100
38.27 " 39.47	1.20	100
39.47 " 40.23	0.76	100
40.23 " 41.90	1.67	100
41.90 " 42.61	0.71	100
42.61 " 44.04	1.43	100
44.04 " 45.11	1.07	100
45.11 " 45.72	0.61	100
45.72 " 46.33	0.61	100
46.33 " 47.57	1.24	100
47.57 " 48.16	0.59	100
48.16 " 49.07	0.91	100
49.07 " 50.29	1.22	100
50.29 " 51.51	1.22	100
51.51 " 52.48	0.97	100
52.48 " 53.44	0.96	100
53.44 " 54.96	1.52	100
54.96 " 55.47	0.51	100
55.47 " 56.15	0.68	100
56.15 " 56.76	0.61	100
56.76 " 58.16	1.40	100
58.16 " 59.13	0.97	100
59.13 " 59.74	0.61	100
59.74 " 60.50	0.76	100
60.50 " 62.18	1.68	100
62.18 " 63.59	1.41	100
63.59 " 64.92	1.33	100
64.92 " 65.22	0.30	100
65.22 " 66.29	1.07	100
66.29 " 66.57	0.18	100
66.57 " 68.44	1.87	100
68.44 " 70.50	2.06	100
70.50 " 72.54	2.04	100
72.54 " 73.45	0.91	100
73.45 " 75.59	2.14	100
75.59 " 76.50	0.81	89
76.50 " 78.64	0.61	29
78.64 " 79.86	0.25	21
79.86 " 81.08	1.22	100
81.08 " 82.60	1.52	100
82.60 " 83.11	0.51	100

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DDH.8 (Continued).

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Depth in Metres.	Core Recovery.	
	Metres.	Percent.
83.11 to 83.97	0.56	65
83.97 84.43	0.38	83
84.43 87.78	0.91	27
87.78 88.39	0.61	100
88.39 89.91	1.52	100
89.91 90.52	0.61	100
90.52 91.54	1.02	100
91.54 92.35	0.81	100
92.35 93.72	1.37	100
93.72 94.79	1.07	100
94.79 96.62	1.83	100
96.62 98.45	1.83	100
98.45 99.67	1.22	100
99.67 100.89	1.22	100
100.89 103.02	2.13	100
103.02 103.86	0.84	100
103.86 104.54	0.68	100
104.54 105.22	0.68	100
105.22 106.07	0.85	100
106.07 107.59	1.52	100
107.59 108.81	1.22	100
108.81 110.03	1.22	100
110.03 111.86	1.83	100
111.86 112.16	0.30	100
112.16 113.07	0.91	100
113.07 113.69	0.62	100
113.69 114.91	1.22	100
114.91 115.21	0.30	100
115.21 116.12	0.66	73
116.12 116.42	0.13	43
116.42 116.88	0.28	61
116.88 117.18	0.20	67
117.18 117.48	0.08	27
117.48 117.78	0.10	33
116.43 118.05	1.22	75
118.05 119.17	0.15	13
119.17 119.47	0.30	100
119.47 120.84	1.37	100
120.84 121.45	0.61	100
121.45 122.36	0.61	100
122.36 122.82	0.46	100
122.82 123.12	0.30	100
123.12 124.03	0.91	100
124.03 124.63	0.60	100
124.63 126.17	1.52	100
126.17 126.32	0.15	100
126.32 128.00	1.06	64
128.00 128.61	0.61	100
128.61 129.06	0.45	100
129.06 129.36	0.10	33
129.36 130.38	0.15	15
130.38 131.14	0.76	100
131.14 131.34	0.20	100
131.34 131.64	0.15	50
131.64 131.94	0.30	100
131.94 132.55	0.61	100
132.55 133.00	0.45	100
133.00 133.15	0.15	100
133.15 133.30	0.15	100
133.30 134.70	1.06	78
134.70 136.07	1.22	89
136.07 136.53	0.46	100
136.53 138.20	1.67	100
138.20 139.26	1.06	100
139.26 140.78	1.52	100
140.78 141.69	0.76	83
141.69 143.08	1.39	100
143.08 144.14	1.06	100
144.14 144.29	0.15	100
144.29 145.68	1.39	100

DDH.8 (Continued)

Depth in Metres.	Core Recovery	
	Metres.	Percent.
145.68 to 146.14	0.46	100
146.14 146.89	0.75	100
146.89 148.11	1.22	100
148.11 148.57	0.46	100
148.57 150.40	1.83	100
150.40 151.01	0.61	100
151.01 151.16	0.15	100
151.16 151.77	0.23	38
151.77 151.92	0.15	100
151.92 152.70	0.61	80
152.70 153.62	0.92	100
153.62 153.92	0.30	100
153.92 154.23	0.08	25
154.23 154.53	0.30	100
154.53 155.75	1.22	100
155.75 157.12	1.37	100
157.12 158.80	1.68	100
158.80 161.24	2.44	100
161.24 162.76	1.52	100
162.76 163.37	0.61	100
163.37 166.11	2.74	100
166.11 167.63	1.52	100
167.63 169.47	1.84	100
169.47 170.69	1.22	100
170.69 172.21	1.52	100
172.21 174.34	2.13	100
174.34 177.08	2.74	100
177.08 178.61	1.53	100
178.61 179.22	0.61	100
179.22 180.59	1.37	100
180.59 182.27	1.68	100
182.27 184.73	2.46	100
184.73 186.86	1.53	100
186.86 189.91	3.05	100
189.91 192.19	2.28	100
192.19 195.09	2.90	100
195.09 198.14	3.05	100
198.14 201.19	3.05	100
201.19 203.63	2.44	100

A.C.I. MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION

R.L. 657 feet.

DEP. 8. PROSPECT: BLOCKS. Grid Reference: 444 210 N, 313 805 E. Angle 50° Inclination. Direction: N52°E Magnetic

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
0	10.35	25°	This hole was initially cased (NX) to 21.34 m and very little core was recovered over the interval 0-21.34m. Sludge samples indicate a green, slightly arenaceous and pyritic chloritic siltstone over this interval. Pale green, slightly sandy, chloritic siltstone. Sporadic euhedral pyrite. Friable and porous. Occurs mainly as broken fragments and tends to yield a plastic clay on addition of water.
10.35	21.34	25°	Mainly massive, white to pale green porphyroblastic chloritic phyllite and siltstone. Common dark green (chloritic?) porphyroblasts (≤3 mm). Sporadic euhedral pyrite.
21.34	31.10	50° at 21.64m. 45-50° " 24.75m. 40° " 25.90m. 65° " 27.07m. 35-40° " 28.09m. 30° " 29.65m.	Massive, pale to dark grey-green chloritic siltstone and phyllite. Moderately to heavily silicified in parts. Few thin (≤2 cm) bands of argillaceous and non-silicified pale green chloritic siltstone. Quartz veins common (≤10 mm), commonly pyritic and with cavities after pyrite. Often have diffuse boundaries in the silicified zones. The phyllitic surfaces often carry small (<1 mm) dark green porphyroblasts (chlorite?). Pyrite common; associated with quartz veins and as disseminated crystals. Very well jointed. Minor microfaulting.
31.10	34.90		Dark green and grey-green heavily silicified chloritic sediments. Extremely hard in parts. Bedding generally indistinct, but banded in parts. Quartz veins (≤10 mm) common, usually with diffuse boundaries, and often pyritic. A few quartz veins have cavities after pyrite. Well jointed. Pyrite common as vein material, as disseminated crystals and associated with quartz veins.
34.90	42.61		Pale to dark green chloritic phyllite and siltstone, silicified in parts, similar to interval 31.1 to 34.90 m. Well jointed. Few slickensided surfaces. Quartz, quartz-pyrite and pyrite veins common, with blebs of chalcopyrite occurring at: 35.36m: discontinuous quartz veins (≤2 cm) containing abundant pyrite and minor chalcopyrite (5%). 35.97m: similar to above occurrence, but vein <10 mm and contains less pyrite and only traces of chalcopyrite.

635171

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
			<p>37.90m: rare chalcopyrite blebs in dark green silicified chloritic siltstone.</p> <p>39.35m: small blebs and irregular and discontinuous veins of chalcopyrite in dark green silicified chloritic siltstone.</p> <p>39.92m: few narrow (≤ 1 mm) discontinuous veins of chalcopyrite in heavily silicified chloritic sediments.</p> <p>40.40m: traces of chalcopyrite in narrow (< 2 mm) pyritic and chloritic quartz veins.</p> <p>40.53m: minute traces of chalcopyrite in heavily silicified chloritic sediments.</p> <p>41.90m: few blebs of chalcopyrite in silicified chloritic sediments.</p> <p>This unit becomes less silicified and more phyllitic towards base.</p> <p>Rare carbonate lenses - weathered residue. Total sulphides $\ll 0.01\%$.</p>
42.61	54.15		<p>Dark green and grey-green silicified and recrystallised chloritic sediments. Generally massive and very hard. Quartz veins common, often with diffuse boundaries and often carrying minor euhedral pyrite and commonly slightly to moderately cavernous after ? carbonate. Sporadic disseminated pyrite. Minute traces of chalcopyrite at approximately 42.75, 44.10, 44.61 to 44.85, 45.56, 52.07 to 52.48m. Minor traces of chalcopyrite in pyritic quartz vein (≤ 5 mm) at about 47.0m. Large quartz vein (5 to 10 cms) at about 45.05m. contains dark green to black chlorite, minor weathered carbonate and cavities after carbonate. Few non-silicified chloritic phyllite bands (≤ 3 cm) below about 50.3m. Few slickensided surfaces.</p>
→ 54.15	59.13		<p>Pale to medium green, generally non-silicified chloritic phyllite containing in parts numerous dark green anhedral (≤ 1 mm) porphyroblasts chlorite (?). Slightly porous and slightly arenaceous in parts. Common euhedral pyrite often associated with thin (≤ 1 mm) quartz-chlorite veins. Few quartz veins (≤ 2 mm) often with diffuse boundaries. Very well jointed, only fragmentary in parts.</p>
59.13	60.42	45° - 50°	<p>Generally massive, pale to dark green, strongly silicified chloritic sediments and quartzite. Extremely hard. Quartz veins common, often with diffuse boundaries. Common disseminated euhedral pyrite and few pyritic quartz veins, slightly cavernous in parts.</p>
60.42	62.61	50°	<p>Pale green and pale green-brown chloritic phyllite and siltstone containing few small (≤ 1 mm) dark green sub-hedral to anhedral porphyroblasts - chlorite ?. Few slightly cavernous quartzose bands - silicified quartz-arenite bands (?). Rare disseminated pyrite.</p>

635172

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
62.61	65.57	45°	Similar to interval 59.13 to 60.42m, but generally less silicified and containing few non-silicified chloritic siltstone and phyllite bands.
65.57	72.12	30°	Massive, white and mottled white-green, extremely hard and silicified chloritic sediments and quartz. Rare bands (≤10 mm) chloritic phyllite. Common disseminated pyrite and few minor and discontinuous pyrite veins. Common quartz veins often with diffuse boundaries and occasionally cavernous and chloritic. Rare dark green chloritic siltstone fragments. Moderately to well jointed. Bedding is generally indistinct or obliterated.
72.12	80.93		Medium to dark green and dark grey-green chloritic phyllite, commonly silicified. Common disseminated pyrite and pyrite veins, often apparently parallel to foliation. Few quartz veins, usually ≤1 mm. Few drag folds observed.
80.93	81.95		Similar to interval 65.57 to 72.12m. Highly cavernous in parts and few thin (≤10 mm) chloritic phyllite bands.
81.95	87.78		Heterogeneous zone with much core loss, but apparently similar to interval 72.12 to 80.93m, and consists mainly of chloritic phyllite, heavily silicified chloritic sediments and quartzite. A medium green, pitted, porous tuffaceous material occurs over basal 35 cm. Common disseminated euhedral pyrite. Rare, narrow (≤3 cm) zones containing small (≤3 mm) chloritic siltstone fragments.
87.78	94.14	0 - 10°	Pale and dark grey-green chloritic quartzite and silicified chloritic sediments containing common bands (≤2 cm) of chloritic phyllite. Extremely hard in parts. At approximately 92.95m, a strongly pyritic and slightly cavernous quartz vein dipping 35-40° contains 2 to 4% chalcopyrite. Common disseminated pyrite and few quartz veins. Drag folding evident. Foliation in phyllite dips 30-40°.
94.14	99.52		Similar to interval 65.57 to 72.12m. Few bands of black carbonaceous and green chloritic siltstone (≤10 mm), silicified in parts. Sporadic disseminated pyrite and pyritic quartz veins, often slightly to moderately cavernous, the quartz veins often with diffuse boundaries. Drag folding defined by siltstone bands. Moderately well jointed.
99.52	100.36		Dark grey carbonaceous phyllite. The top 25 cm consists of complexly dragfolded and deformed banded black carbonaceous phyllite and grey-white silicified and slightly chloritic sediment. Also few deformed quartz veins (≤2 mm) and few slickensided surfaces.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635173
From	To			
100.36	106.55		Medium to dark green chloritic sediment, silicified in parts and medium to dark grey argillaceous and carbonaceous siltstone, also silicified in parts, both rock types containing rare coarser grained quartzose bands. Pyrite very common; as disseminated euhedral crystals, clusters of euhedral crystals, pyrite veins and associated with quartz as quartz-pyrite veins. Pyrite almost exclusively restricted to green chloritic sediment. Sediments commonly finely laminated and rarely cross-bedded. Few load casts and ? slump structures. The green chloritic sediments are commonly massive and relatively featureless. Band of fine grained breccia - conglomerate containing small pebbles (≤ 2 cm but usually ≤ 5 mm) of dark grey carbonaceous siltstone and medium green chloritic siltstone occurs at about 100.74m. Minor microfaults and sporadic drag-folding. Common slickensided surfaces. Few quartz veins and veinlets usually slightly to moderately pyritic and rarely slightly cavernous. Moderately well jointed, rarely with finegrained pyrite on joint faces. The basal 20 cm of the unit is very similar to the interval 99.52 to 100.36m.	
106.55	112.16		Almost identical to the interval 94.14 to 99.52m. and is considered to be a folded continuation of this interval. Generally heavily silicified and extremely hard and compact in parts. Quartz veins (≤ 5 mm) common, often with diffuse boundaries and often slightly cavernous after pyrite. Banded in parts, banding defined by discontinuous trains of green chlorite (?) porphyroblasts. Rare siltstone fragments in parts.	
112.16	115.09		Grey-green, relatively coarse grained chloritic sediments and darker chloritic phyllite, strongly silicified in parts. Pyrite common, disseminated and as pyritic quartz veins (≤ 10 mm). Few quartz veins and veinlets. Sporadic slickensided (chloritic) surfaces and few drag folds.	
115.09	117.78		Pale and medium grey-green, hard, silicified and quartzitic, chloritic sediments, and phyllite. The unit becomes paler where quartz veins are common. The veins usually having diffuse boundaries. Disseminated euhedral (≤ 5 mm) pyrite is common ($\leq 2\%$). The quartz veins are slightly cavernous after pyrite and ? chalcopyrite. Slightly brecciated (recemented with dense white quartz) and slickensided in parts. The core is broken and fragmental and the recovered core apparently contains some foreign material from shallower depths. Drilling difficulties were encountered at this point and the hole was cemented and later re-entered with AQWL equipment.	
117.78	118.05		Cement and cemented sludge.	

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
118.05	119.17		Only 15 cm of core recovered. Dark green silicified chloritic siltstone containing abundant (25%) euhedral pyrite and minor (2%) chalcopyrite. The pyrite occurs as disseminated euhedral crystals (≤ 3 mm) and as a massive pyrite vein (25 mm). The recovered core contains a single quartz vein with diffuse boundaries. The chalcopyrite is anhedral and associated with the pyrite.
119.17	124.23	Foliation dips 50°	Medium to dark green chloritic phyllite, often apparently coarse grained in parts, and containing rare, olive green, extremely fine grained and finely foliated chloritic phyllite bands. Rare veins (?) of oxidised carbonate occur parallel to the foliation at about 123.17m. The unit contains a few thin (≤ 1 mm) quartz veins which are often discontinuous and commonly pyritic. Pyrite occurs throughout as disseminated euhedral (≤ 1 mm) crystals. A few slickensided fault planes are coated with very dark green to black chlorite and traces of talc.
124.23	125.43		Very pale, olive green, extremely finegrained and finely foliated chloritic phyllite containing rare pyritic quartz veins (≤ 2 mm). The well developed phyllite foliation dips 30° - 35° and a lithological bedding plane dips sub-parallel to the long axis of the core. This plane separates the above lithology from a similar but darker green lithology and exhibits a few drag folds with axis parallel to foliation. The unit contains rare, thin (≤ 2 mm) pyritic quartz veins and common disseminated chlorite porphyroblasts (< 1 mm).
125.43	130.48		Similar to the interval 119.17 to 124.23m. and contains a few quartz veins (≤ 2 mm) rarely deformed. Extremely rare chalcopyrite ($< 0.5\%$) is associated with deformed, irregular and discontinuous quartz veins at about 128.00m. Sporadic chlorite porphyroblasts.
130.48	134.70	Foliation dips 50°	Pale to dark green, finegrained chloritic phyllite with gradual colour variations occurring over short distances and containing a few thin (≤ 1 mm) and discontinuous pyrite veins. A few irregular, thin and cavernous pyritic quartz-carbonate veins occur at about 134.60m. Disseminated pyrite is common, but the unit contains only a very few, irregular pyritic quartz veins (≤ 2 mm). A few slickensided fault planes occur, some of which are coated with finegrained pyrite. The unit is apparently coarser grained and much less well foliated about 133.40 to 133.65m.
134.70	137.35		Pale to medium green, very finegrained chloritic phyllite containing lesser amounts of medium to dark green, coarser grained chloritic and recrystallised siltstone and phyllite. These two lithologies are completely folded with dragfold axis parallel to the foliation and dipping 60°. Disseminated pyrite blebs and euhedral pyrite crystals. Rare pyritic quartz veins.

635174

635175

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
137.35	143.08	Foliation dips 55° - 60°	<p>The finer grained and paler phyllite is finely foliated, while the coarser material is coarsely foliated and contains locally preserved traces of the original bedding.</p> <p>Medium green, coarse grained and coarsely foliated, recrystallised chloritic siltstone and phyllite. Similar to the coarser member of the interval 134.70 to 137.35m. The original bedding, where preserved, is noted to be deformed and has a variable dip. The unit contains lesser amounts of pale green, very fine grained chloritic phyllite with a well developed fine foliation and apparent lack of original bedding. Rare, pyrite blebs (≤2 mm) occur parallel to the original bedding, and sporadic disseminated euhedral pyrite occurs throughout. Pyrite also occurs in a few pyritic quartz veins (≤2 mm) which are commonly irregular and discontinuous and rarely cavernous (after pyrite?). The unit contains a few, thin (<1 mm) dark green to black chlorite veins and sporadic chlorite porphyroblasts. Very slight movement has occurred parallel to the foliation.</p>
143.08	145.70	Foliation dips 55° - 60°	<p>Very pale to medium green, very finegrained chloritic phyllite with a waxy lustre. The unit contains a few, irregular and thin (<1 mm) chlorite veins and rare euhedral pyrite.</p>
145.70	148.98		<p>Similar to the interval 137.35 to 143.08m and contains rare cavities lined with euhedral quartz crystals (≤2 mm). The unit shows evidence of having undergone slight shearing and brecciation in parts. Sporadic disseminated euhedral pyrite. Few irregular quartz veins (≤2 mm) commonly with diffuse boundaries.</p>
148.98	151.16		<p>Fine grained, medium green chloritic phyllite containing a few pyritic quartz veins (≤1 mm) which are often slightly cavernous and sub-parallel to the foliation which dips 55° - 60°. Rare euhedral pyrite and pyrite blebs and a few, thin (<1 mm) irregular dark green chlorite veins.</p>
151.16	159.88		<p>White quartz containing numerous, irregular and discontinuous chloritic veins, blebs and stringers, and a few bands of dark green chloritic siltstone particularly between 154.78 to 155.65m, 157.50 to 158.05m, 158.48 to 159.27m. This chloritic material contains common disseminated euhedral pyrite (≤1 mm) and very rare quartz veins containing slight amounts of yellow-brown carbonate. The quartz contains a few irregular pyrite blebs and veinlets and rare cavernous carbonate veins and blebs. Rare slickensided fault planes occur. A few quartz veins (≤3 cm) occur in the thicker chloritic bands. The quartz is slightly cavernous in parts after pyrite and ? carbonate and contains very rare traces of chalcopyrite.</p>

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635176
From	To			
159.88	161.00		Pale and dark grey-green banded chloritic siltstone and phyllite. The banding reflects the original lithology which apparently consisted of laminated (often finely laminated) siltstone. Foliation is poorly developed and intersects the original bedding obliquely. The original bedding has a variable dip (commonly about 40°) being dragfolded in parts. The foliation dips about 65° - 70°. Quartz pyrite and pyritic quartz veins (≤3 mm) are commonly parallel to the foliation.	
161.00	165.81	Foliation dips 65° - 70°	Medium to dark green, relatively coarse grained and recrystallised (?) slightly phyllitic chloritic siltstone containing a few slightly pyritic quartz veins (≤9 cm) some of which contain minor amounts of yellow-brown carbonate and rare carbonate veinlets (<1 mm). Well developed slickensided fault planes are relatively common, a few fault planes containing thin films of finegrained pyrite. The original bedding is locally preserved otherwise the unit is generally featureless and contains rare disseminated finegrained (<0.5 mm) pyrite.	
165.81	169.47		White quartz similar to the interval 151.16 to 159.88m. Common euhedral (≤4 mm) pyrite crystals occur singly or in larger accumulations. Pyrite is also associated with the irregular chloritic veins, blebs, stringers and included chloritic fragments and is associated with a few cavities lined with euhedral quartz crystals. The unit contains a few irregular and discontinuous carbonate veins (≤3 mm).	
169.47	172.71		Broadly similar to the interval 159.88 to 161.00m with the original bedding commonly being preserved. This unit contains a few irregular quartz-carbonate and carbonate veins and veinlets and quartz veins (≤8 cm). The veins are slightly pyritic and pyrite is disseminated through the unit.	
172.21	174.86		Similar to the interval 161.00 to 165.81m.	
174.86	177.04		Grey-green and olive green chloritic siltstone and phyllite with dark grey and grey-green colour banding reflecting the original siltstone lamination. Dragfolds and minor micro-faults are common and the unit contains a few quartz, carbonate and quartz-carbonate veins and veinlets. Minor concentrations of finegrained euhedral pyrite is associated with the vein material and rare disseminated pyrite occurs throughout the unit.	
177.04	189.08		Medium grey-green siltstone and dark grey to black argillaceous, carbonaceous and graphitic siltstone laminae which have been complexly deformed, faulted (microfaults) and sheared. The thickness of single lamina varies considerably over short distances suggesting pre-consolidation slumping or deformation. A few graded beds occur.	

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635177
From	To			
189.08	190.05		<p>The overall colour of this unit varies and depends upon the relative proportions of pale and dark siltstone. The bedding dips variably but is commonly between 45° and 60°. Individual bedding planes are commonly extremely irregular. Pyrite blebs are common and are mainly restricted to the paler siltstone members. The unit contains a few quartz and quartz-carbonate veins (≤ 5 mm).</p> <p>Similar to the interval 177.04 to 189.08m, but consists mainly of silicified and recrystallised grey-green chloritic sediment. The original bedding is almost obliterated. The unit contains a few irregular quartz-carbonate veins (up to 15 mm, but usually < 5 mm), which are commonly slightly pyritic. Pyrite blebs are common and are apparently aligned parallel and sub-parallel to the original bedding.</p>	
190.05	197.92		<p>Similar to the interval 177.04 to 189.77m.</p>	
197.92	203.63	Foliation dips 45°	<p>Similar to the interval 189.77 to 190.60m, but the original bedding is better preserved. The unit contains several bands (≤ 80 cm) of pale grey and grey-green chloritic quartzite and recrystallised pale green chloritic sediments containing minor amounts of euhedral pyrite. Also included within this unit is a band (20 cm) of medium green, finegrained chloritic phyllite. Rare slickensided fault planes.</p> <p><u>DDH.8 COMPLETED AT 203.63 METRES.</u></p>	

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73-947

635178

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION EL.16/68.

12th June, 1971.

REPORT ON DDH.9 - CLUMP PROSPECT.

M. H. McIntyre.

SUMMARY.

DDH.9, the sixth diamond drill hole at the Clump Prospect, was successfully completed at a depth of 206.68m.

The mineralised zone was intersected between 175.25m. and 198.92m. Between 175.25m. and 197.35m., core recovery averaged approximately 9% and within this interval, no core was recovered over intersections up to 6.40m. in length. Sludge assays indicate the presence of variable mineralisation in these zones with poor core recovery, but the sludge values can only be used as indications of chalcopryite, as the drillhole through this interval passes through very porous cavernous ground.

Quartzose material containing pyrite, chalcopryite and minor amounts of carbonate occurred between 197.35m. and 198.92m, assaying 1.52% copper. (Visual estimates 2 - 3% copper - reassays in progress).

Below about 175m, water was issuing from the hole at a rate in excess of 13500 litres per hour.

DDH.9 - CLUMP PROSPECT.

Grid reference:	461 110 N, 309 015 E.
Collar R.L.:	464 feet.
Angle:	50°
Direction:	216° magnetic.
Date drilled:	11/2/71 to 23/3/71.
Drilling rate:	6.50 metres per shift.

1. OPERATIONAL DETAILS.

1.1 Drilling details:

The Mindrill F30 drill rig commenced moving from the site of DDH.6 on 7th February, 1971, and DDH.9 was commenced on 11th February, 1971.

NX casing was seated at 24.38m, and the hole was advanced to 177.39m, using NQWL equipment. BX casing was seated at 176.78m, and the hole was completed at 206.68m, with BQWL equipment on 23rd March, 1971.

Drilling progress and engineering details are graphically described by Fig. 1.

1.2 Drilling conditions:

The drill runs and core recovery are given in Appendix A.

NX casing was drilled to about 15.24m, without the inner tube and core recovery to this depth was about 65%.

Between 15.24 and c.169.9m, drilling conditions were favourable and the core recovery was almost invariably 100%, the drilling rate to this depth being about 11.27m. per shift.

In the interval 169.9m to 198.5m, progress was slow (average 1.9m. per shift) and core recovery poor (average 20%) and no core was recovered from the following intersections within this major interval.

175.25m.	to	181.35m.	
181.35m.	"	181.65m.	(Only 2 cms of core recovered)
181.65m.	"	188.08m.	
190.50m.	"	194.48m.	
194.78m.	"	196.00m.	
196.30m.	"	196.91m.	

The assay results of several sludge samples taken from within these intervals gave Cu values compatible with those collected from within the main mineralised zone which suggests a more extensive mineralised zone was present in DDH.9.

Below about 169.0m. the drillers reported difficulty in pulling the inner tube which was continually jamming in the core barrel. It was therefore necessary for the drill rods to be pulled in order to recover the inner tube and, because the drill hole appeared to collapse slightly each time the rods were pulled, further difficulty was experienced in returning the rods to the bottom of the hole. These difficulties were the cause of the slow progress.

Also at this stage, the flow of water from the hole increased significantly and reached a rate in excess of 13500 litres per hour. Two months after completion of the hole, water was still issuing at the rate of about 9300 litres per hour.

Core recovery improved considerably below the mineralised zone.

Sludge samples were collected over intervals of 0.9m. and those collected between 174.65, and 204.85m, were split and assayed for copper, the assay results being tabulated below:

1.3 Drill hole deviation:

The drill hole surveys were as follows:

0	→ Collar	50°	35°	106.68m.	46°
50		50°	45°	121.90m.	45°
100	→	50°	45°	137.14m.	42°
150		50°	45°	152.40m.	42°
200	→	48°	45°	167.64m.	42°
250		47°	45°	182.90m.	41.5°
300		47°	45°	198.14m.	40°

This drill hole, in common with other drill holes at the Clump Prospect, showed a marked tendency to shallow with increasing depth.

2. GEOLOGY.

The complete drill log is given in Appendix B. and may be briefly summarised as follows :

0 to approx. 166.07m.

Pale grey siltstone, dark grey argillaceous and carbonaceous siltstone and massive, dark grey to black, argillaceous, carbonaceous and commonly porphyroblastic (leucoxene, quartz, cordierite?) siltstone. Finely laminated or in graded beds of variable thickness. Minor concentrations of euhedral pyrite are ubiquitous although generally restricted to the pale grey siltstone units. Rare, thin (≤ 70 cm) bands of pale green, pitted and porous, tuffaceous material. Quartz veins (dominantly ≤ 5 mm) and veinlets are common and are often chloritic and pyritic. Minor traces of chlorite give a pale green tinge to some pale grey siltstone units. Rare, complex, pyritic, quartzose and chloritic veins (≤ 5 cm) contain very minor traces of chalcopyrite. Few graphitic and pyritic joint and fault planes. Microfaults are relatively common.

166.07m. to 175.25m. (c.60-70% recovery).

Recovered material consists of :

- (a) Heavily silicified carbonaceous and graphitic sediments with white vein quartz containing minor pyrite.
- (b) Slightly pyritic carbonaceous quartzite and quartz, slightly to moderately cavernous after carbonate (?), rare chalcopyrite blebs.
- (c) Carbonaceous and graphitic quartzite containing a few irregular quartz and quartz-chlorite veins.
- (d) Carbonaceous siltstone, quartzitic in parts, containing numerous white (leucoxene ?) and yellow-brown (carbonate ?) porphyroblasts, disseminated euhedral pyrite and a few thin quartz-chlorite veins.
- (e) Breccia zone consisting of carbonaceous siltstone fragments, cemented by white quartz and mottled white and yellow-brown quartz-carbonate. Disseminated euhedral pyrite is common.
- (f) Laminated and deformed siltstone and carbonaceous siltstone, containing numerous irregular pyritic quartz veins. Graphitic in parts.
- (g) Carbonaceous and graphitic siltstone, silicified and quartzitic in parts. Few quartz veins containing traces of yellow-brown carbonate.
- (h) Carbonaceous and graphitic siltstone containing numerous pyritic quartz and quartz-chlorite veins and numerous grey and grey-green porphyroblasts.

Mineralised Zone : 175.25m. to 198.92m.

The only core recovered in the unit is as follows:

188.08m. to 196.00m. (11% recovery).

Medium to dark green, finegrained and generally featureless tuffaceous material or chloritic siltstone.

196.00m. to 196.30m. (82% recovery).

Pale yellow-brown, pitted, porous and moderately leached carbonate.

197.35 to 198.92m.

Quartzose material containing abundant pyrite and chalcopyrite. Cavities after carbonate are common and rare, soft discontinuous carbonate veins occur towards the top of the unit.

Chalcopyrite occurs as extremely irregular blebs often associated with carbonate cavities and occurs alone or in intimate association with anhedral to subhedral pyrite.

Total sulphides estimated at about 10 to 12% in the ratio Cpy : Py = 70:30, but assay results gave a value of only 1.52% Cu.

198.92 to 206.68m.

Argillaceous and carbonaceous siltstone.

3. SAMPLE AND ASSAY RESULTS.

Three types of samples were collected from the products of DDH.9 :

- (a) Core sample from, and adjacent to, the mineralised zone.
- (b) Sludge samples from the mineralised zone and from the zone of low recovery.
- (c) Core samples, of relatively uniform lithologies, were collected away from the mineralised zone in order to determine the background values for Cu, Pb and Zn.

The assay results were:

(i) Core Samples from, and adjacent to, the Mineralised Zone.

INTERSECTION (Metres)	INTERVAL (Metres)	Core Occ %	SAMPLE NO. BAL.	ASSAY VALUE ppm. Cu.
149.02 to 150.25	1.23	100	0593	140
150.25 to 151.98	1.73	100	0594	280
151.98 to 152.48	0.50	100	0595	110
152.48 to 154.84	2.36	100	0596	120
154.84 to 157.76	2.92	100	0597	70
157.76 to 159.08	1.32	100	0598	80
159.08 to 161.33	2.25	100	0599	40
161.33 to 165.02	3.69	98	0600	80
165.02 to 165.67	0.65	90	0601	380
165.67 to 166.07	0.40	90	0602	290
166.07 to 167.00	0.93	72	0603	70
167.00 to 169.20	2.20	31	0604	690
169.20 to 169.55	0.35	94	0605	210
169.55 to 169.92	0.37	100	0606	120
169.92 to 171.75	1.83	65	0607	80
171.75 to 172.82	1.07	31	0608	70
172.82 to 173.13	0.31	100	0609	110
173.13 to 174.04	0.91	81	0610	130
174.04 to 175.25	1.21	92	0611	110
188.08 to 190.50	2.42	35	0612	60
196.00 to 196.30	0.30	82	0613	170
196.91 to 197.35	0.44	41	0614	110
197.35 to 198.92	1.57	74	0615	15200
198.92 to 202.10	3.18	97	0616	740
202.10 to 204.44	2.34	100	0617	150
204.44 to 205.45	1.02	100	0618	80
205.46 to 206.68	1.22	70	0619	80

Copper values away from the main mineralised zone are, with few exceptions, within the accepted range of background values (20 to 300 ppm Cu) for black shale. The exceptions, notably samples 0601, 0604 and 0616, are all associated with minor traces of chalcopyrite.

(ii) Sludge Samples:

A number of sludge samples were collected from the mineralised zone and from the zone of low core recovery. The sampling interval was 0.91m. The results are as follows:

INTERSECTION (metres)	SAMPLE NO. BAL.	ASSAY VALUE ppm Cu.
174.65 to 175.57	0539	198
175.57 to 176.48	0540	350
177.39 to 178.30	0541	770
178.30 to 179.22	0542	4700
179.22 to 180.14	0543	2125
180.14 to 181.05	0544	2130
181.05 to 181.97	0545	940
181.97 to 182.88	0546	1375
182.88 to 183.80	0547	4200
183.80 to 184.71	0548	1330
184.71 to 185.63	0549	1050
185.63 to 186.54	0550	1920
186.54 to 187.46	0551	1100
187.46 to 188.37	0552	1430
188.37 to 189.29	0553	1100
189.29 to 190.20	0554	1470
190.20 to 191.12	0555	1420
191.12 to 192.03	0556	760
192.03 to 192.95	0557	1560
192.95 to 193.86	0558	620
193.86 to 194.78	0559	620
194.78 to 195.69	0560	650
195.69 to 196.61	0561	600
196.61 to 197.52	0562	940
197.52 to 198.44	0563	3050
198.44 to 199.35	0564	3325
199.35 to 200.27	0565	3175
200.27 to 201.18	0566	3650
201.18 to 202.10	0567	2975
202.10 to 203.01	0568	2260
203.01 to 203.93	0569	2300
203.93 to 204.84	0570	2270

The main mineralised zone is defined by samples 0563 and 0564. Corresponding with the mineralised zone between 197.35m and 198.92m.

Below 198.92m. sludge samples show consistent copper values (0.2 - 0.36%) whilst the core assays for equivalent intervals show very much lower copper values (150 - 750 ppm). The high copper values may be due to :

- (a) Lagtime in sample retrieval at surface,
- (b) Washing of sulphides from leached parts of hole by issuing water.

The sludge assays indicate that the zone of very low core recovery between 175.25m and 197.35m. does contain significant copper. The variations in copper values may reflect more mineralised zones between 178.30m and 181.05m, and 183.80m. and 191.12m, but with very porous ground and high water flows, significant variations in sludge recovery can be expected. The sludge assays indicate mineralisation within the zone of high core loss.

(iii) Core Samples for background values of Cu, Pb and Zn.

A number of core samples taken from relatively uniform lithologies were assayed for Cu, Pb and Zn, in order to determine background values and trends, if any, in base metal distribution away from the mineralised zone. The assay values are :

Intersection (Metres)		Interval (Metres)	Sample No. BAL.	Assay Value ppm.		
From:	To:			Cu	Pb	Zn
21.93	22.19	0.26	0620	5	30	45
27.72	27.91	0.19	0621	8	25	45
29.47	29.81	0.34	0622	23	28	50
35.49	35.97	0.48	0623	<3	28	55
38.55	38.81	0.26	0624	8	33	55
40.77	41.14	0.37	0625	<3	30	43
44.70	44.85	0.15	0626	28	20	43
48.91	49.11	0.20	0627	20	25	55
55.13	55.53	0.40	0628	15	28	40
60.35	60.70	0.35	0629	10	35	53
65.76	66.01	0.25	0630	15	20	35
66.60	66.89	0.29	0631	5	33	43
70.10	70.65	0.55	0632	8	28	38
75.27	75.58	0.31	0633	8	35	63
78.64	79.06	0.42	0634	5	28	38
82.02	82.46	0.44	0635	5	35	63
87.48	87.78	0.30	0636	5	28	48
90.05	90.47	0.42	0637	18	33	45
94.67	95.00	0.33	0638	8	23	38
98.94	99.64	0.70	0639	<3	33	45
102.50	103.02	0.52	0640	20	28	50
106.26	106.53	0.27	0641	18	33	68
111.65	112.17	0.52	0642	25	35	93
118.20	118.59	0.39	0643	8	30	48
121.68	121.97	0.29	0644	8	40	63
125.50	126.16	0.66	0645	10	35	45
130.18	130.52	0.34	0646	5	33	28
134.98	135.25	0.27	0647	10	33	40
139.80	140.20	0.40	0648	23	25	33
144.68	145.07	0.39	0649	8	36	28
147.46	147.89	0.43	0650	3	25	28

The range and arithmetic mean of Cu, Pb and Zn for these core samples are :

	Cu	Pb	Zn
Mean (ppm)	11	30	47
Range (ppm)	<3 to 28	20 to 40	28 to 93

The range of background values for Cu, Pb and Zn for black shales are (Hawkes and Webb, Geochemistry in Mineral Exploration):

Cu	20 to 300 ppm.
Pb	20 " 400 "
Zn	100 " 1000 "

The values from the DDH.9 core samples, particularly the values for Cu and Zn, appear to be anomalously low and it may be that the enrichment of copper in the mineralised zone of DDH.9, was brought about by abstraction of Cu from the surrounding rocks and eventual concentration in a favourable zone, the present mineralised zone.

The reason for the apparently low Zn values is unknown.

A specimen of the mineralised zone was prepared for thin and polished section examination and the results of this examination will form the subject of a separate report.

4. CONCLUSION.

DDH.9 at the Clump Prospect is considered to have yielded the most promising indication to date, of economic mineralisation in the Balfour area, for the following reasons:

- (a), a well defined intersection of copper mineralisation.
- and,
- (b), an apparently thick sequence of potentially mineralised carbonate rocks.

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DDH.9

635185

APPENDIX A - DRILL RUNS AND CORE RECOVERY

<u>Depth in Metres</u>		<u>Core Recovery</u>	<u>% Core</u>
<u>From</u>	<u>To</u>	<u>in Metres</u>	<u>Recovery</u>
0.00	0.91	0.51	56
0.91	1.52	0.41	67
1.52	2.13	0.30	49
2.13	2.74	0.53	87
2.74	3.20	0.30	87
3.20	5.63	1.37	56
5.63	8.99	1.52	45
8.99	12.19	2.03	64
12.19	13.79	1.60	100
13.79	15.42	1.44	88
15.42	16.20	0.78	100
16.20	18.70	0.84	34
18.70	19.71	1.01	100
19.71	20.55	0.84	100
20.55	21.49	0.94	100
21.49	22.33	0.84	100
22.33	23.39	1.06	100
23.39	23.57	0.18	100
23.57	24.89	0.86	65
24.89	25.85	0.96	100
25.85	27.02	1.17	100
27.02	29.87	2.85	100
29.87	30.58	0.71	100
30.58	32.92	2.34	100
32.92	35.97	2.97	97
35.97	37.81	1.84	100
37.81	38.15	0.18	54
38.15	41.14	2.99	100
41.14	44.14	3.00	100
44.14	44.70	0.56	100
44.70	47.14	2.44	100
47.14	50.29	3.15	100
50.29	51.61	1.32	100
51.61	52.82	1.21	100
52.82	54.26	1.44	100
54.26	57.31	3.05	100
57.31	58.60	1.29	100
58.60	60.35	1.75	100
60.35	63.40	2.64	87
63.40	64.33	0.93	100
64.33	66.01	1.68	100
66.01	66.39	0.38	100
66.39	69.49	3.10	100
69.49	72.54	3.05	100
72.54	75.58	3.04	100
75.58	77.42	1.84	100
77.42	78.64	1.22	100
78.64	81.69	3.05	100
81.69	84.73	3.04	100
84.73	87.78	3.05	100
87.78	90.82	3.04	100
90.82	93.87	3.05	100
93.87	96.92	3.04	100
96.92	99.97	3.05	100
99.97	103.02	3.05	100
103.02	106.07	3.05	100

<u>Depth in Metres</u>		<u>Core Recovery</u>	<u>% Core</u>
<u>From</u>	<u>To</u>	<u>in Metres</u>	<u>Recovery</u>
106.07	108.81	2.74	100
108.81	110.44	1.63	100
110.44	112.17	1.73	100
112.17	115.22	3.05	100
115.22	117.04	1.82	100
117.04	120.18	3.14	100
120.18	123.12	2.94	100
123.12	126.16	3.04	100
126.16	128.90	2.74	100
128.90	130.18	1.28	100
130.18	132.78	2.60	100
132.78	135.63	2.85	100
135.63	136.31	0.68	100
136.31	138.46	2.15	100
138.46	138.91	0.45	100
138.91	142.02	3.11	100
142.02	145.07	3.05	100
145.07	146.18	1.11	100
146.18	147.09	0.91	100
147.09	148.72	1.63	100
148.72	151.77	3.05	100
151.77	154.84	3.05	100
154.84	157.76	2.92	100
157.76	160.88	3.12	100
160.88	163.79	2.91	100
163.79	164.37	0.58	100
164.37	166.72	2.10	90
166.72	169.16	0.76	31
169.16	169.49	0.33	100
169.49	169.92	0.43	100
169.92	170.39	0.23	50
170.39	170.69	0.13	58
170.69	171.30	0.56	92
171.30	171.60	0.20	67
171.60	171.91	0.15	50
171.91	172.21	0.10	33
172.21	172.52	0.05	16
172.52	172.82	0.10	33
172.82	173.13	0.30	100
173.13	173.43	0.13	42
173.43	174.04	0.61	100
174.04	174.34	0.20	67
174.34	174.95	0.61	100
174.95	175.25	0.30	100
175.25	181.35	-	0
181.35	181.65	0.02	8
181.65	188.08	-	0
188.08	188.38	0.15	50
188.38	189.29	0.46	50
189.29	190.20	0.10	11
190.20	190.50	0.13	42
190.50	194.48	-	0
194.48	194.78	0.08	25
194.78	196.00	-	0
196.00	196.30	0.25	82
196.30	196.91	-	0
196.91	197.52	0.25	41
197.52	198.52	0.71	72
198.52	199.45	0.89	95
199.45	200.37	0.91	100
200.37	201.19	0.76	94

<u>Depth In Metres</u>		<u>Core Recovery</u>	<u>% Core</u>
<u>From</u>	<u>To</u>	<u>In Metres</u>	<u>Recovery</u>
201.19	202.10	0.91	100
202.10	203.19	1.09	100
203.19	204.44	1.25	100
204.44	205.46	1.02	100
205.46	206.30	0.71	85
206.30	206.68	0.15	40

A.C.I. MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION

DEP. 9. PROSPECT: CLUMP Grid Reference: 461 110 N. 309 015 E. Collar R.L.: 464 feet. Date Drilled: 11/2/71 - 23/3/71. Angle 50° Direction: 216° magnetic.

Table with columns: INTERVAL IN METRES (From, To), DIP IN BEDDING, and DESCRIPTION. Rows describe geological intervals from 0 to 20.65m with detailed descriptions of siltstone, argillaceous, and carbonaceous layers, including dip angles and structural features like shearing and faulting.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
20.61	21.64		Massive dark grey argillaceous and carbonaceous siltstone containing numerous quartz veins (≤ 3 mm) and fine quartz veinlets. Traces of pyrite occur in quartz veins. Moderately well jointed.
21.64	23.52	50° at 21.75m. 50° at 22.86m.	Pale grey siltstone and dark grey argillaceous and carbonaceous siltstone commonly in graded units (≤ 4 cm) and commonly well laminated with alternating laminae (≤ 2 mm) of pale and dark grey siltstone. Pale grey siltstone content about 30%. Quartz veins and veinlets common. Microfaults very common, often quartz filled. Moderately well jointed.
23.52	28.49		Massive dark grey to black argillaceous and carbonaceous siltstone containing few graded units (faintly chloritic) and laminated bands particularly between 26.43 and 27.43m. Between 24.13 and 24.99m, the unit is chloritic and contains abundant pyrite and traces ($< 0.1\%$) chalcOPYrite in quartz-chlorite veins. This section of the unit is fragmentary, very well jointed. Common minor quartz veins (≤ 2 mm). Microfaults common.
28.49	31.09	80°-85° at 28.96m. 80° at 30.40m.	Pale grey siltstone and dark grey argillaceous and carbonaceous siltstone in graded units of variable thickness and as thin (≤ 2 mm) alternating laminae. Few quartz veins (≤ 3 mm) often slightly cavernous after pyrite. Microfaults very common, fault often quartz filled. Few white anhedral porphyroblasts (≤ 2 mm) of leucOXene (?), parallel and sub-parallel to bedding in dark grey carbonaceous siltstone units. Pale grey siltstone units often faintly chloritic. Few load casts.
31.09	36.29		Dark grey and medium grey (with slight greenish tinge) massive siltstone and argillaceous and carbonaceous siltstone. Rare graded units of pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. Rare disseminated euhedral pyrite, rare pyrite coatings on joint surfaces and rare pyrite in quartz veins. Few straight, regular quartz veins (≤ 3 mm) often slightly cavernous after pyrite and occasionally slightly pyritic and with a uniform dip of 25-30°.
36.29	40.38	85°-90° at 37.90m. 80°-85° " 38.65m. 80° at 40.29m.	Graded units and alternating laminae of pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. The graded units are commonly finely to very finely laminated and are usually ≤ 4 cm, but thickness variable. Microfaults are common, faults often being quartz filled. Quartz veins and veinlets common. This sequence also contains several massive bands of generally featureless dark grey argillaceous and carbonaceous siltstone. Prominent slump structures at 39.48m. Few load casts. Pale grey siltstone units slightly chloritic in parts. Pale grey siltstone content 20%. Towards the base of this sequence, the graded units tend to become thicker and less finely laminated.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
40.38	41.60		Massive dark grey argillaceous and carbonaceous siltstone.
41.60	43.43	75° at 41.70m. 85° " 43.20m.	Similar to interval 36.29 to 40.38m.
43.43	44.14		
44.14	48.59 approx.	80° at 44.50m. 75°-80° at 47.25m.	Massive but fragmentary, pale green, pitted and porous tuffaceous material. Similar to interval 36.29 to 40.38m. Pale grey siltstone bands are decidedly chloritic and contain very rare disseminated euhedral pyrite and rare dark green porphyroblasts of chlorite (?). Minor cross-bedding. Few bands of finely laminated alternations of pale grey siltstone and dark grey argillaceous and carbonaceous siltstone.
48.59	51.61	80° at 48.84m. 80° " 51.50m.	Pale grey siltstone and dark grey argillaceous and carbonaceous siltstone, finely laminated but with few graded units. Single major (5 mm) quartz vein, slightly pyritic and occupying fault zone at about 50.46m, Dip 30°. Rare minor quartz veins and veinlets. A complex pyritic and chalcopyritic quartzose chlorite vein occurs at about 50.72m. The base of this vein is parallel to the bedding but the top is extremely irregular. The vein is about 5 cm. thick (at thickest point) and contains approximately 0.5% total sulphides. Rare quartz veins and veinlets. Few porphyroblasts leucoxene (≤ 1 mm).
51.61	53.52	80° at 52.70m.	Similar to interval 44.14 to 48.59m. Large (approx 3 x 6 cm) sub-rounded to rounded pale grey siltstone pebble at about 52.16m.
53.52	61.80	80° at 54.37m. 80° " 56.26m. 80° " 58.53m. 80° " 59.00m.	Massive dark grey argillaceous and carbonaceous siltstone with common graded units (≤ 15 cm) and containing bands of finely laminated pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. Few thin (≤ 1 mm) straight and well-defined mottled yellow-white quartz/carbonate veins with uniform dip of 30°. Rare, very thin (< 0.5 mm) irregular and discontinuous yellow-brown quartz-carbonate veinlets. Poorly jointed. Few pale grey porphyroblasts (leucoxene ?) occur in dark grey carbonaceous siltstone units particularly towards base of unit. Rare minor erosional features. Chlorite content of this unit appears to increase towards base. Rare quartz and quartz-chlorite veins (≤ 2 mm). Thin (≤ 5 cm) chloritic vein systems at 59.15m.
61.80	62.49 approx.		Massive pale and dark grey-green slightly silicified siltstone. Minor fine-grained pyrite particularly on joint faces. Extremely rare (single bleb) traces of chalcopyrite. Prominent joint dipping 0°.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
62.49	63.93 approx.	30°	Similar to interval 43.43 to 44.14m. Very much fragmented in parts. Soft and friable. Sporadic euhedral pyrite.
63.93	70.09 "	80° at 64.23m. 80° " 66.46m. 75-80° " 68.05m. 80° " 69.29m.	Thin (usually ≤ 2 cm) graded siltstone units consisting of white to pale grey siltstone (at base) grading up to dark grey argillaceous and carbonaceous siltstone (at top). Commonly finely laminated with alternating laminae of pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. The pale grey siltstone bands are usually slightly chloritic and pale grey siltstone content approximately 20%. Few quartz veins and veinlets commonly occupying microfaults and dipping about 25°. Few porphyroblasts of leucoxene occur in dark grey carbonaceous siltstone. Rare fine-grained pyrite, particularly on bedding planes. Few microfaults, poorly jointed.
70.09	82.02 approx.	75-80° at 73.67m. 80° " 75.63m. 80° " 77.45m. 80° " 78.70m. 80° " 81.30m.	Similar to interval 63.93 to 70.09m but graded siltstone units generally thicker (≤ 5 cms) and massive dark grey argillaceous and carbonaceous siltstone units (≤ 60cm) more common. Pale grey siltstone bands usually slightly chloritic. Few bands of finely laminated pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. A complex and sinuous pyritic quartz-chlorite vein system occurs at approximately 78.60m, and contains very rare traces (< 0.1%) of chalcopyrite. Poorly jointed. Minor cross-bedding.
82.02	84.60	75-80° at 83.17m.	Generally massive dark grey argillaceous and carbonaceous siltstone, slightly chloritic in parts and containing numerous bands consisting of several graded siltstone units and finely laminated siltstones. Very rare quartz and pyrite veinlets dipping 30° to 35°. Fine-grained pyrite occasionally on joint faces. Poorly jointed.
84.60	85.99		Similar to interval 70.09 to 82.02m. Sporadic cross-bedding.
85.99	90.95	80° at 86.88m. 75-80° " 90.26m.	Similar to interval 82.02 to 84.60m. Few porphyroblasts of leucoxene in dark grey argillaceous and carbonaceous bands. Rare quartz veins. Poorly jointed.
90.95	96.40	80-85° at 92.69m. 85° " 93.80m. 85° " 96.09m.	Series of graded and finely laminated siltstone units, all slightly chloritic. The graded units consist of thin pale grey siltstone (at base) grading up to dark grey to black porphyroblastic (leucoxene) argillaceous and carbonaceous siltstone. (At top). Pale grey siltstone content approximately 10-15%. The leucoxene porphyroblasts are concentrated at the upper portions of the grey-black carbonaceous siltstone. Few bands (≤ 25 cm) massive dark grey argillaceous and carbonaceous siltstone. Rare quartz veinlets. Few microfaults. Poorly jointed. Rare fine-grained pyrite on joint planes.

635192

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
96.40	99.60		Massive, dark grey to black and dark grey-green porphyroblastic, argillaceous and carbonaceous siltstone, slightly silicified in parts. Abundant leucoxene porphyroblasts ($\leq 0.5\text{mm}$). Rare quartz veins, commonly occupying microfaults. Poorly jointed. Few graded siltstone units at 96.76m.
99.60	105.07	80-85° at 100.65m 85° " 104.73m	Dominantly dark grey to black argillaceous and carbonaceous siltstone with faint green (chloritic?) tinge in parts. Contains few graded siltstone units and few bands of laminated pale and dark grey siltstone. The graded units ($\leq 3\text{ cm}$) consist of pale grey and slightly chloritic siltstone (at base) grading up to dark grey-black argillaceous and carbonaceous siltstone containing numerous leucoxene porphyroblasts ($\leq 1\text{ mm}$). Rare quartz veins and veinlets, commonly dipping 25°. Very rare disseminated pyrite. Slump (?) structures at about 103.8 m.
105.07	106.72	85° at 105.29m 75-80° " 106.29m	Graded siltstone units ($\leq 8\text{ cm}$, but usually much less), and laminated pale and dark grey siltstone. The graded units consist of pale grey, commonly cross-bedded and slightly chloritic siltstone (at base) grading up to dark grey to black argillaceous and carbonaceous siltstone containing abundant leucoxene porphyroblasts. Pale grey siltstone content approximately 55 to 60%. The laminated siltstones consist of alternating pale grey siltstone and dark grey to black argillaceous and carbonaceous siltstone, commonly very finely laminated ($\leq 0.2\text{mm}$). Few quartz veins ($\leq 2\text{ mm}$) slightly to moderately cavernous after pyrite. Rare graphitic joints and fault planes. Few erosional features.
106.72	107.91		Massive, medium and dark grey argillaceous and carbonaceous siltstone, with common leucoxene porphyroblasts and few finely laminated bands of pale grey and dark grey argillaceous and carbonaceous siltstone. Quartz-chlorite veins ($\leq 10\text{ mm}$) dipping about 15-20° are common towards base of unit. Other rare quartz veins and veinlets ($\leq 1\text{ mm}$). Rare microfaults. Poorly jointed, with fine-grained pyrite on some joint faces.
107.91	109.00	80-85°	Finely laminated pale grey siltstone and dark grey argillaceous and carbonaceous siltstone, occasionally in graded units. This sequence has some similarity with the interval 105.07 to 106.72m, but contains much less pale grey siltstone (approximately 15%). Thin ($\leq 5\text{ cm}$) breccia zone containing small (usually $\leq 5\text{ mm}$) black carbonaceous siltstone pebbles in quartz with rare pyrite at base of unit. Few quartz veinlets and rare quartz veins commonly dipping 30-35°. Few microfaults towards base of unit. Poorly jointed except in vicinity of breccia zone.

635193

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
109.00	111.14	80° at 110.74m.	Dark grey to black massive argillaceous and carbonaceous siltstone and finely laminated pale grey siltstone and dark grey carbonaceous siltstone. Numerous leucoxene porphyroblasts. Numerous quartz veinlets and few quartz veins (usually ≤ 0.5 mm) commonly filling microfaults and dipping 45°. Quartz veins commonly slightly cavernous. Fine-grained pyrite on joint faces, generally poorly jointed. Slump (?) structure at about 109.91m.
111.14	113.57		Dark grey-green and dark grey massive argillaceous and carbonaceous siltstone. Numerous leucoxene porphyroblasts. Complexly deformed in top 40 cms. with numerous microfaults and folding of medium grey-green coarse chloritic siltstone. Few quartz veins (≤ 1 mm). Poorly jointed.
113.57	115.70	80° at 114.45m. 75° " 115.58m.	Laminated, dominantly dark grey argillaceous and carbonaceous siltstone, but with few pale grey siltstone laminae. Laminations commonly indistinct. Abundant leucoxene porphyroblasts (≤ 1 mm). Few massive dark grey carbonaceous siltstone units (< 30 cms) and a few thin graded units. Few quartz and quartz-chlorite veins, often defining microfaults and usually slightly cavernous. Moderately well jointed.
115.70	120.00	75-80° at 116.75m. 75-80° " 118.78m.	Dark grey massive argillaceous and carbonaceous siltstone containing numerous leucoxene porphyroblasts and few graded siltstone units (usually ≤ 4 cm) consisting of pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. Few bands (≤ 2 cm) of pale grey siltstone. The dark grey carbonaceous bands of the graded siltstone units contain numerous leucoxene porphyroblasts. At about 116.15m, occurs a sinuous and complex quartz-chlorite vein system in a graded siltstone unit which is intersected by later quartz veins (≤ 1 mm) which are slightly to moderately cavernous. In the massive siltstone, indistinct bedding is defined by sporadic thin pale grey siltstone laminae. Common quartz and quartz-chlorite veins (≤ 1 mm) often dipping 30-40°. Few microfaults.
120.00	123.91	75° at 121.00m. 80° " 123.04m.	Finely to coarsely laminated dark grey argillaceous and carbonaceous siltstone with few pale grey siltstone laminae and few graded units consisting of pale grey siltstone and common dark grey argillaceous and carbonaceous siltstone. Leucoxene porphyroblasts common in darker carbonaceous siltstone. Rare bands of pale grey, slightly chloritic and cross-bedded siltstone. Rare disseminated pyrite, pyritic quartz veins and pyritic joint faces. Few quartz and quartz-chlorite veins and veinlets (≤ 1 mm), often cavernous. Few minor microfaults.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
123.91	126.59		Dark grey to black massive argillaceous and carbonaceous siltstone containing numerous leucoxene porphyroblasts. Few quartz veins (≤ 1 mm) often slightly cavernous. Mottled pale and dark green quartz-chlorite veins at base of unit.
126.59	130.74	75° at 130.42m.	Similar to interval 120.00 to 123.91m. Bedding often only poorly defined. Few massive porphyroblastic siltstone units. Prominent quartz-chlorite veins (≤ 2 cm) at base of unit, possibly filling minor faults. Between 128.50 and 128.90m, occurs a breccia zone containing grey-green sub-angular siltstone pebbles cemented by quartz and quartz-chlorite veins. Few slickensided surfaces. Rare disseminated pyrite. Quartz veins commonly slightly to moderately cavernous.
130.74	132.63		Dark grey to black, massive argillaceous and carbonaceous siltstone containing numerous leucoxene porphyroblasts (≤ 1 mm). Few slightly cavernous and slightly pyritic quartz-chlorite veins (≤ 3 mm) dipping 30°.
132.63	134.55		Similar to interval 120.00 to 123.91m. Slump (?) structure at base of unit. Thin (≤ 0.5 mm), irregular and discontinuous quartz veins common.
134.55	136.31		Dark grey, massive, argillaceous and carbonaceous siltstone containing few disseminated leucoxene porphyroblasts. Few bands of microfaulted and deformed laminated siltstone. At about 136.06m. occurs a coarse breccia zone of dark grey siltstone cemented by white, slightly pyritic and cavernous quartz.
136.31	142.02 approx.	85-90° at 136.42m. 70° " 137.89m. 70° " 140.30m. 80° " 141.40m.	Similar to interval 120.00 to 123.91m. with few massive siltstone units. Unit consists basically of a dark grey argillaceous and carbonaceous siltstone with few, generally indistinct, pale grey siltstone laminae. Few graded siltstone units, commonly ≤ 2 cm. Thin (≤ 1 mm) irregular and discontinuous quartz veins common, together with thicker (≤ 2 mm) more continuous and slightly pyritic quartz and quartz-chlorite veins. Sporadic graphitic slickensides. Laminations more well-defined towards base of unit. Sporadic leucoxene porphyroblasts. Few minor microfaults.
142.02	149.02	80-85° at 144.12m.	Basically a massive dark grey to black argillaceous and carbonaceous siltstone containing a few units corresponding to the interval 136.31 to 142.02m. Pale grey siltstone common often irregular and slightly deformed suggesting slump structure. Numerous leucoxene porphyroblasts particularly towards base of unit. Quartz and quartz-chlorite veins and veinlets (≤ 3 mm) common, veins often irregular and discontinuous and slightly pyritic and cavernous and commonly associated with graphitic slickensides. Very rare pyrite in pale grey siltstone bands. Few minor microfaults.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
149.02	150.25		Massive, pale grey and dark grey argillaceous siltstone, carbonaceous in parts and slightly silicified in parts. Between 149.40 and 149.65m, occurs a pale to medium green pyritic quartz-chlorite mass containing sporadic quartz veins ($\leq 1\text{mm}$) commonly associated with pyrite.
150.25	161.33	70° at 155.31m. 80-85° at 156.86m. 85° at 159.10m.	Massive, dark grey to black argillaceous and carbonaceous siltstone with common bands (up to approx. 80 cm. but usually much less) similar to interval 136.31 to 142.02m. Leucoxene porphyroblasts common throughout. Quartz veins and veinlets common ($\leq 1\text{mm}$) and often dipping 35-40°. Few pyritic quartz-chlorite veins ($\leq 10\text{mm}$) often moderately cavernous. This unit contains a few pyritic and chloritic bands ($\leq 15\text{cm}$) similar to interval 149.40 to 149.65m. Few minor microfaults, commonly quartz filled. Rare pyritic slickensided surfaces.
161.33	165.02	80-85° at 161.35m. 75-80° " 163.74m.	Similar in some respects to the interval 120.00 to 123.91m. Dark grey to black argillaceous and carbonaceous siltstone containing numerous leucoxene (?) porphyroblasts (usually $\leq 1\text{mm}$) with bedding, which is commonly indistinct, defined by pale grey siltstone laminae. Few graded siltstone bands ($\leq 5\text{cm}$). Few graphitic slickensided surfaces. Euhedral pyrite ($\leq 1\text{mm}$) common within pale siltstone. Few pyritic quartz-chlorite veins ($\leq 5\text{mm}$) particularly about 162.60m. These veins are moderately to highly cavernous and usually dip 35° or 65°. Few minor microfaults
165.02	165.67		Similar to interval 161.33 to 165.02m. but microfaults more common and chalcopryrite present associated with cavernous pyritic quartz and quartz-chlorite veins. Graphitic joint surfaces common and often slickensided. Total sulphides $< 0.5\%$.
165.67	166.07		Friable and porous, black carbonaceous fine-grained sediment containing abundant pebbles black carbonaceous siltstone and quartz. May be solidified sludge or caved material.
166.07	167.00 approx.		Mottled black and white heavily silicified carbonaceous and graphitic sediment containing minor pyrite, white quartz vein material in part. Fragmental and high core loss.
167.00	169.20		Slightly pyritic carbonaceous quartzite and quartz, very slightly chloritic in parts. Pyrite generally euhedral. Slightly to moderately cavernous after carbonate. Rare chalcopryrite ($< 0.1\%$) blebs. Very fragmental and high core loss.

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INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
169.20	169.55 approx.		Dark grey carbonaceous and graphitic quartzite containing few irregular quartz and quartz-chlorite veins (≤ 4 mm). Minor euhedral pyrite. Very fragmental and high core loss.
169.55	169.92 approx.		Similar to interval 166.07 to 167.00m. Includes a brecciated dark grey carbonaceous siltstone containing common quartz veins (≤ 2 cm) often cavernous after carbonate. Very fragmental with high core loss.
169.92	171.75 approx.		Dark grey carbonaceous siltstone, quartzitic in parts, containing numerous white and yellow-brown porphyroblasts (≤ 2 mm). Graphitic in parts. Disseminated euhedral pyrite common. Few thin (≤ 1 mm) quartz-chlorite veins. Few fragments with quartz containing pale yellow-brown residues after carbonate. Very fragmental with high core loss.
171.75	172.82 approx.		Breccia zone consisting of medium to dark grey carbonaceous siltstone cemented by white quartz and mottled white and yellow-brown quartz-carbonate. Disseminated fine-grained euhedral pyrite (< 0.5 mm) is common. Very fragmentary with core loss.
172.82	173.13		Laminated and deformed pale grey siltstone and dark grey carbonaceous siltstone. Minor microfaults common, often quartz filled. Numerous irregular quartz veins (≤ 3 mm) occasionally slightly chloritic and commonly pyritic. Common euhedral pyrite. Graphitic in parts.
173.13	174.04		Dark grey carbonaceous and graphitic siltstone, silicified and quartzitic in parts, particularly towards base. Slightly chloritic in parts. Few quartz veins. Minor disseminated euhedral pyrite. Traces of yellow-brown carbonate in quartz veins. Very fragmentary with core loss.
174.04	175.25 approx.		Dark grey to black carbonaceous and graphitic siltstone containing numerous quartz and quartz-chlorite veins which are generally pyritic, particularly at 174.88 to 174.93m. where a pyritic quartz-chlorite vein is slightly cavernous after carbonate. Numerous grey and grey-green euhedral porphyroblasts (≤ 3 mm) particularly towards base of unit. Quartzitic in parts. Well-jointed, but less fragmentary than adjoining units.
175.25	188.08		No core recovered. Leached and highly cavernous carbonate. Sludge samples assayed for Cu.

635197

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
188.08	190.50	40° to 45°	Massive but very fragmentary medium to dark green, fine-grained and featureless tuff or chloritic siltstone. Specific gravity appears to be anomalously high. Rare cavities.
190.50	196.00		No core recovered except for 8 cm of material recovered between 194.17 to 194.47m, identical to that from the interval 188.08 to 190.50m.
196.00	196.30		Pale yellow-brown, pitted and porous, very slightly chloritic carbonate. Indistinct bedding dips at 40-45°. Moderately leached.
196.30	196.91		No core recovered. Sludge samples assayed for copper.
196.91	197.35 approx.		Similar to interval 188.08 to 190.50m.
197.35	198.92 approx.		<u>Mineralised Zone:</u> White quartz containing abundant pyrite and chalcopyrite. An indistinct banding exists particularly towards base of unit. Cavities after carbonate are common and rare soft pale brown discontinuous carbonate veins (≤ 3 mm) occur at top of unit. Few secondary quartz veins. Abundant pyrite and chalcopyrite. Total sulphides estimated at about 10 to 12% in the ratio, Cpy : Py = 70 : 30. Chalcopyrite occurs as extremely irregular blebs often associated with carbonate cavities and occurs alone or in intimate association with anhedral to subhedral pyrite.
198.92	205.46		Medium and dark grey argillaceous and carbonaceous siltstone with common small (≤ 0.5 mm) leucoxene porphyroblasts, particularly in the darker carbonaceous units. Finely laminated in parts and with few graded beds with minor slump structures. Few quartz veins, often irregular and discontinuous. Few minor siltstone pebble bands and few disseminated siltstone pebbles (≤ 15 mm).
205.46	206.68		Dark grey and black argillaceous and carbonaceous siltstone, very finely laminated in parts. <u>DDH.9 COMPLETED AT 206.68 METRES.</u>

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.MINERAL RESOURCES DIVISION.TASMANIAN EXPLORATION EL.16/68.

Date: 25th June, 1971

DDH.10 - MURRAY'S REWARD PROSPECT.

M. H. McINTYRE.

SUMMARY.

DDH.10 at the Murrays Reward Prospect was completed at a depth of 179.83m.

A mineralised zone with poorly defined boundaries was intersected between 120.64m and 126.60m. within a series of chloritic and carbonaceous phyllites and slates and consisted of the following lithologies:

- (a) Carbonaceous and graphitic phyllite containing several chalcopyritic quartz-carbonate veins. Assay value; 1.25% Cu over 1.12m.
- (b) Chloritic and pyritic quartz-carbonate veins associated with green chloritic tuff (?). Disseminated blebs of chalcopyrite. Assay value; 3483 ppm. Cu over 1.35m.
- (c) Porous, fine grained, cream carbonate containing rare traces of chalcopyrite and covellite. Assay value; 143 ppm. Cu over 0.91m.
- (d) White quartz containing chloritic phyllite and siltstone fragments, minor cream carbonate veins and rare disseminated chalcopyrite. Assay value; 2300 ppm. Cu over 2.58m.

This mineralised zone averages about 4150 ppm. Cu over a thickness of 5.96m (true thickness of approximately 4.2m). Anomalously high Cu values (mean value 1287 ppm. Cu) occur over a thickness of about 28.14m. between 110.39 and 138.53m.

DDH.10 - MURRAY'S REWARD PROSPECT.

Grid reference:	435 020 N, 319 512 E.
Collar R.L.:	640.5 feet.
Angle:	55°
Direction:	056° magnetic.
Date drilled:	13.3.71 to 18.4.71.
Drilling rate:	5.44m. per shift.

1. OPERATIONAL DETAILS:1.1 Drilling details.

The Mindrill F.30 drill rig commenced moving to the site of DDH.10, after the temporary abandonment of DDH.8, on 8th March, 1971, and DDH.10 was commenced on 13th March, 1971.

NX casing was seated at 18.29m and the hole progressed to 121.9m with NQWL equipment. BX casing was seated at 121.9m. and the hole was completed at 179.83m. on 18th April, 1971, with the use of BQWL equipment.

Drilling progress and engineering details are graphically described by Fig. 1.

1.2 Drilling conditions.

Drill runs and core recovery are given in Appendix A.

NX casing was drilled to 18.29m. without an inner tube and core recovery to this depth averaged about 16%. From 18.29m. to the bottom of the hole at 179.83m., core recovery was almost invariably 100% except for a 1.81m. interval between 121.30m and 123.11m at which depth, BQWL equipment was introduced and the core recovery was about 54%.

The phyllites had a marked tendency to part parallel to the plane of foliation and the inner tube frequently became blocked. As a result, drill runs were usually short and no ten feet runs with complete core recovery were recorded. The overall drilling rate was very low.

At a depth of about 112.5m. a minor amount of water was issuing from the hole at the rate of about 200 litres/hour.

Sludge samples were collected over intervals of 1.52m. and 0.91m., and those collected between 106.68m. and 123.42m. (intervals of 1.52m.) and 127.39m. and 143.85m. (intervals of 0.91m.) were split and assayed for copper. For reasons unknown, the drillers failed to collect sludge samples between 123.42m and 127.39m.

1.3 Drillhole deviation.

The drillhole surveys were as follows:

→	Collar	55°	at 058° mag.
	15.24m.	51°	
→	30.48m.	55°	
	45.72m.	55.5°	
→	60.96m.	53.5°	
	76.20m.	52°	
→	91.44m.	49°	at 060° magnetic.
	106.68m.	46.5°	
→	121.90m.	45°	
	137.14m.	40.5°	
→	152.40m.	35°	at 073° magnetic.
	164.59m.	32°	
	167.64m.	30°	at 105° magnetic.

The reliability of the Tropari readings is suspect.

DDH.10, in common with all other drillholes at the Balfour area, showed a marked tendency to shallow with increasing depth.

2. GEOLOGY:

The complete drill log is given in Appendix B and may be briefly summarised as follows:

0 to 28.65m.

Finely foliated to massive, pale to medium grey, argillaceous, carbonaceous and graphitic phyllite and siltstone commonly with pale green chloritic tinge.

Few pyritic quartz veins and chlorite porphyroblasts common in parts.

Sporadic disseminated pyrite, graded beds locally preserved.

28.65 to 49.99m.

Pale to dark green, chloritic phyllite, carbonaceous in parts and containing common chloritic porphyroblasts, sporadic disseminated pyrite and a few pyritic quartz veins including a very few containing traces of carbonate residue.

49.99 to 120.64m.

Finely foliated to massive, medium to dark grey carbonaceous and graphitic phyllite and siltstone, often with pale green chloritic tinge and containing common grey-white and brown porphyroblasts. Graded bedding is locally preserved. Rare bands (≤ 15 cm) of pyritic and chloritic tuff (?). Pyritic quartz and quartz-carbonate veins are common and are often moderately to heavily leached and contain chlorite and traces of chalcopyrite. The carbonate veins appear to become more common towards the base of the unit. Rare quartz-pyrite blebs. Sporadic disseminated pyrite. Rare fine grained pyrite on joint planes. Few micro-faults. Rare breccia zones and slickensided fault planes.

120.64 to 126.60m.

Mineralised Zone, consisting of:

120.64 to 121.76m: dark grey to black slightly talcose, carbonaceous and graphitic phyllite, containing several white and yellow-brown, slightly to moderately cavernous quartz-carbonate veins (≤ 10 cm) containing pyrite and chalcopyrite. Assay values: 1.25% Cu, 230 ppm Pb, 1063 ppm Zn.

121.76 to 123.11m: mottled white and brown, chloritic and pyritic quartz-carbonate veins associated with chloritic tuff (?). Minor chalcopyrite. Assay values; 3483 ppm Cu, 105 ppm Pb, 130 ppm Zn.

123.11 to 124.02m: porous, fine grained, cream carbonate containing a few quartz veins and blebs, few chlorite stringers and veinlets and rare traces of chalcopyrite and covellite. Assay values; 143 ppm Cu, 18 ppm Pb, 38 ppm Zn.

124.02 to 126.60m: white quartz containing medium to dark green chloritic phyllite and siltstone fragments and minor cream carbonate. Few irregular and discontinuous pyrite bands. Rare disseminated chalcopyrite. Assay values:

(i) 124.02 to 125.45m; 4068 ppm Cu, 180 ppm Pb, 140 ppm Zn.
 (ii) 125.45 to 126.60m; 115 ppm Cu, 30 ppm Pb, 65 ppm Zn.

126.60 to 137.64m.

This unit consists essentially of chloritic phyllite but contains a few bands of carbonaceous and graphitic phyllite. Yellow-brown porphyroblasts are common. Quartz veins are common and are usually irregular and discontinuous and contain traces of pyrite, carbonate and chlorite. Few quartz-carbonate veins. Rare traces of chalcopyrite.

137.64 to 138.53m.

White quartz containing a few irregular chloritic phyllite fragments and minor carbonate veins. Traces of disseminated chalcopyrite.

138.53 to 179.83m.

Similar to the interval 126.60 to 137.64m, but contains a greater proportion of carbonaceous and graphitic phyllite. Very rare traces of chalcopyrite.

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3. SAMPLE AND ASSAY RESULTS:

Two types of samples of the products of DDH.10 were prepared for assay, and in addition, a comprehensive suite of specimens was collected and prepared for thin and polished section examination. The samples were:

- (i) Core samples assayed for Cu, Pb and Zn.
- (ii) Sludge samples from and adjacent to, the mineralised zone, were assayed for Cu.

(i) Core Samples.

A total of 92 samples were collected from the DDH.10 core and were assayed for Cu, Pb and Zn in order to determine the base metal distribution within the Murrays Reward Prospect and to determine the grade of the mineralised zone. The results were:

INTERSECTION (metres)	INTERVAL (metres)	SAMPLE NO. BAL.	ASSAY (ppm)		
			Cu	Pb	Zn
18.29 to 21.23	2.94	0719	50	28	4
21.23 to 22.51	1.28	0720	40	43	5
22.51 to 24.68	2.17	0721	38	30	5
24.68 to 25.90	1.22	0722	50	30	3
25.90 to 27.43	1.53	0723	60	25	3
27.43 to 28.65	1.22	0724	95	20	2
28.65 to 29.72	1.07	0725	110	28	6
29.72 to 31.24	1.52	0726	33	23	4
31.24 to 33.80	2.56	0727	58	28	6
33.80 to 35.66	1.86	0728	30	23	3
35.66 to 37.19	1.53	0729	35	28	4
37.19 to 38.41	1.22	0730	28	33	4
38.41 to 40.07	1.66	0731	43	55	13
40.07 to 41.14	1.07	0732	33	65	7
41.14 to 42.25	1.11	0733	90	200	100
42.25 to 44.19	1.94	0734	60	120	28
44.19 to 45.40	1.21	0735	33	45	6
45.40 to 46.33	0.93	0736	35	43	4
46.33 to 48.88	2.55	0737	48	45	5
48.88 to 49.99	1.11	0738	45	70	5
49.99 to 51.82	1.83	0739	48	175	3
51.82 to 53.04	1.22	0740	40	53	3
53.04 to 54.33	1.29	0741	35	35	2
54.33 to 56.38	2.05	0742	48	38	3
56.38 to 58.50	2.12	0743	58	30	5
58.50 to 60.02	1.52	0744	53	35	4
60.02 to 61.72	1.70	0745	50	23	3
61.72 to 63.55	1.83	0746	90	35	4
63.55 to 65.23	1.68	0747	40	23	3
65.23 to 66.85	1.62	0748	58	35	10
66.85 to 68.53	1.68	0749	48	33	12
68.53 to 69.27	0.74	0750	45	30	3
69.27 to 70.72	1.45	0751	43	23	4
70.72 to 72.65	1.93	0752	40	25	3
72.65 to 74.22	1.57	0753	48	25	4
74.22 to 75.28	1.06	0754	48	28	4
75.28 to 76.81	1.53	0755	40	33	4
76.81 to 78.52	1.71	0756	55	38	3
78.52 to 80.47	1.95	0757	30	20	5
80.47 to 82.56	2.09	0758	53	390	54
82.56 to 84.29	1.73	0759	50	30	3
84.29 to 85.04	0.75	0760	40	25	2
85.04 to 88.57	3.53	0761	53	33	2
88.57 to 90.22	1.65	0762	53	23	2
90.22 to 91.44	1.22	0763	43	28	1
91.44 to 93.27	1.83	0764	318	25	2
93.27 to 95.16	1.89	0765	55	23	2
95.16 to 97.00	1.84	0766	75	28	2
97.00 to 98.76	1.76	0767	30	105	2
98.76 to 100.43	1.67	0768	63	28	2

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INTERSECTION (metres)	INTERVAL (metres)	SAMPLE NO. BAL.	ASSAY (ppm)		
			Cu	Pb	Zn
100.43 to 101.84	1.41	0769	53	23	23
101.84 to 103.34	1.50	0770	45	25	20
103.34 to 104.48	1.14	0771	53	25	23
104.48 to 105.75	1.27	0772	125	25	25
105.75 to 107.07	1.32	0773	163	30	33
107.07 to 108.67	1.60	0774	58	28	25
108.67 to 110.39	1.72	0775	28	30	20
110.39 to 112.01	1.62	0776	140	33	33
112.01 to 113.27	1.26	0777	188	33	43
113.27 to 114.90	1.63	0778	258	10	58
114.90 to 116.27	1.37	0779	1338	73	158
116.27 to 117.73	1.46	0780	75	15	63
117.73 to 119.02	1.29	0781	153	40	58
119.02 to 120.64	1.62	0782	208	40	50
120.64 to 121.76	1.12	0783	1.25%	230	1063
121.76 to 123.11	1.35	0784	3483	105	130
123.11 to 124.02	0.91	0785	143	18	38
124.02 to 125.45	1.43	0786	4068	180	140
125.45 to 126.60	1.15	0787	115	30	65
126.60 to 127.50	0.90	0788	163	43	45
127.50 to 129.51	2.01	0789	413	18	35
129.51 to 130.84	1.33	0790	225	13	33
130.84 to 132.24	1.40	0791	25	28	40
132.24 to 134.37	2.13	0792	163	35	28
134.37 to 135.78	1.41	0793	313	35	28
135.78 to 137.64	1.86	0794	55	45	35
137.64 to 138.53	0.89	0795	1713	30	33
138.53 to 138.92	0.39	0796	40	35	35
138.92 to 140.80	1.88	0797	20	8	28
140.80 to 142.92	2.12	0798	35	33	33
142.92 to 146.12	3.20	0799	30	40	35
146.12 to 149.00	2.88	0800	43	50	35
149.00 to 152.07	3.07	0801	38	53	40
152.07 to 155.43	3.36	0802	98	43	40
155.43 to 158.30	2.87	0803	83	48	35
158.30 to 161.41	3.11	0804	43	15	30
161.41 to 164.64	3.23	0805	905	30	35
164.64 to 167.27	2.63	0806	23	50	43
167.27 to 170.26	2.99	0807	30	58	43
170.26 to 173.87	3.61	0808	20	58	43
173.87 to 177.69	3.82	0809	90	53	40
177.69 to 179.83	2.14	0810	110	60	35

A visual examination of the Cu values enables the assay results to be roughly sub-divided into three major zones:

- Zone A: 18.29 to 110.39m.
- Zone B: 110.39 " 138.53m. (i) Mineralised zone 120.64 to 126.60m.
- Zone C: 138.53 " 179.83m.

The assay statistics of these zones are:

	MEAN ASSAY VALUES		
	Cu (ppm)	Pb (ppm)	Zn (ppm)
ZONE A	58	46 ²	71 ³
ZONE B	1287	53	134
ZONE C	107 ¹	42	37
MINERALISED ZONE	4150 ⁴	118	281

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NOTES:

1. Includes one anomalous value of 905 ppm. Cu.
2. Includes three values ≥ 175 ppm. Pb.
3. Includes two values > 500 ppm. Zn.
4. The values of the mineralised zone only are weighted according to sample interval.

Cu Distribution:

Zone A is a low-grade sequence containing only background Cu values with rare anomalous values associated with chalcopyrite in vein material. The mean assay value (unweighted for sample interval) is 58 ppm. Cu with a range of 28 to 163 ppm. Cu.

Zone B consists of a sequence of anomalous Cu values, the mean Cu value, including and excluding the main mineralised zone, being 1287 and 362 ppm Cu respectively.

Zone C is similar to Zone A in that it consists of a sequence of background Cu values averaging 107 ppm. Cu and owing much of this relatively high value to one sample (BAL.0805) without which the average value is reduced to about 50 ppm. Cu.

There would therefore appear to exist a broad zone of relatively high copper values (Zone B) existing between 110.39 and 138.53m. within which the major mineralised zone occurs and the anomalous values do not appear to be exclusively restricted to any particular rock type. It should be noted that the carbonate unit (Sample BAL.0785) within the main mineralised zone contains comparatively little copper (143 ppm. Cu), this being at variance with the copper distribution within the carbonate rocks at the Clump Prospect.

Pb Distribution:

The Pb distribution is, with few exceptions, confined to background values only. The mean Pb value is 47 ppm Pb. There does appear to exist a low positive correlation, probably statistically significant, between Cu and Pb and Zn and Pb. No lead minerals were positively identified during logging of the core.

Zn Distribution:

The distribution of zinc within the DDH.10 core is similar to that of the Pb distribution in that a series of background values is occasionally punctuated by an anomalously high value which cannot be related to any positively identified Zn minerals. The main mineralised zone has a mean weighted value of about 281 ppm. Zn and the overall mean value is 73 ppm. Zn.

(ii) Sludge samples:

Sludge samples collected between 106.68 and 143.85m were assayed for copper only.

The results were:

<u>SPECIMEN NO.</u>	<u>DEPTH</u>		<u>SPECIMEN NO.</u>	<u>DEPTH</u>	
M.R.	(metres)		M.R.	(metres)	
1	12.80	T.S.	31	81.65	T.S./P.S.
2	20.20	T.S.	32	81.65	T.S.
3	22.05	T.S.	33	87.49	T.S./P.S.
4	27.09	T.S.	34	89.97	T.S.
5	29.00	T.S./P.S.	35	91.90	T.S.
6	29.52	T.S.	36	92.05	T.S./P.S.
7	33.02	T.S.	37	92.42	T.S./P.S.
8	36.27	T.S.	38	95.80	T.S./P.S.
9	40.68	T.S.	39	97.10	T.S.
10	43.22	T.S.	40	101.66	T.S./P.S.
11	43.88	T.S./P.S.	41	103.74	T.S.
12	46.18	T.S.	42	105.36	T.S.
13	49.51	T.S.	43	107.92	T.S.
14	50.90	T.S.	44	110.85	T.S./P.S.
15	53.48	T.S.	45	113.31	T.S./P.S.
16	56.53	T.S.	46	115.96	T.S.
17	57.80	T.S./P.S.	47	117.10	T.S.
18	58.84	T.S.	48	118.57	T.S./P.S.
19	61.72	T.S.	49	118.87	T.S.
20	65.38	T.S.	50	123.57	T.S./P.S.
21	66.90	T.S./P.S.	51	124.47	T.S./P.S.
22	68.27	T.S.	52	124.85	T.S./P.S.
23	68.97	T.S.	53	126.50	T.S.
24	71.38	T.S.	54	126.98	T.S.
25	72.43	T.S.	55	128.72	T.S.
26	77.20	T.S.	56	129.67	T.S.
27	79.00	T.S./P.S.	57	132.36	T.S.
28	79.52	T.S.	58	138.00	T.S.
29	80.47	T.S./P.S.	59	143.57	T.S.
30	80.90	T.S./P.S.	60	166.36	T.S.

5. CONCLUSION:

DDH.10 intersected sub-economic copper mineralisation beneath the old mine workings of Murrays Reward. The information yielded by this single drill hole is not sufficient to determine whether the high grade secondary and primary copper mineralisation originally mined from Murrays Reward, pinches out with depth and further drillholes are warranted in this area of the Balfour field.

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APPENDIX A

635205

D.D.H.10 - DRILL RUNS AND CORE RECOVERY

Depth	Metric Equivalent		Core Recovery	
			Metres	Per Cent
0 to 10'0"	0	to 3.05	0.33	11
10'0" "	3.05	" 6.71	0.30	8
22'0" "	6.71	" 9.75	0.61	20
32'0" "	9.75	" 12.80	0.41	13
42'0" "	12.80	" 15.85	0.30	10
52'0" "	15.85	" 18.29	0.91	38
60'0" "	18.29	" 19.05	0.76	100
62'6" "	19.05	" 19.35	0.30	100
63'6" "	19.35	" 20.26	0.91	100
66'6" "	20.26	" 22.05	1.27	71
72'4" "	22.05	" 22.81	0.76	57
74'10" "	22.81	" 24.68	1.06	80
81'0" "	24.68	" 25.29	0.61	100
83'0" "	25.29	" 25.90	0.61	100
85'0" "	25.90	" 27.43	1.22	80
90'0" "	27.43	" 28.65	1.22	100
94'0" "	28.65	" 29.26	0.61	100
96'0" "	29.26	" 29.72	0.46	100
97'6" "	29.72	" 30.48	0.76	100
100'0" "	30.48	" 31.24	0.76	100
102'6" "	31.24	" 31.70	0.46	100
104'0" "	31.70	" 32.31	0.61	100
106'0" "	32.31	" 33.22	0.91	100
109'0" "	33.22	" 33.52	0.30	100
110'0" "	33.52	" 34.14	0.61	100
112'0" "	34.14	" 34.75	0.61	100
114'0" "	34.75	" 35.66	0.91	100
117'0" "	35.66	" 36.27	0.61	100
119'0" "	36.27	" 37.19	0.91	100
122'0" "	37.19	" 37.80	0.61	100
124'0" "	37.80	" 38.41	0.61	100
126'0" "	38.41	" 39.02	0.61	100
128'0" "	39.02	" 40.68	1.67	100
133'6" "	40.68	" 41.14	0.46	100
135'0" "	41.14	" 41.60	0.46	100
136'6" "	41.60	" 42.97	1.37	100
141'0" "	42.97	" 44.19	1.22	100
145'0" "	44.19	" 46.33	2.13	100
152'0" "	46.33	" 49.38	2.59	85
162'0" "	49.38	" 49.99	0.61	100
164'0" "	49.99	" 50.60	0.61	100
166'0" "	50.60	" 51.21	0.61	100
168'0" "	51.21	" 51.82	0.61	100
170'0" "	51.82	" 53.04	1.22	100
174'0" "	53.04	" 53.95	0.91	100
177'0" "	53.95	" 54.86	0.91	100
180'0" "	54.86	" 55.62	0.76	100
182'6" "	55.62	" 56.38	0.76	100
185'0" "	56.38	" 56.91	0.53	100
186'9" "	56.91	" 57.59	0.68	100
189'0" "	57.59	" 58.20	0.61	100
191'0" "	58.20	" 58.50	0.30	100
192'0" "	58.50	" 59.41	0.91	100
195'0" "	59.41	" 60.02	0.61	100
197'0" "	60.02	" 60.96	0.91	100
200'0" "	60.96	" 61.26	0.30	100
201'0" "	61.26	" 61.72	0.46	100
202'6" "	61.72	" 62.79	1.07	100
206'0" "	62.79	" 63.55	0.76	100
208'6" "	63.55	" 64.16	0.61	100

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Depth	Metric Equivalent		Core Recovery	
			Metres	Per Cent
210'6" to 212'6"	64.16	to 64.77	0.61	100
212'6" " 214'0"	64.77	" 65.23	0.46	100
214'0" " 215'0"	65.23	" 65.53	0.30	100
215'0" " 216'6"	65.53	" 65.99	0.46	100
216'6" " 219'0"	65.99	" 66.75	0.76	100
219'0" " 222'0"	66.75	" 67.66	0.91	100
222'0" " 223'8"	67.66	" 68.27	0.51	100
223'8" " 227'3"	68.27	" 69.27	1.00	100
227'3" " 229'8"	69.27	" 70.01	0.74	100
229'8" " 232'0"	70.01	" 70.72	0.71	100
232'0" " 234'0"	70.72	" 71.33	0.61	100
234'0" " 238'0"	71.33	" 72.55	1.22	100
238'0" " 242'4"	72.55	" 73.86	1.31	100
242'4" " 243'6"	73.86	" 74.22	0.36	100
243'6" " 245'0"	74.22	" 74.68	0.46	100
245'0" " 250'0"	74.68	" 76.20	1.52	100
250'0" " 250'6"	76.20	" 76.35	0.15	100
250'6" " 252'0"	76.35	" 76.81	0.46	100
252'0" " 254'0"	76.81	" 77.42	0.61	100
254'0" " 256'0"	77.42	" 78.03	0.61	100
256'0" " 258'0"	78.03	" 78.64	0.61	100
258'0" " 264'0"	78.64	" 80.47	1.83	100
264'0" " 266'6"	80.47	" 81.23	0.76	100
266'6" " 268'0"	81.23	" 81.69	0.46	100
268'0" " 270'0"	81.69	" 82.30	0.61	100
270'0" " 271'6"	82.30	" 82.76	0.46	100
271'6" " 273'8"	82.76	" 83.42	0.66	100
273'8" " 275'0"	83.42	" 83.83	0.41	100
275'0" " 276'6"	83.83	" 84.29	0.46	100
276'6" " 278'0"	84.29	" 84.75	0.46	100
278'0" " 279'0"	84.75	" 85.04	0.29	100
279'0" " 289'0"	85.04	" 88.09	1.22	40
289'0" " 293'0"	88.09	" 89.31	1.22	100
293'0" " 296'0"	89.31	" 90.22	0.91	100
296'0" " 300'0"	90.22	" 91.44	1.22	100
300'0" " 303'0"	91.44	" 92.35	0.91	100
303'0" " 306'0"	92.35	" 93.27	0.91	100
306'0" " 310'0"	93.27	" 94.49	1.22	100
310'0" " 314'0"	94.49	" 95.71	1.22	100
314'0" " 320'0"	95.71	" 97.54	1.83	100
320'0" " 322'0"	97.54	" 98.15	0.61	100
322'0" " 324'0"	98.15	" 98.76	0.61	100
324'0" " 326'4"	98.76	" 99.46	0.70	100
326'4" " 329'6"	99.46	" 100.43	0.97	100
329'6" " 335'6"	100.43	" 102.26	1.83	100
335'6" " 342'4"	102.26	" 104.34	2.08	100
342'4" " 345'0"	104.34	" 105.15	0.91	100
345'0" " 348'2"	105.15	" 106.11	0.96	100
348'2" " 351'4"	106.11	" 107.07	0.96	100
351'4" " 352'0"	107.07	" 107.29	0.22	100
352'0" " 354'0"	107.29	" 107.90	0.61	100
354'0" " 360'0"	107.90	" 109.73	1.83	100
360'0" " 362'2"	109.73	" 110.39	0.66	100
362'2" " 365'6"	110.39	" 111.40	1.01	100
365'6" " 367'6"	111.40	" 112.01	0.61	100
367'6" " 375'0"	112.01	" 114.29	2.28	100
375'0" " 377'0"	114.29	" 114.90	0.61	100
377'0" " 381'6"	114.90	" 116.27	1.37	100
381'6" " 384'9"	116.27	" 117.27	1.00	100
384'9" " 390'6"	117.27	" 119.02	1.75	100
390'6" " 394'6"	119.02	" 120.24	1.22	100
394'6" " 398'0"	120.24	" 121.30	1.06	100

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Depth		Metric Equivalent		Core Recovery	
				Metres	Per Cent
398'0"	to 399'6"	121.30	to 121.76	0.30	65
399'6"	" 402'3"	121.76	" 122.58	0.30	36
402'3"	" 404'0"	122.58	" 123.11	0.38	72
404'0"	" 407'0"	123.11	" 124.02	0.91	100
407'0"	" 413'0"	124.02	" 125.85	1.83	100
413'0"	" 415'0"	125.85	" 126.46	0.61	100
415'0"	" 422'0"	126.46	" 128.59	2.13	100
422'0"	" 426'6"	128.59	" 129.96	1.37	100
426'6"	" 427'0"	129.96	" 130.11	0.15	100
427'0"	" 431'6"	130.11	" 131.48	1.37	100
431'6"	" 434'0"	131.48	" 132.24	0.76	100
434'0"	" 439'0"	132.24	" 133.76	0.76	50
439'0"	" 441'0"	133.76	" 134.37	0.61	100
441'0"	" 443'0"	134.37	" 134.98	0.61	100
443'0"	" 447'0"	134.98	" 136.20	1.22	100
447'0"	" 448'0"	136.20	" 136.50	0.30	100
448'0"	" 455'8"	136.50	" 138.76	1.37	56
455'8"	" 457'0"	138.76	" 139.27	0.41	100
457'0"	" 460'6"	139.27	" 140.33	1.06	100
460'6"	" 463'0"	140.33	" 141.09	0.76	100
463'0"	" 469'0"	141.09	" 142.92	1.83	100
469'0"	" 477'0"	142.92	" 145.36	2.44	100
477'0"	" 479'6"	145.36	" 146.12	0.76	100
479'6"	" 481'4"	146.12	" 146.68	0.56	100
481'4"	" 487'0"	146.68	" 148.41	1.73	100
487'0"	" 491'0"	148.41	" 149.63	1.22	100
491'0"	" 495'0"	149.63	" 150.85	1.22	100
495'0"	" 499'0"	150.85	" 152.07	1.22	100
499'0"	" 501'0"	152.07	" 152.68	0.61	100
501'0"	" 503'0"	152.68	" 153.29	0.61	100
503'0"	" 506'0"	153.29	" 154.20	0.91	100
506'0"	" 509'0"	154.20	" 155.11	0.91	100
509'0"	" 513'6"	155.11	" 156.48	1.37	100
513'6"	" 517'0"	156.48	" 157.54	1.06	100
517'0"	" 519'6"	157.54	" 158.30	0.76	100
519'6"	" 520'6"	158.30	" 158.60	0.15	50
520'6"	" 524'0"	158.60	" 159.66	1.06	100
524'0"	" 525'0"	159.66	" 159.96	0.30	100
525'0"	" 527'6"	159.96	" 160.72	0.76	100
527'6"	" 528'10"	160.72	" 161.13	0.41	100
528'10"	" 530'4"	161.13	" 161.59	0.46	100
530'4"	" 531'10"	161.59	" 162.05	0.46	100
531'10"	" 534'4"	162.05	" 162.81	0.76	100
534'4"	" 540'4"	162.81	" 164.64	1.83	100
540'4"	" 540'10"	164.64	" 164.84	0.15	100
540'10"	" 542'10"	164.84	" 165.45	0.61	100
542'10"	" 545'10"	165.45	" 166.36	0.91	100
545'10"	" 548'10"	166.36	" 167.27	0.91	100
548'10"	" 554'10"	167.27	" 169.11	1.83	100
554'10"	" 563'0"	169.11	" 171.60	2.49	100
563'0"	" 568'0"	171.60	" 173.12	1.52	100
568'0"	" 573'0"	173.12	" 174.65	1.52	100
573'0"	" 574'0"	174.65	" 174.96	0.30	100
574'0"	" 577'0"	174.96	" 175.87	0.91	100
577'0"	" 577'6"	175.87	" 176.02	0.15	100
577'6"	" 579'6"	176.02	" 176.63	0.61	100
579'6"	" 583'0"	176.63	" 177.69	0.30	28
583'0"	" 586'0"	177.69	" 178.61	0.91	100
586'0"	" 587'6"	178.61	" 179.07	0.46	100
587'6"	" 589'6"	179.07	" 179.68	0.61	100

A.C.I. MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION

Date drilled: 13.3.71 to 18.4.71.
 Direction: 056° magnetic.

DDH. 10 MURRAYS PROSPECT: REWARD

Grid Reference: 435 020 N, 319 512 E. Angle 55° RL 640.5'

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
0	12.80	30° (25° or 35° true)	Pale to medium grey with pale green (chlorite) tinge, carbonaceous siltstone. Few graded beds containing sporadic pyrite parallel to bedding and confined to paler and coarser sedimentary bands. Slight graphitic sheen on some bedding surfaces. Porous and slightly friable. Few microfaults.
12.80	18.29		Pale to medium grey, massive argillaceous and carbonaceous siltstone with pale green (chlorite) tinge. Few quartz veins, often slightly pyritic. Few small (<0.5mm) chloritic (?) porphyroblasts. Porous and slightly friable.
→ 18.24	21.23	30° (25° or 35° true)	Finely foliated, pale to medium grey, carbonaceous phyllite. Foliation parallel to original bedding and graded bedding preserved. Slightly chloritic in parts and kink bands common. Well jointed, fragmentary in parts.
21.23	22.51		Pale grey-green, generally massive but slightly phyllitic argillaceous sediment containing numerous small (<0.5mm) green (chloritic ?) porphyroblasts.
22.51	28.65		30° at 27.45m. 30° " 28.25m.
28.65	33.80	25°-30° at 33.55m. 25° or 35° true	Grey-green to medium green, porous, chloritic phyllite, often apparently massive, but with indistinct foliation. Few lensoid quartz-pyrite blebs (≤2 cm) and sporadic disseminated euhedral pyrite. Common pyritic quartz veins (≤15mm) usually parallel but occasionally normal, to foliation. Often slightly cavernous. Few small (<0.5mm) chloritic porphyroblasts.
33.80	40.07	30° at 34.80m. 25° " 36.50m. 20°-25° at 37.44m. 20° at 39.75m. 75° or 35° true	Similar to interval 28.65 to 33.80m., but is yellow-green and pale to medium green and very porous and contains numerous chloritic porphyroblasts. Few pyritic quartz blebs and veins, commonly aligned parallel to foliation. Original bedding apparently graded and finely laminated. Few kink bands normal to foliation.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
40.07	41.14	25° 80° or 30° true	Medium to dark green chloritic phyllite. Numerous chloritic porphyroblasts. Massive in basal 40 cm. Few pyritic quartz veins (≤ 2 mm), commonly deformed in basal 40 cm of unit.
41.14	42.25	75°-80° or 30°-35° true	Medium to dark grey-green, strongly fractured chloritic phyllite. Few kink bands. Sporadic fractured pyritic quartz veins (≤ 10 mm). Sporadic disseminated pyrite.
42.25	48.88	20°-25° at 43.32m. 30° at 45.53m.	Medium to dark grey carbonaceous phyllite with pale green chloritic tinge in parts. Foliation is parallel to bedding which is graded and finely laminated. Quartz veins (≤ 15 mm) common, parallel, normal and oblique to foliation. Quartz veins commonly pyritic and slightly cavernous after carbonate with traces of yellow-brown carbonate residue. Massive in parts.
48.88	49.99	73.5°-74.5° or 14.5°-23.5° true	Similar to interval 40.07 to 41.14m. Very fragmental in parts, but massive with poorly defined foliation in basal 50 cms. Few talcose fragments in top 10 cms. Massive sections contain abundant small (≤ 0.5 mm) chloritic porphyroblasts. Few quartz veins (≤ 2 mm). Rare disseminated pyrite.
49.99	51.82	20°-25° at 50.70m	Medium to dark grey, carbonaceous phyllite. Foliation parallel to original bedding. Paler bands represent coarser basal sediments in graded beds. Dark grey argillaceous and carbonaceous bands contain numerous grey-white porphyroblasts (≤ 0.5 mm). Sporadic pyrite in paler bands which usually have a very slight chloritic tinge. Very well-jointed, core fragmentary in parts.
51.82	54.43	86.5°-89.5° W or 8.5°-13.5° E 40° - 45°	Dark grey, apparently massive carbonaceous siltstone, but phyllite foliation defined by numerous pale grey porphyroblasts. Faint chloritic tinge. Few dark grey carbonaceous and graphitic phyllite bands together with pale grey carbonaceous phyllite. Few irregular and discontinuous quartz veins (≤ 2 mm), often slightly cavernous after pyrite (?). Rare finegrained pyrite on joint surfaces. Rare kink bands.
54.43	58.50	79.5°-28.5° W 25° at 54.65m. 15°-20° at 55.44m. 20° at 57.00m. 73.5° E or 13.5° E	Medium to dark grey carbonaceous and graphitic phyllite with common pale grey to white bands which apparently represent coarser basal sediments in graded beds. Quartz veins common, often containing residues yellow-brown carbonate and with cavities after pyrite and carbonate. Very well jointed. Very fissile in parts with foliation parallel to original bedding, the rock tending to part into thin (≤ 0.5 mm) carbonaceous and graphitic sheets. Quartz veins commonly deformed. Sporadic pyrite, usually occurring in the pale grey bands. Numerous pale grey leucoxene (?) porphyroblasts in darker and more massive carbonaceous units. A slightly brecciated zone occurs at 57.60 m, and a moderately to heavily leached quartz-carbonate vein at 57.75 m. Rare slickensided surfaces and rare kink bands.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
58.50	60.02	15° - 20° 45° to 75° E 33.5° E or 38.5° E	Similar to interval 54.43 to 58.50 m, but much less well jointed. Numerous porphyroblasts in darker carbonaceous bands appear to be aligned slightly obliquely to foliation, which is parallel to original bedding. Minor deformed pyritic chlorite-carbonate zone with rare traces of chalcopyrite at about 59.20 m. Faint chloritic tinge.
60.02	66.85	20° at 61.72m. 20° " 63.40m. 33.5° or 35.5° E	Similar to interval 58.50 to 60.02 m. but original bedding finely laminated in parts. Few quartz-pyrite blebs and pyritic quartz veins. Quartz veins (≤ 3 mm) common and often approximately normal to foliation. Graded bedding suggests younging towards East. Numerous porphyroblasts in darker carbonaceous bands. Few kink bands, rare microfaults.
66.85	68.53	85° E or 81° SW 45° at 67.15m. 30° " 67.86m. 81.5° E or 23.5° E	Medium to dark grey, with green chloritic tinge, graded beds (commonly ≤ 5 cm) of carbonaceous phyllite. Abundant small (≤ 0.5 %), grey-green porphyroblasts in darker carbonaceous units. At approximately 66.90 m, occurs a slightly cavernous yellow-green, pyritic quartz-chlorite-carbonate band parallel to original bedding and associated with large (≤ 2 mm) grey-green anhedral porphyroblasts. Few quartz veins (≤ 3 mm). Rare microfaults. A slickensided fault plane roughly parallel to long axis of core occurs at about 67.75 m.
68.53	69.27	25° 78° E or 28.5° E	Medium to dark grey with green chloritic tinge, finely foliated carbonaceous phyllite. Foliation slightly deformed in parts. Rare quartz-pyrite blebs (≤ 2 cm). Prominent microfaults sub-parallel to long axis of core. Rare quartz veins (≤ 1 mm).
69.27	70.72	20° to 25° 50° to 22.5° 7° E or 31° E	Medium to dark grey-green (with pale grey-green bands) carbonaceous phyllite occurring in graded beds (≤ 5 cm). Graded bedding indicates younging towards East. Numerous grey-green porphyroblasts, particularly in darker and more argillaceous bands. Few pyrite-quartz blebs, particularly in pale grey bands. Prominent pyritic and chloritic quartz vein (≤ 10 mm) at about 70.37 m. Few other quartz veins.
70.72	72.65	30° 23.5° E or 83.5° E	Medium to dark grey-green carbonaceous siltstone and phyllite apparently massive but with foliation defined by very numerous grey lensoid porphyroblasts which are aligned parallel to original bedding. Few irregular green-brown, pyritic and chloritic carbonate veins commonly oblique to foliation.
72.65	78.52	31° E or 7° E 20° - 25° at 73.30m. 20° - 25° at 75.20m. 25° at 76.90m.	Similar to interval 69.27 to 70.72m. Massive in parts and finely foliated in parts. Abundant porphyroblasts. Foliated parts of unit consist of alternations of dark grey carbonaceous phyllite and pale grey phyllite containing yellow-brown carbonate. At approximately 76.35 m, the foliation dips 20° and a drag-fold axis dips 50° to 55°. Also occurring in pale grey phyllite bands are common yellow-brown carbonate (?) porphyroblasts. Sporadic pyrite, usually occurring in pale grey bands. Few quartz, quartz-chlorite and quartz-carbonate veins. Rare microfaults.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
78.52	82.56	35° at 80.67m. 24°E - 14°E	Medium grey-green carbonaceous phyllite, apparently mainly massive but with coarse foliation parallel to original bedding planes and with fine foliation parallel to numerous porphyroblasts with well defined preferred orientation. Paler bands contain brown carbonate blebs parallel to original bedding. Porphyroblasts usually pale yellow-green (chlorite-carbonate (?)). Sporadic quartz and quartz-carbonate veins (≤ 3 mm) often normal to foliation and dipping about 40°. Sporadic pyrite in paler phyllite bands. Rare quartz-pyrite blebs. Unit includes two narrow (≤ 15 cm) zones of fragmental and pyritic very pale grey-green chloritic tuff (?). At 79.0m a mottled white and brown quartz-carbonate vein (≤ 2.5 cm) occurs normal to foliation.
82.56	84.29	30° 19°E - 79°E	Pale grey phyllite and medium to dark grey carbonaceous phyllite in graded beds. Disseminated pyrite blebs (≤ 10 mm) in pale grey phyllite. Few erosional features at base of graded beds. Numerous pale yellow-grey porphyroblasts in dark grey carbonaceous phyllite. Few quartz and quartz-carbonate veins (≤ 2 mm), occasionally pyritic. Finely foliated in parts. At approximately 83.83 and 84.29 m. occurs very pale green fragmentary, pyritic and chloritic tuff, apparently containing rare pyritic quartz veins.
84.29	90.22	30° 19°E - 79°E	Similar to interval 82.56 to 84.29 m, but with few massive porphyroblastic units and with common pyritic quartz-carbonate veins parallel and slightly oblique to foliation. These veins (≤ 6 mm) are mottled white, yellow and green. Rare microfaults. Veins dip 30° and 35° - 45°.
90.22	98.76		Dark grey to black carbonaceous phyllite. Apparently massive but with foliation defined by preferred orientation of numerous porphyroblasts and numerous thin (≤ 2 mm) quartz and quartz-carbonate veins. Few thicker quartz-carbonate veins, usually pyritic. Between 91.76 and 91.96 m, occurs a complex pyritic and chloritic quartz-carbonate mass which includes a quartz-carbonate vein (7 cm) dipping 45° and containing rare ($\leq 0.5\%$) chalcopryrite. This carbonate vein is only slightly cavernous and appears to consist of a boxwork of quartz infilled with yellow-brown carbonate. Numerous grey porphyroblasts. Few bands pale grey phyllitic siltstone at about 93.25m associated with large (≤ 15 mm) pyrite blebs. At about 95.80m, is a 6 cm quartz-carbonate vein similar to that between 91.76 and 91.96m. This vein is pyritic and highly cavernous and contains rare traces of chalcopryrite. Dip of veins commonly 45°, but also about 30°.
98.76	103.34		Dark grey to black carbonaceous phyllite, finely foliated in parts, massive in parts and with few graded beds. Porphyroblasts abundant throughout, some being yellow-brown suggesting carbonate. Thin (usually ≤ 1 mm) quartz and quartz-carbonate veins common and often deformed and irregular. Veins are commonly pyritic and chloritic.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
103.34	105.75	60° <i>11°N or 71°N</i>	<p>Microfaults are common, apparently increasing in number towards base of unit. At 101.63 m, occurs a large (2.5 x 6 cm) quartz-carbonate-pyrite bleb, consisting mainly of pyrite with minor quartz and carbonate. Few small pyrite blebs. Rare, irregular and discontinuous bedded (?) pyrite. Rare slickensided fault planes.</p> <p>Dark grey and black carbonaceous phyllite containing numerous pyritic quartz and quartz-carbonate veins, occasionally slightly chloritic. This unit is complexly deformed, particularly in the top 58 cm which consists of alternating pale and medium grey phyllitic siltstone dipping about 0-5° and with numerous microfaults. Quartz-carbonate veins (≤ 2 mm) are common and dip about 55°. Sporadic pyrite in pale grey bands. Microfaults and foliation dip 55°. At about 103.36 m. occurs a pyritic quartz-carbonate vein (2cm) containing traces of chalcopyrite. Remainder of unit consists of dark grey to black carbonaceous and graphitic phyllite, apparently less well-deformed although original bedding is indistinct or obliterated and quartz and quartz-carbonate veins are commonly deformed and drag-folded and are usually pyritic. All veins are commonly irregular, discontinuous, deformed and without preferred orientation. Pyrite is common (approx. 3% of total rock) and is usually associated with vein material. Few slickensided fault planes.</p>
105.75	110.39		<p>Dark grey to black, porphyroblastic carbonaceous phyllite. Foliation generally not well defined except by orientation of numerous quartz and quartz-carbonate veins (≤ 2 mm) and by preferred orientation of small (≤ 1 mm) acicular (deformed?) to lensoid grey-white porphyroblasts. Veins straight and regular and commonly dip 45°.</p> <p>The top 1.2 m, is slightly to moderately deformed similar to the interval 103.34 to 105.75 m, and pyritic and chloritic quartz-carbonate veins and quartz-pyrite veins and blebs are common. A few deformed, irregular and discontinuous quartz and quartz-carbonate veins occur towards base of unit. Rare slickensided and pyritic fault planes. Poorly jointed, the rock parting only parallel to foliation.</p>
110.39	114.90		<p>Similar to the interval 105.75 to 110.39 m, but is more argillaceous and contains fewer porphyroblasts and more quartz-carbonate veins. The quartz-carbonate veins are usually pyritic, often heavily so, and are commonly irregular and deformed and contain minor amounts of chlorite. The original bedding is locally preserved although usually only indistinctly.</p> <p>Between 114.08 and 114.29 m, occurs a heavily pyritic and only slightly quartzose pale yellow and red-brown carbonate vein. This vein is slightly to moderately cavernous and contains few black siltstone fragments and traces of chalcopyrite. A minor breccia zone lies adjacent to this carbonate vein.</p>

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
114.90	116.27	45° to 50° <i>~ vertical</i>	<p>Other carbonate veins are usually only slightly cavernous and are up to 6 cm thick. A few deformed veins give the appearance of ptygmatic folding. Dip of veins often 50° - 60°.</p> <p>Similar to the interval 110.39 to 114.90 m and contains very numerous grey-white porphyroblasts. Quartz and quartz-carbonate veins (≤ 3 mm) are common and are usually pyritic and slightly chloritic. A few large (≤ 6 cm) quartz and quartz-carbonate veins occur and these are moderately to strongly cavernous and contain traces ($< 0.1\%$) of chalcopyrite, a few siltstone or phyllite fragments and minor pyrite.</p>
116.27	117.73		<p>Dark grey to black carbonaceous and graphitic phyllite and slate with foliation independent of original bedding. The foliation is usually normal to the original bedding, which apparently consisted of finely laminated pale grey and dark grey siltstone. This unit contains a few quartz and quartz-carbonate veins (≤ 2 cm) which are moderately cavernous.</p>
117.73	120.64		<p>Dark grey to black carbonaceous and graphitic phyllite. Apparently massive, but original bedding locally preserved. Sporadic small (< 0.5 mm) grey and yellow-brown porphyroblasts. Pyritic quartz and quartz-carbonate veins (≤ 10 mm) are common and are slightly to moderately cavernous. These veins are often irregular, discontinuous and complexly deformed. Dip of veins commonly 45° - 50°.</p> <p>At about 118.92 m, is a thin breccia zone with a cement of vein quartz which has been later deformed. A few microfaults are present.</p>
120.64	121.76		<p>Dark grey to black, slightly talcose carbonaceous and graphitic phyllite containing several thick (10 cm) mottled white and yellow-brown quartz-carbonate veins which are slightly to moderately cavernous.</p> <p>Chalcopyrite ($\leq 2\%$) is associated with pyrite in a vein at about 120.70 m.</p>
121.76	123.11		<p>Mottled white and red-brown chloritic and pyritic quartz-carbonate veins associated with medium green chloritic tuff (?) which contains small, irregular and discontinuous carbonate veins and yellow-brown carbonate (?) porphyroblasts (≤ 1 mm).</p> <p>Chalcopyrite ($\leq 0.5\%$) occurs as disseminated blebs. This unit is very fragmentary in parts.</p>

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
123.11	124.02		Porous, fine grained cream carbonate (red-brown on surface of core) containing few white quartz veins and blebs and scattered chlorite stringers and veinlets. This unit contains traces of chalcopryrite and rare traces of covellite. Several fragments of leached quartz occur at top of unit.
124.02	126.60		White quartz containing medium and dark green chloritic phyllite and siltstone fragments and deformed and elongated laminae. A minor amount of cream carbonate occurs as vein material. The unit contains a few apparently later veins of quartz, carbonate and quartz-carbonate and a few irregular and discontinuous bands of pyrite. Sporadic disseminated pyrite. Rare disseminated chalcopryrite.
126.60	127.50		Pale and medium grey carbonaceous phyllite containing numerous complexly deformed pyritic quartz and quartz-carbonate veins (≤ 5 cm). The original bedding apparently consisted of a series of graded pale grey siltstone (base) and dark grey argillaceous and carbonaceous siltstone laminae. The veins are usually extremely irregular, discontinuous and of variable thickness. The veins are dominantly quartz, a few contain minor amounts of carbonate. Dragfolds are common and a few microfaults occur. The unit is chloritic and graphitic in parts, and contains rare disseminated chalcopryrite.
127.50	130.84	55° 15' 30" W or 10" W	Medium green chloritic phyllite containing many yellow-brown carbonate (?) porphyroblasts (≤ 1 mm). The original bedding is locally preserved and dips 0-15°. Quartz veins are common and are usually irregular, discontinuous and of variable thickness. They contain minor carbonate and occasionally have diffuse boundaries. Between about 129.21 and 129.56 m, a white quartz vein with few diffuse chloritic phyllite inclusions and minor carbonate contains approximately 0.5% chalcopryrite in irregular blebs.
130.84	137.64	45° vertical or horizontal	Similar to the interval 127.50 to 130.84 m, but much more evenly foliated and with much fewer quartz veins. Numerous yellow-brown porphyroblasts. The few quartz veins are slightly chloritic. Rare, narrow (≤ 3 cm) silicified bands contain irregular and discontinuous quartz-carbonate veins and pods with diffuse boundaries. The unit contains rare pyritic quartz veins and rare disseminated pyrite. Very rare chalcopryrite is associated with the pyritic quartz veins.
137.64	138.53		White quartz containing medium green irregular and discontinuous chloritic phyllite and siltstone fragments and minor carbonate veins (≤ 3 mm) and blebs. Pyrite occurs as sporadic disseminated blebs and as fine grained coating on joints. Traces of chalcopryrite occurs as minute blebs.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
138.53	138.92		Similar to the interval 127.50 to 130.83 m.
138.92	140.80		Pale grey-green and medium grey-green chloritic and carbonaceous phyllite. The original bedding is relatively well preserved and consists of graded beds (≤ 3 cm) of pale grey siltstone (base) grading up to dark grey argillaceous and carbonaceous siltstone. Disseminated pyrite occurs in pale grey bands. A few grey-brown porphyroblasts occur in the dark grey carbonaceous bands. Rare quartz veins.
140.80	155.43	40° at 143.55m	Medium grey-green carbonaceous phyllite, slightly chloritic and similar to interval 130.84 to 137.64 m, but containing only rare yellow-brown porphyroblasts. The original bedding apparently consisted of thin (≤ 15 mm) graded beds and laminated pale grey and dark grey carbonaceous siltstone. The unit contains a few quartz and quartz-carbonate veins. The veins are usually ≤ 2 mm, but at 148.56m, there occurs a moderately cavernous and slightly pyritic quartz-carbonate vein 2 cm thick. Very fissile.
		45-50° " 145.36m	
		40° " 146.75m	
		40-45° " 148.45m	
		35° " 149.65m	
		45° " 150.90m	
		45° " 152.53m	
155.43	177.69	40-45° at 156.25m	Medium green and grey-green, finely foliated chloritic phyllite. The foliation is parallel to the original bedding which is relatively well preserved and apparently consisted of finely laminated siltstone, carbonaceous in parts, and a few thin (≤ 2 cm) graded beds. A slight colour banding reflects the original lithology. This unit is generally even-textured and has an overall uniform colour. A few quartz and mottled white-red/brown quartz-carbonate veins occur. These veins are often deformed and slightly pyritic and have a few cavities after carbonate. Rare chalcopyrite is associated with these veins. The unit is slightly porous about 157.54m, and parts very readily parallel to the original bedding. A few minor dragfolds occur in places.
		45° " 157.19m	
		45° " 159.01m	
		40-45° " 161.13m	
		45-50° " 162.81m	
		45° " 164.64m	
		40-45° " 166.45m	
		50° " 169.15m	
		45-50° " 174.05m	
		55° " 174.80m	
177.69	179.83	55° at 178.75m	Similar to the interval 155.43 to 177.69m, but much paler green. Parts very readily parallel to original bedding. Sporadic euhedral pyrite.
			<u>DDH.10 COMPLETED AT 179.83 METRES.</u>

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.MINERAL RESOURCES DIVISIONTASMANIAN EXPLORATION, EL.16/68.

4th July, 1971.

REPORT ON DDH.11, GULLY PROSPECT.

M. H. McIntyre.

SUMMARY.

DDH.11 at the Gully Prospect was completed at a depth of 143.03m.

A mineralised zone was intersected between 107.87 and 111.83m. but core recovery was extremely low (approximately 10%) and the nature of the mineralised zone is not well understood. The recovered core from this zone consisted of quartz-chlorite and quartz-carbonate containing minor pyrite and chalcopyrite and assayed 2825 ppm. Cu.

Further drilling would appear to be warranted in the Gully Prospect area.

DDH.11 - GULLY PROSPECT.

Grid reference:	Not available.
Collar R.L.:	" "
Angle:	50°
Direction:	262° magnetic.
Date drilled:	30.3.71 to 19.4.71.
Drilling rate:	6.81 metres per shift.

1. OPERATIONAL DETAILS.1.1 Drilling details:

The Mindrill F30 drill rig completed drilling of DDH.9 on 23rd March, 1971, and moved to the Gully Prospect where DDH.11 was commenced on 30th March, 1971.

NX casing was seated at 9.14m. and the hole continued with NQWL equipment. Caving of the hole at about 68.58m. hindered progress and NX casing was reamed down and seated at 70.1m. The hole was completed at 143.03m. with NQWL equipment on 19th April, 1971.

1.2 Drilling conditions:

Drill runs and core recovery are listed in Appendix A.

NX casing was drilled to 9.14m. without the core barrel and core recovery to this depth was about 47%.

Core recovery below 9.14m. was with few exceptions, 100%, the major zones of core loss being :

49.06m. to 53.54m:	54% core recovery.
65.21m. " 68.56m:	38% " "
107.15m. " 113.05m:	35% " "

The mineralised zone, which occurs within the interval 107.87m. and 111.83m., yielded only a 10% core recovery.

Drilling conditions were favourable to a depth of about 68.58m., the average drilling rate to this depth being 13.72m. per shift. At about 70.4m., progress was halted by collapse of the hole and jamming of the rods and five days work was necessary to ream NX casing to a depth of 70.1m. Below 70.1m. progress was hindered somewhat by broken ground and the overall drilling rate averaged 6.8m. per shift.

Sludge samples were collected over intervals of 1.52m. and those collected between 91.44m. and 121.9m. were assayed for copper, the assay results being tabulated below:

1.3 Drillhole deviations:

The drillhole surveys were as follows:

Collar	50°	
15.24m.	48°	
30.48m.	49°	
45.72m.	47°	at 290° magnetic.
60.96m.	48°	
76.20m.	46°	
91.44m.	46°	at 173° magnetic.
97.54m.	42°	at 198° magnetic.
106.68m.	45.5°	
121.90m.	45°	

The Tropari azimuth readings are considered to be erroneous. No magnetite was observed during logging of the core. DDH.11, in common with all earlier drillholes in the Balfour area, showed a tendency to shallow with increasing depth.

2. GEOLOGY.

The complete drill log for DDH.11 is given in Appendix B. and may be summarised as follows:

0 to approx. 107.87m.

Pale to medium grey siltstone and dark grey argillaceous, carbonaceous and graphitic siltstones and shales, occurring in graded beds, laminated sequences and, rarely, in massive units. Disseminated euhedral pyrite occurs within the sediments and is commonly restricted to the paler and coarser sediments.

Veins (≤ 5 mm) are common and consist of quartz, carbonate and chlorite in varying proportions. The veins are commonly pyritic and occasionally cavernous after carbonate and, in rare instances contain trace amounts of chalcopyrite.

Rare, irregular chloritic and pyritic masses (≤ 5 cm) contain minor traces of chalcopyrite. Sporadic leucoxene porphyroblast.

This unit contains a very few breccia zones (≤ 10 cm) consisting of shale and siltstone fragments cemented with quartz or pyritic quartz and chlorite.

Very rare rounded siltstone pebbles (≤ 10 mm).

Few microfaults. Few graphitic joint and fault planes.

107.87m. to 111.83m. Mineralised Zone.

The above boundaries of this mineralised zone are approximations only, because of the very low core recovery (approximately 10%). The low core recovery may be due to solution of carbonate mineral or the presence of old workings.

The recovered core consists of quartz-chlorite and quartz-carbonate containing minor pyrite and chalcopyrite. Assay value 2825 ppm. Cu.

111.83m. to 113.20m.

Brecciated zone consisting of dark grey argillaceous and carbonaceous siltstones which have been brecciated and cemented with quartz and chlorite.

Graphitic and slickensided fault planes are common and the unit contains a thick (6 cm) quartz-chlorite-carbonate vein.

113.20m. to 115.16m.

Finely laminated pale and medium grey siltstone, brecciated in parts and with common microfaults.

115.16m. to 116.16m.

Finely laminated white quartzose sandstone and minor dark grey siltstone. Faulted and brecciated with common graphitic and slickensided fault planes. Quartz occurs as a breccia cement and as a fault filling.

116.16m. to 143.03m.

Extremely irregularly bedded pale grey siltstone and sandstone and medium to dark grey carbonaceous siltstone occurring as graded beds and finely laminated to finely bedded units. Microfaults, slump (?) structures and erosional features are common.

3. SAMPLE AND ASSAY RESULTS.

Two types of samples of the products of DDH.11 were assayed for copper.

- (a) Core samples from, and adjacent to, the mineralised zone.
- (b) Sludge samples from, and adjacent to, the mineralised zone.

The assay results were:

(a) Core samples:

INTERSECTION (metres)	INTERVAL (metres)	SAMPLE NO. BAL.	ASSAY VALUE ppm. Cu
86.16 to 87.50	1.34	1084	58
87.50 89.11	1.61	1085	13
89.11 90.25	1.14	1086	25
90.25 92.39	2.14	1087	380
92.39 94.39	2.00	1088	15
94.39 95.48	1.09	1089	13
95.48 97.44	1.96	1090	23
97.44 99.31	1.87	1091	25
99.31 101.00	1.69	1092	18
101.00 102.00	1.00	1093	15
102.00 104.54	2.54	1094	15
104.54 106.52	1.98	1095	23
106.52 107.87	1.35	1096	18
107.87 111.83	3.96	1097	2825
111.83 113.20	1.37	1098	30
113.20 115.16	1.96	1099	10
115.16 116.16	1.00	1100	33
116.16 118.64	2.48	1101	25
118.64 121.71	3.07	1102	25

The copper values of these core samples, with two exceptions, fall within the accepted range of values for black shales. The two exceptions, samples 1087 and 1097, are both associated with visible chalcopyrite. The true copper content of the mineralised zone is unknown because of the high core loss and the recorded value of 2825 ppm. Cu must be regarded as an approximation only.

(b) Sludge samples:

INTERSECTION (metres)	SAMPLE NO. BAL.	ASSAY VALUE ppm. Cu.
91.44 to 92.96	0699	90
92.96 to 94.49	0700	60
94.49 to 96.01	0701	65
96.01 to 97.54	0702	43
97.54 to 99.06	0703	28
99.06 to 100.58	0704	63
100.58 to 102.10	0705	83
102.10 to 103.63	0706	53
103.63 to 105.15	0707	83
105.15 to 106.68	0708	68
106.68 to 108.20	0709	1275
108.20 to 109.73	0710	910
109.73 to 111.25	0711	230
111.25 to 112.78	0712	203
112.78 to 114.30	0713	155
114.30 to 115.82	0714	95
115.82 to 117.34	0715	123
117.34 to 118.87	0716	143
118.87 to 120.39	0717	128
120.39 to 121.90	0718	113

The sludge sample assay results confirm the presence of a mineralised zone at about 107m, and suggest that the mineralised zone occurs between about 106.68m and 109.73m.

4. CONCLUSION.

The extremely poor core recovery in the vicinity of the mineralised zone intersected by DDH.11 makes determination of the true thickness and copper content of this zone impossible. The unrecovered material occurring between 107.87m. and 111.83m. may consist of potentially mineralised but severely leached carbonate, although the sludge sample assay results suggest that Cu concentration does not extend over the complete interval.

Further drilling is warranted in the Gully Prospect area.

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APPENDIX A

D.D.H.11. DRILL RUNS AND CORE RECOVERY

DEPTH IN METRES			CORE RECOVERY	
			Metres	Per Cent
0	to	3.05	0.91	30
3.05	"	6.10	1.83	60
6.10	"	9.14	1.52	50
9.14	"	10.05	0.91	100
10.05	"	12.49	2.44	100
12.49	"	14.93	2.44	100
14.93	"	15.92	0.99	100
15.92	"	16.58	0.66	100
16.58	"	19.20	2.62	100
19.20	"	22.25	3.05	100
22.25	"	24.99	2.74	100
24.99	"	26.51	1.52	100
26.51	"	28.34	1.83	100
28.34	"	31.39	3.05	100
31.39	"	33.17	1.78	100
33.17	"	35.66	2.49	100
35.66	"	37.18	1.52	100
37.18	"	38.09	0.91	100
38.09	"	38.85	0.76	100
38.85	"	39.92	1.07	100
39.92	"	42.67	2.74	100
42.67	"	44.04	1.37	100
44.04	"	45.11	1.07	100
45.11	"	46.17	1.06	100
46.17	"	48.30	2.13	100
48.30	"	49.06	0.76	100
49.06	"	49.81	0.30	40
49.81	"	51.31	1.50	100
51.31	"	52.12	0.41	50
52.12	"	53.54	0.20	14
53.54	"	55.27	1.73	100
55.27	"	56.20	0.93	100
56.20	"	57.09	0.89	100
57.09	"	58.26	1.17	100
58.26	"	58.82	0.56	100
58.82	"	60.42	1.60	100
60.42	"	62.00	1.58	100
62.00	"	63.54	1.54	100
63.54	"	64.60	1.06	100
64.60	"	65.21	0.61	100
65.21	"	66.12	0.15	17
66.12	"	67.34	0.20	17
67.34	"	67.80	0.31	67
67.80	"	68.56	0.61	20
68.56	"	69.02	0.46	100
69.02	"	69.48	0.46	100
69.48	"	70.39	0.61	67
70.39	"	71.00	0.61	100
71.00	"	71.61	0.61	100
71.61	"	72.02	0.41	100
72.02	"	72.45	0.43	100
72.45	"	73.24	0.79	100
73.24	"	73.85	0.61	100
73.85	"	75.17	1.32	100
75.17	"	76.20	1.03	100
76.20	"	77.57	1.37	100
77.57	"	79.02	1.45	100
79.02	"	80.26	1.24	100

DEPTH IN METRES			CORE RECOVERY	
			Metres	Per Cent
80.26	to	80.61	0.35	100
80.61	"	81.07	0.46	100
81.07	"	82.30	1.22	100
82.30	"	84.43	2.13	100
84.43	"	85.65	1.22	100
85.65	"	86.16	0.51	100
86.16	"	88.69	2.53	100
88.69	"	89.60	0.91	100
89.60	"	90.52	0.74	81
90.52	"	91.89	1.37	100
91.89	"	94.94	3.05	100
94.94	"	96.21	1.27	100
96.21	"	98.04	1.83	100
98.04	"	100.36	2.32	100
100.36	"	101.50	1.14	100
101.50	"	102.41	0.91	100
102.41	"	102.51	0.10	100
102.51	"	103.02	0.51	100
103.02	"	103.32	0.30	100
103.32	"	103.67	0.35	100
103.67	"	104.54	0.87	100
104.54	"	107.15	2.61	100
107.15	"	108.49	0.76	57
108.49	"	109.10	0.08	13
109.10	"	109.71	0	0
109.71	"	110.01	0	0
110.01	"	110.31	0.02	8
110.31	"	110.92	0.05	8
110.92	"	111.83	0.08	8
111.83	"	113.05	1.11	91
113.05	"	113.20	0.15	100
113.20	"	114.26	1.06	100
114.26	"	115.48	1.22	100
115.48	"	116.70	1.22	100
116.70	"	119.59	2.89	100
119.59	"	122.71	3.12	100
122.71	"	125.78	3.08	100
125.78	"	127.98	2.20	100
127.98	"	129.96	1.98	100
129.96	"	131.71	1.75	100
131.71	"	132.39	0.68	100
132.39	"	134.34	1.95	100
134.34	"	135.45	1.11	100
135.45	"	136.82	1.37	100
136.82	"	138.03	1.22	100
138.03	"	139.40	1.37	100
139.40	"	141.10	1.67	100
141.10	"	141.61	0.51	100
141.61	"	141.71	0.10	100
141.71	"	142.22	0.51	100
142.22	"	143.03	0.81	100

A.C.T. MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION

Drilling rate: 6.81m/shift.

Collar R.L. N/A.

Date drilled: 30.3.71 to 19.4.71.

DHL.11.

PROSPECT: GULLY

Grid Reference: N/A

Angle 50°

Direction: 262° magnetic.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
0	6.10	65°	Pale to medium grey siltstone and dark grey argillaceous and carbonaceous siltstone in graded beds (≤ 5 cm but variable), consisting of pale grey siltstone, usually slightly pyritic, at base, grading up to dark grey argillaceous and carbonaceous siltstone at top. The pale grey siltstone content is approximately 20-25% and the pale grey siltstone is commonly slightly chloritic. Microfaults are common and erosional features occur at the base of the graded beds. A few white, slightly pyritic quartz veins (≤ 2 mm) occur throughout this unit. The darker argillaceous and carbonaceous members of the graded beds contain sporadic grey-white leucoxene (?) porphyroblasts.
6.10	10.05		Massive dark grey to black argillaceous and carbonaceous siltstone containing numerous grey-white leucoxene. Quartz veins are rare. A very few graded beds occur and consists of pale grey siltstone (base) grading up to dark grey argillaceous and carbonaceous siltstone.
10.05	11.12	65°	Similar to the interval 0 to 6.10m, but contains much less pale grey siltstone. Pale grey siltstone content $\leq 15\%$.
11.12	13.17	65°	This unit consists of an assortment of massive, dark grey, porphyroblastic argillaceous and carbonaceous siltstone, coarsely laminated (and graded in parts), pale grey and dark grey carbonaceous siltstone and a few graded beds of pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. Disseminated pyrite is often associated with the pale grey siltstone. A few slightly pyritic quartz veins (≤ 2 mm) occur within the unit.
13.17	15.23		Massive, dark grey to black argillaceous and carbonaceous siltstone containing numerous grey-white porphyroblasts (≤ 1 mm) of leucoxene (?), and a few red-brown irregular and discontinuous carbonate veins (≤ 2 mm) at about 13.84m. A narrow (≤ 10 cm) breccia zone of black argillaceous and carbonaceous siltstone fragments cemented by white quartz occurs at about 15.10m. This sequence is generally well jointed and coarsely fragmental in parts and contains a few white quartz veins (≤ 2 mm) which commonly dip between 25° and 40°.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
15.23	18.00	60°	Dark grey carbonaceous siltstone occurring in graded beds (generally ≤ 5 cm but variable) laminated sequences and massive sequences. Numerous grey-white, leucoxene porphyroblasts occur in some dark grey argillaceous and carbonaceous bands. The graded bedding has a generally poorly developed pale grey siltstone member, the major part of the graded beds consisting of dark grey and black argillaceous and carbonaceous siltstone. The unit contains a very few, thin (≤ 1 mm) irregular and discontinuous quartz veins.
18.00	20.99		Massive, medium to dark grey argillaceous and carbonaceous siltstone containing a few pale grey siltstone bands and laminae towards base of unit. A very few, rounded siltstone pebbles (≤ 1 cm) occur towards the base of the unit which is poorly jointed. A few joints contain traces of fine grained pyrite. Rare, thin (≤ 1 mm) irregular quartz veins and rare blebs of pyrite (≤ 10 mm). At about 20.70m occurs an irregular, pale green, chloritic and pyritic mass apparently located within a breccia zone in which a few siltstone pebbles are vaguely visible. Rare pyritic quartz veins occur oblique to bedding and lateral branching of these veins occasionally results in short, narrow pyrite veins occurring parallel to bedding. The unit contains a very few graphitic and slickensided fault planes.
20.99	28.65	50°-55° at 21.30m. 15° " 22.75m. 75°-80° " 23.35m. 70° " 26.40m.	Pale grey siltstone and medium to dark grey argillaceous and carbonaceous siltstone occurring in graded beds (≤ 7 cm). Pale grey siltstone content about 15%. Erosional features are common at the base of the graded beds. At about 21.55m, occurs a narrow (≤ 10 cm) breccia zone consisting of siltstone fragments cemented by white quartz containing traces of yellow-brown carbonate. The unit contains a few bands (≤ 5 cm) of laminated pale grey siltstone and dark grey argillaceous and carbonaceous siltstone. A few subhedral to euhedral pyrite blebs (≤ 10 mm) occur throughout. Rare microfaults, commonly quartz-filled. A few thin (≤ 2 mm) irregular and discontinuous quartz veins occur. Thin coatings of brown carbonate occur on a very few joint planes. The unit has undergone minor deformation in parts, particularly at about 22.75m, where a local dip change occurs.
28.65	31.45		Massive, dark grey argillaceous and carbonaceous siltstone containing a very few, thin (≤ 1 mm) yellow-brown carbonate veins which dip 35°.

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635224

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
31.45	33.40		Pale grey siltstone and dark grey argillaceous and carbonaceous siltstone occurring in graded beds (≤ 3 cm) and laminated sequences. Slightly deformed and brecciated in parts and with common microfaults which are often quartz-filled. A cavernous and pyritic quartz-carbonate vein occurs at about 32.47m. An irregular chloritic and pyritic mass occurs at about 33.00m. Quartz veins (≤ 3 mm) are common and are usually irregular and discontinuous. A few pyrite blebs (≤ 10 mm) occur throughout the unit, usually in the pale grey siltstone members of the graded beds.
33.40	36.41	60°	This unit consists essentially of a massive dark grey argillaceous and carbonaceous siltstone containing a few sequences of graded bedding consisting of pale grey siltstone (base) grading up to dark grey argillaceous and carbonaceous siltstone. The graded units are commonly microfaulted. A few minor quartz veins and carbonate veins (≤ 2 mm) occur, the carbonate veins commonly lying parallel to the bedding. Between about 35.94 and 36.30m, is a dark grey-green, chloritic carbonaceous siltstone containing numerous irregular blebs (≤ 2 cm) and bands of pyrite. A few pyrite blebs have a regular lensoid core of dark pyrite surrounded by an irregular rim of paler pyrite.
36.41	38.75	70°	Pale grey siltstone ($\leq 10-15\%$) and dark grey argillaceous and carbonaceous siltstone occurring as graded beds (generally ≤ 3 cm, but variable) with a poorly developed, pale grey, coarser grained base. Rare, thin (≤ 1 mm) yellow-brown carbonate veins occur parallel and normal to bedding and are commonly deformed and sinuous. A few quartz filled microfaults occur. Few other quartz veins. Generally poorly jointed. Graphitic and slickensided fragments occur at about 38.10m. Rare fine grained pyrite on joint planes.
38.75	42.67		Massive, dark grey, argillaceous and carbonaceous siltstone containing few pale grey siltstone bands (≤ 5 cm), and minute, sporadic grey-white leucoxene porphyroblasts. A few quartz and quartz-carbonate veins occur and are usually cavernous after carbonate and, in one instance at 42.17m, showing evidence of folding. A few other thin (≤ 1 mm) quartz and carbonate veins occur and these are commonly irregular and discontinuous. Sporadic pyrite blebs (≤ 5 mm) appear to be confined to the pale grey siltstone bands. The minor carbonate veins parallel to the bedding are commonly deformed and sinuous.

635225

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
42.67	44.04	45°	Pale grey siltstone (10%) and dark grey argillaceous and carbonaceous siltstone occurring in thin (≤ 2 cm) graded beds and rare laminated sequences. The unit is poorly jointed and contains a few microfaults and a few erosional features at the base of the graded beds. A few, thin (≤ 2 mm) irregular and discontinuous quartz quartz-carbonate and yellow-brown carbonate veins occur, those carbonate veins parallel to the bedding, are commonly deformed and sinuous.
44.04	46.35	60° - 65°	Massive, dark grey to black argillaceous and carbonaceous siltstone containing few pale grey siltstone bands which form the base of graded beds (≤ 5 cm). The unit contains a few slickensided and graphitic fault planes. At about 45.57m, is a 4 cm graded bed which has been deformed and faulted (during compaction?), the fault planes being filled with blebs and short discontinuous veins of quartz-carbonate. Few other quartz and carbonate veins (≤ 1 mm).
46.35	49.06	55°	Pale grey siltstone and dark grey argillaceous and carbonaceous siltstone occurring in graded beds (≤ 4 cm). A few irregular basal structures suggest slumping or reworking, a few erosional features yielding discordant bedding of some graded units. The sequence is laminated in parts, with alternations of pale grey siltstone and dark grey argillaceous and carbonaceous siltstone laminae (≤ 2 mm). A few quartz-filled microfaults occur. The unit contains a few quartz veins and rare, thin (≤ 1 mm) carbonate veins, some of which are parallel to the bedding and are irregular and sinuous. Moderately well jointed, with few graphitic fault planes. Microfaults and graphitic fault planes appear to become more common towards base of unit.
49.06	53.54	50° - 55°	Massive, dark grey, argillaceous, carbonaceous and graphitic siltstone containing a very few pale grey siltstone bands. Very well jointed with many graphitic joint planes. Microfaults and graphitic and slickensided fault planes are common. Many thin, (≤ 1 mm) irregular, discontinuous and deformed quartz veins occasionally slightly pyritic. Few minor graded beds (≤ 2 cm).
53.54	54.61	50° - 55°	Pale grey siltstone and dark grey argillaceous and carbonaceous siltstone in thin (≤ 2 cm) graded beds and thin laminated sequences. A very few pyrite blebs (≤ 10 mm) occur and are apparently restricted to the pale grey siltstone bands. Few microfaults, commonly graphitic. The unit contains a very few, thin (≤ 1 mm), slightly curved quartz veins.
54.61	56.70	50°	This unit consists essentially of a massive, dark grey to black, argillaceous, carbonaceous and graphitic siltstone, but also contains a few graded beds which have a generally poorly developed pale grey siltstone base ($< 10\%$). The unit is well jointed and microfaults are relatively common. Joint and fault planes are commonly graphitic and fault planes are also commonly slickensided.

635226

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
56.70	58.91	50°	<p>This unit contains numerous irregular and discontinuous, thin (≤ 1 mm) quartz veins, veinlets and blebs, which are commonly slightly deformed. A minor dragfold occurs at about 54.77m, the axis of which dips about 40°. Minor amounts of finegrained pyrite occurs on some joint faces.</p> <p>Dark grey to black, argillaceous, carbonaceous and graphitic siltstone containing numerous pale grey siltstone laminae and basal graded beds. Very well jointed, graphitic joint planes and fault planes are common. Discrete pyrite blebs and euhedral crystals are common in pale grey siltstone bands. Microfaults are also common and are often filled with quartz, carbonate or quartz-carbonate. Many thin (≤ 2 mm) quartz veins which are commonly irregular and discontinuous. Graphitic joint and fault planes are often highly reflective.</p>
58.91	61.38		<p>This unit consists of an assortment of dark grey to black, argillaceous, carbonaceous and graphitic siltstone, a few pale grey and dark grey graded siltstone beds and a very few pale grey and dark grey siltstone sequences. The unit contains many thin, irregular and discontinuous, quartz, carbonate and quartz-carbonate veins and veinlets which are commonly slightly pyritic.</p> <p>At about 60.50m, occurs a 10 cm band of medium grey-green, slightly chloritic carbonaceous siltstone, containing a quartz-pyrite vein (≤ 6 mm) and numerous pyrite blebs. This quartz-pyrite vein, which dips at about 75°, has a discontinuous core of pyrite and a pyritic rim. The quartz-carbonate vein commonly consists of a quartz core with a carbonate rim.</p>
61.38	62.40	60°	<p>Pale grey siltstone and dark grey argillaceous and carbonaceous siltstone in graded beds (generally ≤ 3 cm, but variable). Rare, thin (≤ 1 mm) brown carbonate veins occur parallel to the bedding and a few other carbonate and quartz veins occur normal to the bedding. The unit is moderately well jointed in parts, with graphitic joint planes and few microfaults.</p>
62.40	72.54		<p>Massive, dark grey to black, argillaceous, carbonaceous and graphitic siltstone containing rare, deformed and irregular pale grey siltstone bands and numerous quartz and quartz-carbonate veins (≤ 3 mm) which are commonly, irregular, discontinuous pyritic and chloritic. The unit is extremely well jointed, the recovered core consisting mainly of pebble size fragments and fine grained pyrite occurs on some joint and fault planes. At about 71.75m, occurs a narrow (≤ 4 cm) irregular pyrite-chlorite mass, part of the pyrite being slickensided. The unit contains a very few pyrite veins (≤ 3 mm).</p>

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635227
From	To			
72.54	74.51	45° - 50°	Similar to the interval 61.38 to 62.40m. Few quartz-filled microfaults. Rare pyritic and cavernous quartz-carbonate veins, particularly at 72.65m.	
74.51	76.20	50°	This unit consists essentially of a massive dark grey to black argillaceous, carbonaceous and graphitic siltstone containing numerous irregular and discontinuous quartz, carbonate and quartz-carbonate veins and stringers, all generally ≤ 1 mm, and all commonly chloritic and slightly pyritic. Rare pyrite blebs. Indistinct bedding.	
76.20	82.02	45°	Medium grey and dark grey, argillaceous, carbonaceous and graphitic siltstone in graded beds which have been microfaulted and brecciated in parts. Moderately well jointed with common slickensided and graphitic fault planes. The sequence contains a few apparently massive and featureless units, but closer examination reveals a vague bedding and suggestions of graded bedding. Slightly chloritic quartz and quartz-carbonate veins are common and many are irregular, discontinuous and locally pyritic. Between about 79.37 and 79.87m is a medium grey-green chloritic and carbonaceous siltstone containing numerous pyritic blebs, many of which appear to be aligned parallel to the bedding which at this point dips about 40°. A narrow (5 cm) breccia zone at about 80.70m contains pyritic quartz veins.	
82.02	86.16		Massive, dark grey to black argillaceous, carbonaceous and graphitic siltstone containing numerous quartz veins (cavernous after carbonate), carbonate veins and quartz-carbonate veins all of which are commonly pyritic and chloritic. A few pyrite veins and blebs also occur within the unit. This sequence is a zone of deformation. Microfaults and minor folds are numerous and the unit is highly graphitic in parts and has been invaded by several pyrite-chlorite masses. A few graded beds are present, but have all been more or less deformed. The core is fragmentary in parts.	
86.16	90.25	45° at 86.48m. 70° " 89.85m.	Medium to dark grey argillaceous and carbonaceous siltstone containing a few pale grey siltstone bands (usually ≤ 10 mm) and a few thin graded beds. Thin (≤ 2 cm) and irregular quartz veins are common. The unit also contains a few carbonate veins (≤ 2 mm) and a few quartz-carbonate veins (≤ 2 mm) which often occur with a carbonate core and thin quartz rim. The veins are commonly slightly pyritic. The larger carbonate and quartz-carbonate veins are moderately to highly cavernous after carbonate. Between about 88.80 and 89.60m. is a zone of deformation, containing many microfaults commonly filled with pyritic and chloritic quartz and lesser carbonate veins. The unit contains rare thin (≤ 6 cm) breccia zones cemented by slightly pyritic quartz and chlorite. Graphitic and slickensided fault planes are relatively common. Moderately well jointed.	

635228

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
90.25	92.39		Massive dark grey argillaceous and carbonaceous siltstone containing many thin quartz veins and veinlets and a few carbonate veinlets which tend to lie sub-parallel to long axis of the core. A larger chloritic and heavily pyritic quartz vein is also sub-parallel to long axis of the core and contains minor traces (<0.1%) of chalcopryrite and $\geq 10\%$ pyrite. A breccia zone (≤ 10 cm) at the base of the unit has a pyritic quartz-chlorite cement.
92.39	94.39	50°	Medium grey argillaceous and carbonaceous siltstone, pale grey siltstone and graphitic siltstone occurs in graded beds and banded sequences and contains rare massive dark grey carbonaceous units. The pale grey siltstone content is about 15%. Erosional features are relatively common at the base of the pale grey siltstone members. The unit contains a few quartz veins (≤ 2 mm); many quartz veinlets (<1 mm), rare carbonate veinlets, and a few chlorite and quartz-chlorite veins. At 93.24m is a medium grey, irregular chloritic intrusion. Graphitic bedding planes are common. Poorly jointed, few microfaults.
94.39	95.48		This unit consists essentially of a massive, dark grey argillaceous and carbonaceous siltstone containing a few quartz, carbonate and quartz-chlorite veins and veinlets which are usually ≤ 2 mm but exceptionally up to 15 mm thick. The carbonate and quartz-carbonate veins are commonly slightly to moderately cavernous, and the chlorite veins are slightly pyritic. This unit contains a few rounded siltstone pebbles (≤ 10 mm).
95.48	99.31	45° - 55°	Pale grey siltstone and medium to dark grey argillaceous and carbonaceous siltstone in graded beds (≤ 3 cm but of variable thickness). Pale grey siltstone content about 20%. A few quartz, carbonate, quartz-carbonate and quartz-chlorite veins (≤ 4 mm) occur and are commonly irregular and discontinuous. The carbonate bearing veins are commonly slightly cavernous. Few graphitic bedding planes and rare microfaults. Poorly jointed.
99.31	101.00		Massive, dark grey, argillaceous and carbonaceous siltstone containing a few quartz and carbonate veinlets (<1 mm) and rare chlorite veins (≤ 3 mm). Poorly jointed.
101.00	102.00	55°	Pale grey siltstone and sandstone and dark grey, argillaceous and carbonaceous siltstone, laminated and in graded beds (≤ 2 cm). Very well jointed, the core is fragmentary in parts. Quartz and quartz-chlorite veins and veinlets are common and are usually irregular and discontinuous and form microfault filling. Few microfaults and rare slickensided fault planes. The quartz veins contain traces of pyrite. Graphitic bedding planes are common.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635229
From	To			
102.00	104.54		Similar to the interval 101.00 to 102.00m, but contains numerous quartz veins and veinlets (≤ 3 cm) which contain minor pyrite and very rare chalcopyrite. Very well jointed. Graphitic joint and fault planes common. The quartz veins are commonly irregular, discontinuous and of variable thickness and often form the filling of microfaults. Slightly brecciated in parts.	
104.54	106.52		Pale grey siltstone and dark grey argillaceous and carbonaceous siltstone in rare graded beds. Usually finely to coarsely laminated. Microfaults are common and are often filled with quartz and quartz-chlorite veins containing minor traces of carbonate. The veins are usually ≤ 4 mm thick, but one slightly pyritic quartz-chlorite vein is 2 cm thick. The microfaults and veins commonly dip about 40° . Poorly jointed. Few graphitic fault and joint planes. Dip of sediment is very variable.	
106.52	107.87		Massive, dark grey to black, very argillaceous and carbonaceous siltstone containing a few anhedral quartz porphyroblasts. Quartz, chlorite and quartz-chlorite veins are common (≤ 3 mm) and contain minor pyrite and very rare chalcopyrite.	
107.87	111.83		<u>Mineralised Zone:</u> Very poor core recovery (approx. 10%) over this unit, which appears to consist of quartz-chlorite and quartz-carbonate containing minor pyrite and chalcopyrite (approx. 0.5 to 1.0% chalcopyrite).	
111.83	113.20		Brecciated zone consisting essentially of dark grey siltstone which has been fractured and brecciated in parts and cemented with white quartz, medium green quartz-chlorite (often slightly pyritic) and a thick (6 cm) quartz-chlorite-carbonate vein. Minor amounts of pyrite associated with veins. Well jointed. Graphitic and slickensided fault planes are common.	
113.20	115.16	80°	Finely laminated pale and medium grey porphyroblastic siltstone which is fractured and brecciated in parts, particularly at about 113.80m. where a disrupted siltstone breccia is cemented with white vein quartz. Irregular and discontinuous quartz veins are common. Few quartz-carbonate veins. Rare disseminated pyrite. Micro-faulting common. Bedding planes are generally indistinct and are often difficult to trace over distances greater than a few centimetres. They are irregular and discontinuous and grade imperceptibly, one into the next. Common, grey-brown, acicular porphyroblasts (≤ 1 mm) are aligned parallel to the bedding.	
115.16	116.16		Finely laminated white quartzose sandstone and minor dark grey siltstone. Faulted and brecciated with common graphitic and slickensided fault planes. White quartz veins are common as a breccia cement and as a fault filling, and are slightly pyritic. The unit is slightly chloritic in parts. The bedding is indistinct, irregular and discontinuous.	

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.	635230
From	To			
116.16	143.03		<p>Extremely irregularly bedded pale grey siltstone and sandstone and medium to dark grey carbonaceous siltstone occurring as graded beds, finely laminated or finely bedded units. Slump structures, erosional features and microfaults are common. Local unconformities are common. Individual beds are almost invariably irregular, of variable thickness and commonly ^{have} poorly defined boundaries. A few slightly pyritic quartz veins occur. Rare disseminated pyrite. A few units have a more regular bedding. This unit may be subjectively sub-divided on the basis of sandstone content and regularity of bedding.</p> <p><u>DDH.11 COMPLETED AT 143.03 METRES.</u></p>	

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AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

MINERAL RESOURCES DIVISION

TASMANIAN EXPLORATION EL.16/68.

12th July, 1971.

REPORT ON DDH.12, DEVELOPMENT PROSPECT.

M. H. McIntyre.

SUMMARY.

DDH.12 at the Development Prospect was completed at a depth of 98.15m.

Very minor traces (<0.1% Cu) of chalcopyrite were associated with quartz and quartz-carbonate veins contained within chloritic slates and phyllites.

The assay results and apparently discontinuous nature of the lode material suggest that further investigations at the Development Prospect are probably not warranted.

DDH.12 - DEVELOPMENT PROSPECT.

Grid reference:	446 646 N, 313 363 E.
Collar R.L.:	546 Feet.
Angle:	49°
Direction:	096° magnetic.
Date drilled:	26/4/71 to 7/5/71.
Drilling rate:	8.92 metres per shift.

1. OPERATIONAL DETAILS.

1.1 Drilling details:

DDH.12 was commenced on 26th April, 1971, after the Mindrill F30 drill rig had been moved from the site of DDH.11.

NX casing was seated at 6.1m. and the hole advanced to 74.37m. with NQWL equipment. BX casing was seated at this depth and the hole was completed at 98.15m. with BQWL equipment.

1.2 Drilling conditions:

Drill runs and core recovery are listed in Appendix A.

NX casing was drilled to 6.1m. without a core barrel and core recovery to this depth was 89%. Core recovery between 6.1m. and 98.15m. was almost invariably 100%.

Minor caving and a few hard quartzitic formations hindered progress in places.

Sludge samples were collected over intervals of 1.52m. and those collected between 50.29m. and 96.62m. were assayed for Cu. The core taken between 5.18m. and 98.15m. was split and assayed for Cu, Pb and Zn. Assay results for both types of samples are tabulated later.

1.3 .../...

MISSING PAGES 2 & 4

73.48m. to 78.40m.

Grey, medium green and dark green silicified and chloritic slate and quartzite containing common quartz veins, some of which are pyritic, and rare carbonate and quartz-carbonate veins and veinlets. Sporadic disseminated euhedral pyrite.

78.40m. to 90.35m.

Medium to dark grey-green chloritic and dark grey carbonaceous slate containing numerous brown (carbonate ?) porphyroblasts, few carbonate veins and veinlets and a few pyritic and chloritic quartz veins. Few pyritic and chloritic quartzose blebs.

90.35m. to 92.80m.

Finely foliated pale green and pitted chloritic phyllite with numerous slightly cavernous and pyritic quartz veins containing minor traces of chalcopyrite.

92.80m. to 98.15m.

Green chloritic and dark grey carbonaceous slate containing a few pyritic quartz and quartz-carbonate veins. Sporadic disseminated pyrite.

3. SAMPLE AND ASSAY RESULTS.

The core collected between 5.18m. and 98.15m. was split and assayed for Cu, Pb and Zn. Sludge samples collected between 50.29m. and 96.62m. were assayed for Cu. The assay results were:

(a) Core samples:

INTERSECTION (metres)	INTERVAL (metres)	SAMPLE NO. BAL.	ASSAY VALUE ppm		
			Cu	Pb	Zn
5.18 to 6.89	1.71	1238	63	20	65
6.89 9.44	2.55	1239	25	23	53
9.44 11.90	2.46	1240	28	13	55
11.90 17.98	6.08	1241	115	30	58
17.98 19.20	1.22	1242	25	15	48
19.20 22.28	3.08	1243	20	18	50
22.28 26.13	3.85	1244	30	33	50
26.13 30.48	4.35	1245	25	18	50
30.48 32.51	2.03	1246	28	15	53
32.51 36.61	4.10	1247	25	20	50
36.61 37.95	1.34	1248	25	18	23
37.95 39.54	1.59	1249	23	23	28
39.54 39.93	0.39	1250	28	10	18
39.93 42.97	3.04	1251	30	10	20
42.97 47.01	4.04	1252	30	20	38
47.01 50.70	3.69	1253	40	18	35
50.70 52.00	1.30	1254	70	20	53
52.00 52.91	0.91	1255	235	25	63
52.91 55.64	2.73	1256	40	25	33
55.64 57.74	2.10	1257	33	28	28
57.74 59.96	2.22	1258	40	32	25
59.96 62.34	2.38	1259	48	13	43
62.34 64.77	2.43	1260	38	20	20
64.77 68.13	3.36	1261	28	20	25
68.13 72.78	4.65	1262	43	20	25
72.78 73.48	0.70	1263	25	110	20
73.48 75.71	2.23	1264	38	3	33
75.71 78.40	2.69	1265	38	32	63
78.40 79.96	1.56	1266	38	25	35
79.96 85.41	5.45	1267	38	25	35
85.41 90.35	4.94	1268	43	23	38
90.35 92.80	2.45	1269	730	13	103
92.80 95.27	2.47	1270	48	15	48
95.27 98.15	2.88	1271	103	275	58

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The discontinuous and variable nature of the mineralised zone discourages further investigations on the Development Prospect area.

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D.D.H.12. DRILL RUNS AND CORE RECOVERY

635234

DEPTH IN METRES			CORE RECOVERY	
			Metres	Per Cent
0	to	0.61	0.46	75
0.61	"	1.52	0.71	78
1.52	"	1.83	1.22	100
1.83	"	2.44	0.61	100
2.44	"	3.05	0.46	75
3.05	"	3.66	0.30	50
3.66	"	4.88	0.76	62
4.88	"	6.10	0.91	75
6.10	"	7.01	0.91	100
7.01	"	7.72	0.71	100
7.72	"	9.44	1.72	100
9.44	"	11.12	1.68	100
11.12	"	12.37	1.25	100
12.37	"	14.40	2.21	100
14.40	"	14.63	0.23	100
14.63	"	14.73	0.10	100
14.73	"	17.47	2.74	100
17.47	"	17.98	0.51	100
17.98	"	19.20	1.22	100
19.20	"	20.27	1.07	100
20.27	"	21.52	1.25	100
21.52	"	22.48	0.96	100
22.48	"	23.22	0.74	100
23.22	"	23.72	0.50	100
23.72	"	24.56	0.84	100
24.56	"	25.14	0.58	100
25.14	"	25.75	0.61	100
25.75	"	26.13	0.38	100
26.13	"	26.66	0.53	100
26.66	"	27.43	0.77	100
27.43	"	28.34	0.91	100
28.34	"	30.48	2.14	100
30.48	"	31.39	0.91	100
31.39	"	32.51	1.12	100
32.51	"	33.60	1.09	100
33.60	"	34.75	1.15	100
34.75	"	35.30	0.55	100
35.30	"	36.06	0.76	100
36.06	"	36.88	0.82	100
36.88	"	37.39	0.51	100
37.39	"	37.95	0.56	100
37.95	"	38.71	0.76	100
38.71	"	39.27	0.56	100
39.27	"	40.13	0.86	100
40.13	"	40.69	0.56	100
40.69	"	41.24	0.55	100
41.24	"	42.08	0.84	100
42.08	"	42.97	0.89	100
42.97	"	44.80	1.52	83
44.80	"	46.02	1.22	100
46.02	"	47.01	0.99	100
47.01	"	47.85	0.84	100
47.85	"	48.76	0.91	100
48.76	"	49.22	0.15	35
49.22	"	49.52	0.30	100
49.52	"	50.70	1.18	100
50.70	"	51.51	0.81	100
51.51	"	51.94	0.43	100
51.94	"	52.91	0.97	100

259

635235

- 2 -

DEPTH IN METRES	CORE RECOVERY	
	Metres	Per Cent
52.91 to 53.54	0.63	100
53.54 " 54.18	0.38	60
54.18 " 55.06	0.88	100
55.06 " 55.64	0.58	100
55.64 " 56.38	0.74	100
56.38 " 57.09	0.71	100
57.09 " 58.67	1.58	100
58.67 " 60.66	1.99	100
60.66 " 61.42	0.76	100
61.42 " 63.19	1.77	100
63.19 " 64.01	0.82	100
64.01 " 64.52	0.51	100
64.52 " 65.07	0.55	100
65.07 " 66.14	1.07	100
66.14 " 67.06	0.92	100
67.06 " 67.57	0.51	100
67.57 " 68.88	1.31	100
68.88 " 70.56	1.68	100
70.56 " 72.28	1.72	100
72.28 " 73.61	1.33	100
73.61 " 74.42	0.81	100
74.42 " 77.11	2.69	100
77.11 " 78.26	1.15	100
78.26 " 79.96	1.70	100
79.96 " 81.31	1.35	100
81.31 " 81.92	0.61	100
81.92 " 84.23	2.31	100
84.23 " 85.80	1.57	100
85.80 " 87.63	1.83	100
87.63 " 90.45	2.82	100
90.45 " 91.59	1.14	100
91.59 " 92.35	0.76	100
92.35 " 94.03	1.68	100
94.03 " 95.55	1.52	100
95.55 " 96.21	0.36	59
96.21 " 96.77	0.56	100
96.77 " 98.15	0.30	22

A.C.T. MINERAL RESOURCES DIVISION

Page 1

TASMANIAN EXPLORATION

Drilling rate: 8.92m./shift.

Date drilled: 26.4.71 to 7.5.71.

Grid Reference: Collar R.L.: 5461, Angle 49°

Direction: 096° magnetic.

DEP. 12

PROSPECT: DEVELOP-

MENT.

446 646 N, 313 368 E.

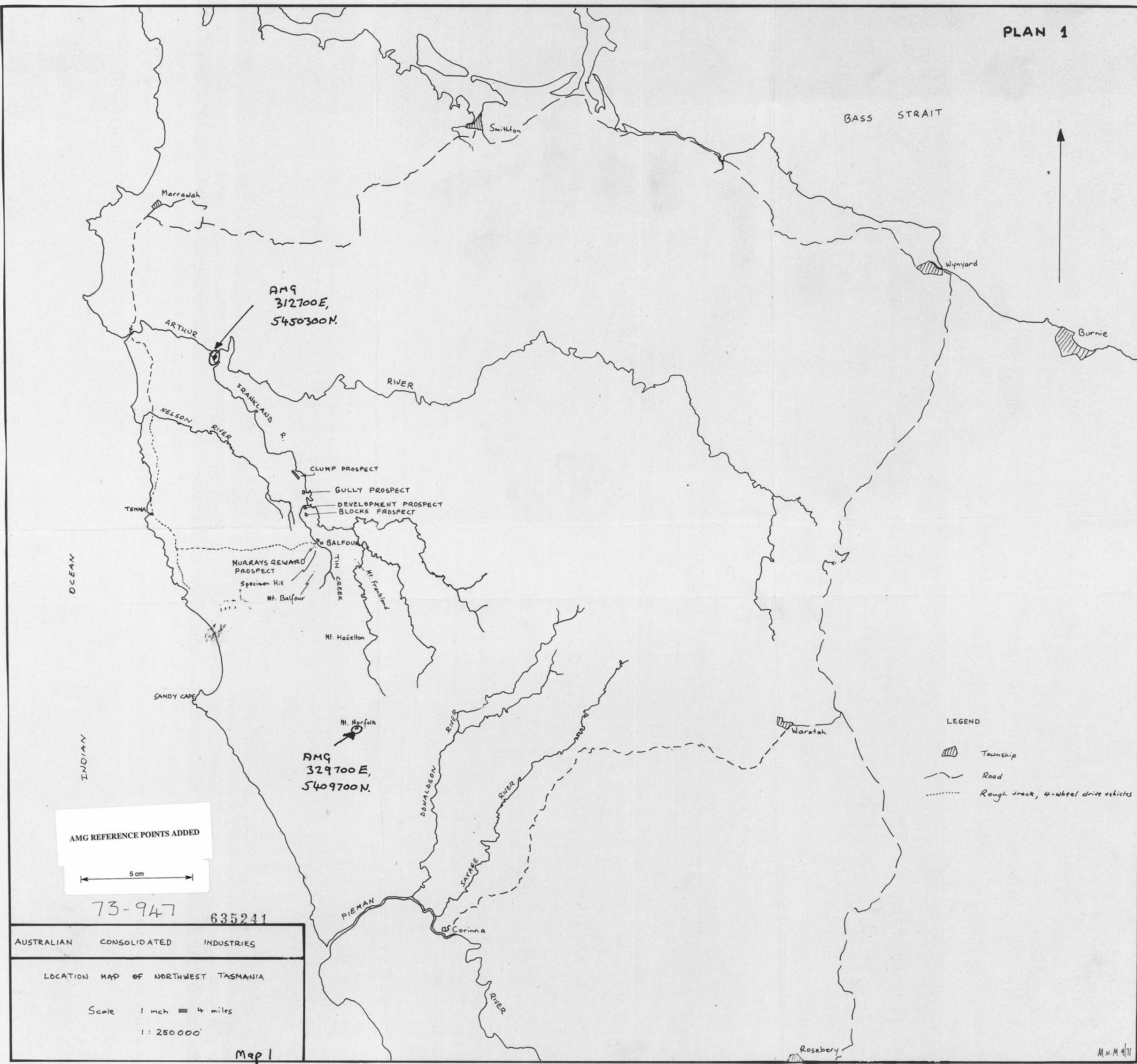
INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION
From	To		
0	0.61		Fragmental and weathered white and grey-brown (with minor red-brown iron staining), slightly silicified chloritic siltstone and phyllite containing a few quartz pebbles, which are probably foreign.
0.61	5.18	0° - 10° 40° foliation.	Pale grey-green and medium green argillaceous chloritic slate. Slight colour banding defines the original bedding. Poorly jointed with rare red-brown, iron-stained joint planes. Very rare, disseminated pyrite.
5.18	6.89		Chloritic slate similar to the interval 0.61 to 5.18m, but dominantly medium grey with slight green (chloritic) tinge. Very rare disseminated pyrite.
6.89	11.90		Similar to the intervals 0.61 to 5.18 and 5.18 to 6.89m. Bedding and foliation are generally well defined. Dominantly grey-green and medium green. Poorly jointed. Very rare, thin (<1 mm) carbonate veins parallel to original bedding. Very rare disseminated pyrite.
11.90	17.98	0° - 10° 45° foliation.	Similar to the above intervals. Medium to dark green chloritic slate. Rare pyritic bands parallel to bedding. The bedding is commonly less well defined than in the above intervals and is massive in parts. Rare, slightly cavernous quartz veins.
17.98	19.20	20° 45-50° foliation	Medium to dark green chloritic slate similar to the interval 11.90 to 17.98m, but bedding well defined. Rare pyritic bands (<2 mm) parallel to bedding. Poorly jointed. Foliation intersects bedding at about 70°.
19.20	22.28	25° 40° foliation.	Pale to medium green chloritic slate. Similar to previous intervals. The bedding is well defined and includes rare dark grey and argillaceous and carbonaceous bands (<10 mm). This unit is softer and more porous than the interval 17.98 to 19.20m. Foliation intersects bedding at 65°.
22.28	26.13	0° - 5° 65° foliation.	Medium to dark green chloritic slate containing rare, thin carbonaceous bands. Moderately well jointed, core fragmentary in parts. A prominent joint plane parallel to the bedding is faced with dark green chlorite.
26.13	30.48	50° - 55° foliation.	Similar to the interval 22.28 to 26.13m, but exhibits marked variations of dip. The unit contains many microfaults, some of which are filled with pyritic quartz veins.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
			Rare thin (≤ 1 mm) discontinuous carbonate veins often parallel to bedding. Few irregular and discontinuous quartz-pyrite veins and rare pyrite blebs. Few dragfolds. Few dark grey carbonaceous (?) bands. Rare, cavernous (after pyrite ?) quartz veins. Bedding is well defined.
30.48	32.51	50° foliation	Medium to dark green chloritic slate. Bedding poorly defined. Poorly jointed.
32.51	36.61		Medium green, chloritic and phyllitic slate with numerous lensoid pyrite blebs aligned parallel to the foliation. The original bedding is poorly defined and almost obliterated. The unit contains a few pyritic quartz-carbonate veins (≤ 3 mm) which are usually slightly to moderately cavernous. Rare, discontinuous carbonate veins (≤ 1 mm). Over the basal 60 cm, the pyrite blebs become less common and pyritic carbonate and quartz-carbonate veins (≤ 5 mm) become more common. The veins are generally irregular, discontinuous and have a variable thickness. They consist mainly of carbonate containing a minor core of quartz.
36.61	37.95		Finely foliated pale to medium green chloritic phyllite.
37.95	39.54	30°	
39.54	39.93	60-65° foliation.	Medium to dark green chloritic slate.
			Pale to medium green, chloritic and phyllitic slate containing a thick (8cm) slightly pyritic quartz-carbonate vein which, in turn, contains irregular, discontinuous and deformed chloritic slate stringers and fragments.
39.93	50.70	20° 60° foliation.	Medium to dark green chloritic slate containing a few, usually irregular and discontinuous, quartz-pyrite veins and pyrite blebs, which are commonly aligned parallel to the foliation. Two thick (≤ 2 cm) cavernous quartz-carbonate veins occur at about 41.73m. Rare, irregular, discontinuous and thin (≤ 1 mm) carbonate veins. The bedding is generally poorly defined and the basal 20 cm. has a soft and slightly plastic texture. The unit is phyllitic in parts and becomes somewhat fragmented towards base.
50.70	52.00		Dark green and black, slightly silicified, chloritic and carbonaceous slate and siltstone containing numerous quartz and quartz-carbonate veins, one of which is moderately to highly cavernous. The veins are slightly pyritic and commonly consist of a quartz core with a yellow-brown carbonate rim. The larger veins are 3 to 5 cm. thick. The smaller quartz veins (≤ 5 mm) commonly have diffuse boundaries. Rare, slickensided fault planes. Disseminated pyrite blebs and disrupted pyritic accumulations. Very rare traces ($< 0.1\%$) of chalcopyrite.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
52.00	52.91		Massive, mottled white and pale yellow-brown quartz-carbonate containing numerous fragments of black carbonaceous slate. Generally solid and compact but moderately to highly cavernous in some parts. Few graphitic partings and incipient fractures defined by irregular graphite films and stringers. Slightly pyritic in parts. Rare irregular blebs (≤ 3 mm) of chalcopyrite apparently associated with the cavernous zones.
52.91	55.64		Dark green and dark grey to black chloritic and carbonaceous phyllitic slate containing common disseminated pyrite and a few pyritic quartz-carbonate veins (≤ 15 mm) particularly about 54.13m. The quartz-carbonate veins are slightly cavernous in parts.
55.64	57.74		Massive, dark grey-green chloritic slate containing numerous pale brown anhedral porphyroblasts (< 1 mm). Relatively common pyritic quartz veins (≤ 5 mm), often irregular and deformed and containing minor amounts of carbonate (similar to porphyroblasts).
57.74	59.96		Medium to dark green chloritic and dark grey carbonaceous slate containing numerous brown carbonate (?) porphyroblasts (≤ 1 mm) particularly in the chloritic units. This unit is commonly finely laminated and the green chloritic and dark grey to black carbonaceous members appear to have originally been the base and top respectively to graded beds. Slight erosional features occur at the base of the graded beds.
59.96	62.34		Similar to the interval 55.64 to 57.74m, but contains several slightly chloritic and pyritic quartz-carbonate veins (≤ 5 cm), some of which are moderately to highly cavernous. The pyrite is euhedral (≤ 10 mm). Rare, slickensided fault planes. A few quartz veins (≤ 8 mm) occur and commonly contain minor concentration of red-brown carbonate.
62.34	64.77		Medium green chloritic slate containing numerous yellow-brown carbonate (?) porphyroblasts, irregular, short and discontinuous carbonate veins and very pale cream-green chloritic and talcose phyllite. Rare, cavernous quartz-carbonate veins (≤ 10 mm) occur parallel to the foliation which dips 50° . Numerous brown porphyroblasts (≤ 1 mm).
64.77	68.13		Medium green chloritic and slightly phyllitic and grey quartzose and coarser-grained siltstone, finely laminated in parts. The coarser grained bands probably represent the basal members of graded beds. The unit also contains a few bands of silicified medium to dark green chloritic slate and very pale green talcose and chloritic phyllite.

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
68.13	72.78	30°	Hard, medium to dark green, massive chloritic quartzite containing a few thick (≤ 4 cm) quartz veins containing minor amounts of yellow-brown carbonate and a number of smaller anastomosing quartz veins. The quartz veins commonly have diffuse boundaries. The unit contains a few softer zones of finer grained chloritic sediments and a few thin (≤ 2 cm) chloritic phyllite bands. Few slickensided fault planes. Rare disseminated pyrite. Rare, short, discontinuous carbonate veins and veinlets (≤ 1 mm). Indistinct bedding.
72.78	73.48		White quartz containing minor yellow-brown carbonate blebs and minor amounts of heavily silicified, faintly chloritic sediments. Many incipient fractures.
73.48	75.71		Grey and medium green, heavily silicified chloritic sediments and chloritic quartzite containing numerous white quartz veins with diffuse boundaries and a few quartz-carbonate veins (≤ 2 cm) and rare yellow-brown carbonate veins (≤ 10 mm). The carbonate bearing veins are often heavily cavernous.
75.71	78.40		Medium to dark green, massive chloritic slate, slightly silicified in parts and containing rare, slightly pyritic quartz-carbonate veins. Sporadic disseminated euhedral pyrite (≤ 1 mm). Few quartz and quartz-carbonate veins and veinlets (≤ 1 mm).
78.40	79.96		Medium grey siltstone and dark grey argillaceous and carbonaceous siltstone with irregular bedding which suggests preconsolidation slumping or deformation. Numerous brown (? carbonate) porphyroblasts (≤ 1 mm) and a few deformed dark yellow-brown carbonate veins (≤ 2 mm). Lensoid pyritic and chloritic quartzose blebs are common. Phyllitic in parts with graphitic foliation. The paler members are slightly chloritic.
79.96	85.41		Medium to dark grey-green chloritic and dark grey carbonaceous slate. The carbonaceous members tend to be finely laminated while the paler and coarser members are coarsely laminated and contain numerous pyrite blebs (≤ 2 mm). Yellow-brown porphyroblasts (≤ 1 mm) are common. Few slightly pyritic quartz-carbonate veins (≤ 5 mm, but usually ≤ 2 mm). Few phyllitic and graphitic partings occur parallel to the argillaceous and carbonaceous members. The original bedding is slightly irregular, similar to that of the interval 78.40 to 79.96m. Sporadic disseminated pyrite.
85.41	90.35		Medium to dark grey-green and grey, fine grained chloritic and carbonaceous slate containing numerous brown porphyroblasts (≤ 1 mm) and a few carbonate veins and veinlets. The original bedding is indistinct and slightly irregular giving the rock a massive appearance. Few pyritic, slightly cavernous and slightly chloritic quartz veins (≤ 5 mm).

INTERVAL IN METRES		DIP IN BEDDING	DESCRIPTION.
From	To		
90.35	92.80		Finely foliated, pale green and pitted chloritic phyllite, containing numerous, slightly cavernous and pyritic quartz veins containing minor traces (<0.5%) of chalcopyrite. Very rare blebs of chalcopyrite not apparently associated with quartz veins.
92.80	95.27		Medium to dark green, chloritic and slightly phyllitic slate containing common irregular and discontinuous pyritic quartz, carbonate and quartz-carbonate veins. Sporadic disseminated pyrite.
95.27	98.15		Medium to dark grey, slightly chloritic carbonaceous slate containing a few pyritic quartz and quartz-carbonate veins (≤ 2 mm) and sporadic disseminated pyrite. The veins are commonly irregular and discontinuous.
			<u>DDH.12 COMPLETED AT 98.15 METRES.</u>



LEGEND

-  Township
-  Road
-  Rough track, 4-wheel drive vehicles

AMG REFERENCE POINTS ADDED

5 cm

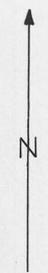
73-947 635241

AUSTRALIAN CONSOLIDATED INDUSTRIES

LOCATION MAP OF NORTHWEST TASMANIA

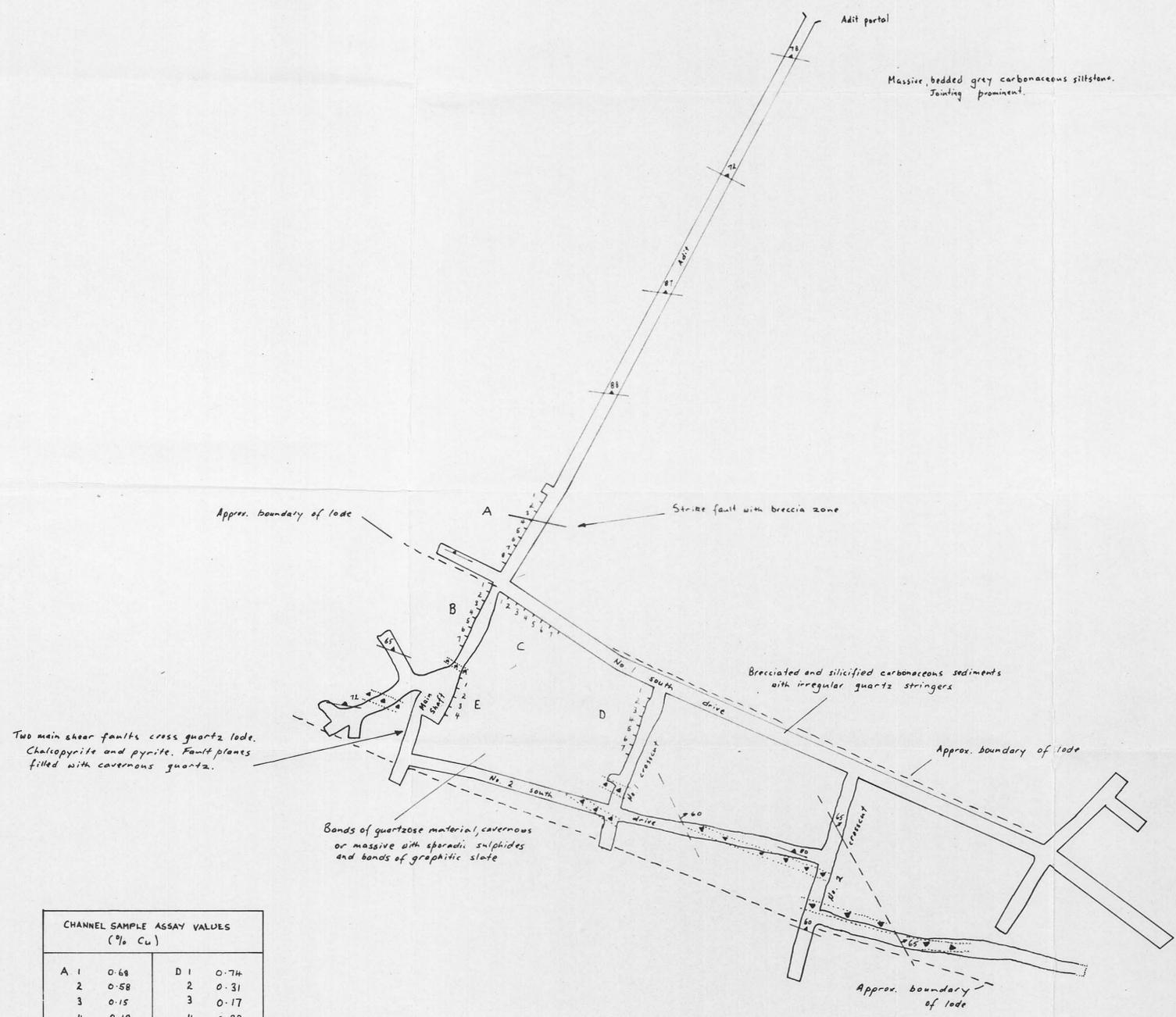
Scale 1 inch = 4 miles
1:250,000

Map 1



LEGEND

- E ¹/₂/₃/₄ Channel samples
- Quartz veins
- Strike & dip of bedding
- Probable fault
- Definite fault



CHANNEL SAMPLE ASSAY VALUES (% Cu)			
A 1	0.68	D 1	0.74
2	0.58	2	0.31
3	0.15	3	0.17
4	0.19	4	0.32
5	0.11	5	0.49
6	0.02	6	0.50
7	0.09	7	0.54
8	0.12	E 1	0.018
B 1	0.017	2	0.019
2	0.29	3	0.023
3	0.96	4	3.53
4	1.02		
5	0.11		
6	0.17		
7	0.23		
C 1	0.34		
2	0.073		
3	0.50		
4	0.52		
5	1.15		
6	0.21		
7	0.26		

AUSTRALIAN CONSOLIDATED INDUSTRIES

CLUMP PROSPECT

CLUMP MINE - UNDERGROUND WORKINGS 635242

Scale: 1 in. = 40 feet 5 cm

1:400

Map 2 2012 M.M. 8/7



Legend

- DDH 1 Diamond drill site
- Dip & strike
- ▭ Quartz or siliceous material exposed in costean
- △ Trig station

AUSTRALIAN CONSOLIDATED INDUSTRIES

CLUMP PROSPECT

Plan showing geology and location of drillholes and costeans

Scale: 1 inch = 100 feet 635213

1:1200

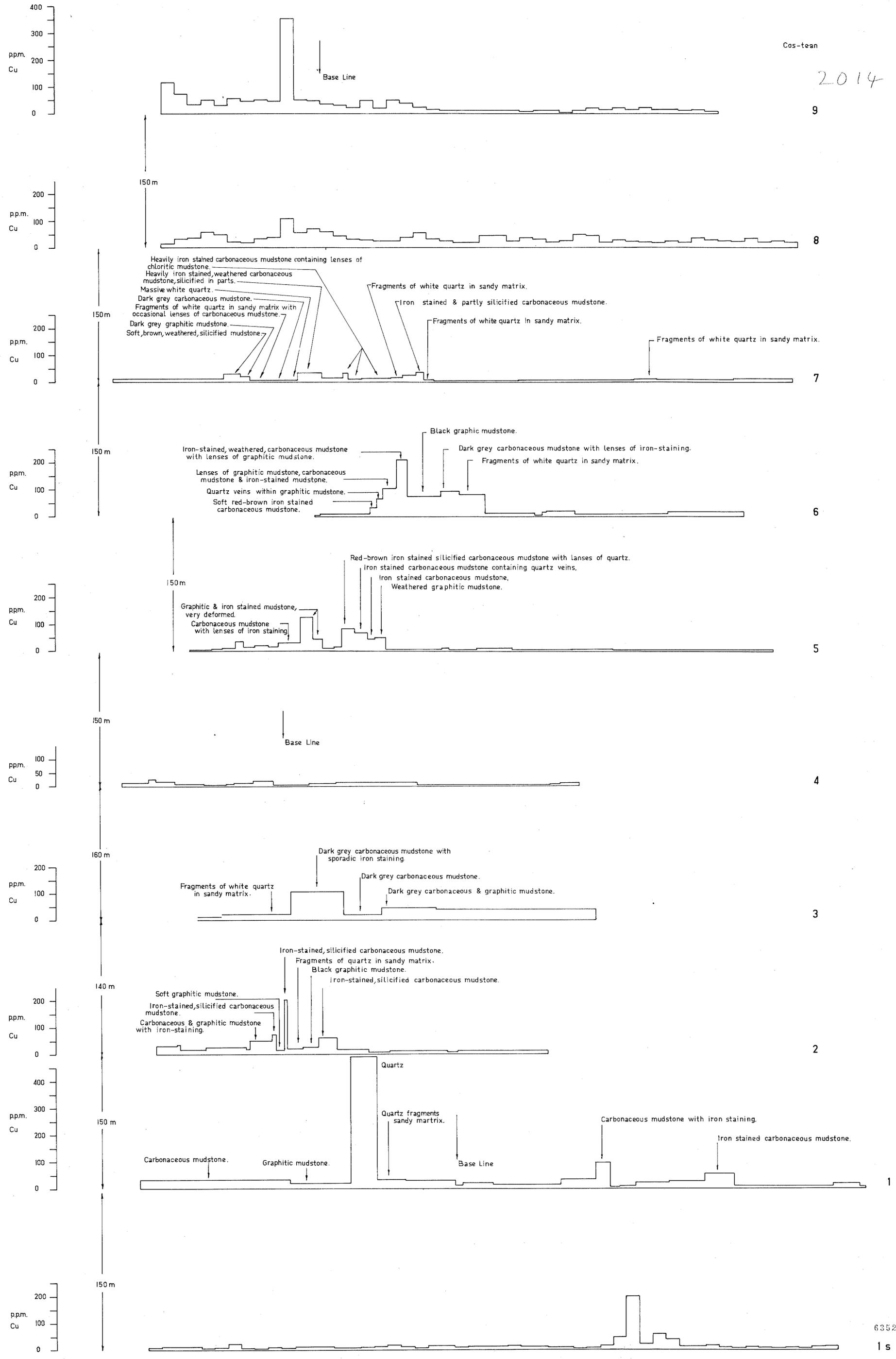
2013

Map 3

2013

Map 3

2014

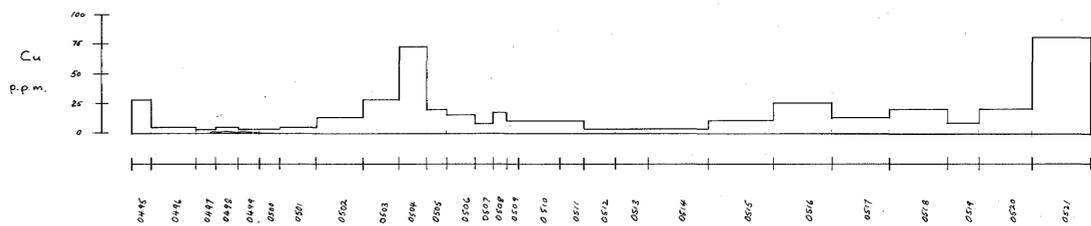


73-947 CLUMP PROSPECT
Cos-tean geochemistry

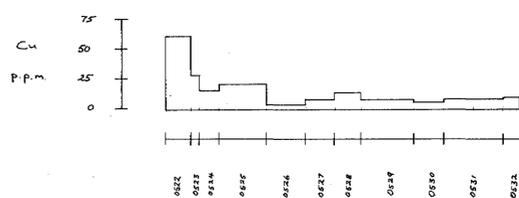
PLAN 4

5cm

Scale: 1cm = 2.5m

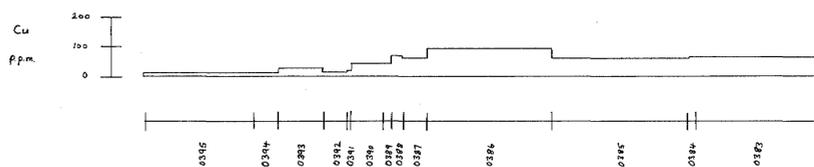


Costean 7
82.5 m



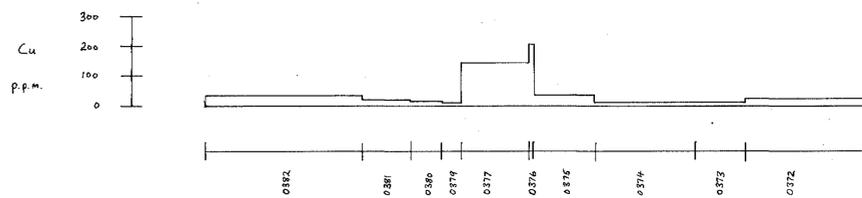
Costean 6

34.0 m



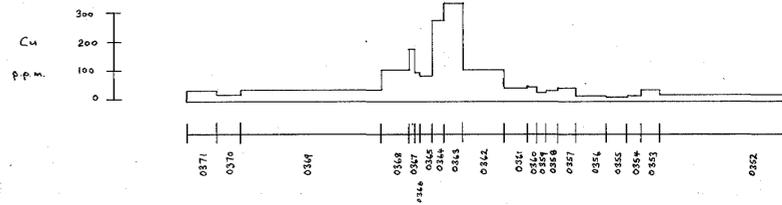
Costean 3

31.2 metres

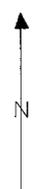


Costean 2

47.5 metres



Costean 1



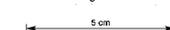
635245 73-947

AUSTRALIAN CONSOLIDATED INDUSTRIES

GULLY PROSPECT

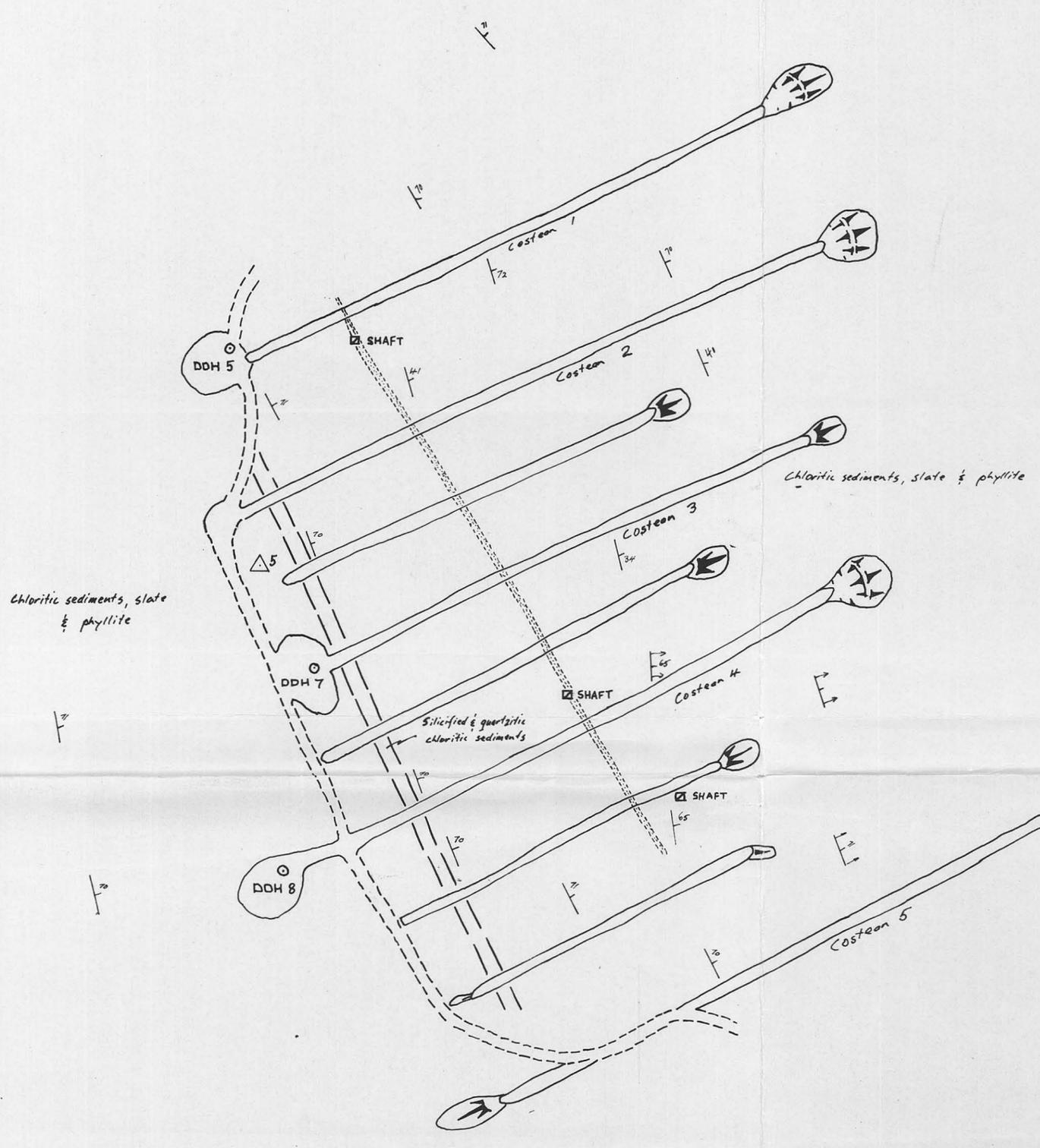
Costean geochemistry

Scale: 1 cm = 2.5 m.
(along costean) 1 : 250



2015

Map 5



LEGEND

- Dip and strike of bedding showing direction of younging
- Lithological boundaries
- Mineralized quartz lode
- Road
- Trig station

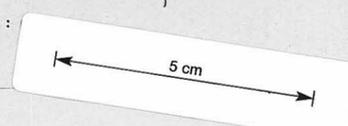
635246 73-947

AUSTRALIAN CONSOLIDATED INDUSTRIES

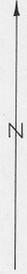
BLOCKS PROSPECT

Geological plan showing location of diamond drillholes and costeans

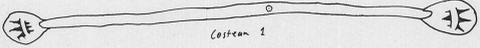
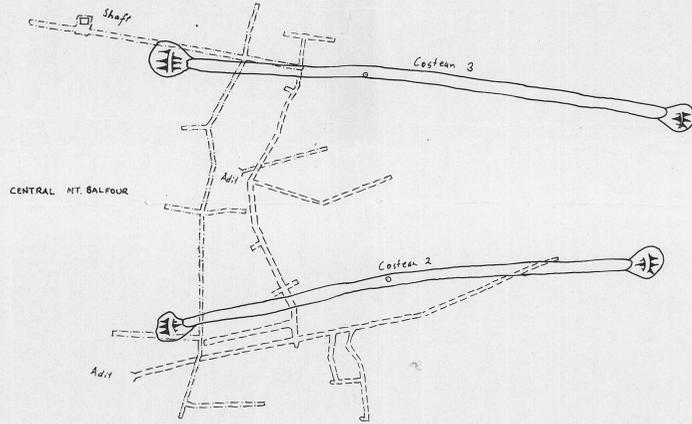
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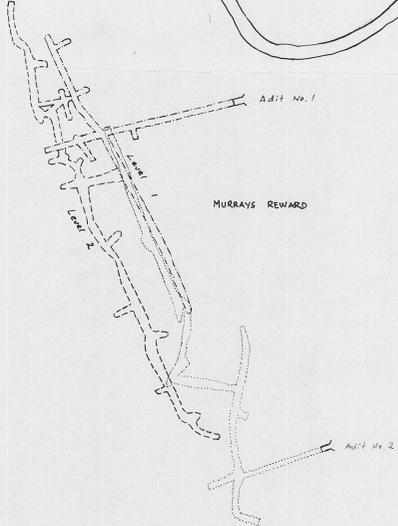
2016
M.H.M. 9/71



BALFOUR



Adit No. 5



LEGEND

-  Underground workings
-  Road

635247 73-947

AUSTRALIAN CONSOLIDATED INDUSTRIES

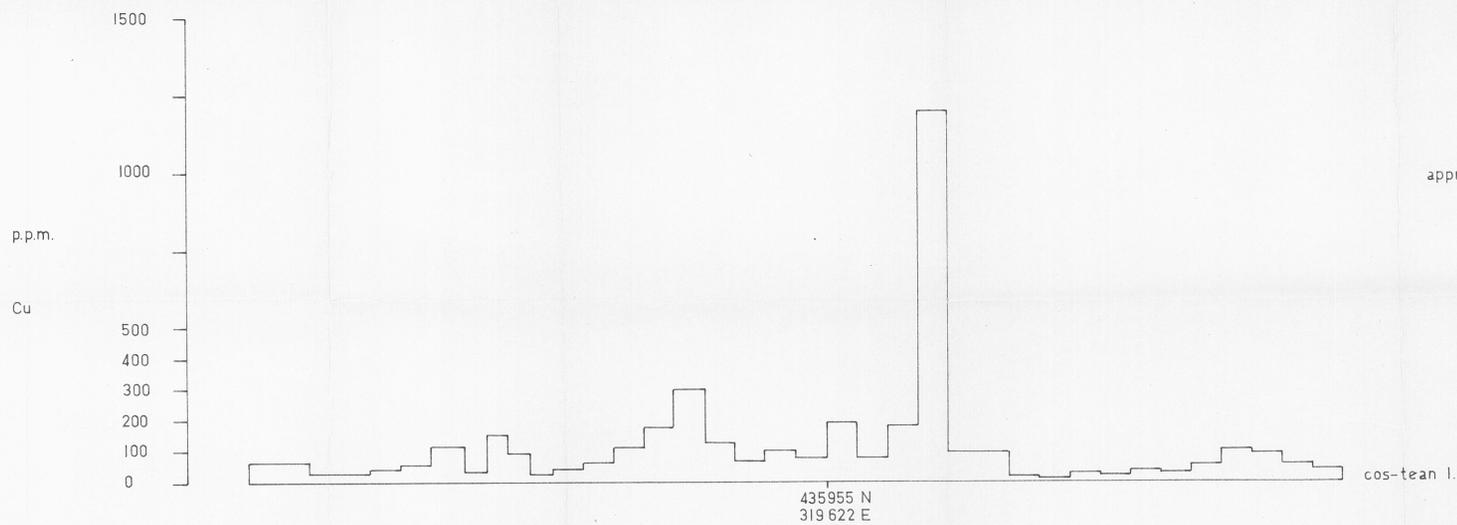
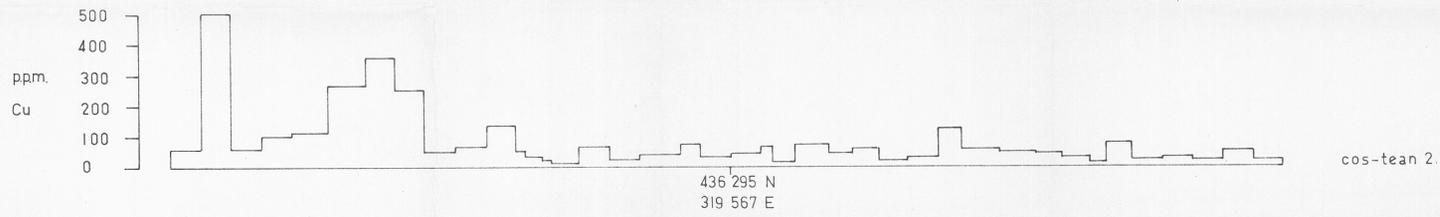
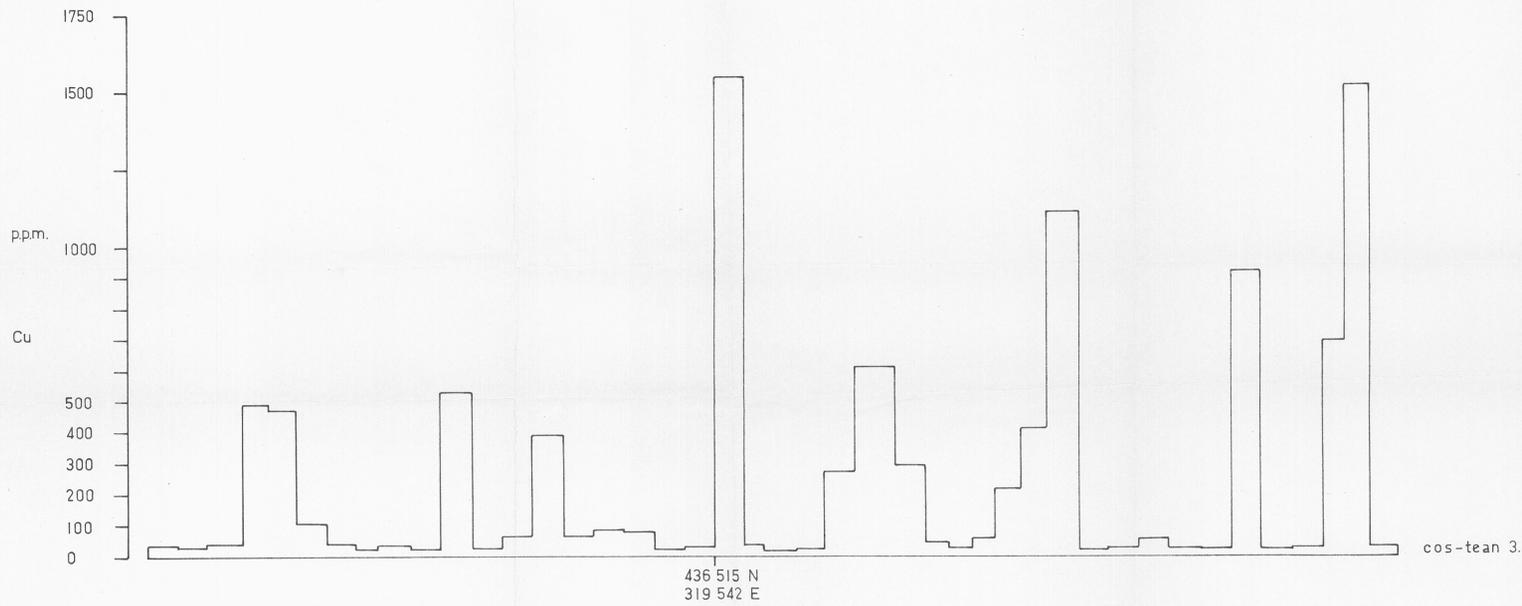
MURRAYS REWARD PROSPECT

Plan showing location of drillhole, costeans and underground workings

Scale 1 cm = 10 m.
1: 1000



Map 7



approx. 67 metres

approx. 105 metres



CENTRAL PROSPECT

Histograms showing copper distribution

Scale: 1cm = 2.5m



PLAN 8

73-947

M.H.M 7/71

2018

635248

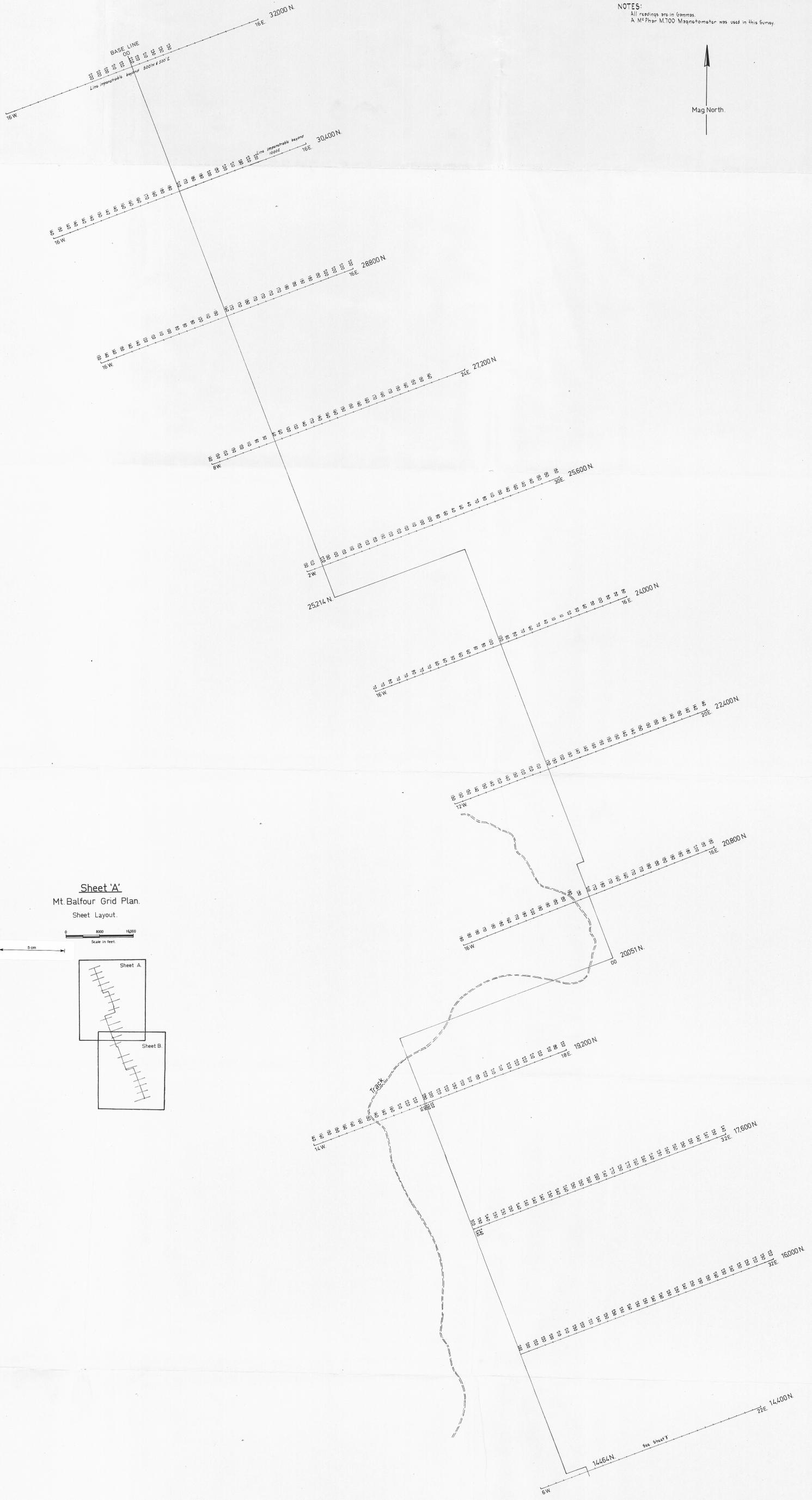
AUSTRALIAN CONSOLIDATED INDUSTRIES LIMITED**MINERAL RESOURCES DIVISION****MINIERAL EXPLORATION IN E.L. 16/68****BALFOUR, NORTH-WEST TASMANIA****1970 - 1971****By****M.H. McINTYRE****August, 1971****CONTENTS:**

- Sheet 'A' Magnetometer Orientation Survey. Mt Balfour Grid - Sheet A
- Sheet 'B' Magnetometer Orientation Survey. Mt Balfour Grid - Sheet B
- Plan 1. Mt Balfour. - The Block Grid. Induced Polarization and Resistivity Survey
- Plan 2. Mt Balfour - The Clump Grid. Induced Polarization and Resistivity Survey
- Plan 3. Mt Balfour - Murray Reward Grid. Induced Polarization and Resistivity Survey

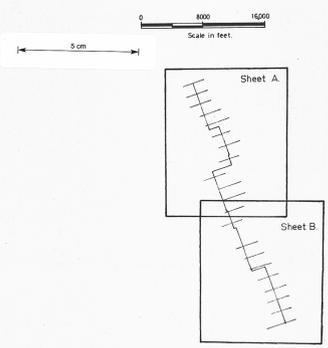
73-0947**Volume 3/3**

AUSTRALIAN CONSOLIDATED INDUSTRIES Ltd.
 Magnetometer Orientation Survey
 Mt Balfour Grid Tas. SHEET 'A'
 EXPLOREX Pty Ltd.
 Date of Survey: March 1971 Scale: 1" = 400' Draughtsmen: REB & A.J.G.

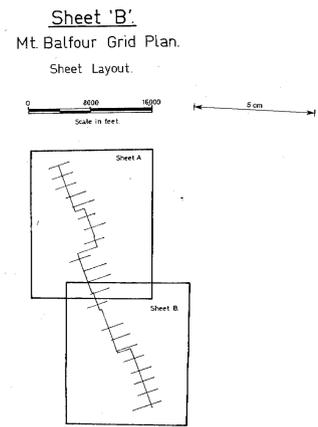
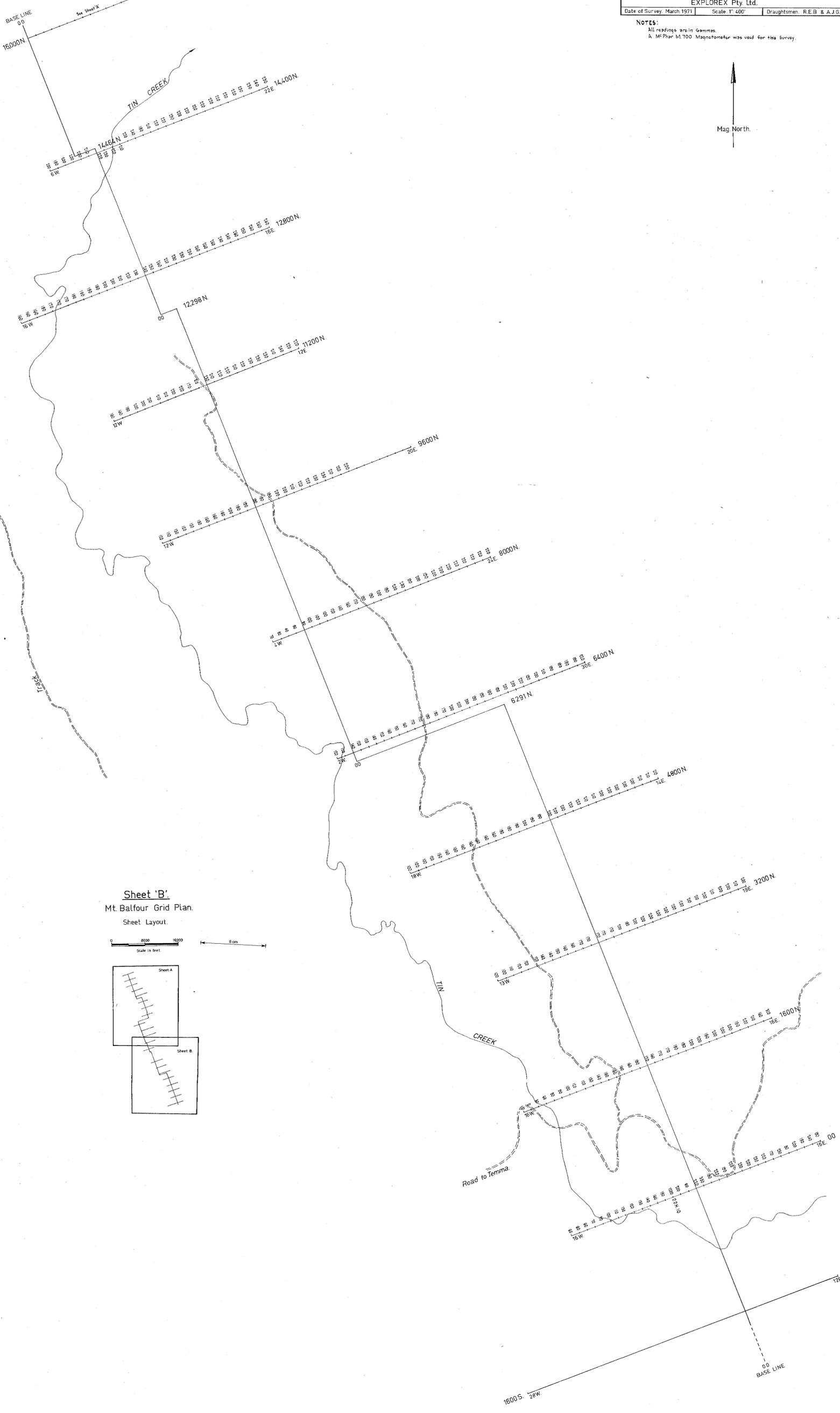
NOTES:
 All readings are in Gauss.
 A M. Phair M100 Magnetometer was used in this Survey.



Sheet 'A'
 Mt Balfour Grid Plan.
 Sheet Layout.

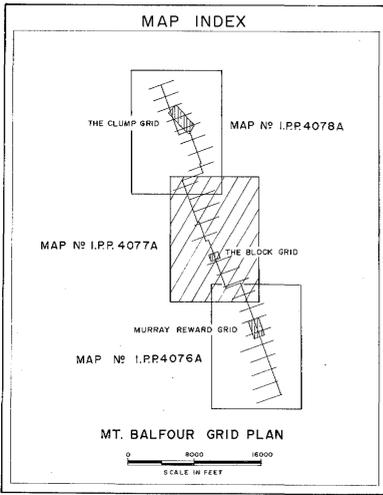
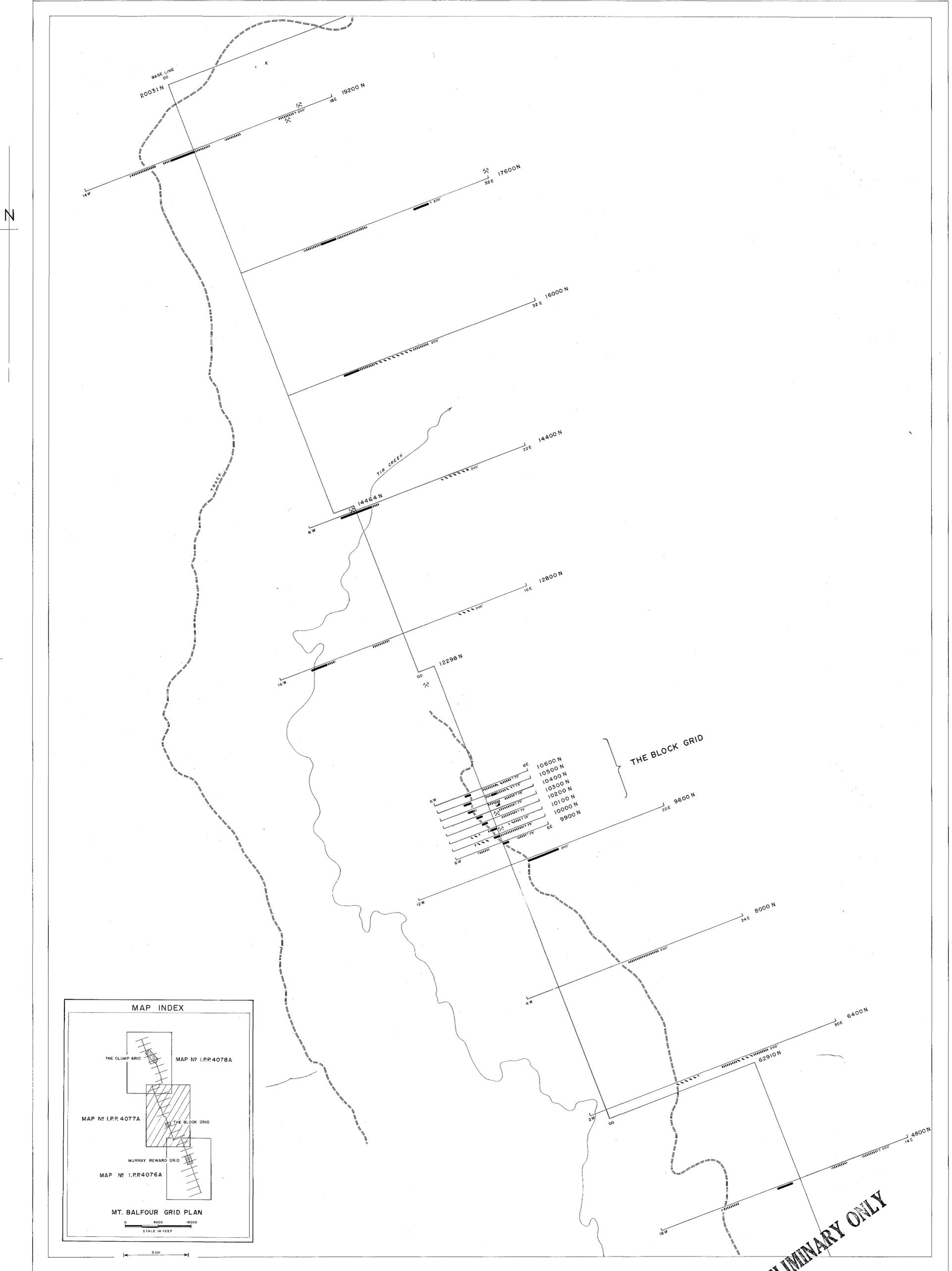


NOTES:
 All readings are in Gammas.
 A MP39-M700 Magnetometer was used for this survey.



McPHAR GEOPHYSICS PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY



SURFACE PROJECTION OF ANOMALOUS ZONES
 DEFINITE
 PROBABLE
 POSSIBLE
 NUMBERS AT THE END OF ANOMALY INDICATES SPREAD USED

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

MT. BALFOUR GRID TAS.

SCALE: 1 INCH = 400 FEET



PRELIMINARY ONLY

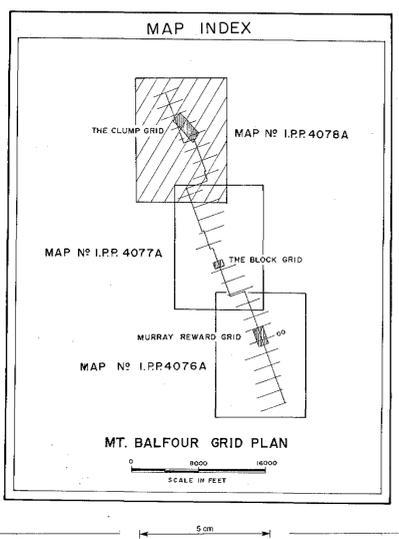
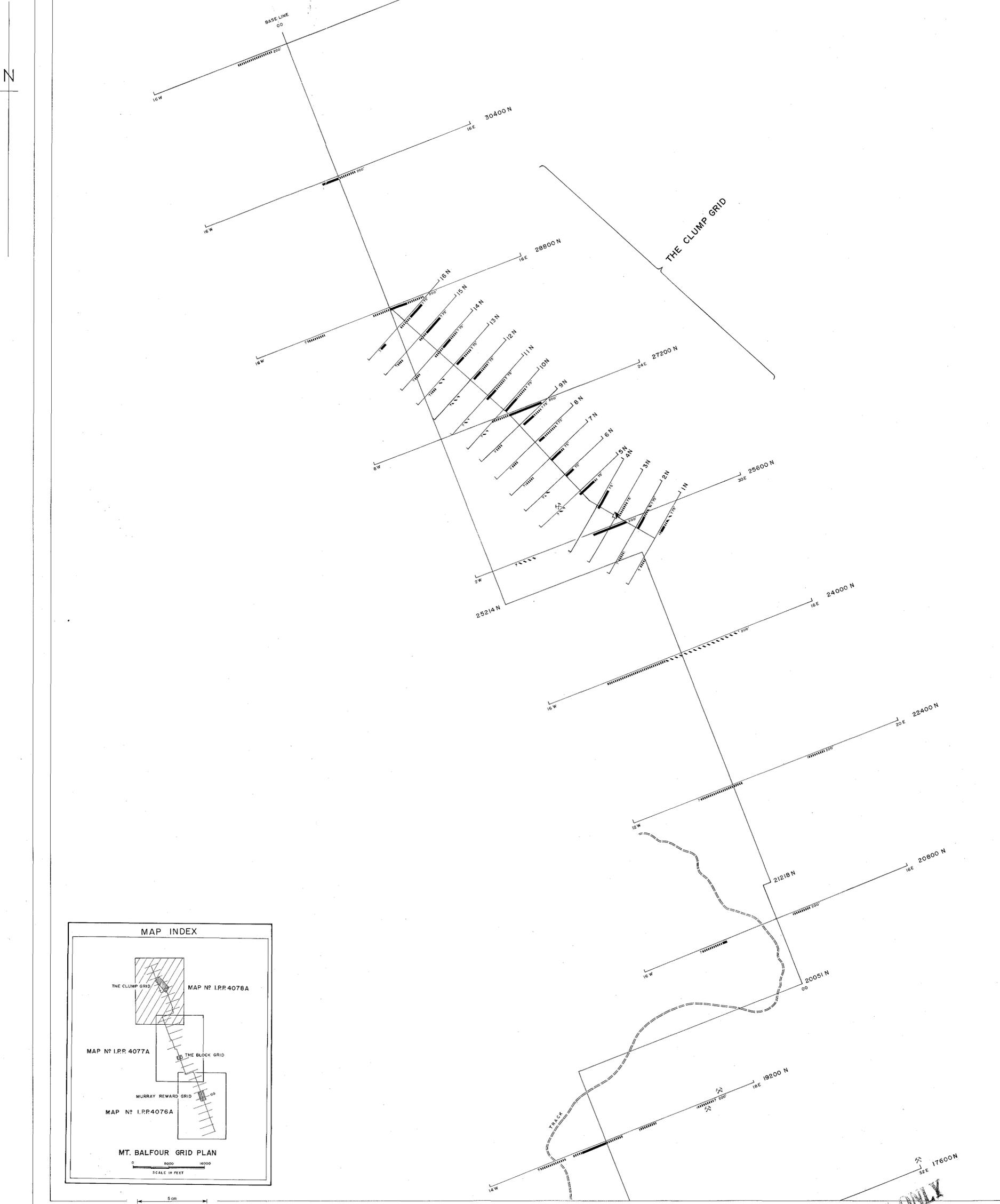
DRAWN: R.G.Z.
 DATE: 11-8-70
 APPROVED:

DATE:

PLAN 1. 635252

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MT. BALFOUR GRID TAS

SCALE: 1 INCH = 400 FEET

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DATE: 11-8-70
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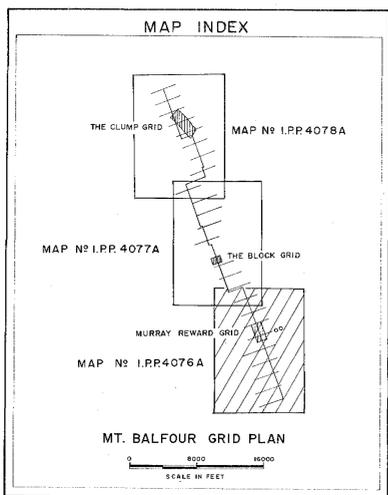
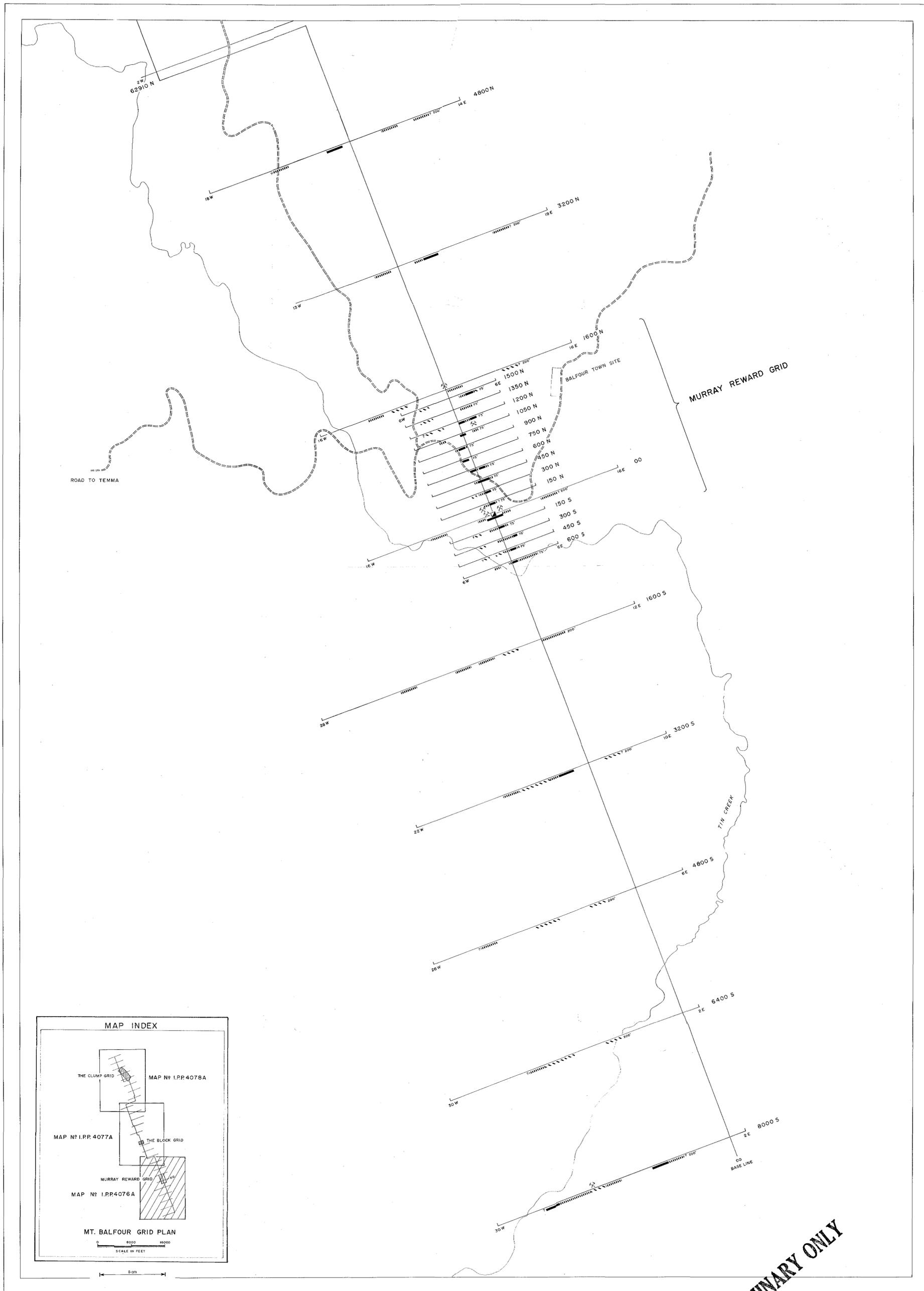
DATE:

SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE
NUMBER AT THE END OF ANOMALY
INDICATES SPREAD USED.

635253
PLAN 2

McPHAR GEOPHYSICS PTY. LTD.

INDUCED POLARIZATION AND RESISTIVITY SURVEY



SURFACE PROJECTION
OF ANOMALOUS ZONES
DEFINITE
PROBABLE
POSSIBLE
NUMBER AT THE END OF ANOMALY
INDICATES SPREAD USED

AUSTRALIAN CONSOLIDATED INDUSTRIES LTD.

MT. BALFOUR GRID TAS.

SCALE: 1 INCH = 400 FEET

PRELIMINARY ONLY

DRAWN: R.G.Z.
DATE: 11-8-70
APPROVED:

DATE:

LAN 3a

635254

DWG: I.P.P. 4076 A